

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1233	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1787.00				Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling: Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	12/18/2012 - 12/21/2012
Survey Method:	GPS				SWL measured by:		Drilled By:	Hetager Drilling
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)				
Upper Freeport	390.6	1396.4				
Upper Kittanning	469.3	1317.7				
Middle Kittanning	486.0	1301.0				
Lower Kittanning	555.4	1231.6				
					Logged By:	Don Bergreen Jr.
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	293504.87
					Easting:	1520367.48
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
10.0	10.0	##### ##### ##### ##### ##### ##### ##### ##### #####	10	Sandy Clay, brown			
14.0	4.0	=====		Shale, brown, weathered			
31.0	17.0	=====	20	Shale, black			
33.0	2.0	□□□□□□□□	30	Limestone, black with fossils (Ames LS)			
40.5	7.5	=====	40	Shale, black			
41.0	0.5	■		Ames Coal			
48.0	7.0	##### ##### ##### ##### ##### ##### #####		Claystone, gray, limy			
		.....	50	Sandstone, gray			
		.....	60				
		.....	70				
		.....	80				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1233	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion	
Surface Elev.	1787.00					Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling: Continuous Core
Surveyed by:	LCT	ND					Date Drilled:	12/18/2012 - 12/21/2012
Survey Method:	GPS						SWL measured by:	
Coal Seam ID		Bottom Depth (ft)	Bottom Elevation (MSL)					
Upper Freeport		390.6	1396.4					
Upper Kittanning		469.3	1317.7					
Middle Kittanning		486.0	1301.0					
Lower Kittanning		555.4	1231.6					
							Logged By: Don Bergreen Jr.	
							Municipality: Donegal	
							County, State: Westmoreland, PA	
							Quadrangle: Stahlstown, PA	
							Laboratory: Geochemical	
							Northing: 293504.87	
							Easting: 1520367.48	
							Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
85.0	37.0	[Graphic Log: Dotted lines]		Sandstone, gray			
109.0	24.0	[Graphic Log: Dashed lines]	90 100	Siltstone, gray and red			
123.0	14.0	[Graphic Log: Dash-dot lines]	110 120	Sandy Shale, gray			
145.0	22.0	[Graphic Log: Solid lines]	130 140	Shale, black (LB Horizon)			
		[Graphic Log: Solid lines]	150 160	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No. DH-1233
 Surface Elev. 1787.00
 Surveyed by: LCT
 Survey Method: GPS

Measured Static Water Levels

Date Measured ND
 Depth (ft) _____
 Elevation (MSL) _____
 Notes _____
 SWL measured by: _____

Operation Name : Rustic Ridge #1 Mine-Expansion
 Method Drilling: Continuous Core
 Date Drilled: 12/18/2012 - 12/21/2012
 Drilled By: Hetager Drilling
 Logged By: Don Bergreen Jr.
 Municipality: Donegal
 County, State: Westmoreland, PA
 Quadrangle: Stahlstown, PA
 Laboratory: Geochemical
 Northing: 293504.87
 Easting: 1520367.48
 Grid Coordinates: _____

Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)
Upper Freeport	390.6	1396.4
Upper Kittanning	469.3	1317.7
Middle Kittanning	486.0	1301.0
Lower Kittanning	555.4	1231.6

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
162.4	17.4	=====		Shale, gray			
180.9	18.5	=====	170	Siltstone, red			
196.0	15.1	=====	180	Shale, gray			
200.8	4.8	=====	190	Siltstone, red			
201.3	0.5	|||||	200	Limestone, gray with fossils (Cambridge LS)			
210.5	9.2	=====	210	Siltstone, black and gray			
		=====	220	Sandy Shale, gray			
		=====	230				
		=====	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1233	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion	
Surface Elev.	1787.00					Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling: Continuous Core
Surveyed by:	LCT						Date Drilled:	12/18/2012 - 12/21/2012
Survey Method:	GPS						Drilled By:	Hetager Drilling
							Logged By:	Don Bergreen Jr.
							Municipality:	Donegal
							County, State:	Westmoreland, PA
							Quadrangle:	Stahlstown, PA
							Laboratory:	Geochemical
							Northing:	293504.87
							Easting:	1520367.48
							Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Coal Seam ID								
Upper Freeport		390.6	1396.4					
Upper Kittanning		469.3	1317.7					
Middle Kittanning		486.0	1301.0					
Lower Kittanning		555.4	1231.6					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
250.8	40.3		250	Sandy Shale, gray			
253.0	2.2			Limestone, black with fossils (Brush Creek LS)			
286.4	33.4		270	Shale, black			
			290				
			300				
			310				
			320				

7.1A GEOLOGIC DRILL LOG

Hole No. <u>DH-1233</u>	Measured Static Water Levels	Operation Name : Rustic Ridge #1 Mine-Expansion
Surface Elev. <u>1787.00</u>		Method Drilling: Continuous Core
Surveyed by: <u>LCT</u>		Date Drilled: 12/18/2012 - 12/21/2012
Survey Method: <u>GPS</u>		Drilled By: Hetager Drilling
	Date Measured <u>ND</u>	Logged By: Don Bergreen Jr.
	Depth (ft)	Municipality: Donegal
	Elevation (MSL)	County, State: Westmoreland, PA
	Notes	Quadrangle: Stahlstown, PA
	SWL measured by: _____	Laboratory: Geochemical
		Northing: 293504.87
		Easting: 1520367.48
		Grid Coordinates: _____
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)
Upper Freeport	390.6	1396.4
Upper Kittanning	469.3	1317.7
Middle Kittanning	486.0	1301.0
Lower Kittanning	555.4	1231.6

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
354.0	67.6	=====	330	Sandy Shale, gray			
		=====	340				
		=====	350				
388.0	34.0	=====	360	Sandstone, gray			
		=====	370				
		=====	380				
390.1	2.1	=====	390	Shale, black			
390.6	0.5	=====		Upper Freeport Coal			
		#####		Claystone, gray			
		#####					
		#####					
		#####					
		#####					
		#####	400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1233	Measured Static Water Levels			
Surface Elev.	1787.00				
Surveyed by:	LCT	Date Measured	Depth (ft)	Elevation (MSL)	Notes
Survey Method:	GPS	ND			
Coal Seam ID		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by: _____	
Upper Freeport		390.6	1396.4		
Upper Kittanning		469.3	1317.7		
Middle Kittanning		486.0	1301.0		
Lower Kittanning		555.4	1231.6		

Operation Name :	Rustic Ridge #1 Mine-Expansion
Method Drilling:	Continuous Core
Date Drilled:	12/18/2012 - 12/21/2012
Drilled By:	Hetager Drilling
Logged By:	Don Bergreen Jr.
Municipality:	Donegal
County, State:	Westmoreland, PA
Quadrangle:	Stahlstown, PA
Laboratory:	Geochemical
Northing:	293504.87
Easting:	1520367.48
Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
485.5	16.2	=====		Shale, black			
486.0	0.5	=====		Middle Kittanning Coal			
		#####	490	Claystone, gray			
		#####					
		#####					
		#####					
		#####	500				
		#####					
		#####					
		#####					
		#####	510				
		#####					
517.0	31.0	#####		Shale, dark gray			
		=====	520				
		=====					
		=====					
		=====					
		=====	530				
		=====					
		=====					
		=====	540				
		=====					
550.8	33.8	=====	550	Lower Kittanning Coal			
555.4	4.6	=====					
		+=====		Siltstone, gray			
		+=====	560				

7.1A GEOLOGIC DRILL LOG

Hole No. <u>DH-1233</u>	Measured Static Water Levels			Operation Name : Rustic Ridge #1 Mine-Expansion
Surface Elev. <u>1787.00</u>	Date Measured <u>ND</u>	Depth (ft)	Elevation (MSL)	Method Drilling: Continuous Core
Surveyed by: <u>LCT</u>	Notes			Date Drilled: 12/18/2012 - 12/21/2012
Survey				Drilled By: Hetager Drilling
Method: <u>GPS</u>				Logged By: Don Bergreen Jr.
				Municipality: Donegal
				County, State: Westmoreland, PA
				Quadrangle: Stahlstown, PA
				Laboratory: Geochemical
				Northing: 293504.87
				Easting: 1520367.48
				Grid Coordinates:

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
569.0	13.6	=====		Siltstone, gray			
			570	Bottom of Hole DH 1233 Depth 569 feet			
			580				
			590				
			600				
			610				
			620				
			630				
			640				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1320	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1734.70	Date	Depth	Elevation	Method Drilling:	Continuous Core
Surveyed by:	LCT	Measured	(ft)	(MSL)	Date Drilled:	8/26/2013-8/28/2013
Survey Method:	GPS	ND			Drilled By:	Sano Drilling
		SWL measured by:			Logged By:	W. Gomolka
		Bottom Depth	Bottom Elevation		Municipality:	Donegal
		(ft)	(MSL)		County, State:	Westmoreland, PA
Coal Seam ID					Quadrangle:	Stahlstown, PA
Mahoning	114.9	1619.8			Laboratory:	Geochemical
Upper Freeport	162.9	1571.8			Northing:	288406.8
Middle Kittanning	295.2	1439.5			Easting:	1508738.5
Lower Kittanning	371.7	1363.0			Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
113.0	42.4		90 100 110	Shale, gray with sandstone streaks			
114.9	1.9			Mahoning Coal			
116.9	2.0			Shale, gray, limey			
121.3	4.4		120 140 150	Clayshale, gray			
160.2	38.9		130 140 150 160	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1320	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1734.70				Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	8/26/2013-8/28/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
					Logged By:	W. Gomolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288406.8
					Easting:	1508738.5
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
161.2	1.0	=====		Shale, dark gray			
162.9	1.7	=====		Upper Freeport Coal			
167.0	4.1	=====		Clayshale, gray			
171.0	4.0	=====	170	Shale, gray			
172.0	1.0	=====		Sandstone, gray			
185.0	13.0	=====	180	Shale, gray			
189.0	4.0	#####	190	Claystone, gray			
207.5	18.5	=====	200	Shale, gray			
		=====	210				
		=====	220				
		=====	230				
		=====	240	Shale, dark gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1320	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1734.70	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	8/26/2013-8/28/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
					Logged By:	W. Gornolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288406.8
					Easting:	1508738.5
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
246.0	38.5	=====		Shale, dark gray			
257.0	11.0	.....	250	Sandstone, gray			
265.2	8.2	.....	260	Sandstone, gray with shale			
293.2	28.0	=====	270	Shale, dark gray			
		=====	280				
		=====	290				
295.2	2.0	■		Middle Kittanning Coal			
304.2	9.0	=====	300	Shale, gray			
309.0	4.8	□□□□□□□□		Limestone, dark gray (Middle Kittanning LS)			
315.4	6.4	=====	310	Shale, gray			
315.8	0.4	=====			Shale, dark gray		
		=====	320	Clayshale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No. DH-1320	Measured Static Water Levels			Operation Name : Rustic Ridge #1 Mine-Expansion
Surface Elev. 1734.70	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling: Continuous Core
Surveyed by: LCT	ND			Date Drilled: 8/26/2013-8/28/2013
Survey Method: GPS				Drilled By: Sano Drilling
	SWL measured by:			Logged By: W. Gomolka
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)		Municipality: Donegal
Mahoning	114.9	1619.8		County, State: Westmoreland, PA
Upper Freeport	162.9	1571.8		Quadrangle: Stahlstown, PA
Middle Kittanning	295.2	1439.5		Laboratory: Geochemical
Lower Kittanning	371.7	1363.0		Northing: 288406.8
				Easting: 1508738.5
				Grid Coordinates:

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
322.0	6.2	=====		Clayshale, gray			
323.0	1.0	=====		Shale, dark gray			
		=====					
		=====					
		=====	330				
		=====		Shale, gray			
		=====					
		=====					
		=====	340				
340.2	17.2	=====					
		=====					
		=====					
		=====	350				
		=====		Sandstone, gray with shale, streaks			
		=====					
		=====	360				
		=====					
		=====					
365.7	25.5	=====					
366.7	1.0	=====		Shale, dark gray			
		=====					
		=====	370				
371.7	5.0	=====		Lower Kittanning Coal			
372.7	1.0	=====		Shale, dark gray			
		=====					
		=====		Shale, gray, limey			
		=====	380				
382.0	9.3	=====					
		=====		Shale, gray			
		=====					
		=====	390				
390.0	8.0	=====					
		=====		Shale, dark gray			
		=====					
395.2	5.2	=====					
		=====		Bottom of Hole DH 1320 Depth 395.2 feet			
		=====	400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1321	Measured Static Water Levels			
Surface Elev.	1739.00				
Surveyed by:	LCT	Date Measured	Depth (ft)	Elevation (MSL)	Notes
Method:	GPS	ND			
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal	51.2	1687.8	Lower Kittanning	355.2	1383.8
Mahoning	103.2	1635.8			
Upper Freeport	154.5	1584.5			
Middle Kittanning	294.9	1444.1			

Operation Name :	Rustic Ridge #1 Mine-Expansion
Method Drilling:	Continuous Core
Date Drilled:	8/29/2013-9/3/2013
Drilled By:	Sano Drilling
Logged By:	W. Gomolka
Municipality:	Donegal
County, State:	Westmoreland, PA
Quadrangle:	Stahlstown, PA
Laboratory:	Geochemical
Northing:	287637.8
Easting:	1507860.5
Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
20.2	20.2	##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### #####	10 20	Silty Clay, brown			
50.2	30.0	##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### #####	30 40 50	Shale, dark gray			
51.2	1.0	#####		Coal			
52.0	0.8	#####		Shale, dark gray			
52.3	0.3	#####		Limestone, gray with fossils (Brush Creek LS)			
59.2	6.9	##### ##### ##### ##### ##### ##### ##### ##### ##### #####	60	Shale, gray, limey			
75.2	16.0	##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### ##### #####	70	Shale, gray			
79.2	4.0	#####	80	Shale, dark gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1321	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1739.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	8/29/2013-9/3/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
					Logged By:	W. Gornolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	287637.8
					Easting:	1507860.5
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Coal	51.2	1687.8	Lower Kittanning	355.2	1383.80	
Mahoning	103.2	1635.8				
Upper Freeport	154.5	1584.5				
Middle Kittanning	294.9	1444.1				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
86.0	6.8	.....		Sandstone, gray			
96.0	10.0	=====	90	Shale, gray			
101.2	5.2	=====	100	Shale, dark gray			
103.2	2.0	██████████		Mahoning Coal			
104.5	1.3	#####		Claystone, gray			
105.4	0.9	.....		Sandstone, gray			
147.0	41.6	=====	110	Shale, gray			
		=====	120				
		=====	130				
		=====	140				
152.8	5.8	=====	150	Shale, dark gray			
154.5	1.7	██████████		Upper Freeport Coal			
158.5	4.0	=====		Shale, gray, limy			
		=====	160	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No. <u>DH-1321</u>	Measured Static Water Levels				Operation Name : Rustic Ridge #1 Mine-Expansion
Surface Elev. <u>1739.00</u>	Date	Depth	Elevation	Notes	Method Drilling: Continuous Core
Surveyed by: <u>LCT</u>	Measured	(ft)	(MSL)		Date Drilled: 8/29/2013-9/3/2013
Survey Method: <u>GPS</u>	ND				Drilled By: Sano Drilling
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		Logged By: W. Gomolka
Coal	51.2	1687.8	Lower Kittanning	355.2 1383.80	Municipality: Donegal
Mahoning	103.2	1635.8			County, State: Westmoreland, PA
Upper Freeport	154.5	1584.5			Quadrangle: Stahlstown, PA
Middle Kittanning	294.9	1444.1			Laboratory: Geochemical
					Northing: 287637.8
					Easting: 1507860.5
					Grid Coordinates:

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		=====					
		=====					
		=====					
		=====					
		=====					
		=====	170				
		=====					
		=====					
		=====					
		=====					
		=====	180				
		=====					
		=====					
		=====					
		=====					
		=====	190				
		=====					
		=====					
		=====					
		=====					
		=====					
		=====	200	Shale, gray			
		=====					
		=====					
		=====					
		=====					
		=====	210				
		=====					
		=====					
		=====					
		=====					
		=====					
		=====	220				
		=====					
		=====					
		=====					
		=====					
		=====					
		=====	230				
		=====					
		=====					
		=====					
		=====					
		=====					
		=====	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1321	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1739.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	8/29/2013-9/3/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
					Logged By:	W. Gornolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	287637.8
					Easting:	1507860.5
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal	51.2	1687.8	Lower Kittanning	355.2	1383.80	
Mahoning	103.2	1635.8				
Upper Freeport	154.5	1584.5				
Middle Kittanning	294.9	1444.1				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
249.0	90.5	=====		Shale, gray			
260.0	11.0	.....	250	Sandstone, gray with coal streaks			
263.0	3.0	=====	260	Shale, gray			
292.7	29.7	=====	270	Shale, dark gray			
293.5	0.8	.....	280				
294.9	1.4	=====	290	Sandstone, gray			
295.5	0.6	.....		Middle Kittanning Coal			
297.0	1.5	=====		Shale, dark gray			
305.0	8.0	OOOOOOOO	300	Limestone, gray (Middle Kittanning LS)			
309.0	4.0	=====		Shale, gray			
310.0	1.0	=====	310	Shale, dark gray			
311.5	1.5	=====		Shale, gray			
312.1	0.6	=====		Shale, dark gray			
		=====	320	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1321	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1739.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	8/29/2013-9/3/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
					Logged By:	W. Gomolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	287637.8
					Easting:	1507860.5
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal	51.2	1687.8	Lower Kittanning	355.2	1383.80	
Mahoning	103.2	1635.8				
Upper Freeport	154.5	1584.5				
Middle Kittanning	294.9	1444.1				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
335.2	23.1	=====	330	Shale, gray			
351.8	16.6	.....	340	Sandstone, gray with shale streaks			
355.2	3.4	■	350	Lower Kittanning Coal			
357.2	2.0	=====		Shale, dark gray			
365.2	8.0	=====	360	Clayshale, gray with shale			
370.2	5.0	=====	370	Shale, gray			
				Bottom of Hole DH 1321 Depth 370.2 feet			
			380				
			390				
			400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1322	Measured Static Water Levels				Operation Name :		Rustic Ridge #1 Mine-Expansion
Surface Elev.	1835.30					Date Measured		ND	Method Drilling:	Continuous Core
Surveyed by:	LCT	Depth (ft)	Elevation (MSL)	Notes	Date Drilled:	9/4/2013-9/9/2013		
Survey Method:	GPS	SWL measured by:				Drilled By:	Sano Drilling	
		Bottom Depth (ft)	Bottom Elevation (MSL)		Logged By:	W. Gornolka		
Coal Seam ID					Municipality:	Donegal		
Lower Bakerstown	89.7	1745.6	Lower Kittanning	494.0	1341.3	County, State:	Westmoreland, PA	
Mahoning Coal	260.4	1574.9				Quadrangle:	Stahlstown, PA	
Upper Freeport	302.7	1532.6				Laboratory:	Geochemical	
Middle Kittanning	429.2	1406.1				Northing:	288693.1	
						Easting:	1510360.8	
						Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
84.0	33.8	=====		Shale, dark gray			
85.6	1.6	=====		Shale, dark gray with fossils			
88.7	3.1	=====		Shale, dark gray			
89.7	1.0	=====	90	Lower Bakerstown Coal			
93.0	3.3	=====		Shale, gray, limey			
		=====	100				
		=====					
		=====	110	Shale, gray			
		=====					
		=====	120				
126.0	33.0	=====					
		=====	130	Shale, red and gray			
132.0	6.0	=====					
		=====	140				
		=====					
		=====	150	Shale, gray			
		=====					
		=====	160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1322	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1835.30	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	9/4/2013-9/9/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
					Logged By:	W. Gomolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288693.1
					Easting:	1510360.8
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
162.0	30.0	=====		Shale, gray			
		=====					
		=====					
		=====	170	Shale, dark gray			
		=====					
180.4	18.4	=====	180				
182.2	1.8	|||||		Limestone, gray with fossils (Brush Creek LS)			
		=====					
		=====					
		=====	190	Shale, dark gray			
		=====					
		=====					
		=====	200				
		=====					
		=====					
210.0	27.8	=====	210				
		=====					
		=====					
		=====	220	Shale, gray			
		=====					
		=====					
		=====	230				
		=====					
		=====					
		=====	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1322	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1835.30	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	9/4/2013-9/9/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
					Logged By:	W. Gomolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288693.1
					Easting:	1510360.8
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
255.0	45.0	[Graphic Log]	250	Shale, gray			
258.2	3.2	[Graphic Log]		Shale, dark gray			
260.4	2.2	[Graphic Log]	260	Mahoning Coal			
265.0	4.6	[Graphic Log]		Shale, gray, limey			
302.5	37.5	[Graphic Log]	270				
302.7	0.2	[Graphic Log]	280	Shale, gray			
		[Graphic Log]	290				
		[Graphic Log]	300				
		[Graphic Log]		Upper Freeport Coal			
310.0	7.3	[Graphic Log]	310	Shale, gray, limey			
		[Graphic Log]		Shale, gray			
		[Graphic Log]	320				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1322	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1835.30					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	9/4/2013-9/9/2013
Survey Method:	GPS	SWL measured by:				Drilled By:	Sano Drilling
		Bottom Depth (ft)	Bottom Elevation (MSL)			Logged By:	W. Gomolka
Coal Seam ID						Municipality:	Donegal
Lower Bakerstown	89.7	1745.6	Lower Kittanning	494.0	1341.3	County, State:	Westmoreland, PA
Mahoning Coal	260.4	1574.9				Quadrangle:	Stahlstown, PA
Upper Freeport	302.7	1532.6				Laboratory:	Geochemical
Middle Kittanning	429.2	1406.1				Northing:	288693.1
						Easting:	1510360.8
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
325.0	15.0	=====		Shale, gray			
		=====					
		=====					
		=====	330				
		=====					
		=====					
		=====	340				
		=====					
		=====					
		=====					
		=====	350				
		=====					
		=====					
		=====					
		=====					
		=====	360	Shale, dark gray			
		=====					
		=====					
		=====					
		=====	370				
		=====					
		=====					
		=====					
		=====	380				
		=====					
		=====					
		=====					
		=====	390				
		=====					
		=====					
394.0	69.0	=====					
		.....		Sandstone, gray with shale and coal streaks			
						
						
		.....	400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1322	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1835.30	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	9/4/2013-9/9/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
					Logged By:	W. Gornolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288693.1
					Easting:	1510360.8
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
414.0	20.0		410	Sandstone, gray with shale and coal streaks			
426.5	12.5		420	Shale, dark gray			
429.2	2.7			Middle Kittanning Coal			
430.2	1.0		430	Shale, dark gray			
439.0	8.8			Shale, gray			
445.0	6.0		440	Limestone, dark gray (Middle Kittanning LS)			
475.0	30.0		450	Shale, gray			
			460				
			470				
			480	Sandstone, gray with shale streaks			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1322	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1835.30	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	9/4/2013-9/9/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
					Logged By:	W. Gornolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288693.1
					Easting:	1510360.8
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
491.0	16.0	[Graphic Log: Dotted lines]	490	Sandstone, gray with shale streaks			
494.0	3.0	[Graphic Log: Solid black]		Lower Kittanning Coal			
494.4	0.4	[Graphic Log: Dotted lines]		Shale, dark gray			
500.0	5.6	[Graphic Log: Dotted lines]	500	Shale, gray			
502.5	2.5	[Graphic Log: Dotted lines]		Shale, dark gray			
510.2	7.7	[Graphic Log: Dotted lines]	510	Shale, gray, limey			
		[Graphic Log: Dotted lines]	520	Bottom of Hole DH 1322 Depth 510.2 feet			
		[Graphic Log: Dotted lines]	530				
		[Graphic Log: Dotted lines]	540				
		[Graphic Log: Dotted lines]	550				
		[Graphic Log: Dotted lines]	560				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1323	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1833.40					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	9/16/2013-9/20/2013	
Survey Method:	GPS				Drilled By:	Sano Drilling	
					Logged By:	W. Gomolka	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	289232.6	
					Easting:	1511935.2	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
108.2	38.0	[Graphic Log: 90-100 ft scale]	90	Shale, dark gray			
110.2	2.0	[Graphic Log: 110 ft scale]	110	Shale, dark gray with fossils			
114.2	4.0	[Graphic Log: 114.2 ft scale]		Shale, dark gray			
114.6	0.4	[Graphic Log: 114.6 ft scale]		Lower Bakerstown Coal			
116.0	1.4	[Graphic Log: 116.0 ft scale]		Shale, gray, limey			
120.2	4.2	[Graphic Log: 120 ft scale]	120	Shale, gray			
125.6	5.4	[Graphic Log: 125.6 ft scale]		Sandstone, gray			
149.0	23.4	[Graphic Log: 130-140 ft scale]	130	Shale, gray			
150.2	1.2	[Graphic Log: 150 ft scale]	150	Shale, red and gray			
158.5	8.3	[Graphic Log: 158.5 ft scale]		Clayshale, gray			
		[Graphic Log: 160 ft scale]	160	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1323	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion	
Surface Elev.	1833.40	Date	Depth	Elevation	Method Drilling:	Continuous Core	
Surveyed by:	LCT	Measured	(ft)	(MSL)	Date Drilled:	9/16/2013-9/20/2013	
Survey Method:	GPS	ND			Drilled By:	Sano Drilling	
		SWL measured by:			Logged By:	W. Gomolka	
	Bottom Depth (ft)	Bottom Elevation (MSL)			Municipality:	Donegal	
Coal Seam ID					County, State:	Westmoreland, PA	
Lower Bakerstown	114.6	1718.8	Lower Kittanning	513.0	1320.4	Quadrangle:	Stahlstown, PA
Mahoning	284.7	1548.7				Laboratory:	Geochemical
Upper Freeport	330.8	1502.6				Northing:	289232.6
Middle Kittanning	446.0	1387.4				Easting:	1511935.2
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
189.0	30.5		170 180	Shale, gray			
202.5	13.5		190 200	Shale, dark gray			
204.0	1.5		204 205.5	Limestone, gray with fossils (Brush Creek LS)			
233.0	29.0		210 220 230	Shale, dark gray			
			240	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1323	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1833.40				Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling: Continuous Core
Surveyed by:	LCT	ND				Date Drilled: 9/16/2013-9/20/2013
Survey Method:	GPS					Drilled By: Sano Drilling
						Logged By: W. Gornolka
						Municipality: Donegal
						County, State: Westmoreland, PA
						Quadrangle: Stahlstown, PA
						Laboratory: Geochemical
						Northing: 289232.6
						Easting: 1511935.2
						Grid Coordinates:

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
			250	Shale, gray			
			260				
			270				
			280				
282.2	49.2						
284.7	2.5			Mahoning Coal			
288.2	3.5			Shale, dark gray			
			290	Shale, gray, limey			
			300				
295.0	6.8		310				
			320	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1323	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1833.40	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	9/16/2013-9/20/2013
Survey Method:	GPS					Drilled By:	Sano Drilling
						Logged By:	W. Gomolka
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289232.6
						Easting:	1511935.2
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Lower Bakerstown	114.6	1718.8	Lower Kittanning	513.0	1320.4		
Mahoning	284.7	1548.7					
Upper Freeport	330.8	1502.6					
Middle Kittanning	446.0	1387.4					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
325.2	30.2	=====		Shale, gray			
329.8	4.6	=====	330	Shale, dark gray			
330.8	1.0	=====		Upper Freeport Coal			
340.0	9.2	=====	340	Shale, gray, limey			
378.0	38.0	=====	350	Shale, gray			
		=====	360				
		=====	370				
		=====	380	Shale, dark gray			
		=====	390				
		=====	400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1323	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1833.40	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	9/16/2013-9/20/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
		SWL measured by:			Logged By:	W. Gomolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	289232.6
					Easting:	1511935.2
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
423.0	45.0	[Graphic Log: 410-420]	410	Shale, dark gray			
445.0	22.0	[Graphic Log: 430-440]	430	Sandstone, gray			
446.0	1.0	[Graphic Log: 440-446]	440	Middle Kittanning Coal			
447.2	1.2	[Graphic Log: 446-447.2]		Shale, gray, limey			
453.4	6.2	[Graphic Log: 447.2-453.4]	450	Shale, gray			
457.0	3.6	[Graphic Log: 453.4-457.0]		Shale, dark gray			
465.2	8.2	[Graphic Log: 457.0-465.2]	460	Limestone, dark gray (Middle Kittanning LS)			
467.0	1.8	[Graphic Log: 465.2-467.0]		Shale, gray			
467.8	0.8	[Graphic Log: 467.0-467.8]		Shale, dark gray			
470.7	2.9	[Graphic Log: 467.8-470.7]	470	Shale, gray			
471.6	0.9	[Graphic Log: 470.7-471.6]		Shale, dark gray			
		[Graphic Log: 471.6-480]	480	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1323	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1833.40	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	9/16/2013-9/20/2013
Survey Method:	GPS				Drilled By:	Sano Drilling
					Logged By:	W. Gomolka
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	289232.6
					Easting:	1511935.2
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Lower Bakerstown	114.6	1718.8	Lower Kittanning	513.0	1320.4	
Mahoning	284.7	1548.7				
Upper Freeport	330.8	1502.6				
Middle Kittanning	446.0	1387.4				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
492.0	20.4		490	Shale, gray			
510.2	18.2		510	Shale, dark gray			
513.0	2.8			Lower Kittanning Coal			
522.0	9.0		520	Shale, gray			
535.2	13.2		530	Shale, gray with sandstone streaks			
			540	Bottom of Hole DH 1323 Depth 535.2 feet			
			550				
			560				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1324	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1820.20					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	9/10/2013-9/13/2013	
Survey Method:	GPS				Drilled By:	Sano Drilling	
					Logged By:	W. Gomolka	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	291049.9	
					Easting:	1510565.1	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
10.2	10.2	=====	10	Shale brown, weathered			
24.0	13.8	.....	20	Sandstone, brown, weathered			
30.2	6.2	=====	30	Shale brown and gray, weathered			
45.2	15.0	#####	40	Claystone, gray			
75.0	29.8	=====	50	Shale, brown and gray, weathered			
		=====	60				
		=====	70				
		=====	80	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1324	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1820.20					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	9/10/2013-9/13/2013	
Survey Method:	GPS				Drilled By:	Sano Drilling	
					Logged By:	W. Gomolka	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	291049.9	
					Easting:	1510565.1	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
85.0	10.0	=====		Shale, gray			
103.0	18.0	=====	90	Shale, dark gray			
104.0	1.0	=====	100	Shale, dark gray with fossils			
107.8	3.8	=====		Shale, dark gray			
108.3	0.5	=====		Lower Bakerstown Coal			
113.0	4.7	#####	110	Claystone, gray			
125.0	12.0	=====	120	Shale, gray			
147.0	22.0	=====	130	Shale, gray			
150.2	3.2	=====	140	Shale, gray			
		=====	150	Shale, red and gray			
		=====	160	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1324	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1820.20					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	9/10/2013-9/13/2013
Survey Method:	GPS					Drilled By:	Sano Drilling
						Logged By:	W. Gornolka
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	291049.9
						Easting:	1510565.1
						Grid Coordinates:	

Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:	Date	Depth (ft)	Elevation (MSL)	Notes
--------------	-------------------	------------------------	------------------	------	------------	-----------------	-------

Lower Bakerstown	108.3	1711.9	Upper Kittanning		384.8	1435.4	
Mahoning	232.8	1587.4	Upper Kittanning		405.2	1415.0	
Upper Freeport	280.7	1539.5	Middle Kittanning		434.5	1385.7	
Lower Freeport	333.2	1487.0	Lower Kittanning		493.5	1326.7	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
190.0	39.8	=====	190	Shale, gray			
200.2	10.2	=====	200	Shale, dark gray			
202.2	2.0	OOOOOOOOOO		Limestone, gray with fossils (Brush Creek LS)			
232.5	30.3	=====	210	Shale, dark gray			
232.8	0.3	=====	220	Mahoning Coal			
		=====	230	Shale, gray, limey			
		=====	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1324	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1820.20	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	9/10/2013-9/13/2013
Survey Method:	GPS					Drilled By:	Sano Drilling
						Logged By:	W. Gomolka
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	291049.9
						Easting:	1510565.1
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Lower Bakerstown	108.3	1711.9	Upper Kittanning	384.8	1435.4		
Mahoning	232.8	1587.4	Upper Kittanning	405.2	1415.0		
Upper Freeport	280.7	1539.5	Middle Kittanning	434.5	1385.7		
Lower Freeport	333.2	1487.0	Lower Kittanning	493.5	1326.7		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
242.3	9.5	=====		Shale, gray, limey			
		=====					
		=====					
		=====					
		=====	250				
		=====					
		=====		Shale, gray			
		=====					
		=====	260				
		=====					
		=====					
270.0	27.7	=====	270				
		=====		Shale, gray			
		=====					
		=====					
		=====					
279.7	9.7	=====	280				
280.7	1.0	=====		Upper Freeport Coal			
281.7	1.0	=====		Shale, dark gray			
		=====					
		=====					
		=====					
		=====		Shale, gray, limey			
		=====	290				
		=====					
		=====					
		=====					
295.0	13.3	=====					
		=====					
		=====					
		=====					
		=====	300				
		=====		Shale, gray			
		=====					
		=====					
		=====					
308.5	13.5	=====					
		=====					
		=====					
		=====					
		=====	310				
		=====		Shale, dark gray			
		=====					
		=====					
315.2	6.7	=====					
		=====					
		=====					
		=====					
		=====					
		=====	320				
		=====		Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1324	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1820.20	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	9/10/2013-9/13/2013
Survey Method:	GPS					Drilled By:	Sano Drilling
						Logged By:	W. Gomolka
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	291049.9
						Easting:	1510565.1
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
324.0	8.8	=====		Shale, gray			
327.8	3.8	.....		Sandstone, gray			
333.2	5.4	████████	330	Lower Freeport Coal (with shale)			
336.0	2.8	=====		Shale, gray, limey			
361.0	25.0	=====	340 350 360	Shale, gray			
372.0	11.0	=====	370	Shale, gray, veregated			
377.0	5.0	=====		Shale, dark gray			
381.4	4.4	=====	380	Shale, dark gray			
384.8	3.4	████████		Upper Kittanning Coal			
390.2	5.4	#####	390	Clayshale, gray			
		=====	400	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1324	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1820.20	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	9/10/2013-9/13/2013
Survey Method:	GPS					Drilled By:	Sano Drilling
						Logged By:	W. Gomolka
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	291049.9
						Easting:	1510565.1
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
403.5	13.3	=====		Shale, gray			
405.2	1.7	=====		Upper Kittanning Coal			
		=====	410				
		=====		Shale, dark gray			
		=====	420				
		=====					
		=====	430				
432.6	27.4	=====					
434.5	1.9	=====		Middle Kittanning Coal			
		=====		Shale, dark gray			
441.0	6.5	=====	440				
		=====		Limestone, dark gray (Middle Kittanning LS)			
447.0	6.0	=====					
		=====	450				
		=====		Shale, gray			
455.6	8.6	=====					
456.0	0.4	=====		Shale, dark gray			
457.5	1.5	=====		Shale, gray			
458.5	1.0	=====		Shale, dark gray			
		=====	460				
		=====		Shale, gray			
		=====	470				
475.0	16.5	=====					
		=====		Shale, dark gray with sandstone streaks			
		=====	480				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1324	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1820.20					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT		ND			Date Drilled:	9/10/2013-9/13/2013
Survey Method:	GPS					Drilled By:	Sano Drilling
						Logged By:	W. Gornolka
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	291049.9
						Easting:	1510565.1
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
490.2	15.2	[Graphic Log]	490	Shale, dark gray with sandstone streaks			
493.5	3.3	[Graphic Log]		Lower Kittanning Coal			
499.0	5.5	[Graphic Log]		Shale, gray, limey			
505.0	6.0	[Graphic Log]	500	Shale, gray			
510.2	5.2	[Graphic Log]	510	Shale, dark gray with sandstone streaks			
		[Graphic Log]		Bottom of Hole DH 1324 Depth 510.2 feet			
		[Graphic Log]	520				
		[Graphic Log]	530				
		[Graphic Log]	540				
		[Graphic Log]	550				
		[Graphic Log]	560				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1903	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1802.80	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/15/2019-1/18/2019
Survey Method:	GPS					Drilled By:	RES
		SWL measured by:				Logged By:	P. Mack
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)					
Coal	60.50	1742.3					
Mahoning	106.00	1696.8					
Coal	107.30	1695.5					
Middle Kittanning	281.80	1521.0					
			Municipality: Donegal				
			County, State: Westmoreland, PA				
			Quadrangle: Stahlstown, PA				
			Laboratory: Geochemical				
			Northing: 287903.789				
			Easting: 1506104.564				
			Grid Coordinates:				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		=====				100%	93%
100.0	39.5	=====	90	Shale, gray		87%	88%
103.0	3.0	.....		Sandstone, gray			
106.0	3.0	.....		Mahoning Coal			
106.7	0.7	=====		Shale, gray			
107.3	0.6	=====		Coal			
109.0	1.7	=====		Shale, gray			
111.6	2.6	=====	110	Shale, gray, limy		95%	85%
117.5	5.9	=====		Shale, gray			
120.0	2.5	.....	120	Sandstone, gray			
133.0	13.0	=====	130	Shale, gray, with sandstone		100%	90%
135.7	2.7	.....		Sandstone, gray			
143.0	7.3	=====	140	Sandstone, gray, hard		97%	69%
147.0	4.0	=====		Shale, dark gray, broken			
		.....	150				
		.....		Sandstone, gray, with shale and coal streaks, hard		100%	83%
		.....	160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1903	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1802.80	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/15/2019-1/18/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	287903.789
					Easting:	1506104.564
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
161.0	14.0	.....		SS, gray, with shale and coal streaks, hard (Upper Freeport horizon)			
167.0	6.0	=====		Shale, gray		100%	83%
175.0	8.0	=====	170	Shale, gray, with clayshale		80%	42%
178.0	3.0	=====		Shale, gray, with sandstone			
199.0	21.0	=====	180	Shale, gray		100%	87%
218.0	19.0	=====	190	Shale, dark gray		100%	93%
234.0	16.0	=====	200	Shale, dark gray, with sandstone		100%	87%
		=====	210				
		=====	220				
		=====	230				
		=====	240	Sandstone, gray, with shale and coal streaks		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1903	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1802.80	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/15/2019-1/18/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	287903.789
					Easting:	1506104.564
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
242.0	8.0	[Graphic Log]		Sandstone, gray, with shale and coal streaks			
250.0	8.0	[Graphic Log]	250	Sandstone, gray		100%	93%
279.8	29.8	[Graphic Log]	280	Shale, dark gray, with sandstone		100%	100%
281.8	2.0	[Graphic Log]		Middle Kittanning Coal			
283.0	1.2	[Graphic Log]		Shale, gray			
297.0	14.0	[Graphic Log]	300	Shale, gray, with sandstone		100%	100%
307.0	10.0	[Graphic Log]	310	Limestone, gray (Middle Kittanning)		100%	87%
313.0	6.0	[Graphic Log]	320	Shale, gray, with clayshale			
315.5	2.5	[Graphic Log]		Shale, dark gray			
		[Graphic Log]		Shale, gray		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1903	Measured Static Water Levels			Notes	Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1802.80					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	SWL measured by:				Date Drilled:	1/15/2019-1/18/2019
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	287903.789
						Easting:	1506104.564
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)				
Coal Seam ID							
Coal		60.50	1742.3				
Mahoning		106.00	1696.8				
Coal		107.30	1695.5				
Middle Kittanning		281.80	1521.0				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
331.0	15.5	=====	330	Shale, gray		100%	100%
336.7	5.7	:-:=-:-:-:-		Sandy Shale, gray to dark gray, w/ int bed sandstone		100%	93%
339.2	2.5	.....		Sandstone, light gray, some breaks, w/ some int bed sh.			
349.7	10.5	=====	340	Shale, gray, w/ fossils, some sandy			
351.0	1.3	=====	350	Shale, dark gray to black, numerous breaks, weak		100%	45%
351.65	0.65	=====		Lower Kittanning - Coal, shaley			
352.95	1.30	=====		Lower Kittanning - Coal, w/ boney coal, dull			
354.30	1.35	=====		Lower Kittanning - Coal, bright, some pyrite, some crushed			
354.60	0.30	=====		Lower Kittanning - Lost core			
355.6	1.0	#####		Clayshale, gray, some sandy, several breaks			
359.4	3.8	#####	360	Clayshale, gray to light gray, some breaks			
363.9	4.5	#####		Clayshale, dark gray, some soft and crumbled		100%	60%
364.6	0.7	:-:=-:-:-:-		Sandy Shale, gray			
370.2	5.6	=====	370	Shale, gray			
				Bottom of Hole DH 1903 Depth 370.2 feet			
			380				
			390				
			400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1904	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1768.53				Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT		ND		Date Drilled:	1/23/2019-2/7/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288686.04
					Easting:	1508137.38
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
12.0	12.0	=====	10	Shale, brown, weathered			
19.0	7.0	=====	20	Shale, red			
27.0	8.0	#####	30	Clayshale, brown		63%	0%
35.0	8.0	#####	40	Clayshale, gray, with shale			
56.0	21.0	=====	50	Shale, gray, with sandstone		100%	80%
69.5	13.5	=====	60	Shale, dark gray			
70.5	1.0	|||||	70	Limestone, gray, with fossils (Brush Creek LS)		100%	83%
		=====	80	Shale, dark gray		100%	93%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1904	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1768.53	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/23/2019-2/7/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288686.04
					Easting:	1508137.38
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
96.0	25.5	[Graphic Log]	90	Shale, dark gray		100%	93%
100.0	4.0	[Graphic Log]	100	Shale, dark gray, broken		100%	73%
128.5	28.5	[Graphic Log]	110	Shale, gray		100%	93%
135.0	6.5	[Graphic Log]	120	Shale, gray, with sandstone		100%	90%
149.0	14.0	[Graphic Log]	130	Shale, gray, with clayshale		100%	87%
151.0	81.0	[Graphic Log]	140	Shale, dark gray, broken			
155.2	4.2	[Graphic Log]	150	Mahoning Coal, with shale		80%	54%
158.4	3.2	[Graphic Log]		Shale, gray, with clay			
		[Graphic Log]	160	Shale, gray, with sandstone			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1904	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1768.53				Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/23/2019-2/7/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288686.04
					Easting:	1508137.38
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
176.0	17.6	[Graphic Log]	170	Shale, gray, with sandstone		80%	54%
180.0	4.0	[Graphic Log]	180	Shale, gray, with clayshale		93%	86%
197.2	17.2	[Graphic Log]	190	Shale, gray, badly broken		80%	38%
200.2	3.0	[Graphic Log]	200	Upper Freeport Coal, with shale			
210.2	10.0	[Graphic Log]	210	Shale, gray, with clay		87%	38%
220.2	10.0	[Graphic Log]	220	Shale, gray		100%	73%
225.2	5.0	[Graphic Log]		Shale, dark gray, with clay			
235.0	9.8	[Graphic Log]	230	Shale, gray		100%	87%
		[Graphic Log]	240	Shale, gray, with sandstone			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1904	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1768.53	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/23/2019-2/7/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288686.04
					Easting:	1508137.38
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		155.2	1613.3			
Upper Freeport		200.2	1568.3			
Middle Kittanning		327.0	1441.5			
Lower Kittanning		398.6	1369.9			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
256.0	21.0	=====	250	Shale, gray, with sandstone		100%	93%
263.0	7.0	=====	260	Shale, dark gray		100%	80%
269.0	6.0	=====		Shale, gray, with clayshale			
270.2	1.2	=====	270	Shale, gray, limy			
283.0	12.8	=====	280	Shale, gray		100%	87%
290.0	7.0	.....	290	Sandstone, gray			
299.5	9.5	.....		Sandstone, gray, hard		100%	90%
300.5	1.0	=====	300	Shale, dark gray			
306.0	5.5	.....		Sandstone, gray, with coal streaks, hard			
		.....	310			100%	93%
		.....		Sandstone, gray			
320.2	14.2	.....	320			100%	77%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1904	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1768.53	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/23/2019-2/7/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288686.04
					Easting:	1508137.38
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
324.8	25.0	[Graphic Log]		Sandstone, gray, with coal streaks, hard		100%	77%
327.0	2.2	[Graphic Log]		Middle Kittanning Coal			
331.2	4.2	[Graphic Log]	330	Sandy Shale, gray, with sandstone			
337.0	5.8	[Graphic Log]		Shale, dark gray		100%	90%
343.0	6.0	[Graphic Log]	340	Limestone, gray (Middle Kittanning LS)			
349.0	6.0	[Graphic Log]		Shale, gray			
349.5	0.5	[Graphic Log]	350	Shale, dark gray			
354.0	4.5	[Graphic Log]		Shale, gray		100%	87%
354.8	0.8	[Graphic Log]		Shale, dark gray			
367.0	12.2	[Graphic Log]	360	Shale, gray		100%	100%
374.0	7.0	[Graphic Log]	370	Shale, gray, with sandstone			
393.8	19.8	[Graphic Log]	380	Sandys shale, gray to dark gray, w/ intbed. SS		100%	100%
		[Graphic Log]	390				
394.0	0.2	[Graphic Log]		Sandstone, lt. gray, some breaks, w/ some interbed. shale			
394.28	0.28	[Graphic Log]					
395.93	1.65	[Graphic Log]		Lower Kittanning Coal		91%	44%
395.96	0.03	[Graphic Log]		lost core (397.0 - 398.6)			
396.91	0.95	[Graphic Log]					
397.00	0.09	[Graphic Log]					
398.60	1.60	[Graphic Log]	400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1904	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1768.53	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/23/2019-2/7/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288686.04
					Easting:	1508137.38
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		155.2	1613.3			
Upper Freeport		200.2	1568.3			
Middle Kittanning		327.0	1441.5			
Lower Kittanning		398.6	1369.9			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
400.1	1.5	#####		Clayshale, gray, some sandy, several breaks		91%	44%
407.0	6.9	#####		Clayshale, gray to light gray, some breaks			
415.0	8.0	#####	410	Shale, gray, with sandstone		100%	90%
435.7	20.7	#####	420 430	Sandstone, gray, with dark gray shale		100%	100%
446.1	10.4	#####	440	Shale, dark gray		100%	93%
448.1	2.0	#####		Shale, gray			
455.0	6.9	#####	450	Shale, dark gray			
465.2	10.2	#####	460	Shale, gray, with clayshale		100%	63%
			470 480	Bottom of Hole DH 1904 Depth 465.2 feet			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1905	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1709.18					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	2/13/2019-2/15/2019	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	290807.006	
					Easting:	1508633.136	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
10.2	10.2		10	Shale, brown, weathered			
24.0	13.8		20	Sandy Shale, gray and brown		100%	20%
33.0	9.0		30	Shale, gray and brown, broken		80%	17%
53.7	20.7		40	Shale, dark gray		100%	87%
54.8	1.1		50				
				Limestone, gray, with fossils (Brush Creek LS)			
			60	Shale, dark gray			
			70				
			80				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1905	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1709.18	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	2/13/2019-2/15/2019
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290807.006
						Easting:	1508633.136
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning		137.3	1571.9	Upper Kittanning	259.0	1450.2	
Upper Freeport		176.4	1532.8	Middle Kittanning	286.5	1422.7	
Lower Freeport		224.4	1484.8	Lower Kittanning	351.5	1357.6	
Lower Freeport		230.2	1479.0				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
84.0	29.2	=====		Shale, dark gray		100%	53%
95.0	11.0	=====	90	Shale, gray, with clayshale			
130.0	35.0	=====	100	Sandy Shale, gray, with sandstone		100%	67%
		=====	110				
		=====	120				
133.4	3.4	=====	130	Shale, dark gray		100%	87%
137.3	3.9	#####		Mahoning Coal, with shale			
142.0	4.7	#####	140	Clayshale, gray		97%	62%
		=====	150	Sandy Shale, gray, with shale		100%	100%
		=====	160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1905	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1709.18	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	2/13/2019-2/15/2019
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290807.006
						Easting:	1508633.136
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	137.3	1571.9	Upper Kittanning	259.0	1450.2		
Upper Freeport	176.4	1532.8	Middle Kittanning	286.5	1422.7		
Lower Freeport	224.4	1484.8	Lower Kittanning	351.5	1357.6		
Lower Freeport	230.2	1479.0					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
170.0	28.0	[Graphic Log]	170	Sandy Shale, gray, with shale		100%	100%
175.0	5.0	[Graphic Log]		Shale, dark gray		100%	53%
1.4	1.0	[Graphic Log]		Upper Freeport Coal, with shale			
180.0	3.6	[Graphic Log]	180	Shale, gray, with clayshale			
199.0	19.0	[Graphic Log]	190	Sandy Shale, gray, with shale		100%	100%
205.0	6.0	[Graphic Log]	200	Sandstone, gray		100%	93%
217.5		[Graphic Log]	210	Shale, gray			
222.4	17.0	[Graphic Log]	220	Shale, dark gray		93%	57%
224.4	2.0	[Graphic Log]		Lower Freeport Coal, with shale			
227.7	4.0	[Graphic Log]		Shale, dark gray			
230.2	2.5	[Graphic Log]	230	Lower Freeport Coal, with shale			
238.0	7.8	[Graphic Log]		Shale, gray, with clay		87%	27%
		[Graphic Log]	240	Sandyshale, gray, with sandstone			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1905	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1709.18	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	2/13/2019-2/15/2019
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290807.006
						Easting:	1508633.136
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	137.3	1571.9	Upper Kittanning	259.0	1450.2		
Upper Freeport	176.4	1532.8	Middle Kittanning	286.5	1422.7		
Lower Freeport	224.4	1484.8	Lower Kittanning	351.5	1357.6		
Lower Freeport	230.2	1479.0					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
247.5	9.5	[Graphic Log]		Sandy Shale, gray, with sandstone		100%	93%
256.0	8.5	[Graphic Log]	250	Shale, gray			
256.9	0.9	[Graphic Log]		Shale, dark gray			
259.0	2.1	[Graphic Log]		Upper Kittanning Coal, with shale			
261.0	2.0	[Graphic Log]	260	Shale, dark gray			
270.0	9.0	[Graphic Log]	270	Sandyshale, dark gray		100%	77%
284.0	14.0	[Graphic Log]	280	Shale, dark gray		100%	83%
286.5	2.5	[Graphic Log]		Middle Kittanning Coal			
292.8	6.3	[Graphic Log]	290	Shale, dark gray, with sandstone		97%	83%
298.0	5.2	[Graphic Log]		Limestone, gray (Middle Kittanning LS)			
299.5	1.5	[Graphic Log]		Clay, gray			
306.5	7.0	[Graphic Log]	300	Sandy Shale, gray			
311.5	5.0	[Graphic Log]	310	Shale, gray, with dark gray shale		100%	100%
320.0	8.5	[Graphic Log]	320	Sandy Shale, gray		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1905	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1709.18					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	2/13/2019-2/15/2019	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	290807.006	
					Easting:	1508633.136	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
325.0	5.0	=====		Shale, dark gray		100%	100%
328.2	3.2	.....		Sandstone, gray, with sandyshale			
333.2	5.0	.....	330	Sandstone, gray, fine grained			
337.3	4.1	=====		Sandy Shale, dark gray, w/ thin interbed. SS		100%	100%
341.3	4.0	=====	340	Shale, dark gray			
346.4	5.1	=====		Sandy Shale, dark gray, w/ thin interbed. SS			
347.4	1.0	=====		Shale, dark gray			
348.2	0.8	=====		Shale, dark gray			
349.40	1.20	=====		Lower Kittanning - coal, with some boney, dull			
351.54	2.14	=====	350	Lower Kittanning - coal, bright			
354.2	2.7	#####		Clayshale, dark gray, some breaks, and sandy		85%	39%
361.4	7.2	#####	360	Clayshale, gray to dark gray, several breaks, some slicks			
365.0	3.6	=====		Shale, gray			
375.2	10.2	=====	370	Shale, dark gray		100%	93%
			380	Bottom of Hole DH 1905 Depth 375.2 feet			
			390				
			400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1944	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1761.50					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	11/14/2019-11/20/2019	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	287489.957	
					Easting:	1517001.319	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
95.0	19.0	[Graphic Log: 19 ft scale]	90	Shale, gray		100%	87%
107.0	12.0	[Graphic Log: 12 ft scale]	100	Shale, gray, with clayshale		100%	57%
140.0	33.0	[Graphic Log: 33 ft scale]	110, 120, 130, 140	Shale, gray, with sandyshale		100%	100%
145.5	5.5	[Graphic Log: 5.5 ft scale]		Shale, dark gray		100%	93%
146.6	1.1	[Graphic Log: 1.1 ft scale]		Shale, dark gray, with fossils (Brush Creek)			
		[Graphic Log: 15 ft scale]	150	Shale, dark gray		100%	83%
		[Graphic Log: 16 ft scale]	160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1944	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1761.50	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	11/14/2019-11/20/2019
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	287489.957
						Easting:	1517001.319
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	220.2	1541.3	Upper Kittanning	369.70	1391.8		
Upper Freeport	272.3	1489.2	Lower Kittanning	437.2	1324.3		
Coal	348.2	1413.3					
Upper Kittanning	352.8	1408.7					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
165.0	18.4	[Graphic Log]		Shale, dark gray		100%	83%
173.5	8.5	[Graphic Log]	170	Shale, dark gray, broken		100%	30%
183.5	10.0	[Graphic Log]	180	Shale, gray, with clayshale			
213.5	30.0	[Graphic Log]	190 200 210	Shale, gray, with sandyshale		100%	97%
217.5	4.0	[Graphic Log]		Shale, dark gray			
220.2	2.7	[Graphic Log]	220	Mahoning Coal, with shale		93%	64%
227.0	6.8	[Graphic Log]		Shale, gray, with clayshale			
240.0	13.0	[Graphic Log]	230 240	Shale, gray, with sandyshale		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1944	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1761.50					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	11/14/2019-11/20/2019	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	287489.957	
					Easting:	1517001.319	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
256.0	16.0		250	Shale, gray		100%	90%
271.5	15.5		270	Shale, dark gra		100%	87%
272.3	0.8			Upper Freeport Coal, with shale			
279.0	6.7		280	Shale, dark gray		100%	83%
			290			100%	100%
			300	Shale, gray			
			310			100%	100%
			320			100%	97%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1944	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1761.50	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	11/14/2019-11/20/2019
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	287489.957
						Easting:	1517001.319
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	220.2	1541.3	Upper Kittanning	369.70	1391.8		
Upper Freeport	272.3	1489.2	Lower Kittanning	437.2	1324.3		
Coal	348.2	1413.3					
Upper Kittanning	352.8	1408.7					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
336.4	11.4	[Graphic Log]	330	Shale, dark gray		100%	97%
343.0	6.6	[Graphic Log]	340	Shale, gray, with sandstone		100%	83%
347.9	4.9	[Graphic Log]		Shale, dark gray			
348.2	0.3	[Graphic Log]		Coal			
350.9	2.7	[Graphic Log]	350	Shale, dark gray			
352.8	1.9	[Graphic Log]		Upper Kittanning Coal, with shale		100%	80%
356.4	3.6	[Graphic Log]		Shale, gray, with sandstone			
367.8	11.4	[Graphic Log]	360	Shale, dark gray, with sandstone		97%	86%
369.7	1.9	[Graphic Log]	370	Upper Kittanning Coal, with shale			
371.7	2.0	[Graphic Log]		Shale, gray			
400.0	28.3	[Graphic Log]	380 390 400	Sandyshale, gray, with sandstone		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1944	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1761.50					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	11/14/2019-11/20/2019	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	287489.957	
					Easting:	1517001.319	
					Grid Coordinates:		
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	220.2	1541.3	Upper Kittanning	369.70	1391.8		
Upper Freeport	272.3	1489.2	Lower Kittanning	437.2	1324.3		
Coal	348.2	1413.3					
Upper Kittanning	352.8	1408.7					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
409.0	9.0	=====		Shale, gray		100%	100%
414.2	5.2	=====	410	Sandy Shale, gray, with sandstone		100%	100%
419.0	4.8	=====		Sandstone, light gray			
432.8	13.8	=====	420	Sandy Shale, gray, with interbedded sandstone		100%	87%
433.65	0.85	=====		Sandy Shale, gray			
434.02	0.4	=====		Lower Kittanning - Boney coal, dull, with coal bands			
434.15	0.1	=====		Lower Kittanning - Shale, black			
437.20	3.05	=====		Lower Kittanning - Coal, bright			
442.5	5.3	#####	440	Clayshale, dark gray to gray, broken		89%	52%
447.1	4.6	=====		Sandstone, gray, some clayey			
450.2	3.1	=====	450	Shale, gray, with sandyshale and sandstone			
		=====		Bottom of Hole DH 1944 Depth 450.2 feet			
		=====	460				
		=====					
		=====	470				
		=====					
		=====	480				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1945	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1684.29					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	12/3/2019-12/6/2019	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	287051.569	
					Easting:	1515855.743	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
99.3	28.0	[Graphic Log: 90-99.3 ft]	90	Shale, dark gray		100%	90%
110.0	10.7	[Graphic Log: 100-110.0 ft]	100	Shale, gray, with clayshale		93%	64%
140.0	30.0	[Graphic Log: 110-140.0 ft]	110	Shale, gray, with sandyshale		100%	57%
146.0	6.0	[Graphic Log: 120-146.0 ft]	120	Shale, gray, broken		100%	87%
148.7	2.7	[Graphic Log: 130-148.7 ft]	130	Mahoning Coal, with shale		80%	25%
151.7	3.0	[Graphic Log: 140-151.7 ft]	140	Shale, gray			
		[Graphic Log: 146-151.7 ft]	150	Shale, gray			
		[Graphic Log: 151.7-160 ft]	160	Shale, gray, with clayshale		100%	37%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1945	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1684.29	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	12/3/2019-12/6/2019
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	287051.569
						Easting:	1515855.743
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	148.7	1535.6	Middle Kittanning	295.9	1388.4		
Upper Freeport	205.5	1478.8	Lower Kittanning	370.4	1313.9		
Upper Kittanning	278.2	1406.1					
Upper Kittanning	284.0	1400.3					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
253.0	47.5	=====	250	Shale, gray		100%	80%
261.0	8.0	#####	260	Clayshale, gray		100%	60%
273.0	12.0	=====	270	Shale, gray		100%	70%
277.9	4.9	=====		Shale, dark gray		100%	70%
278.2	0.3	=====	280	Upper Kittanning Coal			
281.8	3.6	=====		Shale, dark gray			
284.0	2.2	=====		Upper Kittanning Coal, with shale			
294.8	10.8	=====	290	Shale, dark gray		100%	77%
295.9	1.1	=====		Middle Kittanning Coal, with shale			
301.0	5.1	=====	300	Shale, gray			
		=====	310	Sandy Shale, gray, with sandstone		100%	100%
		=====	320			100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1945	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1684.29	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	12/3/2019-12/6/2019
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	287051.569
						Easting:	1515855.743
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	148.7	1535.6	Middle Kittanning	295.9	1388.4		
Upper Freeport	205.5	1478.8	Lower Kittanning	370.4	1313.9		
Upper Kittanning	278.2	1406.1					
Upper Kittanning	284.0	1400.3					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
						100%	100%
			330				
				Sandy Shale, gray, with sandstone		100%	93%
			340				
346.9	45.9						
			350				
351.9	5.0			Sandstone, light gray, fine grained		100%	100%
			360				
				Sandy Shale, dark gray, with interbedded ss		100%	100%
365.2	13.3					100%	100%
366.9	1.7			Shale, dark gray (0.50); Shale, gray, with clay (0.10); shale, gray (0.50); Shale, black, with coal bands (0.60)			
367.8	0.9			Lower Kittanning - Coal, bright, with some bone and pyrite			
			370				
370.4	2.6			Lower Kittanning			
		#####					
		#####					
374.4	4.0	#####		Clayshale, dark gray, some broken		100%	43%
		#####					
377.9	3.5	#####		Clayshale, gray, sandy			
379.4	1.5	#####		Clayshale, gray, sandy, broken			
380.2	0.8	#####	380	Clayshale, gray, sandy			
				Bottom of Hole DH 1945 Depth 380.2 feet			
			390				
			400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1946	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1681.54				Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	12/11/2019-12/13/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	286357.336
					Easting:	1514723.153
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD	
25.2	25.2	[Graphic Log: 25.2 ft depth]	10	Shale, brown, weathered				
27.5	2.3	[Graphic Log: 27.5 ft depth]	20	Shale, brown and gray		100%	40%	
42.0	14.5	[Graphic Log: 42.0 ft depth]	30	Shale, gray		100%	80%	
46.8	4.8	[Graphic Log: 46.8 ft depth]	40	Shale, dark gray				
48.0	1.2	[Graphic Log: 48.0 ft depth]		Limestone, gray, with fossils (Brush Creek LS)				
		[Graphic Log: 50-60 ft depth]	50	Shale, dark gray		100%	83%	
		[Graphic Log: 60-70 ft depth]	60				100%	77%
		[Graphic Log: 70-80 ft depth]	70				100%	40%
		[Graphic Log: 80 ft depth]	80					

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1946	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1681.54	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	12/11/2019-12/13/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	286357.336
					Easting:	1514723.153
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		267.5	1414.0			
Middle Kittanning		279.0	1402.5			
Lower Kittanning		351.7	1329.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
81.5	33.5	=====		Shale, dark gray			
		=====		Shale, gray, with clayshale		100%	40%
94.0	12.5	=====	90				
		=====		Shale, gray		100%	80%
105.0	11.0	=====	100				
		=====		Shale, gray, with sandyshale		100%	93%
126.5	21.5	=====	110				
128.5	2.0	=====	120	Shale, dark gray (Mahoning Horizon)		100%	70%
		=====		Shale, gray, with clayshale			
135.0	6.5	=====	130				
		=====		Shale, gray		100%	93%
		=====	140				
		=====		Shale, gray		100%	80%
		=====	150				
		=====					
		=====	160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1946	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1681.54	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	12/11/2019-12/13/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	286357.336
					Easting:	1514723.153
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		267.5	1414.0			
Middle Kittanning		279.0	1402.5			
Lower Kittanning		351.7	1329.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD	
178.0	43.0	[Graphic Log]	170	Shale, gray		100%	80%	
181.7	3.7	[Graphic Log]	180	Shale, dark gray		100%	90%	
184.7	3.0	[Graphic Log]		Shale, dark gray, with coal (Upper Freeport)				
225.0	40.3	[Graphic Log]	190	Shale, gray		90%	78%	
		[Graphic Log]	200				100%	87%
		[Graphic Log]	210					
		[Graphic Log]	220				100%	83%
233.0	8.0	[Graphic Log]	230	Shale, gray, variegated		100%	53%	
240.0	7.0	[Graphic Log]	240	Shale, gray, with clayshale				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1946	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1681.54	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	12/11/2019-12/13/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	286357.336
					Easting:	1514723.153
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		267.5	1414.0			
Middle Kittanning		279.0	1402.5			
Lower Kittanning		351.7	1329.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
255.0	15.0	=====	250	Shale, gray, with sandyshale		100%	100%
258.7	3.7	=====	260	Shale, dark gray			
260.8	2.1	=====		Shale, dark gray, with coal (Upper Kittanning)			
266.2	5.4	=====		Shale, dark gray		100%	68%
267.5	1.3	=====		Upper Kittanning Coal			
277.4	9.9	=====	270	Shale, dark gray, with sandstone			
29.0	1.6	=====		Middle Kittanning Coal, with shale		100%	83%
290.2	11.2	=====	290	Shale, gray			
295.0	4.8	=====		Shale, dark gray		100%	100%
300.0	5.0	OOOOOOOOOO	300	Limestone, gray (Middle Kittanning LS)			
305.2	5.2	=====		Shale, gray			
306.2	1.0	=====		Shale, dark gray			
		=====	310	Shale, gray, with sandyshale		100%	83%
		=====	320			100%	83%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1946	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1681.54	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	12/11/2019-12/13/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	286357.336
					Easting:	1514723.153
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		267.5	1414.0			
Middle Kittanning		279.0	1402.5			
Lower Kittanning		351.7	1329.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
325.0	18.8	=====		Shale, gray, with sandyshale		100%	83%
328.0	3.0	=====		Sandy Shale, gray, with sandstone, hard			
337.4	9.4	.....	330	Sandstone, light gray, some breaks		100%	100%
346.3	8.9	=====	340	Sandyshale, dark gray, with interbedded ss		100%	100%
347.44	1.14	=====		Shale, gray			
347.81	0.37	=====		Lower Kittanning - Boney coal, with coal streaks			
348.01	0.20	=====		Lower Kittanning - Shale, black, w/ coal streaks			
351.70	3.69	=====	350	Lower Kittanning - Coal, bright		100%	43%
356.6	4.9	#####		Clayshale, dark gray, several breaks, with slicks			
359.7	3.1	#####	360	Clayshale, gray, with HAFs and slicks			
361.7	2.0	#####		Clayshale, gray, sandy		100%	100%
365.2	3.5	=====		Shale, gray, with sandyshale			
			370	Bottom of Hole DH 1946 Depth 365.2 feet			
			380				
			390				
			400				

7.1A GEOLOGIC DRILL LOG

Hole No. DH-1947
Surface Elev. 1679.72
Surveyed by: LCT
Survey Method: GPS

Measured Static Water Levels
 Date Measured ND
 Depth (ft)
 Elevation (MSL)
 Notes

Operation Name : Rustic Ridge #1 Mine-Expansion
Method Drilling: Continuous Core
Date Drilled: 12/17/2019-12/23/2019
Drilled By: RES
Logged By: P. Mack
Municipality: Donegal
County, State: Westmoreland, PA
Quadrangle: Stahlstown, PA
Laboratory: Geochemical
Northing: 287373.536
Easting: 1514686.294
Grid Coordinates:

Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)
Mahoning	121.2	1558.5
Upper Freeport	168.6	1511.1
Middle Kittanning	269.8	1409.9
Lower Kittanning	345.6	1334.1

SWL measured by:

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
25.2	25.2	=====	10	Shale, brown, highly weathered			
40.0	14.8	=====	30	Shale, brown		100%	0%
43.5	3.5	=====	40	Shale, gray		100%	33%
46.7	3.2	=====		Shale, dark gray			
48.3	1.6	oooooooo		Limestone, gray, with fossils (Brusch Creek LS)			
75.3	27.0	=====	50	Shale, dark gray		100%	83%
80.3	5.0	=====	60	Shale, dark gray			
		=====	70	Shale, dark gray		100%	93%
		=====	80	Shale, gray		100%	87%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1947	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1679.72	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	12/17/2019-12/23/2019
Survey Method:	GPS				Drilled By:	RES
		SWL measured by:			Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	287373.536
					Easting:	1514686.294
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
82.0	1.7	=====	—	Shale, dark gray			
84.0	2.0	=====	—	Shale, dark gray, with coal			
		=====				100%	87%
		=====	90				
		=====					
		=====	100	Shale, gray		100%	90%
		=====					
		=====	110			100%	77%
		=====					
118.2	34.2	=====					
121.2	3.0	=====	120	Mahoning Coal, with shale			
		=====					
		=====		Shale, gray		100%	80%
131.0	9.8	=====	130				
		=====					
133.0	2.0	=====		Shale, gray, limy			
		=====					
		=====	140			100%	87%
		=====					
		=====	150	Shale, gray			
		=====					
		=====	160			100%	70%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1947	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1679.72	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	12/17/2019-12/23/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	287373.536
					Easting:	1514686.294
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD	
161.0	28.0	=====		Shale, gray				
163.0	2.0	=====		Shale, gray, fractured		100%	70%	
167.0	4.0	=====		Shale, dark gray, with sandstone				
168.6	1.6	=====		Upper Freeport Coal, with shale				
192.0	23.4	=====	170	Shale, gray		100%	77%	
		=====	180				100%	67%
		=====	190					
225.0	33.0	=====	200	Shale, gray, with sandshale		100%	100%	
		=====	210				100%	100%
		=====	220					
238.0	13.0	.....	230	Sandstone, gray, with shale		100%	87%
240.2	2.2	=====	240	Shale, dark gray, with coal (Upper Kittanning)				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1947	Measured Static Water Levels			Operation Name : Rustic Ridge #1 Mine-Expansion	
Surface Elev.	1679.72					Date Measured	Depth (ft)	Elevation (MSL)
Surveyed by:	LCT	ND				Method Drilling: Continuous Core
Survey Method:	GPS					Date Drilled: 12/17/2019-12/23/2019
						Drilled By: RES
						Logged By: P. Mack
						Municipality: Donegal
						County, State: Westmoreland, PA
						Quadrangle: Stahlstown, PA
						Laboratory: Geochemical
					Northing: 287373.536	
					Easting: 1514686.294	
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
250.0	9.8	[Graphic Log]	250	Shale, dark gray, broken		100%	43%
252.5	2.5	[Graphic Log]		Sandstone, gray, with coal (Upper Kittanning Horizon)			
255.3	2.8	[Graphic Log]		Shale, dark gray, with coal (Upper Kittanning Horizon)			
268.0	12.7	[Graphic Log]	260	Shale, dark gray		100%	57%
269.8	1.8	[Graphic Log]	270	Middle Kittanning Coal, with shale			
273.5	3.7	[Graphic Log]		Shale, gray			
292.5	19.0	[Graphic Log]	280 290	Sandyshale, gray, with sandstone		100%	90%
295.0	2.5	[Graphic Log]		Shale, gray		100%	83%
295.5	0.5	[Graphic Log]		Shale, dark gray			
299.0	3.5	[Graphic Log]		Sandy Shale, gray			
300.2	1.2	[Graphic Log]	300	Shale, dark gray			
315.2	15.0	[Graphic Log]	310	Shale, gray		100%	100%
		[Graphic Log]	320	Sandy Shale, gray, with sandstone		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-1947	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1679.72	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	12/17/2019-12/23/2019
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	287373.536
					Easting:	1514686.294
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
322.0	6.8	=====		Sandy Shale, gray, with sandstone			
		.....				100%	100%
		.....	330	Sandstone, light gray, w/ interbed. shale, several breaks			
		.....				100%	100%
		.....				100%	100%
340.4	18.4	=====	340				
341.0	1.0	=====		Sandy Shale, dark gray			
342.0	0.6	=====		Lower Kittanning Coal			
342.7	0.7	=====					
345.6	2.9	=====		Lower Kittanning - Coal, bright			
349.4	3.8	#####		Clayshale, dark gray to gray, some breaks		92%	76%
		#####	350				
		#####		Clayshale, gray, sandy, with slicks			
355.2	5.8	#####					
		.....		Bottom of Hole DH 1947 Depth 355.2 feet			
		.....	360				
						
		.....	370				
						
		.....	380				
						
		.....	390				
						
		.....	400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2001	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1660.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/6/2020-1/10/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	287373.536
						Easting:	1514686.294
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	117.7	1542.3	Lower Kittanning	344.5	1315.5		
Upper Freeport	163.7	1496.3					
Upper Kittanning	250.8	1409.2					
Middle Kittanning	275.8	1384.2					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
25.2	25.2		10	Shale, brown, weathered			
39.6	14.4		20	Shale, gray		100%	40%
41.0	1.0		30	Limestone, gray, with fossils (Brush Creek LS)		100%	83%
70.5	29.5		40	Shale, dark gray		100%	80%
79.0	8.5		50	Shale, gray, with clayshale		100%	77%
			60	Shale, gray, with sandys shale		100%	80%
			70				
			80				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2001	Measured Static Water Levels				Operation Name : Rustic Ridge #1 Mine-Expansion	
	Surface Elev.	1660.00	Date Measured	Depth (ft)	Elevation (MSL)		Date Drilled: 1/6/2020-1/10/2020
	Surveyed by:	LCT	ND				Drilled By: RES
Survey Method:	GPS				Logged By: P. Mack		
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		Municipality: Donegal	
Coal Seam ID						County, State: Westmoreland, PA	
Mahoning	117.7	1542.3	Lower Kittanning	344.5	1315.5	Quadrangle: Stahlstown, PA	
Upper Freeport	163.7	1496.3				Laboratory: Geochemical	
Upper Kittanning	250.8	1409.2				Northing: 287373.536	
Middle Kittanning	275.8	1384.2				Easting: 1514686.294	
						Grid Coordinates: 	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		=====				100%	80%
		=====	90				
		=====		Shale, gray, with sandys shale		100%	93%
		=====	100				
		=====					
		=====	110				
114.0	35.0	=====				100%	63%
115.5	1.5	=====		Shale, dark gray			
117.7	2.2	=====		Mahoning Coal, with shale			
		=====	120				
		=====					
		=====	130			100%	93%
		=====					
		=====	140				
		=====		Shale, gray		100%	90%
		=====	150				
		=====					
157.0	39.3	=====				90%	67%
		=====	160				
		=====		Shale, dark gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2001	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1660.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/6/2020-1/10/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	287373.536
						Easting:	1514686.294
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	117.7	1542.3	Lower Kittanning	344.5	1315.5		
Upper Freeport	163.7	1496.3					
Upper Kittanning	250.8	1409.2					
Middle Kittanning	275.8	1384.2					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD	
162.4	5.4	=====		Shale, dark gray		90%	67%	
163.7	1.3	=====		Upper Freeport Coal				
169.0	5.3	#####		Clayshale, gray, with shale				
221.0	52.0	=====	170	Shale, gray, with sandyshale		100%	90%	
		=====	180				100%	100%
		=====	190				100%	100%
		=====	200				100%	100%
		=====	210				100%	90%
225.0	4.0	.....	220	Sandstone, gray, with shale			
		.....	230	Sandstone, gray			
		240				100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2001	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1660.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/6/2020-1/10/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	287373.536
						Easting:	1514686.294
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	117.7	1542.3	Lower Kittanning	344.5	1315.5		
Upper Freeport	163.7	1496.3					
Upper Kittanning	250.8	1409.2					
Middle Kittanning	275.8	1384.2					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
248.9	23.9	[Graphic Log: Dotted lines]		Sandstone, gray		100%	80%
250.8	1.9	[Graphic Log: Solid black]	250	Upper Kittanning Coal, with shale			
273.5	22.7	[Graphic Log: Horizontal dashes]	260	Shale, dark gray		100%	93%
275.8	2.3	[Graphic Log: Solid black]	270	Middle Kittanning Coal, with shale			
281.0	5.2	[Graphic Log: Horizontal dashes]	280	Shale, gray		100%	80%
286.5	5.5	[Graphic Log: Horizontal dashes]		Shale, dark gray			
295.0	8.5	[Graphic Log: Horizontal dashes]	290	Shale, gray		100%	93%
		[Graphic Log: Horizontal dashes]	300				
		[Graphic Log: Horizontal dashes]	310	Sandy Shale, gray, with sandstone		100%	100%
		[Graphic Log: Horizontal dashes]	320			100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2002	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1863.97	Date	Depth	Elevation	Method Drilling:	Continuous Core
Surveyed by:	LCT	Measured	(ft)	(MSL)	Date Drilled:	1/13/2020-1/27/2020
Survey Method:	GPS	ND			Drilled By:	RES
		Bottom Depth	Bottom Elevation	SWL measured by:	Logged By:	P. Mack
		(ft)	(MSL)		Municipality:	Donegal
Coal Seam ID					County, State:	Westmoreland, PA
Upper Kittanning	497.70	1366.3			Quadrangle:	Stahlstown, PA
Middle Kittanning	527.90	1336.1			Laboratory:	Geochemical
Lower Kittanning	592.30	1271.7			Northing:	288669.186
					Easting:	1519681.479
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
17.0	17.0	[Graphic Log: 17.0 ft depth]	10	Shale, brown, weathered			
25.2	8.2	[Graphic Log: 25.2 ft depth]	20	Shale, dark gray, weathered			
28.2	3.0	[Graphic Log: 28.2 ft depth]		Shale, gray		100%	80%
30.4	2.2	[Graphic Log: 30.4 ft depth]	30	Limestone, gray			
50.4	20.0	[Graphic Log: 50.4 ft depth]	40	Shale, gray, with clayshale		100%	40%
54.0	3.6	[Graphic Log: 54.0 ft depth]	50	Shale, dark gray		100%	37%
71.0	17.0	[Graphic Log: 71.0 ft depth]	60	Shale, dark gray, with fossils		100%	53%
75.5	4.5	[Graphic Log: 75.5 ft depth]	70	Shale, dark gray, broken			
		[Graphic Log: 80 ft depth]	80	Shale, gray, with clayshale		100%	40%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2002	Measured Static Water Levels			
Surface Elev.	1863.97	Date	Depth	Elevation	Notes
Surveyed by:	LCT	Measured	(ft)	(MSL)	
Survey Method:	GPS	ND			
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Upper Kittanning	497.70	1366.3			
Middle Kittanning	527.90	1336.1			
Lower Kittanning	592.30	1271.7			

Operation Name :	Rustic Ridge #1 Mine-Expansion
Method Drilling:	Continuous Core
Date Drilled:	1/13/2020-1/27/2020
Drilled By:	RES
Logged By:	P. Mack
Municipality:	Donegal
County, State:	Westmoreland, PA
Quadrangle:	Stahlstown, PA
Laboratory:	Geochemical
Northing:	288669.186
Easting:	1519681.479
Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		=====				100%	90%
176.8	20.3	=====		Shale, dark gray			
177.4	0.6	=====	170			100%	80%
183.0	5.6	=====		Shale, gray, with clayshale			
193.0	10.0	=====		Shale, gray		93%	71%
195.3	2.3	=====		Shale, red			
199.0	3.7	=====		Shale, dark gray			
207.0	8.0	=====	200			100%	67%
		=====		Shale, gray and red			
229.0	22.0	=====		Shale, gray, with sandyshale		100%	100%
231.2	2.2	=====	210				
235.4	4.2	=====		Shale, dark gray		100%	80%
236.5	1.1	=====	220				
		=====		Limestone, gray, with fossils (Brush Creek LS)			
		=====		Shale, gray			
		=====	230				
		=====		Shale, gray and red			
		=====		Shale, dark gray			
		=====		Limestone, gray, with fossils (Brush Creek LS)			
		=====		Shale, gray			
		=====	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2002	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1863.97	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/13/2020-1/27/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288669.186
					Easting:	1519681.479
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		497.70	1366.3			
Middle Kittanning		527.90	1336.1			
Lower Kittanning		592.30	1271.7			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
271.0	34.5		250 260 270	Shale, gray		100%	93%
282.0	11.0		280	Shale, dark gray		100%	100%
283.5	1.5		283	Limestone, gray, with fossils			
312.0	28.5		290 300 310	Shale, dark gray		100%	100%
318.0	6.0		318 320	Shale, gray, with clayshale		100%	90%
			320	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2002	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1863.97	Date	Depth	Elevation	Method Drilling:	Continuous Core
Surveyed by:	LCT	Measured	(ft)	(MSL)	Date Drilled:	1/13/2020-1/27/2020
Survey Method:	GPS	ND			Drilled By:	RES
		SWL measured by:			Logged By:	P. Mack
	Bottom Depth	Bottom Elevation			Municipality:	Donegal
	(ft)	(MSL)			County, State:	Westmoreland, PA
Coal Seam ID					Quadrangle:	Stahlstown, PA
Upper Kittanning	497.70	1366.3			Laboratory:	Geochemical
Middle Kittanning	527.90	1336.1			Northing:	288669.186
Lower Kittanning	592.30	1271.7			Easting:	1519681.479
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		=====				100%	90%
		=====					
		=====	330				
		=====					
		=====	340			100%	90%
		=====					
		=====	350				
		=====					
		=====	360	Shale, gray		100%	87%
		=====					
		=====	370				
		=====					
		=====	380			93%	86%
		=====					
		=====	390				
		=====					
393.0	75.0	=====					
		=====					
		=====					
		=====					
		=====		Shale, gray, with sandys shale		87%	92%
		=====	400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2002	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1863.97				Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT				Date Drilled:	1/13/2020-1/27/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288669.186
					Easting:	1519681.479
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
413.0	20.0	[Graphic Log]	410	Shale, gray, with sandy shale		87%	92%
432.0	19.0	[Graphic Log]	430	Shale, dark gray		100%	83%
479.0	47.0	[Graphic Log]	480	Sandstone, gray		100%	87%
		[Graphic Log]	440	Shale, gray		100%	100%
		[Graphic Log]	450				
		[Graphic Log]	460				
		[Graphic Log]	470				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2002	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1863.97	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/13/2020-1/27/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288669.186
					Easting:	1519681.479
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		497.70	1366.3			
Middle Kittanning		527.90	1336.1			
Lower Kittanning		592.30	1271.7			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
485.0	6.0			Sandstone, gray			
495.4	10.4		490	Shale, dark gray		97%	83%
497.7	2.3			Upper Kittanning Coal, with shale			
514.0	16.3		500 510	Shale, dark gray		100%	73%
522.0	8.0		520	Shale, dark gray, broken		100%	47%
526.1	4.1			Shale, dark gray			
527.9	1.8			Middle Kittanning Coal, with shale			
534.0	6.1		530	Shale, gray		100%	80%
541.0	7.0		540	Shale, dark gray			
			550	Shale, gray		100%	93%
			560			100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2002	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1863.97	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/13/2020-1/27/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288669.186
					Easting:	1519681.479
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
561.0	1.0	=====		Shale, gray			
562.0	21.0	=====					
568.0	6.0	=====		Sandy Shale, gray		100%	100%
568.3	0.3	=====		Shale, dark gray, with sandstone			
570		=====	570			100%	100%
580		=====	580	Sandy Shale, gry, w/ interbed. ss		100%	116%
588.13	19.83	=====				100%	70%
588.58	0.45	=====		Lower Kittanning - Coal, with boney coal			
588.83	0.25	=====	590				
592.30	3.47	=====		Lower Kittanning Coal			
594.0	1.7	=====		Sandstone, dark gray to gray			
597.7	3.7	#####		Claystone, dark gray, some sandy, some slicks			
600		=====	600			100%	100%
602.3	4.6	=====		Sandstone, dark gray			
605.2	2.9	=====		Shale, dark gray			
610		=====	610				
620		=====	620				
630		=====	630				
640		=====	640				
				Bottom of Hole DH 2002 Depth 605.2 feet			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2003	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1770.21	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/28/2020-1/31/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288920.832
					Easting:	1521055.983
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		255.6	1514.6			
Middle Kittanning		426.5	1343.7			
Lower Kittanning		484.3	1285.9			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
22.2	22.2	[Graphic Log: 0-22.2 ft]	10	Shale, brown, weathered			
35.2	13.0	[Graphic Log: 22.2-35.2 ft]	30	Shale, gray, with clayshale		80%	0%
65.0	29.8	[Graphic Log: 35.2-65.0 ft]	50	Shale, gray, with sandy shale		100%	77%
		[Graphic Log: 65.0-80 ft]	60			100%	93%
		[Graphic Log: 80-85 ft]	70	Shale, dark gray		100%	83%
		[Graphic Log: 85-90 ft]	80			100%	57%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2003	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1770.21	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/28/2020-1/31/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288920.832
					Easting:	1521055.983
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
82.5	17.5	=====		Shale, dark gray			
87.5	5.0	#####		Clayshale, gray		100%	57%
97.0	9.5	=====	90	Shale, gray			
99.5	2.5	=====	100	Shale, red and gray		100%	73%
103.5	4.0	=====		Shale, gray			
106.5	3.0	=====		Shale, red and gray			
140.2	33.7	=====	110	Shale, gray, with sandys shale		100%	87%
141.2	1.0	=====	120				
142.2	1.0	=====	130				
		=====	140	Limestone, gray, with fossils			
		=====		Shale, dark gray		100%	47%
		=====	150	Shale, gray			
		=====	160				100%	93%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2003	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1770.21	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/28/2020-1/31/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288920.832
					Easting:	1521055.983
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		255.6	1514.6			
Middle Kittanning		426.5	1343.7			
Lower Kittanning		484.3	1285.9			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		=====				100%	93%
		=====					
		=====	170				
		=====		Shale, gray		100%	100%
		=====					
		=====	180				
184.0	41.8	=====					
		=====		Shale, dark gray		100%	93%
189.0	5.0	=====					
191.0	2.0	|||||	190	Limestone, gray, with fossils (Brush Creek LS)			
		=====					
		=====					
		=====	200				
		=====		Shale, dark gray		100%	80%
		=====					
		=====	210				
213.0	22.0	=====					
		=====					
		=====					
		=====	220				
		=====		Shale, gray, with clayshale		100%	57%
		=====					
		=====					
		=====	230				
		=====					
		=====					
240.0	27.0	=====	240			100%	80%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2003	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1770.21	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/28/2020-1/31/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288920.832
					Easting:	1521055.983
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		255.6	1514.6			
Middle Kittanning		426.5	1343.7			
Lower Kittanning		484.3	1285.9			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
253.0	13.0	[Graphic Log: 13 ft scale]	250	Shale, gray		100%	80%
255.4	2.4	[Graphic Log: 2.4 ft scale]		Shale, dark gray			
255.6	0.2	[Graphic Log: 0.2 ft scale]		Mahoning Coal			
260.0	4.4	[Graphic Log: 4.4 ft scale]	260	Shale, gray, with clayshale			
270.0	10.0	[Graphic Log: 10 ft scale]	270	Shale, gray		100%	67%
302.0	32.0	[Graphic Log: 32 ft scale]	280	Shale, gray, with sandyshale		100%	93%
		[Graphic Log: 290 ft scale]	290			100%	100%
		[Graphic Log: 300 ft scale]	300				
		[Graphic Log: 310 ft scale]	310	Sandstone, gray		100%	100%
		[Graphic Log: 320 ft scale]	320			100%	87%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2003	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1770.21	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/28/2020-1/31/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288920.832
					Easting:	1521055.983
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		255.6	1514.6			
Middle Kittanning		426.5	1343.7			
Lower Kittanning		484.3	1285.9			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
321.5	19.5	[Graphic Log]		Sandstone, gray			
						100%	87%
335.0	13.5	[Graphic Log]	330	Shale, dark gray			
340.5	5.5	[Graphic Log]	340	Shale, gray			
						100%	83%
358.0	17.5	[Graphic Log]	350	Sandstone, gray			
						100%	100%
			360				
						100%	100%
			370				
						100%	100%
			380	Shale, dark gray			
						100%	100%
			390				
						100%	93%
			400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2003	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1770.21	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/28/2020-1/31/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288920.832
					Easting:	1521055.983
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		255.6	1514.6			
Middle Kittanning		426.5	1343.7			
Lower Kittanning		484.3	1285.9			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
405.0	47.0	[Graphic Log: 405.0 to 424.8]		Shale, dark gray		100%	93%
424.8	19.8	[Graphic Log: 424.8 to 426.5]		Shale, dark gray, with sandstone		100%	93%
426.5	1.7	[Graphic Log: 426.5 to 428.5]		Middle Kittanning Coal, with shale		100%	60%
428.5	2.0	[Graphic Log: 428.5 to 435.5]		Shale, gray		100%	60%
435.5	7.0	[Graphic Log: 435.5 to 441.5]		Sandy Shale, gray, with sandstone		100%	100%
441.5	6.0	[Graphic Log: 441.5 to 460.7]		Shale, dark gray		100%	100%
460.7	19.2	[Graphic Log: 460.7 to 462.5]		Shale, gray		100%	93%
462.5	1.8	[Graphic Log: 462.5 to 480.7]		Shale, gray, with some sandstone inclusions		100%	93%
480.7	18.2	[Graphic Log: 480.7 to 500.0]		Sandstone, gray, with interbedded sandyshale		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2003	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1770.21				Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling: Continuous Core
Surveyed by:	LCT					Date Drilled: 1/28/2020-1/31/2020
Survey Method:	GPS					Drilled By: RES
						Logged By: P. Mack
						Municipality: Donegal
						County, State: Westmoreland, PA
						Quadrangle: Stahlstown, PA
						Laboratory: Geochemical
						Northing: 288920.832
						Easting: 1521055.983
						Grid Coordinates:

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
481.14	0.44	#####		Lower Kittanning - Boney, with coal bands		100%	67%
481.31	0.17			Lower Kittanning - Shale, black			
484.30	2.99			Lower Kittanning - Coal, bright			
485.7	1.4			Claystone, gray			
494.3	8.6			Sandstone, gray			
495.2	0.9		Sandy Shale, gray				
				Bottom of Hole DH 2003 Depth 495.2 feet			
			500				
			510				
			520				
			530				
			540				
			550				
			560				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2004	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1824.38	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	2/3/2020-2/12/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289764.508
						Easting:	1521736.642
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	316.90	1507.5	Middle Kittanning	479.00	1345.4		
Lower Freeport	402.80	1421.6	Lower Kittanning	540.70	1283.7		
Lower Freeport	406.60	1417.8					
Middle Kittanning	460.50	1363.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
38.5	38.5	[Graphic Log]	10	Shale, brown, weathered			
40.0	1.5	[Graphic Log]	20	Shale, dark gray, with coal			
48.0	8.0	[Graphic Log]	30	Shale, gray, limy, with limestone		93%	23%
67.5	19.5	[Graphic Log]	40	Shale, gray, with sandy shale		100%	67%
69.0	1.5	[Graphic Log]	50	Sandstone, gray		100%	77%
80.0	11.0	[Graphic Log]	60	Shale, gray, with sandy shale		93%	25%
		[Graphic Log]	70				
		[Graphic Log]	80				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2004	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1824.38	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	2/3/2020-2/12/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289764.508
						Easting:	1521736.642
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	316.90	1507.5	Middle Kittanning	479.00	1345.4		
Lower Freeport	402.80	1421.6	Lower Kittanning	540.70	1283.7		
Lower Freeport	406.60	1417.8					
Middle Kittanning	460.50	1363.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
83.0	3.0	=====		Shale, dark gray		93%	25%
86.0	3.0	#####		Clayshale, gray			
88.0	2.0	=====		Shale, red and gray			
95.0	7.0	=====	90	Shale, gray			
		=====	100			100%	80%
		=====	110	Shale, gray, with sandyshale		100%	100%
		=====	120				
125.0	30.0	=====					
		=====	130	Shale, dark gray		100%	87%
		=====	140				
141.7	16.7	=====					
142.1	0.4	□□□□□□□□		Limestone, gray, with fossils		100%	47%
		=====	150	Shale, gray			
		=====				100%	67%
158.7	16.6	=====					
		=====	160	Shale, red and gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2004	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1824.38	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	2/3/2020-2/12/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289764.508
						Easting:	1521736.642
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	316.90	1507.5	Middle Kittanning	479.00	1345.4		
Lower Freeport	402.80	1421.6	Lower Kittanning	540.70	1283.7		
Lower Freeport	406.60	1417.8					
Middle Kittanning	460.50	1363.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
161.7	3.0	=====		Shale, red and gray		100%	67%
		=====		Shale, gray, with clayshale			
169.0	7.3	=====	170			100%	67%
		=====		Shale, gray, with sandyshale			
		=====	180				
		=====				100%	100%
		=====	190				
195.0	26.0	=====		Shale, dark gray			
199.5	4.5	=====	200			100%	43%
		=====		Shale, gray, with clayshale			
210.0	10.5	=====	210				
		=====		Shale, gray, with sandyshale			
		=====	220			100%	100%
		=====					
		=====	230				
		=====				100%	93%
		=====	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2004	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1824.38	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	2/3/2020-2/12/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289764.508
						Easting:	1521736.642
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning		316.90	1507.5	Middle Kittanning	479.00	1345.4	
Lower Freeport		402.80	1421.6	Lower Kittanning	540.70	1283.7	
Lower Freeport		406.60	1417.8				
Middle Kittanning		460.50	1363.9				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
243.0	33.0	=====		Shale, gray, with sandys shale			
249.2	6.2	=====		Shale, dark gray		100%	100%
250.8	1.6	|||||	250	Limestone, gray, with fossils (Brush Creek LS)			
279.0	28.2	=====	260	Shale, dark gray		100%	83%
285.2	6.2	=====	270				
		=====	280	Shale, gray, with clayshale			
314.2	29.0	=====	290	Shale, gray		100%	100%
		=====	300				
		=====	310				
316.4	2.2	=====		Shale, dark gray			
316.9	0.5	#####		Mahoning Coal, with shale			
		#####		Clay, gray		93%	64%
		#####	320				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2004	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1824.38	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	2/3/2020-2/12/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289764.508
						Easting:	1521736.642
						Grid Coordinates:	
	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Coal Seam ID							
Mahoning	316.90	1507.5	Middle Kittanning	479.00	1345.4		
Lower Freeport	402.80	1421.6	Lower Kittanning	540.70	1283.7		
Lower Freeport	406.60						
Middle Kittanning	460.50	1363.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
402.7	12.5	=====		Shale, dark gray		100%	90%
402.8	0.1	=====		Lower Freeport Coal			
405.7	2.9	.....		Sandstone, gray, hard		100%	90%
406.6	0.9	=====		Lower Freeport Coal, with shale			
413.0	6.4	.....	410	Sandstone, gray, hard		100%	90%
						
432.0	19.0	.....	420	Shale, gray		100%	90%
						
449.0	17.0	.....	430			100%	93%
450.0	1.0	=====	440	Sandstone, gray, hard			
459.0	9.0	.....	450	Shale, dark gray		100%	30%
		.....		Shale, dark gray, broken			
460.5	1.5	=====	460	Middle Kittanning Coal, with shale		100%	77%
461.7	1.2	=====		Shale, dark gray, broken			
465.0	3.3	.....		Sandyshale, gray		100%	77%
						
477.7	12.7	.....	470	Shale, dark gray		100%	77%
479.0	1.3	=====		Middle Kittanning Coal, with shale			
		=====	480	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2004	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1824.38					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	Notes	ND			Date Drilled:	2/3/2020-2/12/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289764.508
						Easting:	1521736.642
						Grid Coordinates:	
	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Coal Seam ID							
Mahoning	316.90	1507.5	Middle Kittanning	479.00	1345.4		
Lower Freeport	402.80	1421.6	Lower Kittanning	540.70	1283.7		
Lower Freeport	406.60	1417.8					
Middle Kittanning	460.50	1363.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
485.0	6.0	[Graphic Log]		Shale, gray			
492.5	7.5	[Graphic Log]	490	Sandy Shale, gray, with sandstone		100%	93%
497.5	5.0	[Graphic Log]		Shale, dark gray			
518.6	21.1	[Graphic Log]	500 510	Shale, gray		100%	100%
520.3	1.7	[Graphic Log]	520	Shale, gray, some slicks			
538.4	18.1	[Graphic Log]	530	Sandstone, light gray, well sorted, several breaks, hard		100%	100%
538.6	0.2	[Graphic Log]		Shale, black			
539.03	0.43	[Graphic Log]	540	Lower Kittanning Coal		100%	45%
540.70	1.67	[Graphic Log]		Claystone, dark gray to gray, some breaks			
542.5	1.8	[Graphic Log]		Claystone, gray, broken and crumbled in places			
544.1	1.6	[Graphic Log]		Claystone, tannish gray			
544.8	0.7	[Graphic Log]		Claystone, gray, some sandy			
546.0	1.2	[Graphic Log]					
550.7	4.7	[Graphic Log]	550	Sandstone, gray, fine grained			
555.0	4.3	[Graphic Log]		Shale, gray		100%	93%
		[Graphic Log]	560	Shale, dark gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2004	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1824.38	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	2/3/2020-2/12/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289764.508
						Easting:	1521736.642
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	316.90	1507.5	Middle Kittanning	479.00	1345.4		
Lower Freeport	402.80	1421.6	Lower Kittanning	540.70	1283.7		
Lower Freeport	406.60	1417.8					
Middle Kittanning	460.50	1363.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
571.0	16.0	=====	570	Shale, dark gray		100%	15%
575.2	4.2	.....		Sandstone, gray, hard			
				Bottom of Hole DH 2004 Depth 575.2 feet			
			580				
			590				
			600				
			610	Shale, gray, with sandy shale			
			620				
			630				
			640				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2005	Measured Static Water Levels			
Surface Elev.	1816.61				
Surveyed by:	LCT	Date Measured	Depth (ft)	Elevation (MSL)	Notes
Survey Method:	GPS	ND			
Coal Seam ID		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by: _____	
Mahoning		318.6	1498.0		
Upper Freeport		389.0	1427.6		
Lower Kittanning		548.7	1267.9		

Operation Name :	Rustic Ridge #1 Mine-Expansion
Method Drilling:	Continuous Core
Date Drilled:	2/13/2020-2/21/2020
Drilled By:	RES
Logged By:	P. Mack
Municipality:	Donegal
County, State:	Westmoreland, PA
Quadrangle:	Stahlstown, PA
Laboratory:	Geochemical
Northing:	290323.211
Easting:	1520790.805
Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
				Shale, brown, weathered			
30.2	30.2		30				
32.5	2.3			Shale, dark gray			
34.2	1.7	|||||		Limestone, gray, with fossils			
37.5	3.3			Shale, dark gray, with coal		80%	17%
45.0	7.5		40	Shale, gray, with clayshale			
65.0	20.0		50	Shale, brown and gray, broken		100%	77%
67.2	2.2	.....	60	Sandstone, brown, fractured		100%	33%
			70	Shale, gray, broken			
			80			100%	33%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2005	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1816.61	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	2/13/2020-2/21/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	290323.211
					Easting:	1520790.805
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		318.6	1498.0			
Upper Freeport		389.0	1427.6			
Lower Kittanning		548.7	1267.9			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
81.0	13.8	=====		Shale, gray, broken			
		=====				100%	33%
		=====		Shale, gray, with clayshale			
91.0	10.0	=====	90				
		=====		Shale, red			
95.0	4.0	=====				100%	40%
		=====		Shale, gray, with clayshale			
108.0	13.0	=====	100				
		=====		Shale, gray, with sandyshale		100%	80%
124.0	16.0	=====	110				
		=====		Shale, dark gray		100%	83%
		=====					
		=====		Shale, dark gray, with fossils		100%	47%
141.0	17.0	=====	120				
142.0	1.0	=====					
		=====		Shale, gray, with clayshale			
150.0	8.0	=====	130				
		=====		Shale, gray		100%	90%
159.0	9.0	=====	140				
		=====		Shale, red and gray			
		=====	150				
		=====					
		=====	160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2005	Measured Static Water Levels			Operation Name : Rustic Ridge #1 Mine-Expansion	
Surface Elev.	1816.61					Date Measured	Depth (ft)	Elevation (MSL)
Surveyed by:	LCT	ND				Method Drilling: Continuous Core
Survey Method:	GPS					Date Drilled: 2/13/2020-2/21/2020
Coal Seam ID		Bottom Depth (ft)	Bottom Elevation (MSL)	Notes		Drilled By: RES
Mahoning		318.6	1498.0			Logged By: P. Mack
Upper Freeport		389.0	1427.6			Municipality: Donegal
Lower Kittanning		548.7	1267.9			County, State: Westmoreland, PA
						Quadrangle: Stahlstown, PA
						Laboratory: Geochemical
					Northing: 290323.211	
					Easting: 1520790.805	
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
171.5		[Graphic Log]	170	Shale, red and gray		100%	90%
195.0	23.5	[Graphic Log]	180	Shale, gray, with sandy shale		100%	57%
200.4	5.4	[Graphic Log]	190	Shale, red and gra		100%	100%
201.4	1.0	[Graphic Log]	200	Limestone, gray, with fossils		100%	37%
214.0	12.6	[Graphic Log]	210	Shale, gray, with clay		100%	73%
		[Graphic Log]	220	Shale, gray, with clayshale		100%	100%
		[Graphic Log]	230				
		[Graphic Log]	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2005	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1816.61	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	2/13/2020-2/21/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	290323.211
					Easting:	1520790.805
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Mahoning	318.6	1498.0				
Upper Freeport	389.0	1427.6				
Lower Kittanning	548.7	1267.9				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
245.0	31.0	=====		Shale, gray, with clayshale			
251.5	6.5	=====	250	Shale, dark gray		100%	100%
253.1	1.6	|||||		Limestone, gray, with fossils (Brush Creek LS)			
281.5	28.4	=====	260	Shale, dark gray		100%	100%
		=====	270				
		=====	280			100%	73%
286.5	5.0	=====		Shale, gray, with clayshale			
315.2	28.7	=====	290	Shale, gray, with sandy		100%	90%
		=====	300				
		=====	310			100%	93%
318.0	2.8	=====		Shale, dark gray		100%	67%
318.6	0.6	#####		Mahoning Coal, with shale			
		#####	320	Clayshale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2005	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1816.61	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	2/13/2020-2/21/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	290323.211
					Easting:	1520790.805
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
324.0	5.4	##### ##### ##### #####		Clayshale, gray		100%	67%
0.3	21.0	=====	330	Shale, gray		100%	100%
361.0	16.0	=====	350	Shale, gray		100%	100%
378.4	17.4	.....	370	Sandstone, gray		100%	100%
381.2	2.8	=====	380	Shale, dark gray			
383.0	1.8	=====		Shale, dark gray, with coal (Upper Freeport)		100%	40%
388.0	5.0	=====		Shale, gray, with clayshale			
389.0	1.0	=====		Upper Freeport Coal, with shale			
		=====	390	Shale, gray		100%	100%
		=====	400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2005	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1816.61	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	2/13/2020-2/21/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	290323.211
					Easting:	1520790.805
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		318.6	1498.0			
Upper Freeport		389.0	1427.6			
Lower Kittanning		548.7	1267.9			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
418.5	29.5	=====	410	Shale, gray		100%	100%
		.....	420				
		.....	430				
		.....	440	Sandstone, gray, hard			
		.....	450				
460.0	41.5	.....	460			100%	100%
		.....	470	Shale, dark gray			
		.....	480				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2005	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1816.61	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	2/13/2020-2/21/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	290323.211
					Easting:	1520790.805
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
493.0 494.0	33.0 1.0	=====	490	Shale, dark gray		100%	83%
				Shale, dark gray, with coal (Middle Kittanning)			
500.0	6.0	=====	500	Shale, gray			
504.8 505.1	4.8 0.3	=====		Shale, dark gray		100%	93%
				Shale, dark gray, with coal (Middle Kittanning)			
511.0	5.9	|||||	510	Limestone, gray (Middle Kittanning LS)			
516.3 517.2	5.3 0.9	=====		Shale, gray			
				Shale, dark gray		100%	80%
525.7	8.5	=====	520	Shale, gray			
			530				
				Sandy shale, gray, with interbedded sandstone		100%	93%
			540				
545.2 545.7	19.5 0.5	=====		Shale, black, with bone and coal, broken		100%	65%
548.7 550.2	3.0 1.5	=====	550	Lower Kittanning - Coal, bright			
				Clayshale, gray, sandy, several breaks			
555.3	5.1	#####		Clayshale, gray to tannish gray, several breaks			
558.7	3.4	=====		Sandstone, gray		100%	80%
			560	Shale, gray, with sandy shale			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2005	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1816.61	Date	Depth	Elevation	Method Drilling:	Continuous Core
Surveyed by:	LCT	Measured	(ft)	(MSL)	Date Drilled:	2/13/2020-2/21/2020
Survey Method:	GPS	ND			Drilled By:	RES
		Bottom Depth	Bottom Elevation	SWL measured by:	Logged By:	P. Mack
		(ft)	(MSL)		Municipality:	Donegal
Coal Seam ID					County, State:	Westmoreland, PA
Mahoning	318.6	1498.0			Quadrangle:	Stahlstown, PA
Upper Freeport	389.0	1427.6			Laboratory:	Geochemical
Lower Kittanning	548.7	1267.9			Northing:	290323.211
					Easting:	1520790.805
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
565.2	6.5	=====		Shale, gray, with sandy shale		100%	80%
				Bottom of Hole DH 2005 Depth 565.2 feet			
			570				
			580				
			590				
			600				
			610				
			620				
			630				
			640				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2007	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1767.53	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	3/2/2020-3/11/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	285553.476
						Easting:	1513415.743
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	198.40	1569.1	Middle Kittanning	345.20	1422.3		
Upper Freeport	249.80	1517.7	Lower Kittanning	422.40	1345.1		
Upper Kittanning	324.40	1443.1					
Upper Kittanning	331.80	1435.7					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
25.2	25.2	=====	10	Shale, dark gray, weathered			
31.0	5.8	#####	30	Clayshale, gray			
45.0	14.0	=====	40	Shale, gray		93%	39%
75.2	30.2	=====	50	Shale, gray, with clayshale, broken		100%	0%
76.2	1.0	=====	70				100%	40%
		=====		Shale, dark gray			
		=====		Shale, gray		100%	80%
		=====	80				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2007	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1767.53	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	3/2/2020-3/11/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	285553.476
						Easting:	1513415.743
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		=====				100%	80%
		=====	90				
		=====				100%	93%
		=====	100	Shale, gray			
		=====				100%	93%
		=====	110				
119.2	43.0	=====					
121.2	2.0	|||||	120	Limestone, dark gray, with fossils (Brush Creek LS)			
		=====				100%	90%
		=====	130				
		=====				100%	93%
		=====	140	Shale, dark gray			
		=====				100%	93%
		=====	150				
156.0	34.8	=====				100%	80%
		=====					
		=====	160	Shale, gray, with clayshale			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2007	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1767.53	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	3/2/2020-3/11/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	285553.476
						Easting:	1513415.743
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	198.40	1569.1	Middle Kittanning	345.20	1422.3		
Upper Freeport	249.80	1517.7	Lower Kittanning	422.40	1345.1		
Upper Kittanning	324.40	1443.1					
Upper Kittanning	331.80	1435.7					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
167.5	11.5	[Graphic Log]		Shale, gray, with clayshale		100%	80%
194.2	26.7	[Graphic Log]	170 180 190	Shale, gray, with sandyshale		100%	93%
195.9	1.7	[Graphic Log]		Shale, dark gray			
198.4	2.5	[Graphic Log]		Mahoning Coal			
205.0	6.6	[Graphic Log]	200	Shale, gray, with clayshale		83%	72%
		[Graphic Log]	210 220	Shale, gray, with sandyshale		100%	93%
		[Graphic Log]	230 240			100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2007	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1767.53	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	3/2/2020-3/11/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	285553.476
						Easting:	1513415.743
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	198.40	1569.1	Middle Kittanning	345.20	1422.3		
Upper Freeport	249.80	1517.7	Lower Kittanning	422.40	1345.1		
Upper Kittanning	324.40	1443.1					
Upper Kittanning	331.80	1435.7					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
245.0	40.0	=====		Shale, gray, with sandyshale			
247.8	2.8	=====		Shale, dark gray, with sandstone		100%	80%
249.8	2.0	=====	250	Upper Freeport Coal, with shale			
		=====					
		=====	260			100%	93%
		=====					
		=====	270				
		=====		Shale, gray		100%	87%
		=====	280				
		=====					
		=====	290			100%	90%
295.0	45.2	=====					
		=====		Shale, gray, variegated			
300.2	5.2	=====	300				
		#####		Clayshale, gray			
304.0	3.8	#####					
		=====				100%	67%
		=====	310				
		=====		Shale, gray			
		=====				100%	90%
		=====	320				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2007	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1767.53	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	3/2/2020-3/11/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	285553.476
						Easting:	1513415.743
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
322.4	18.4	=====		Shale, gray			
324.0	1.6	=====		Shale, dark gray			
324.4	0.4	=====		Upper Kittanning Coal		100%	90%
330.9	6.5	=====	330	Shale, dark gray			
331.8	0.9	=====		Upper Kittanning Coal, with shale			
343.4	11.6	=====	340	Shale, dark gray, with sandstone		100%	70%
345.2	1.8	=====		Middle Kittanning Coal, with shale			
363.1	17.9	=====	350	Shale, gray		100%	93%
363.6	0.5	=====	360	Shale, dark gray			
369.3	5.7	OOOOOOOOO	370	Limestone, gray (Middle Kittanning LS)		100%	90%
393.3	24.0	=====	380	Shale, gray		100%	90%
396.8	5.5	=====	390	Sandstone, gray, with shale			
		=====	400	Sandstone, light gray		100%	97%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2007	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1767.53	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	3/2/2020-3/11/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	285553.476
						Easting:	1513415.743
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	198.40	1569.1	Middle Kittanning	345.20	1422.3		
Upper Freeport	249.80	1517.7	Lower Kittanning	422.40	1345.1		
Upper Kittanning	324.40	1443.1					
Upper Kittanning	331.80	1435.7					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
410.0	11.2	[Graphic Log]	410	Sandstone, light gray		100%	97%
416.3	6.3	[Graphic Log]		Sandy Shale, dark gray, w/ some interbedded sandstone		100%	100%
418.2	0.3	[Graphic Log]		Shale, dark gray			
418.8	0.6	[Graphic Log]					
419.5		[Graphic Log]	420	Lower Kittanning Coal		100%	33%
422.4	4.0	[Graphic Log]					
424.1	1.7	[Graphic Log]		Claystone, dark gray, broken, weak			
432.0	8.0	[Graphic Log]	430	Sandy Shale, dark gray, with some clay		100%	100%
435.2	2.8	[Graphic Log]		Shale, gray, with sandstone			
		[Graphic Log]	440	Bottom of Hole DH 2007 Depth 435.2 feet			
		[Graphic Log]	450				
		[Graphic Log]	460				
		[Graphic Log]	470				
		[Graphic Log]	480				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2010	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1935.51	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	3/30/2020-4/7/2020
Survey Method:	GPS				Drilled By:	RES
		SWL measured by:			Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291395.307
					Easting:	1522705.705
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)			
Coal Seam ID						
Upper Freeport		501.3	1434.2			
Lower Kittanning		654.2	1281.3			
Lower Kittanning		655.7	1279.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
35.2	35.2	[Graphic Log: 0-35.2 ft]	10, 20, 30	Shale, brown, weathered			
38.2	3.0	[Graphic Log: 35.2-38.2 ft]		Sandy Shale, brown and gray			
47.2	9.0	[Graphic Log: 38.2-47.2 ft]	40	Shale, gray		100%	65%
73.5	26.3	[Graphic Log: 47.2-73.5 ft]	50, 60, 70	Shale, brown and gray, weathered, with sandstone		100%	37%
		[Graphic Log: 73.5-80 ft]	80	Shale, dark gray, broken		83%	28%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2010	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1935.51	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	3/30/2020-4/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291395.307
					Easting:	1522705.705
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Freeport		501.3	1434.2			
Lower Kittanning		654.2	1281.3			
Lower Kittanning		655.7	1279.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
87.0	13.5	=====		Shale, dark gray, broken		83%	28%
107.0	20.0	.....	90	Sandstone, gray, with shale and coal streaks		93%	71%
108.3	1.3	=====		Shale, dark gray, with coal			
114.0	5.7	=====	110	Shale, dark gray		100%	47%
130.0	16.0	OOOOOOOO	120	Limestone, gray, with shale		100%	80%
144.0	14.0	=====	140	Shale, gray, with clayshale		100%	30%
150.7	6.7	=====	150	Shale, dark gray			
158.0	7.3	=====		Shale, dark gray, with fossils		100%	60%
158.6	0.6	OOOOOOOO		Limestone, gray, with fossils			
		=====	160	Shale, dark gray, broken			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2010	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1935.51	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	3/30/2020-4/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291395.307
					Easting:	1522705.705
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Freeport		501.3	1434.2			
Lower Kittanning		654.2	1281.3			
Lower Kittanning		655.7	1279.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
163.0	4.4	=====		Shale, dark gray, broken		100%	60%
		=====					
		=====	170	Shale, gray		100%	63%
		=====					
		=====	180				
186.0	23.0	=====		Shale, red and gray		100%	47%
		=====					
		=====	190				
195.2	9.2	=====		Limestone, gray, with shale		100%	83%
		=====					
		=====	200				
		=====					
		=====	210	Shale, gray, with clayshale		100%	70%
210.2	15.0	=====					
		=====					
		=====	220				
		=====					
		=====	230	Shale, gray, with sandyshale		100%	100%
219.5	9.3	=====					
		=====					
		=====	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2010	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1935.51	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	3/30/2020-4/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291395.307
					Easting:	1522705.705
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Freeport		501.3	1434.2			
Lower Kittanning		654.2	1281.3			
Lower Kittanning		655.7	1279.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
246.0	26.5	=====		Shale, gray, with sandyshale			
		=====				100%	100%
		=====	250				
		=====		Shale, dark gray			
		=====	260			100%	83%
267.0	21.0	=====					
		=====	270				
		=====		Shale, gray		100%	93%
		=====	280				
290.0	23.0	=====	290				
		#####		Clayshale, gray		100%	63%
294.0	4.0	#####					
295.5	1.5	=====		Shale, red			
		=====					
		=====	300				
		=====		Shale, gray		100%	100%
		=====	310				
		=====				100%	87%
		=====	320				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2010	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1935.51	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	3/30/2020-4/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291395.307
					Easting:	1522705.705
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Freeport		501.3	1434.2			
Lower Kittanning		654.2	1281.3			
Lower Kittanning		655.7	1279.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
325.0	29.5	=====		Shale, gray		100%	87%
326.0	1.0	|||||		Limestone, gray, with fossils			
328.5	2.5	=====		Shale, dark gray			
		=====	330			100%	90%
		=====	340				
		=====		Shale, gray			
		=====	350			100%	77%
		=====	360				
363.0	34.5	=====					
		=====	370	Shale, dark gray		100%	100%
375.2	12.2	=====					
377.0	1.8	|||||		Limestone, gray, with fossils (Brush Creek LS)			
		=====	380			100%	100%
		=====	390				
		=====		Shale, dark gray			
		=====	400			100%	83%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2010	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1935.51	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	3/30/2020-4/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291395.307
					Easting:	1522705.705
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Freeport		501.3	1434.2			
Lower Kittanning		654.2	1281.3			
Lower Kittanning		655.7	1279.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
404.0	27.0	=====		Shale, dark gray		100%	83%
410.0	6.0	=====	410	Shale, gray, with clayshale			
		=====				100%	63%
		=====	420				
		=====		Shale, gray, with sandyshale		100%	100%
		=====	430				
		=====				100%	87%
442.0	32.0	=====	440				
446.6	4.6	=====		Shale, dark gray			
448.0	1.4	=====		Shale, dark gray, with Mahoning coal			
		=====	450				
		=====		Shale, gray			
455.0	7.0	=====				100%	77%
		=====	460				
		=====		Shale, gray, with sandyshale		100%	93%
		=====	470				
		=====					
		=====	480				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2010	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1935.51	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	3/30/2020-4/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291395.307
					Easting:	1522705.705
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Freeport		501.3	1434.2			
Lower Kittanning		654.2	1281.3			
Lower Kittanning		655.7	1279.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
484.0	29.0	=====		Shale, gray, with sandyshale			
488.3	4.3	=====		Shale, dark gray		100%	77%
489.7	1.4	=====	490	Shale, dark gray, with Upper Freeport coal			
498.4	8.7	=====		Shale, dark gray			
501.3	2.9	=====	500	Upper Freeport Coal, with shale			
529.3	28.0	=====	510	Shale, gray		100%	80%
		=====	520			100%	100%
		=====	530			100%	100%
		=====	540	Sandstone, gray		100%	100%
		=====	550			100%	93%
		=====	560				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2010	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1935.51	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	3/30/2020-4/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291395.307
					Easting:	1522705.705
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Freeport		501.3	1434.2			
Lower Kittanning		654.2	1281.3			
Lower Kittanning		655.7	1279.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
564.5	35.2	[Graphic Log]		Sandstone, gray		100%	93%
577.6	13.1	[Graphic Log]	570	Shale, gray		100%	80%
579.5	1.9	[Graphic Log]		Shale, dark gray, with coal (Middle Kittanning)		100%	80%
597.8	18.3	[Graphic Log]	580	Shale, dark gray		100%	83%
599.2	1.4	[Graphic Log]		Shale, dark gray, with coal (Middle Kittanning)		100%	83%
602.0	2.8	[Graphic Log]	600	Shale, gray		100%	100%
612.0	10.0	[Graphic Log]	610	Sandstone, gray		100%	100%
615.2	3.2	[Graphic Log]		Shale, dark gray		100%	100%
618.2	3.0	[Graphic Log]		Limestone, gray (Middle Kittanning LS)		100%	100%
633.8	15.6	[Graphic Log]	620	Shale, gray, with sandy shale		100%	100%
		[Graphic Log]	630				
640.3	6.5	[Graphic Log]		Sandy Shale, dark gray		100%	90%
		[Graphic Log]	640	Sandstone, light gray, coarse grained			

7.1A GEOLOGIC DRILL LOG

Hole No. <u>DH-2010</u>	Measured Static Water Levels	Operation Name : <u>Rustic Ridge #1 Mine-Expansion</u>
Surface Elev. <u>1935.51</u>	Date _____	Method Drilling: <u>Continuous Core</u>
Surveyed by: <u>LCT</u>	Depth _____	Date Drilled: <u>3/30/2020-4/7/2020</u>
Survey Method: <u>GPS</u>	Elevation _____	Drilled By: <u>RES</u>
	Notes	Logged By: <u>P. Mack</u>
	ND	Municipality: <u>Donegal</u>
	SWL measured by: _____	County, State: <u>Westmoreland, PA</u>
	Bottom Depth _____	Quadrangle: <u>Stahlstown, PA</u>
	Bottom Elevation _____	Laboratory: <u>Geochemical</u>
Coal Seam ID	(ft)	(MSL)
Upper Freeport	501.3	1434.2
Lower Kittanning	654.2	1281.3
Lower Kittanning	655.7	1279.8
		Northing: <u>291395.307</u>
		Easting: <u>1522705.705</u>
		Grid Coordinates: _____

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		.....	====			100%	90%
653.5	13.2	.....	====	Sandstone, light gray, coarse grained			
		.....	====			100%	53%
653.8	0.3	=====	====	Shale, black			
654.2	0.4	=====	====	Lower Kittanning Coal			
655.7	1.5	=====	====	Clayshale, dark gray			
657.1	1.4	#####	====				
		#####	====				
661.0	3.9	#####	660	Claystone, gray to light gray, broken, with slicks			
		:-:=-:=-:=-:=-:	====				
665.8	4.8	:-:=-:=-:=-:=-:	====	Sandy Shale, gray, with some clay			
		=====	====			100%	100%
		=====	670				
681.0	15.2	=====	====	Shale, gray, with sandyshale			
		=====	680				
		.....	====			100%	100%
		.....	====	Sandstone, gray, hard			
695.0	14.0	.....	690				
		.....	====			100%	87%
703.0	8.0	.....	700	Sandstone, gray, with col streaks, hard			
705.2	2.2	.....	====	Sandstone, gray, hard			
		.....	====	Bottom of Hole DH 2010 Depth 705.2 feet			
		.....	710				
		.....	720				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2011	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1677.03				Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT				Date Drilled:	4/8/2020-4/15/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Latitude:	290483.299
					Longitude:	1519869.000
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		307.1	1369.9			
Upper Kittanning		325.3	1351.7			
Middle Kittanning		348.2	1328.8			
Lower Kittanning		418.0	1259.0			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
23.0	23.0	[Graphic Log: 0-23 ft]	10	Shale, brown, weathered			
26.2	3.2	[Graphic Log: 23-26.2 ft]	20	Shale, red			
35.0	8.8	[Graphic Log: 26.2-35 ft]	30	Shale, gray, with clayshale		100%	0%
37.0	2.0	[Graphic Log: 35-37 ft]	40	Shale, red		83%	48%
60.0	23.0	[Graphic Log: 37-60 ft]	50	Shale, gray		100%	87%
63.0	3.0	[Graphic Log: 60-63 ft]	60	Shale, red and gray			
76.0	13.0	[Graphic Log: 63-76 ft]	70	Shale, gray, with clayshale		100%	40%
		[Graphic Log: 76-80 ft]	80	Shale, gray		100%	83%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2011	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1677.03				Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/8/2020-4/15/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Latitude:	290483.299
					Longitude:	1519869.000
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		307.1	1369.9			
Upper Kittanning		325.3	1351.7			
Middle Kittanning		348.2	1328.8			
Lower Kittanning		418.0	1259.0			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
101.0	25.0		90	Shale, gray		100%	83%
113.5	12.5		110	Shale, dark gray		100%	100%
115.0	1.5			Limestone, gray, with fossils (Brush Creek LS)			
144.0	29.0		120	Shale, dark gray		100%	100%
153.0	9.0		130	Shale, gray, with clayshale		100%	73%
			140	Shale, gray, with sandy shale		100%	80%
			150				
			160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2011	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1677.03	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/8/2020-4/15/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Latitude:	290483.299
					Longitude:	1519869.000
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		307.1	1369.9			
Upper Kittanning		325.3	1351.7			
Middle Kittanning		348.2	1328.8			
Lower Kittanning		418.0	1259.0			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
184.0	31.0	=====	170	Shale, gray, with sandy shale		100%	80%
193.0	9.0	=====	180				
		=====	190	Shale, gray, with clayshale		100%	33%
		=====	200				
		=====	210	Shale, gray, with sandy shale		100%	100%
		=====	220				
226.0	33.0	.....	230	Sandstone, gray, with shale		100%	90%
		.....	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2011	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1677.03	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/8/2020-4/15/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Latitude:	290483.299
					Longitude:	1519869.000
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		307.1	1369.9			
Upper Kittanning		325.3	1351.7			
Middle Kittanning		348.2	1328.8			
Lower Kittanning		418.0	1259.0			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
			250	Sandstone, gray, with shale		100%	93%
258.0	32.0						
260.2			260	Shale, dark gray			
						100%	30%
				Shale, gray, with clayshale			
270.2			270				
						100%	100%
			280				
				Shale, gray			
						100%	93%
			290				
			300				
303.2	33.0						
				Upper Kittanning Coal, with shale			
307.1	3.9						
						100%	53%
				Clayshale, gray			
309.5	2.4						
			310				
				Shale, gray			
						100%	53%
319.0	9.5						
			320	Shale, dark gray, with sandstone			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2011	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1677.03	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/8/2020-4/15/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Latitude:	290483.299
					Longitude:	1519869.000
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		307.1	1369.9			
Upper Kittanning		325.3	1351.7			
Middle Kittanning		348.2	1328.8			
Lower Kittanning		418.0	1259.0			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
323.7	4.7	=====		Shale, dark gray, with sandstone			
325.3	1.6	=====		Upper Kittanning Coal, with shale		100%	53%
		=====	330				
		=====		Shale, dark gray		100%	100%
		=====	340				
347.2	21.9	=====					
348.2	1.0	=====		Middle Kittanning Coal, with shale			
		=====	350				
		=====		Shale, gray		100%	87%
360.2	12.0	=====	360				
361.0	0.8	=====		Shale, dark gray			
365.2	4.2	|||||		Limestone, gray (Middle Kittanning LS)			
		=====	370			100%	93%
		=====		Shale, gray			
		=====	380				
385.0	19.8	=====				100%	93%
		=====	390				
		=====		Sandy Shale, gray, with sandstone			
394.8	9.8	=====				100%	100%
		=====	400				
		=====		Sandstone, light gray, w/ interbed. ssh, several breaks			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2011	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1677.03	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/8/2020-4/15/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Latitude:	290483.299
					Longitude:	1519869.000
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		307.1	1369.9			
Upper Kittanning		325.3	1351.7			
Middle Kittanning		348.2	1328.8			
Lower Kittanning		418.0	1259.0			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		.....		Sandstone, light gray, w/ interbed, sandy shale		100%	100%
						
						
						
						
						
						
						
						
						
414.8	20.0		410				
415.5				Lower Kittanning - Boney coal, with coal			
418.0	2.5			Lower Kittanning - Coal, bright		100%	43%
419.5	1.5	#####		Clayshale, dark gray, broken			
		#####	420				
		#####		Claystone, gray, crumbled and broken			
		#####					
423.9	4.4	#####					
		#####		Clayshale, gray, HAFs and slicks			
428.0	4.1	#####				100%	90%
		#####					
430.2	2.2		430	Shale, gray			
				Bottom of Hole DH 2011 Depth 430.2 feet			
			440				
			450				
			460				
			470				
			480				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2012	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1627.90				Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT		ND		Date Drilled:	4/16/2020-4/22/2020
Survey Method:	GPS				Drilled By:	RES
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:	Logged By:	P. Mack
Coal Seam ID					Municipality:	Donegal
Lower Kittanning	379.3	1248.6			County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291682.828
					Easting:	1519667.638
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
13.2	13.2	=====	10	Shale, brown, weathered		24%	0%
18.0	4.8	#####		Clayshale, red			
32.5	14.5	=====	20 30	Shale, gray, with clayshale		80%	0%
57.0	24.5	=====	40 50	Shale, gray		100%	83%
69.0	12.0	=====	60	Shale, dark gray		100%	87%
70.5	1.5	|||||	70	Limestone, gray, with fossils (Brush Creek LS)		100%	90%
		=====	80	Shale, dark gray		100%	93%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2012	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1627.90				Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT				Date Drilled:	4/16/2020-4/22/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291682.828
					Easting:	1519667.638
					Grid Coordinates:	
Coal Seam ID		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Lower Kittanning		379.3	1248.6			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
101.0	30.5	[Graphic Log: 90-100 ft]	90	Shale, dark gray		100%	93%
114.5	13.5	[Graphic Log: 110-114.5 ft]	110	Shale, gray, with clayshale		100%	40%
140.0	25.5	[Graphic Log: 120-140 ft]	120	Shale, gray		100%	93%
151.0	11.0	[Graphic Log: 140-151 ft]	140	Shale, gray, with clayshale		100%	37%
		[Graphic Log: 151-160 ft]	150	Shale, gray, with sandy shale and sandstone		100%	93%
		[Graphic Log: 160-160 ft]	160				

7.1A GEOLOGIC DRILL LOG

Hole No. <u>DH-2012</u>	Measured Static Water Levels		Operation Name : <u>Rustic Ridge #1 Mine-Expansion</u>	
Surface Elev. <u>1627.90</u>	Date Measured <u>ND</u>	Depth (ft)	Elevation (MSL)	Method Drilling: <u>Continuous Core</u>
Surveyed by: <u>LCT</u>	Notes			Date Drilled: <u>4/16/2020-4/22/2020</u>
Survey Method: <u>GPS</u>				Bottom Depth (ft) <u>379.3</u>	Bottom Elevation (MSL) 1248.6	Drilled By: RES
Coal Seam ID <u>Lower Kittanning</u>	SWL measured by: _____			Logged By: <u>P. Mack</u>
				Municipality: <u>Donegal</u>
				County, State: <u>Westmoreland, PA</u>
				Quadrangle: <u>Stahlstown, PA</u>
				Laboratory: <u>Geochemical</u>
				Northing: <u>291682.828</u>
				Easting: <u>1519667.638</u>
				Grid Coordinates: _____

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		=====				100%	93%
		=====					
		=====					
		=====	170	Shale, gray, with sandy shale and sandstone		100%	100%
		=====					
		=====					
180.0	29.0	=====	180				
						
						
						
		.....	190	Sandstone, gray		100%	100%
						
						
						
210.0	30.0	.....	210				
						
213.0	3.0	=====		Shale, dark gray, with coal (Upper Freeport)			
		=====					
219.0	6.0	=====		Shale, gray		100%	77%
		=====					
		=====					
		=====	220	Shale, gray, with limestone			
226.0	7.0	=====					
		=====					
		=====	230	Shale, gray, with clayshale			
232.5	6.5	=====					
		=====					
		=====					
		=====	240	Shale, gray, with sandy shale and sandstone		100%	83%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2012	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1627.90	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/16/2020-4/22/2020
Survey Method:	GPS				Drilled By:	RES
		SWL measured by:			Logged By:	P. Mack
	Bottom Depth (ft)	Bottom Elevation (MSL)			Municipality:	Donegal
Coal Seam ID					County, State:	Westmoreland, PA
Lower Kittanning	379.3	1248.6			Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291682.828
					Easting:	1519667.638
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		=====				100%	100%
		=====	250				
		=====		Shale, gray, with sandy shale and sandstone		100%	100%
		=====	260				
		=====				100%	93%
		=====	270				
		=====				100%	100%
		=====	280				
283.6	51.1	=====		Shale, dark gray, with coal (Upper Kittanning)			
284.1	0.5	=====					
287.5	3.4	=====		Shale, gray			
		=====	290			100%	100%
		=====		Shale, dark gray			
		=====	300			100%	87%
309.0	21.5	=====					
309.4	0.4	=====	310	Shale, dark gray, with coal (Middle Kittanning)			
		=====		Shale, gray		100%	93%
		=====	320				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2012	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1627.90	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/16/2020-4/22/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291682.828
					Easting:	1519667.638
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Lower Kittanning	379.3	1248.6				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
323.0	13.6	=====		Shale, gray			
327.0	4.0	|||||		Limestone, gray (Middle Kittanning LS)		100%	93%
335.0	8.0	=====	330	Shale, gray			
335.7	0.7	=====		Shale, dark gray			
355.7	20.0	=====	340	Shale, gray, with sandy shale			
		=====	350				
374.3	18.6	=====	360	Sandy Shale, dark gray, with interbed Sandstone			
		=====	370				
375.7	1.4	=====		Shale, dark gray, with boney			
375.8	0.1	=====		Lower Kittanning - Boney			
379.3	3.5	=====		Lower Kittanning - Coal, bright			
379.9	0.6	#####	380	Clayshale, dark gray		100%	53%
383.7		#####		Clayshale, gray, sandy, with breaks and HAFs			
388.7	9.0	#####		Clayshale, tan. gray to gray, several breaks, w/ slicks			
389.3	0.6	#####		Sandstone, gray		100%	100%
390.2	0.9	=====	390	Sandy Shale, gray			
				Bottom of Hole DH 2012 Depth 390.2 feet			
			400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2013	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1804.67	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/27/2020-5/5/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	292175.038
					Easting:	1520225.41
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		319.0	1485.7			
Middle Kittanning		492.4	1312.3			
Lower Kittanning		559.3	1245.4			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
15.2	15.2	[Graphic Log: 15.2 ft depth]	10	Shale, brown, weathered			
32.0	16.8	[Graphic Log: 32.0 ft depth]	30	Shale, dark gray, broken		77%	0%
41.0	9.0	[Graphic Log: 41.0 ft depth]	40	Shale, dark gray, with limestone and fossils		90%	33%
55.0	14.0	[Graphic Log: 55.0 ft depth]	50	Shale, dark gray, broken		93%	29%
60.0	5.0	[Graphic Log: 60.0 ft depth]	60	Sandy Shale, gray, with shale and coal streaks			
64.5	4.5	[Graphic Log: 64.5 ft depth]		Shale, gray, with clayshale			
		[Graphic Log: 70 ft depth]	70	Sandy Shale, gray		100%	67%
		[Graphic Log: 80 ft depth]	80			100%	87%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2013	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1804.67	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/27/2020-5/5/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	292175.038
					Easting:	1520225.41
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		319.0	1485.7			
Middle Kittanning		492.4	1312.3			
Lower Kittanning		559.3	1245.4			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
81.5	17.0	=====		Sandy Shale, gray		100%	87%
		=====		Shale, gray			
		=====	90				
95.2	13.7	=====		Shale, red, with gray shale and clayshale		100%	17%
		=====	100				
107.0	11.8	=====		Shale, gray		100%	80%
		=====	110				
		=====	120				
123.0	16.0	=====		Shale, dark gray, broken		100%	60%
		=====	130				
		=====	140				
143.3	20.3	=====		Limestone, gray, with fossils		100%	60%
143.6	0.3	|||||					
		#####		Clayshale, gray, with shale		100%	90%
		#####	150				
		#####	160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2013	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1804.67	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/27/2020-5/5/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	292175.038
					Easting:	1520225.41
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		319.0	1485.7			
Middle Kittanning		492.4	1312.3			
Lower Kittanning		559.3	1245.4			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
163.6	20.0	##### ##### ##### #####		Clayshale, gray, with shale		100%	90%
178.5	14.9	=====	170	Shale, red and gray		100%	30%
196.5	18.0	=====	180	Shale, gray		100%	83%
198.5	2.0	=====		Shale, red			
204.6	6.1	=====	200	Shale, gray		100%	30%
205.0	0.4	=====		Coal			
		=====	210				
		=====	220	Shale, gray		100%	93%
		=====	230				
240.0	35.0	=====	240			100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2013	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1804.67				Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/27/2020-5/5/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	292175.038
					Easting:	1520225.41
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		319.0	1485.7			
Middle Kittanning		492.4	1312.3			
Lower Kittanning		559.3	1245.4			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
252.0	12.0	=====	250	Shale, dark gray		100%	100%
254.0	2.0	|||||		Limestone, gray, with fossils (Brush Creek LS)			
283.0	29.0	=====	260	Shale, dark gray		100%	100%
		=====	270				
		=====	280			100%	87%
		=====	290				
		=====	300	Shale, gray		100%	93%
		=====	310				
318.0	35.0	=====					
319.0	1.0	=====		Mahoning Coal, with shale		100%	72%
		=====	320	Shale, gray, with clayshale			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2013	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1804.67	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/27/2020-5/5/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	292175.038
					Easting:	1520225.41
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		319.0	1485.7			
Middle Kittanning		492.4	1312.3			
Lower Kittanning		559.3	1245.4			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
334.0	15.0	[Graphic Log: 15 ft of shale with clay shale]	330	Shale, gray, with clayshale		100%	72%
346.0	12.0	[Graphic Log: 12 ft of shale with sandy shale]	340	Shale, gray, with sandy shale		100%	100%
384.6	38.6	[Graphic Log: 38.6 ft of sandstone]	350, 360, 370, 380	Sandstone, gray		100%	100%
		[Graphic Log: 16.4 ft of shale]	390, 400	Shale, dark gray		100%	87%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2013	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1804.67	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/27/2020-5/5/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	292175.038
					Easting:	1520225.41
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		319.0	1485.7			
Middle Kittanning		492.4	1312.3			
Lower Kittanning		559.3	1245.4			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
404.0	19.4	=====		Shale, dark gray		100%	87%
410.0	6.0	=====	410	Shale, gray, with clayshale			
421.0	11.0	=====	420	Shale, gray, with sandy shale		100%	77%
464.0	43.0	.....	430	Sandstone, gray, with sandy shale		100%	100%
		.....	440			100%	100%
		.....	450			100%	93%
		.....	460			100%	93%
		=====	470	Shale, dark gray		100%	93%
		=====	480				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2013	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1804.67	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	4/27/2020-5/5/2020
Survey Method:	GPS				Drilled By:	RES
		SWL measured by:			Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	292175.038
					Easting:	1520225.41
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)			
Coal Seam ID						
Mahoning		319.0	1485.7			
Middle Kittanning		492.4	1312.3			
Lower Kittanning		559.3	1245.4			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
492.0	28.0	[Graphic Log: Horizontal dashes]	490	Shale, dark gray		80%	54%
492.4	0.4	[Graphic Log: Horizontal dashes]		Middle Kittanning Coal			
504.5	12.1	[Graphic Log: Horizontal dashes]	500	Shale, gray		100%	100%
511.0	6.5	[Graphic Log: Stippled pattern]	510	Limestone, gray (Middle Kittanning LS)			
525.0	14.0	[Graphic Log: Horizontal dashes]	520	Shale, gray, with sandy shale		100%	90%
530.0	5.0	[Graphic Log: Horizontal dashes]	530	Shale, gray, with clayshale			
534.0	4.0	[Graphic Log: Horizontal dashes]		Sandy Shale, gray		80%	83%
535.5	1.5	[Graphic Log: Horizontal dashes]		Sandy Shale, dark gray			
555.1	19.6	[Graphic Log: Horizontal dashes]	540	Sandy Shale, gray, with thin interbedded sandstone		33%	90%
555.5	0.42	[Graphic Log: Horizontal dashes]		Lower Kittanning - Boney, with coal bands			
559.3	3.80	[Graphic Log: Horizontal dashes]	550	Lower Kittanning - Coal, bright		85%	43%
560.4	1.1	[Graphic Log: Horizontal dashes]	560	Clayshale, dark gray, some sandy			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2013	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1804.67				Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling: Continuous Core
Surveyed by:	LCT					Date Drilled: 4/27/2020-5/5/2020
Survey Method:	GPS					Drilled By: RES
						Logged By: P. Mack
						Municipality: Donegal
						County, State: Westmoreland, PA
						Quadrangle: Stahlstown, PA
						Laboratory: Geochemical
						Northing: 292175.038
						Easting: 1520225.41
						Grid Coordinates:

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
565.4	5.0	##### ##### ##### ##### #####		Claystone, dark to light gray		85%	43%
570.2	4.8	:|=|=|=|=|=| :=|=|=|=|=|=| :=|=|=|=|=|=| :=|=|=|=|=|=|		Sandy Shale, gray			
			570	Bottom of Hole DH 2013 Depth 570.2 feet			
			580				
			590				
			600				
			610				
			620				
			630				
			640				

7.1A GEOLOGIC DRILL LOG

Hole No. <u>DH-2014</u>	Measured Static Water Levels	Operation Name : Rustic Ridge #1 Mine-Expansion
Surface Elev. <u>1756.70</u>	Date Measured <u>ND</u>	Method Drilling: Continuous Core
Surveyed by: <u>LCT</u>	Depth (ft)	Date Drilled: 5/19/2020-5/26/2020
Survey Method: <u>GPS</u>	Elevation (MSL)	Drilled By: RES
Coal Seam ID	Notes	Logged By: P. Mack
	SWL measured by: _____	Municipality: Donegal
Bottom Depth (ft)		County, State: Westmoreland, PA
Bottom Elevation (MSL)		Quadrangle: Stahlstown, PA
Upper Kittanning	405.7 1351.0	Laboratory: Geochemical
Upper Kittanning	420.8 1335.9	Northing: 291368.488
Middle Kittanning	441.5 1315.2	Easting: 1521159.95
Lower Kittanning	501.9 1254.8	Grid Coordinates: _____

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
23.2	23.2	#####	10	Clay, brown, sandy, with sandstone			
26.0	2.8	.....		Sandstone, gray		100%	0%
27.7	1.7	00000000		Limestone, gray			
40.0	12.3	=====	30	Shale, gray, with clayshale		100%	27%
50.0	10.0	=====	40	Shale, red and gray			
60.0		=====	50			100%	67%
70.0		=====	60	Shale, gray			
80.0	30.0	=====	70			100%	93%
		=====	80			100%	87%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2014	Measured Static Water Levels	Operation Name : Rustic Ridge #1 Mine-Expansion
Surface Elev.	1756.70	Date Measured	Method Drilling: Continuous Core
Surveyed by:	LCT	Depth (ft)	Date Drilled: 5/19/2020-5/26/2020
Survey Method:	GPS	Elevation (MSL)	Drilled By: RES
		Notes	Logged By: P. Mack
			Municipality: Donegal
			County, State: Westmoreland, PA
			Quadrangle: Stahlstown, PA
			Laboratory: Geochemical
			Northing: 291368.488
			Easting: 1521159.95
			Grid Coordinates: _____

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
			90	Shale, dark gray		100%	87%
102.0	22.0		100				
102.5	0.5			Shale, dark gray, with fossils			
108.5	6.0			Shale, gray, with clayshale			
			110				
120.0	11.5		120	Shale, gray, with sandy shale		100%	77%
125.0	5.0			Shale, red and gray			
128.0	3.0			Shale, dark gray		100%	57%
132.5	4.5	##### ##### ##### #####	130	Clayshale, red and gray			
			140				
			150	Shale, gray		100%	93%
156.0	23.5						
156.7	0.7			Shale, red			
157.7	1.0	□□□□□□□□		Limestone, gray			
			160	Shale, dark gray		100%	80%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2014	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1756.70	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	5/19/2020-5/26/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291368.488
					Easting:	1521159.95
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
165.4	7.7	=====		Shale, dark gray		100%	80%
180.4	15.0	=====	170	Shale, gray, with clayshale		100%	17%
205.0	24.6	=====	180	Shale, gray		100%	93%
212.5	7.5	=====	190	Shale, gray		100%	90%
214.1	1.6	=====	200	Shale, gray		100%	100%
		=====	210	Limestone, gray, with fossils (Brush Creek LS)		100%	100%
		=====	220	Shale, dark gray		100%	100%
		=====	230	Shale, dark gray		100%	100%
		=====	240	Shale, dark gray		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2014	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1756.70	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	5/19/2020-5/26/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291368.488
					Easting:	1521159.95
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
243.0	28.9	=====		Shale, dark gray		100%	47%
		=====	250				
		=====	260	Shale, gray		100%	100%
		=====	270				
281.0	38.0	=====	280			100%	67%
284.0	3.0	=====		Shale, dark gray			
285.2	1.2	=====		Shale, dark gray, with coal (Mahoning)			
		=====	290	Shale, gray, with clayshale		100%	60%
293.5	8.3	=====	300				
		=====	310	Shale, gray, with sandy shale		100%	100%
		=====	320			100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2014	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1756.70	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	5/19/2020-5/26/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291368.488
					Easting:	1521159.95
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
332.5	39.0	[Graphic Log]	330	Shale, gray, with sandy shale		100%	100%
348.6	16.1	[Graphic Log]	340	Sandstone, gray		100%	100%
350.8	2.2	[Graphic Log]	350	Shale, dark gray, with coal (Upper Freeport)		100%	50%
		[Graphic Log]	360				
		[Graphic Log]	370			100%	90%
		[Graphic Log]	380	Shale, gray		100%	100%
		[Graphic Log]	390				
399.6	48.8	[Graphic Log]	400			100%	47%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2014	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1756.70	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	5/19/2020-5/26/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291368.488
					Easting:	1521159.95
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		405.7	1351.0			
Upper Kittanning		420.8	1335.9			
Middle Kittanning		441.5	1315.2			
Lower Kittanning		501.9	1254.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
402.2	2.6	=====		Shale, dark gray		100%	47%
405.7	3.5	=====		Upper Kittanning Coal			
419.0	13.3	=====	410	Shale, gray		100%	77%
420.8	1.8	=====	420	Upper Kittanning Coal, with shale			
440.2	19.4	=====	430	Shale, dark gray		100%	93%
441.5	1.3	=====	440	Middle Kittanning Coal, with shale			
449.0	7.5	=====	450	Sandy Shale, gray		100%	83%
454.2	5.2	=====	460	Shale, dark gray			
461.0	6.8	=====	470	Limestone, gray (Middle Kittanning LS)		100%	93%
478.5	17.5	=====	480	Shale, gray		100%	93%
		=====		Sandy Shale, gray, with interbedded shale			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2014	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1756.70	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	5/19/2020-5/26/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291368.488
					Easting:	1521159.95
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Upper Kittanning		405.7	1351.0			
Upper Kittanning		420.8	1335.9			
Middle Kittanning		441.5	1315.2			
Lower Kittanning		501.9	1254.8			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
482.8	4.3	=====		Sandy Shale, gray, with interbedded shale		100%	93%
484.7	1.9	=====		Shale, dark gray, w/ int. sandstone			
493.0	8.3	.....	490	Sandstone, light gray, fine grained, some int. shale			
498.0	5.0	=====		Sandy Shale, dark gray, with thin int. sandstone		100%	73%
498.5	0.5	=====		Boney coal, with coal bands			
501.9	3.4	=====	500	Lower Kittanning - Shale, black (498.62) Lower Kittanning - Coal, bright			
503.7	1.8	#####		Clayshale, dark gray, some sandy		100%	100%
506.2	2.5	#####		Claystone, gray, some broken, with slicks			
508.0	1.8	#####		Clayshale, gray, sandy			
510.8	2.8	.....	510	Sandstone, light gray		100%	100%
515.2	4.4	=====		Sandy Shale, gray			
		=====		Bottom of Hole DH 2014 Depth 515.2 feet			
		=====	520				
		=====	530				
		=====	540				
		=====	550				
		=====	560				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2015	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1741.41	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	5/28/2020 - 6/2/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288925.15
						Easting:	1509403.29
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	145.5	1595.9	Lower Kittanning	387.4	1354.0		
Upper Freeport	190.8	1550.6					
Upper Kittanning	273.5	1467.9					
Middle Kittanning	316.6	1424.8					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
10.0	10.0	=====	10	Shale, brown, weathered			
17.0	7.0	#####		Clay, brown and red		40%	0%
23.0	6.0	=====	20	Shale, brown and gray, weathered		93%	7%
48.0	25.0	=====	30	Shale, gray		100%	93%
69.0	21.0	=====	40	Shale, dark gray		100%	93%
70.6	1.6	|||||	50	Limestone, gray, with fossils (Brush Creek LS)		100%	100%
		=====	60	Shale, dark gray		100%	80%
		=====	70				
		=====	80				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2015	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1741.41	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	5/28/2020 - 6/2/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288925.15
						Easting:	1509403.29
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	145.5	1595.9	Lower Kittanning	387.4	1354.0		
Upper Freeport	190.8	1550.6					
Upper Kittanning	273.5	1467.9					
Middle Kittanning	316.6	1424.8			1741.4		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
		=====				100%	80%
98.4	27.8	=====	90	Shale, dark gray			
100.0	1.6	#####	100	Clay, gray		100%	60%
105.0	5.0	=====		Shale, gray			
105.4	0.4	=====		Shale, dark gray			
108.0	2.6	#####		Clay, gray			
		=====	110			100%	80%
		=====	120	Shale, gray, with sandy shale			
		=====	130			100%	90%
135.0	27.0	=====					
		=====	140	Shale, dark gray		100%	47%
143.7	8.7	=====					
145.5	1.8	=====		Mahoning Coal, with shale binders			
		=====	150	Shale, gray, with clayshale			
152.0	6.5	=====				100%	87%
		=====	160	Shale, gray, with sandy shale			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2015	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1741.41	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	5/28/2020 - 6/2/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288925.15
						Easting:	1509403.29
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	145.5	1595.9	Lower Kittanning	387.4	1354.0		
Upper Freeport	190.8	1550.6					
Upper Kittanning	273.5	1467.9					
Middle Kittanning	316.6	1424.8			1741.4		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
188.0	36.0	[Graphic Log]	170	Shale, gray, with sandy shale		100%	87%
189.4	1.4	[Graphic Log]	190	Shale, dark gray, broken			
190.8	1.4	[Graphic Log]		Upper Freeport Coal, with shale			
195.2	4.4	[Graphic Log]		Shale, gray, with clayshale		93%	54%
230.0	34.8	[Graphic Log]	200	Shale, gray		100%	83%
		[Graphic Log]	210				
		[Graphic Log]	220				
		[Graphic Log]	230				
240.0	10.0	[Graphic Log]		Shale, gray, with sandy shale		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2015	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1741.41	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	5/28/2020 - 6/2/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288925.15
						Easting:	1509403.29
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	145.5	1595.9	Lower Kittanning	387.4	1354.0		
Upper Freeport	190.8	1550.6					
Upper Kittanning	273.5	1467.9					
Middle Kittanning	316.6	1424.8			1741.4		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
261.0	21.0	[Graphic Log: 250-260 ft]	250	Sandy Shale, gray, with sandstone		100%	100%
264.2	3.2	[Graphic Log: 260-264.2 ft]	260	Shale, dark gray		100%	93%
272.8	8.6	[Graphic Log: 264.2-272.8 ft]	270	Sandstone, gray			
273.5	0.7	[Graphic Log: 272.8-273.5 ft]		Upper Kittanning Coal, with shale			
280.0	6.5	[Graphic Log: 273.5-280.0 ft]	280	Shale, gray		100%	83%
302.0	22.0	[Graphic Log: 280.0-302.0 ft]	290	Shale, dark gray		100%	93%
314.4	12.4	[Graphic Log: 302.0-314.4 ft]	300				
316.6	2.2	[Graphic Log: 314.4-316.6 ft]	310	Sandstone, gray, with dark gray shale		100%	90%
		[Graphic Log: 316.6-320.0 ft]		Middle Kittanning Coal			
		[Graphic Log: 320.0-321.6 ft]	320	Shale, gray		100%	87%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2015	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1741.41	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	5/28/2020 - 6/2/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288925.15
						Easting:	1509403.29
						Grid Coordinates:	
	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Coal Seam ID							
Mahoning	145.5	1595.9	Lower Kittanning	387.4	1354.0		
Upper Freeport	190.8	1550.6					
Upper Kittanning	273.5	1467.9					
Middle Kittanning	316.6	1424.8			1741.4		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
321.0	4.4	=====		Shale, gray			
324.7	3.7	=====		Shale, dark gray		100%	87%
328.0	3.0	□□□□□□□□		Limestone, gray (Middle Kittanning LS)			
344.0	16.0	=====	330	Shale, gray		100%	93%
346.0	2.0	=====		Shale, drak gray			
353.6	7.6	=====	350	Shale, gray		100%	80%
356.0	2.4	=====		Shale, gray, with clayshale			
360.2	4.2	=====	360	Shale, gray			
363.6	3.4	=====		Shale, dark gray, with sandstone			
375.0	11.4	.....	370	Sandstone, gray, with int. sandy shale		100%	85%
383.6	8.6	.....				
384.01	0.41	.....				
387.23	3.22	.....		Lower Kittanning Coal lost core 387.23 - 387.40			
387.40	0.17	.....				
389.2	1.8	#####	390	Clayshale, gray, sandy, hard		100%	67%
393.0	5.0	#####		Clayshale, gray, several breaks			
398.0	5.0	.....		Sandstone, gray, with interbedded sandy shale			
		=====	400	Shale, gray		100%	80%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2015	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1741.41	Date	Depth	Elevation	Method Drilling:	Continuous Core
Surveyed by:	LCT	Measured	(ft)	(MSL)	Date Drilled:	5/28/2020 - 6/2/2020
Survey Method:	GPS	ND			Drilled By:	RES
		SWL measured by:			Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	288925.15
					Easting:	1509403.29
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)				
Mahoning	145.5	1595.9	Lower Kittanning	387.4	1354.0	
Upper Freeport	190.8	1550.6				
Upper Kittanning	273.5	1467.9				
Middle Kittanning	316.6	1424.8			1741.4	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
400.2	2.8	=====		Shale, gray			
				Bottom of Hole DH 2015 Depth 400.2 feet			
			410				
			420				
			430				
			440				
			450				
			460				
			470				
			480				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2016	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1714.01	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	6/8/2020 - 6/10/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290081.47
						Easting:	1509054.67
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	158.6	1555.4	Upper Kittanning	276.5	1437.5		
Upper Freeport	196.4	1517.6	Middle Kittanning	308.5	1405.5		
Lower Freeport	243.0	1471.0	Lower Kittanning	380.2	1333.8		
Lower Freeport	249.5	1464.5					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
17.0	17.0	[Graphic Log]	10	Shale, brown, red and gray, weathered			
29.2	12.2	[Graphic Log]	30	Shale, gray, weathered		70%	0%
32.0	2.8	[Graphic Log]		Sandstone, gray			
48.5	16.5	[Graphic Log]	40	Shale, gray, with sandy shale		100%	83%
69.0	37.0	[Graphic Log]	50	Shale, dark gray		100%	87%
71.0	2.0	[Graphic Log]	70	Limestone, gray, with fossils (Brush Creek LS)		100%	100%
		[Graphic Log]	80	Shale, dark gray		100%	87%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2016	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1714.01	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	6/8/2020 - 6/10/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290081.47
						Easting:	1509054.67
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD	
98.0	57.6	=====	90	Shale, dark gray		100%	87%	
105.2	7.2	=====	100	Shale, gray		100%	67%	
107.0	1.8	=====		Shale, dark gray				
112.0	5.0	#####	110	Claystone, gray		100%	60%	
144.5	32.5	=====	120	Shale, gray, with sandy shale and sandstone		100%	93%	
		=====	130				100%	83%
		=====	140				100%	83%
148.2	3.7	=====		Shale, dark gray				
149.2	1.0	#####	150	Clay, gray				
154.4	5.2	=====		Shale, dark gray		100%	60%	
158.6	4.2	=====		Mahoning Coal, with shale				
		=====	160	Shale, gray, with clayshale				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2016	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1714.01					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	6/8/2020 - 6/10/2020	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	290081.47	
					Easting:	1509054.67	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
165.0	6.4	[Graphic Log]		Shale, gray, with clayshale		100%	60%
188.0	23.0	[Graphic Log]	170 180	Shale, gray		100%	87%
195.2 196.4	7.2 1.2	[Graphic Log]	190	Shale, dark gray		100%	83%
		[Graphic Log]		Upper Freeport Coal			
216.0	19.6	[Graphic Log]	200 210	Shale, gray		100%	77%
230.0	14.0	[Graphic Log]	220 230	Shale, gray, with sandy shale		100%	100%
239.0	9.0	[Graphic Log]		Shale, dark gray		100%	53%
		[Graphic Log]	240	Lower Freeport Coal			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2016	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1714.01					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	6/8/2020 - 6/10/2020	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	290081.47	
					Easting:	1509054.67	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
243.0	4.0			Lower Freeport Coal, with shale		100%	37%
247.5	4.5			Shale, dark gray			
249.5	2.0		250	Lower Freeport Coal		100%	93%
256.5	7.0			Shale, gray, with clayshale			
265.0	15.0		260	Shale, gray		100%	80%
268.0	3.0			Sandstone, gray, hard			
275.2	7.2		270	Shale, gray		100%	93%
276.5	1.3			Upper Kittanning Coal, with shale			
306.1	29.6		280	Shale, dark gray		100%	77%
308.5	2.4		290				
316.4	7.9		300				
			310	Limestone, gray (Middle Kittanning LS)		100%	93%
			320				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2016	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1714.01	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	6/8/2020 - 6/10/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290081.47
						Easting:	1509054.67
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
322.4	6.0	|||||		Limestone, gray (Middle Kittanning LS)			
329.0	6.6	=====		Shale, gray		100%	93%
333.0	4.0	:-:-:-:-:-	330	Sandy Shale, gray			
334.2	1.2	=====		Shale, dark gray			
335.9	1.7	=====		Shale, gray			
337.0	1.1	=====		Shale, dark gray			
344.0	7.0	:-:-:-:-:-	340	Sandy Shale, gray		100%	80%
356.5	12.5	=====	350	Shale, dark gray		100%	100%
375.3	18.8	.....	360	Sandy Shale, gray, with interbedded sandstone		100%	100%
375.5	0.2	=====		Shale, dark gray			
375.6	0.1	#####		Clay, gray, soft			
376.0	0.4	=====		Shale, dark gray to black			
376.5	0.5	=====		Boney coal, with shale			
376.62	0.12	#####		Lower Kittanning - Boney, with coal bands dull			
380.2	3.58	=====	380	Lower Kittanning Coal			
381.0	0.8	#####		Clayshale, gray, easy to break			
381.2	0.2	#####		Claystone, gray, soft			
382.5	1.3	#####		Clayshale, grayish tank			
390.2	7.7	#####	390	Clayshale, gray, some sandy		100%	57%
				Bottom of Hole DH 2016 Depth 390.2 feet			
			400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2017	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1792.64	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	6/15/2020 - 6/18/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290127.92
						Easting:	1507832.95
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	184.5	1608.1	Upper Kittanning	299.0	1493.6		
Upper Freeport	222.0	1570.6	Middle Kittanning	330.4	1462.2		
Lower Freeport	263.7	1528.9	Lower Kittanning	398.3	1394.3		
Lower Freeport	269.0	1523.6					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
15.2	15.2	[Graphic Log: 15.2 ft depth]	10	Shale, brown, weathered			
28.0	12.8	[Graphic Log: 28.0 ft depth]	20	Shale, gray		100%	20%
56.0	28.0	[Graphic Log: 56.0 ft depth]	30	Shale, red and gray		100%	73%
		[Graphic Log: 56.0 ft depth]	40				
		[Graphic Log: 56.0 ft depth]	50			100%	27%
		[Graphic Log: 56.0 ft depth]	60	Shale, gray		100%	87%
		[Graphic Log: 56.0 ft depth]	70				
		[Graphic Log: 56.0 ft depth]	80			100%	80%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2017	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1792.64	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	6/15/2020 - 6/18/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290127.92
						Easting:	1507832.95
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	184.5	1608.1	Upper Kittanning	299.0	1493.6		
Upper Freeport	222.0	1570.6	Middle Kittanning	330.4	1462.2		
Lower Freeport	263.7	1528.9	Lower Kittanning	398.3	1394.3		
Lower Freeport	269.0	1523.6					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
89.5	33.5	=====	90	Shale, gray		100%	80%
100.0	10.5	=====	100	Shale, dark gray		100%	100%
101.7	1.7	|||||		Limestone, gray, with fossils (Brush Creek LS)			
129.0	27.3	=====	110	Shale, dark gray		100%	100%
		=====	120				
143.5	14.5	=====	130	Shale, gray, with clayshale		100%	57%
		=====	140				
		=====	150	Shale, gray, with sandy shale		100%	100%
		=====	160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2017	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1792.64	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	6/15/2020 - 6/18/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290127.92
						Easting:	1507832.95
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	184.5	1608.1	Upper Kittanning	299.0	1493.6		
Upper Freeport	222.0	1570.6	Middle Kittanning	330.4	1462.2		
Lower Freeport	263.7	1528.9	Lower Kittanning	398.3	1394.3		
Lower Freeport	269.0	1523.6					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
177.0	33.5	[Graphic Log]	170	Shale, gray, with sandy shale		100%	100%
180.0	3.0	[Graphic Log]	180	Shale, dark gray		100%	83%
184.5	4.5	[Graphic Log]		Mahoning Coal			
199.5	15.0	[Graphic Log]	190	Shale, gray		100%	57%
209.0	9.5	[Graphic Log]	200	Sandstone, gray		100%	100%
220.0	11.0	[Graphic Log]	210	Shale, gray			
222.0	2.0	[Graphic Log]	220	Shale, dark gray, with coal (Upper Freeport)		100%	80%
225.0	3.0	[Graphic Log]		Shale, gray, with clayshale			
		[Graphic Log]	230	Shale, gray		100%	100%
		[Graphic Log]	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2017	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1792.64	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	6/15/2020 - 6/18/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290127.92
						Easting:	1507832.95
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	184.5	1608.1	Upper Kittanning	299.0	1493.6		
Upper Freeport	222.0	1570.6	Middle Kittanning	330.4	1462.2		
Lower Freeport	263.7	1528.9	Lower Kittanning	398.3	1394.3		
Lower Freeport	269.0	1523.6					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
253.0	28.0	[Graphic Log]	250	Shale, gray		100%	90%
260.6	7.6	[Graphic Log]	260	Shale, dark gray			
263.7	3.1	[Graphic Log]		Shale, dark gray, with coal (Lower Freeport)		100%	50%
267.5	3.8	[Graphic Log]		Shale, dark gray			
269.0	1.5	[Graphic Log]		Lower Freeport Coal			
276.0	7.0	[Graphic Log]	270	Clay, gray			
297.4	21.4	[Graphic Log]	280	Shale, gray, with sandy shale		100%	60%
299.0	1.6	[Graphic Log]	290			90%	70%
		[Graphic Log]		Upper Kittanning Coal			
305.0	6.0	[Graphic Log]	300	Shale, gray			
		[Graphic Log]				100%	100%
		[Graphic Log]	310	Sandy Shale, gray			
		[Graphic Log]				100%	77%
		[Graphic Log]	320				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2017	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1792.64	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	6/15/2020 - 6/18/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290127.92
						Easting:	1507832.95
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	184.5	1608.1	Upper Kittanning	299.0	1493.6		
Upper Freeport	222.0	1570.6	Middle Kittanning	330.4	1462.2		
Lower Freeport	263.7	1528.9	Lower Kittanning	398.3	1394.3		
Lower Freeport	269.0	1523.6					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
328.0	23.0			Sandy Shale, gray		100%	77%
330.4	2.4		330	Middle Kittanning Coal, with shale			
338.6	8.2			Shale, dark gray		100%	93%
341.0	2.4		340	Limestone, gray (Middle Kittanning LS)			
347.5	6.5			Shale, gray			
				Shale, dark gray			
365.0	16.0		350 360	Shale, gray		100%	87%
372.2	7.2		370	Sandstone, gray, with shale		100%	80%
374.9	2.7			Shale, dark gray, with sandy shale			
390.4	15.5		380 390	Sandy Shale, gray, a few breaks		100%	100%
394.9	4.5			Sandy Shale, gray, with interbedded sandstone			
395.2	0.3			Lower Kittanning - Boney, with coal bands, dull		100%	73%
398.1	2.9			Lower Kittanning - Coal, bright			
398.3	0.2			Lower Kittanning - Coal, with thin shale lenses, black			
			400	Clayshale, gray, sandy			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2017	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1792.64	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	6/15/2020 - 6/18/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290127.92
						Easting:	1507832.95
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
400.8	2.5	#####		Clayshale, gray, sandy			
405.8	5.0	#####		Sandy Shale, gray			
408.3	2.5	#####		Clayshale, gray, some sandy			
415.0	6.7	#####	410	Shale, gray			
418.0	3.0	#####		Shale, dark gray			
420.2	2.2	#####	420	Sandy Shale, gray			
				Bottom of Hole DH 2017 Depth 420.2 feet			
			430				
			440				
			450				
			460				
			470				
			480				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2033	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1870.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	10/5/2020-10/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291393.923
					Easting:	1507118.398
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
15.2	15.2	[Graphic Log]	10	Shale, brown and gray, highly weathered			
26.0	10.8	[Graphic Log]	20	Shale, brown		93%	0%
35.0	9.0	[Graphic Log]	30	Shale, brown and gray			
52.5	17.5	[Graphic Log]	40	Shale, dark gray		73%	23%
53.1	0.6	[Graphic Log]	50	Shale, dark gray, with fossils		100%	30%
57.1	4.0	[Graphic Log]		Shale, dark gray, broken			
61.1	4.0	[Graphic Log]	60	Clay, gray			
		[Graphic Log]	70	Shale, gray		100%	93%
		[Graphic Log]	80			100%	80%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2033	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1870.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	10/5/2020-10/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291393.923
					Easting:	1507118.398
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Lower Freeport	312.5	1557.5				
Lower Freeport	320.6	1549.4				
Middle Kittanning	385.7	1484.3				
Lower Kittanning	451.6	1418.4				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
95.5	34.4	[Graphic Log]	90	Shale, gray		100%	80%
98.8	3.3	[Graphic Log]		Shale, dark gray		100%	60%
100.0	1.2	[Graphic Log]	100	Coal, with shale			
123.0	23.0	[Graphic Log]	110	Sandy Shale, gray		100%	87%
139.0	16.0	[Graphic Log]	130	Shale, gray		100%	100%
149.0	10.0	[Graphic Log]	140	Shale, dark gray		100%	90%
151.2	2.2	[Graphic Log]	150	Shale, dark gray, with fossils (Brush Creek)			
		[Graphic Log]	160	Shale, dark gray		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2033	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1870.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	10/5/2020-10/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291393.923
					Easting:	1507118.398
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
257.5	31.3	[Graphic Log]	250	Shale, gray		100%	87%
260.0	2.5	[Graphic Log]	260	Shale, dark gray, with coal (Upper Freeport)			
262.1	2.1	[Graphic Log]		Clay, gray		100%	73%
299.2	37.1	[Graphic Log]	270				
300.2	1.0	[Graphic Log]	280	Shale, gray		100%	93%
303.2	3.0	[Graphic Log]	290				
305.8	2.6	[Graphic Log]	300	Shale, dark gray, with coal (Lower Freeport)			
311.4	5.6	[Graphic Log]	310	Shale, daark gray, with Lower Freeport coal			
312.5	1.1	[Graphic Log]		Shale, dark gray		87%	73%
		[Graphic Log]		Lower Freeport Coal, with shale			
318.9	6.4	[Graphic Log]		Shale, dark gray			
320.6	1.7	[Graphic Log]	320	Lower Freeport Coal, with shale		100%	77%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2033	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1870.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	10/5/2020-10/7/2020
Survey Method:	GPS				Drilled By:	RES
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	291393.923
					Easting:	1507118.398
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
331.6	11.0		330	Shale, gray, with clayshale		100%	77%
360.3	28.7		350	Sandy Shale, gray		100%	100%
382.5	22.2		380	Shale, dark gray		100%	90%
385.7	3.2			Middle Kittanning Coal		100%	73%
395.0	9.3		390	Sandy Shale, gray		100%	93%
			400	Limestone, gray (Middle Kittanning LS)			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2033	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1870.00				Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling: Continuous Core
Surveyed by:	LCT					Date Drilled: 10/5/2020-10/7/2020
Survey Method:	GPS					Drilled By: RES
						Logged By: P. Mack
						Municipality: Donegal
						County, State: Westmoreland, PA
						Quadrangle: Stahlstown, PA
						Laboratory: Geochemical
						Northing: 291393.923
						Easting: 1507118.398
						Grid Coordinates:

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
401.0	6.0			Limestone, gray (Middle Kittanning LS)		100%	93%
409.0	8.0			Sandy Shale, gray, with sandstone			
410.2	1.2		410	Shale, dark gray			
411.0	0.8			Shale, gray			
412.0	1.0			Shale, dark gray		100%	100%
428.2	16.2		420	Sandy Shale, gray, with sandstone		100%	100%
448.2	20.0		430	Sandstone, gray, c. grained to f. grained, w/ sh inclusions			
448.5	0.3		440	Lower Kittanning - Shale, black, with coal bands		100%	27%
451.6	3.1		450	Lower Kittanning - Coal, bright			
461.6	10.0		460	Clayshale, gray to dark gray			
			470	Bottom of Hole DH 2033 Depth 453.5 feet			
			480				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2036A	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1805.04	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	11/5/2020-11/13/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289808.785
						Easting:	1510086.491
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	244.00	1561.0	Middle Kittanning	408.50	1396.5		
Upper Freeport	288.00	1517.0	Lower Kittanning	478.20	1326.8		
Lower Freeport	344.00	1461.0					
Lower Freeport	349.50	1455.5					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
15.2	15.2	[Graphic Log: 15.2 ft depth]	10	Shale, brown, weathered			
30.7	15.5	[Graphic Log: 30.7 ft depth]	30	Shale, brown and gray		100%	7%
45.0	14.3	[Graphic Log: 45.0 ft depth]	40	Shale, gray		100%	33%
67.0	22.0	[Graphic Log: 67.0 ft depth]	50	Shale, dark gray		100%	80%
67.5	0.5	[Graphic Log: 67.5 ft depth]		Coal, with shale		100%	80%
75.5	8.0	[Graphic Log: 75.5 ft depth]	70	Shale, gray, with clayshale			
		[Graphic Log: 80 ft depth]	80	Shale, gray		100%	83%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2036A	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1805.04	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	11/5/2020-11/13/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289808.785
						Easting:	1510086.491
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	244.00	1561.0	Middle Kittanning	408.50	1396.5		
Upper Freeport	288.00	1517.0	Lower Kittanning	478.20	1326.8		
Lower Freeport	344.00	1461.0					
Lower Freeport	349.50	1455.5					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
105.0	29.5	=====	90	Shale, gray		100%	83%
112.0	7.0	=====	110	Shale, red		100%	47%
120.0	8.0	=====	120	Shale, gray, with clayshale		100%	83%
143.0	23.0	=====	140	Shale, gray, with sandy shale		100%	97%
		=====	150	Shale, dark gray		100%	93%
		=====	160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2036A	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1805.04	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	11/5/2020-11/13/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289808.785
						Easting:	1510086.491
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
162.0	19.0	=====		Shale, dark gray			
163.3	1.3	|||||		Limestone, gray, with fossils (Brush Creek LS)		100%	93%
		=====					
		=====	170				
		=====		Shale, dark gray			
		=====	180				
		=====					
		=====	190				
192.3	29.0	=====					
		=====		Shale, gray, with clayshale			
		=====	200				
203.5	11.2	=====				100%	80%
		=====					
		=====	210				
		=====		Shale, gray, with sandy shale			
		=====	220				
		=====					
		=====	230				
239.0	35.5	=====					
		=====	240	Mahoning Coal, with shale			
		=====					
		=====				100%	93%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2036A	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1805.04	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	11/5/2020-11/13/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289808.785
						Easting:	1510086.491
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	244.00	1561.0	Middle Kittanning	408.50	1396.5		
Upper Freeport	288.00	1517.0	Lower Kittanning	478.20	1326.8		
Lower Freeport	344.00	1461.0					
Lower Freeport	349.50	1455.5					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
244.0	5.0			Mahoning Coal, with shale			
			250	Shale, gray		100%	57%
			260	Shale, gray		100%	100%
			270	Shale, gray		100%	93%
281.0	37.0		280	Shale, gray			
284.5	3.5			Sandstone, gray			
286.8	2.3			Shale, dark gray			
288.0	1.2			Upper Freeport Coal, with shale			
290.2	2.2		290	Shale, gray			
				Shale, gray, with sandy shale		100%	80%
300.2	10.0		300	Shale, gray			
				Shale, gray		100%	90%
			310	Shale, gray			
				Shale, gray		100%	100%
			320	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2036A	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1805.04	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	11/5/2020-11/13/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289808.785
						Easting:	1510086.491
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	244.00	1561.0	Middle Kittanning	408.50	1396.5		
Upper Freeport	288.00	1517.0	Lower Kittanning	478.20	1326.8		
Lower Freeport	344.00	1461.0					
Lower Freeport	349.50	1455.5					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
339.5	39.3	=====	330	Shale, gray		100%	100%
343.6	4.1	=====	340	Shale, dark gray		100%	93%
344.0	0.4	=====		Lower Freeport Coal, with shale			
347.5	3.5	=====		Shale, dark gray			
349.5	2.0	=====		Lower Freeport Coal, with shale			
353.0	3.5	#####	350	Clay, gray		100%	60%
378.5	25.5	=====	360	Shale, gray		100%	93%
		=====	370				
		=====	380				
		=====	390	Shale, dark gray, with sandstone		100%	100%
		=====	400			100%	93%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2036A	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1805.04	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	11/5/2020-11/13/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	289808.785
						Easting:	1510086.491
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	244.00	1561.0	Middle Kittanning	408.50	1396.5		
Upper Freeport	288.00	1517.0	Lower Kittanning	478.20	1326.8		
Lower Freeport	344.00	1461.0					
Lower Freeport	349.50	1455.5					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
406.0	27.5	=====		Shale, dark gray, with sandstone		100%	93%
408.5	2.5	=====		Middle Kittanning Coal			
416.3	8.0	=====	410	Sandy Shale, dark gray		100%	80%
421.3	5.0	=====	420	Limestone, gray (Middle Kittanning LS)			
432.7	11.4	=====	430	Shale, gray		100%	100%
433.5	0.8	=====		Shale, dark gray			
450.5	17.0	=====	440	Shale, gray, with sandy shale		100%	100%
454.4	3.9	=====	450	Shale, dark gray, with sandstone streaks		100%	100%
473.0	18.6	=====	460	Sandstone, light gray, with interbedded sandy shale		100%	100%
473.8	0.8	=====	470	Shale, dark gray to black			
473.9	0.1	#####		Claystone, dark gray			
474.4	0.5	=====		Shale, black, with boney coal			
474.55	0.15	=====		Lower Kittanning - Boney coal, with shale		100%	41%
478.20	3.65	=====		Lower Kittanning - Coal, bright			
479.2	1.0	=====		Shale, gray			
			480	Bottom of Hole DH 2036A Depth 479.2 feet			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2037	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1744.01	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous
Surveyed by:	LCT	ND				Date Drilled:	11/18/2020-11/24/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290814.942
						Easting:	1507903.156
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	138.4	1605.6	Upper Kittanning	252.3	1491.7		
Upper Freeport	170.6	1573.4	Middle Kittanning	276.3	1467.7		
Lower Freeport	215.2	1528.8	Lower Kittanning	341.6	1402.4		
Lower Freeport	218.8	1525.2					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
86.1	30.0	[Graphic Log]		Shale, dark gray		100%	83%
95.2	9.1	[Graphic Log]	90	Shale, gray, with clayshale			
129.0	33.8	[Graphic Log]	100, 110, 120	Shale, gray, with sandy shale		100%	83%
133.9	4.9	[Graphic Log]	130	Shale, dark gray		100%	87%
138.4	4.5	[Graphic Log]		Mahoning Coal			
		[Graphic Log]	140, 150	Shale, gray		100%	70%
		[Graphic Log]	160			100%	80%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2037	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1744.01	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous
Surveyed by:	LCT	ND				Date Drilled:	11/18/2020-11/24/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290814.942
						Easting:	1507903.156
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
166.5	28.1	[Graphic Log]		Shale, gray		100%	80%
169.2	2.7	[Graphic Log]		Shale, dark gray, broken			
170.6	1.4	[Graphic Log]	170	Upper Freeport Coal			
208.2	37.6	[Graphic Log]	180 190 200	Shale, gray, with sandy shale		100%	67%
213.0	4.8	[Graphic Log]	210	Shale, dark gray			
215.2	2.2	[Graphic Log]		Lower Freeport Coal, with shale			
217.2	2.0	[Graphic Log]		Shale, dark gray			
218.8	1.6	[Graphic Log]		Lower Freeport Coal		100%	47%
230.0	11.0	[Graphic Log]	220 230	Shale, gray, with sandy shale			
		[Graphic Log]	240	Sandy Shale, gray, with sandstone		100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2037	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1744.01					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous
Surveyed by:	LCT	ND			Date Drilled:	11/18/2020-11/24/2020	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	290814.942	
					Easting:	1507903.156	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
241.0	11.0	[Graphic Log]		Sandy Shale, gray, with sandstone			
250.0	9.0	[Graphic Log]	250	Shale, dark gray, with sandstone		100%	77%
252.3	2.3	[Graphic Log]		Upper Kittanning Coal, with shale			
258.0	5.7	[Graphic Log]		Sandy Shale, gray			
274.2	16.2	[Graphic Log]	260 270	Shale, dark gray		100%	100%
276.3	2.1	[Graphic Log]		Middle Kittanning Coal			
283.5	7.2	[Graphic Log]	280	Shale, gray, with sandstone		100%	77%
285.2	1.7	[Graphic Log]		Shale, dark gray			
289.0	3.8	[Graphic Log]		Limestone, gray (Middle Kittanning LS)			
296.5	7.5	[Graphic Log]	290	Shale, gray		100%	93%
297.6	1.1	[Graphic Log]		Shale, dark gray			
303.2	5.6	[Graphic Log]	300	Shale, gray			
304.2	1.0	[Graphic Log]		Shale, dark gray			
312.2	8.0	[Graphic Log]	310	Shale, gray, with sandy shale		100%	100%
318.3	6.1	[Graphic Log]		Sandy Shale, dark gray, with sandstone		100%	100%
		[Graphic Log]	320	Sandy Shale, dark gray, with interbedded sandstone			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2037	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1744.01	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous
Surveyed by:	LCT	ND				Date Drilled:	11/18/2020-11/24/2020
Survey Method:	GPS					Drilled By:	RES
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	290814.942
						Easting:	1507903.156
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
332.8	14.5	[Graphic Log]	330	Sandy Shale, dark gray, with interbedded sandstone		100%	100%
337.9	5.1	[Graphic Log]		Sandstone, light gray, w/ int. sandy shale		100%	100%
338.3	0.4	[Graphic Log]		Shale, black, with boney coal			
338.8	0.5	[Graphic Log]		Lower Kittanning - Shale, black, w/ coal streaks			
339.5	0.7	[Graphic Log]	340	Lower Kittanning - Boney coal		100%	41%
340.3	0.9	[Graphic Log]		Lower Kittanning - Coal, bright, hard			
341.6	1.3	[Graphic Log]		Lower Kittanning - Coal, bright, soft			
342.6	1.0	[Graphic Log]		Shale, gray			
				Bottom of Hole DH 2037 Depth 342.6 feet			
			350				
			360				
			370				
			380				
			390				
			400				

7.1A GEOLOGIC DRILL LOG

Hole No. DH-2114	Measured Static Water Levels		Operation Name : Rustic Ridge #1 Mine-Expansion
Surface Elev. 1513.70	Date Measured ND	Depth (ft)	Method Drilling: Continuous Core
Surveyed by: LCT	Elevation (MSL)	Notes	Date Drilled: 6/22/2021-6/28/2021
Survey Method: GPS	SWL measured by:		Drilled By: RES
	Bottom Depth (ft)	Bottom Elevation (MSL)	Logged By: P. Mack
Coal Seam ID			Municipality: Donegal
Mahoning	21.4	1492.3	County, State: Westmoreland, PA
Upper Freeport	77.0	1436.7	Quadrangle: Stahlstown, PA
Upper Kittanning	168.0	1345.7	Laboratory: Geochemical
Middle Kittanning	192.5	1321.2	Northing: 290947.42
		Lower Kittanning 262.3 1251.4	Easting: 1516910.08
			Grid Coordinates:

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
5.0	5.0	#####		Clay, brown, sandy			
15.0	10.0	=====	10	Shale, brown, weathered			
17.2	2.2	=====		Shale, gray			
21.4	4.2	[REDACTED]	20	Mahoning Coal, with shale		77%	0%
35.2	13.8	=====	30	Shale, gray, with clayshale			
41.0	5.8	:-----:-----:	40	Sandy Shale, gray, with shale		100%	60%
66.5	25.5	=====	50	Shale, gray		100%	93%
75.7	9.2	=====	60	Shale, gray			
77.0	1.3	[REDACTED]	70	Shale, dark gray		100%	80%
		=====		Upper Freeport Coal, with shale			
		=====	80	Shale, gray		93%	39%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2114	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1513.70					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	6/22/2021-6/28/2021	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	290947.42	
					Easting:	1516910.08	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD	
82.2	5.2	[Graphic Log]		Shale, gray				
87.0	4.8	[Graphic Log]		Shale, gray, limy, with limestone		93%	39%	
92.0	5.0	[Graphic Log]	90	Shale, gray				
127.0	35.0	[Graphic Log]	100	Sandy Shale, gray		100%	90%	
		[Graphic Log]	110				100%	93%
		[Graphic Log]	120					
		[Graphic Log]	130	Sandstone, gray		100%	93%	
		[Graphic Log]	140				100%	100%
		[Graphic Log]	150				100%	87%
		[Graphic Log]	160					

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2114	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1513.70					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	6/22/2021-6/28/2021	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	290947.42	
					Easting:	1516910.08	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
162.0	35.0	[Graphic Log]		Sandstone, gray		100%	87%
166.0	4.0	[Graphic Log]		Shale, dark gray			
168.0	2.0	[Graphic Log]		Upper Kittanning Coal, with shale			
170.0		[Graphic Log]	170	Sandyshale, dark gray		100%	80%
180.0		[Graphic Log]	180				
190.0		[Graphic Log]	190				
191.2	23.2	[Graphic Log]		Middle Kittanning Coal			
192.5	1.3	[Graphic Log]		Shale, dark gray			
194.2	1.7	[Graphic Log]		Shale, dark gray, limy			
200.2	6.0	[Graphic Log]	200	Limestone, gray (Middle Kittanning LS)		100%	83%
206.0	5.8	[Graphic Log]		Sandy Shale, gray		100%	100%
210.0		[Graphic Log]	210				
220.0		[Graphic Log]	220				
230.0		[Graphic Log]	230				
236.0	30.0	[Graphic Log]		Sandy Shale, dark gray			
238.4	2.4	[Graphic Log]		Sandy Shale, dark gray, with interbedded sandstone			
		[Graphic Log]	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-2114	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1513.70					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	6/22/2021-6/28/2021	
Survey Method:	GPS				Drilled By:	RES	
					Logged By:	P. Mack	
					Municipality:	Donegal	
					County, State:	Westmoreland, PA	
					Quadrangle:	Stahlstown, PA	
					Laboratory:	Geochemical	
					Northing:	290947.42	
					Easting:	1516910.08	
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
				Sandy Shale, dark gray, with interbedded sandstone		100%	100%
257.1	18.7						
257.6	0.5			Shale, dark gray			
258.4	0.8			Shale, black, with coal bands and boney		91%	51%
258.9	0.5			Lower Kittanning - Boney, with coal bands			
			260				
				Lower Kittanning - Coal, bright			
262.3	3.4						
263.0	0.7	#####		Clayshale, dark gray to gray			
264.4	1.4	#####		Clayshale, gray, soft			
		#####					
266.3	1.9	#####		Clayshale, gray, some sandy			
		#####					
270.7	4.4	#####	270	Sandy Shale, gray			
		#####					
272.3	2.0	#####		Sandy Shale, dark gray, with interbedded sandstone			
				Bottom of Hole DH 2114 Depth 272.3 feet			
			280				
			290				
			300				
			310				
#REF!	#REF!		320				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13100	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1807.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/3/2012-1/7/2012
Survey Method:	GPS				Drilled By:	Hetager Drilling
					Logged By:	Don Bergreen Jr.
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	294796.22
					Easting:	1522809.12
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Coal	246.2	1560.8	Upper Kittanning	478.4	1328.6	
Mahoning	363.3	1443.7	Lower Kittanning	576.3	1230.7	
Upper Freeport	410.8	1396.2				
Upper Kittanning	466.7	1340.3				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
90.1	13.8	=====	90	Shale, gray, limey			
96.3	6.2	#####		Claystone, gray			
104.0	7.7	#####	100	Claystone, red			
149.1	45.1	=====	110	Siltstone, red and gray			
		=====	120				
		=====	130				
		=====	140				
158.4	9.3	.....	150	Sandstone, gray			
		=====	160	Shale, black (Lower Bakerstown Horizon)			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13100	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1807.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/3/2012-1/7/2012
Survey Method:	GPS					Drilled By:	Hetager Drilling
						Logged By:	Don Bergreen Jr.
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	294796.22
						Easting:	1522809.12
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Coal	246.2	1560.8	Upper Kittanning	478.4	1328.6		
Mahoning	363.3	1443.7	Lower Kittanning	576.3	1230.7		
Upper Freeport	410.8	1396.2					
Upper Kittanning	466.7	1340.3					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
179.6	21.2	=====	170	Shale, black (Lower Bakerstown Horizon)			
187.9	8.3	#####	180	Claystone, gray			
199.3	11.4	:-:-:-:-:-	190	Sandy Shale, gray			
216.8	17.5	#####	200	Claystone, red			
236.3	19.5	.....	220	Sandstone, gray			
240.1	3.8	#####	230	Claystone, red			
		#####	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13100	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1807.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/3/2012-1/7/2012
Survey Method:	GPS					Drilled By:	Hetager Drilling
						Logged By:	Don Bergreen Jr.
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	294796.22
						Easting:	1522809.12
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Coal	246.2	1560.8	Upper Kittanning	478.4	1328.6		
Mahoning	363.3	1443.7	Lower Kittanning	576.3	1230.7		
Upper Freeport	410.8	1396.2					
Upper Kittanning	466.7	1340.3					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
245.5	5.4	=====		Shale, black			
246.2	0.7	=====		Coal			
254.2	8.0	#####	250	Limeyclaystone, gray			
285.3	31.1	=====	260	Sandy Shale, gray			
		=====	270				
		=====	280				
292.3	7.0	OOOOOOOO	290	Limestone, black with fossils (Brush Creek LS)			
293.4	1.1	OOOOOOOO		Limestone, gray with fossils (Brush Creek LS)			
		=====	300	Shale, black			
		=====					
		=====	310				
		=====	320				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13100	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1807.00	Date	Depth	Elevation	Method Drilling:	Continuous Core
Surveyed by:	LCT	Measured	(ft)	(MSL)	Date Drilled:	1/3/2012-1/7/2012
Survey Method:	GPS	ND			Drilled By:	Hetager Drilling
		Bottom Depth	Bottom Elevation	SWL measured by:	Logged By:	Don Bergreen Jr.
Coal Seam ID		(ft)	(MSL)		Municipality:	Donegal
Coal	246.2	1560.8	Upper Kittanning	478.4	County, State:	Westmoreland, PA
Mahoning	363.3	1443.7	Lower Kittanning	576.3	Quadrangle:	Stahlstown, PA
Upper Freeport	410.8	1396.2			Laboratory:	Geochemical
Upper Kittanning	466.7	1340.3			Northing:	294796.22
					Easting:	1522809.12
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
331.2	37.8	=====	330	Shale, black			
359.0	27.8	=====	340	Siltstone, gray			
362.0	3.0	=====	350				
363.3	1.3	=====	360	Sandy Shale, black			
374.0	10.7	#####	370	Mahoning Coal			
382.3	8.3	.....	380	Claystone, gray			
		.....	390	Sandstone, gray			
		.....	400	Sandy Shale, black			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13100	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1807.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/3/2012-1/7/2012
Survey Method:	GPS				Drilled By:	Hetager Drilling
					Logged By:	Don Bergreen Jr.
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	294796.22
					Easting:	1522809.12
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal	246.2	1560.8	Upper Kittanning	478.4	1328.6	
Mahoning	363.3	1443.7	Lower Kittanning	576.3	1230.7	
Upper Freeport	410.8	1396.2				
Upper Kittanning	466.7	1340.3				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
409.7	27.4	[Graphic Log]		Sandy Shale, black			
410.0	0.3	[Graphic Log]	410	Upper Freeport Coal			
410.6	0.6	[Graphic Log]		Shale, black			
410.8	0.2	[Graphic Log]		Upper Freeport Coal			
		[Graphic Log]	420				
		[Graphic Log]	430				
		[Graphic Log]	440	Sandy Shale, gray			
		[Graphic Log]	450				
		[Graphic Log]	460				
464.8	54.0	[Graphic Log]					
466.7	1.9	[Graphic Log]		Upper Kittanning Coal			
		[Graphic Log]	470	Shale, gray			
478.3	11.6	[Graphic Log]					
478.4	0.1	[Graphic Log]		Upper Kittanning Coal			
		[Graphic Log]	480	Shale, black			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13100	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1807.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/3/2012-1/7/2012
Survey Method:	GPS				Drilled By:	Hetager Drilling
					Logged By:	Don Bergreen Jr.
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	294796.22
					Easting:	1522809.12
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal	246.2	1560.8	Upper Kittanning	478.4	1328.6	
Mahoning	363.3	1443.7	Lower Kittanning	576.3	1230.7	
Upper Freeport	410.8	1396.2				
Upper Kittanning	466.7	1340.3				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
534.1	55.7		490 500 510 520 530	Shale, black			
540.3	6.2		540	Limestone gray (Middle Kittanning LS)			
547.7	7.4			Siltstone, gray, mottled			
559.1	11.4		550 560	Siltstone, gray Sandstone, gray with interbedded sandy shale			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13100	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1807.00	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	1/3/2012-1/7/2012
Survey Method:	GPS				Drilled By:	Hetager Drilling
					Logged By:	Don Bergreen Jr.
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	294796.22
					Easting:	1522809.12
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
573.7	14.6	[Graphic Log: Dotted lines]	570	Sandstone, gray with interbedded sandy shale			
576.3	2.6	[Graphic Log: Solid black]		Lower Kittanning Coal			
584.3	8.0	[Graphic Log: Hash marks]	580	Claystone, gray			
589.0	4.7	[Graphic Log: Hash marks]		Siltstone, gray, mottled			
		[Graphic Log: Dotted lines]	590	Bottom of Hole DH 13100 Depth 589 feet			
		[Graphic Log: Dotted lines]	600				
		[Graphic Log: Dotted lines]	610				
		[Graphic Log: Dotted lines]	620				
		[Graphic Log: Dotted lines]	630				
		[Graphic Log: Dotted lines]	640				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13101	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1785.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/9/2013-1/15/2013
Survey Method:	GPS					Drilled By:	Hetager Drilling
						Logged By:	Don Bergreen Jr.
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288515.29
						Easting:	1518819.61
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	270.1	1514.9	Middle Kittanning	435.0	1350.0		
Upper Freeport	328.5	1456.5	Lower Kittanning	494.3	1290.7		
Upper Kittanning	404.9	1380.1					
Upper Kittanning	412.1	1372.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
9.0	9.0	##### ##### ##### ##### ##### ##### ##### ##### ##### #####		Silty Clay, brown			
32.2	23.2	=====	10	Shale, gray, weathered			
		=====	20				
		=====	30				
34.3	2.1	#####		Claystone, red			
55.2	20.9	+=====	40	Siltstone, gray			
		+=====	50				
76.3	21.1	.....	60	Sandstone, gray			
		.....	70				
		=====	80	Sandy Shale, black			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13101	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1785.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/9/2013-1/15/2013
Survey Method:	GPS					Drilled By:	Hetager Drilling
						Logged By:	Don Bergreen Jr.
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288515.29
						Easting:	1518819.61
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	270.1	1514.9	Middle Kittanning	435.0	1350.0		
Upper Freeport	328.5	1456.5	Lower Kittanning	494.3	1290.7		
Upper Kittanning	404.9	1380.1					
Upper Kittanning	412.1	1372.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
92.3	16.0	=====	90	Sandy Shale, black			
119.2	26.9	#####	110	Claystone, gray			
124.4	5.2	=====	120	Siltstone red and gray			
		=====	130				
		=====	140	Sandy Shale, gray			
		=====	150				
		=====	160				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13101	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1785.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/9/2013-1/15/2013
Survey Method:	GPS					Drilled By:	Hetager Drilling
						Logged By:	Don Bergreen Jr.
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288515.29
						Easting:	1518819.61
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	270.1	1514.9	Middle Kittanning	435.0	1350.0		
Upper Freeport	328.5	1456.5	Lower Kittanning	494.3	1290.7		
Upper Kittanning	404.9	1380.1					
Upper Kittanning	412.1	1372.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
184.2	59.8		170 180	Sandy Shale, gray			
197.0	12.8		190	Sandy Shale ,black			
198.0	1.0			Limestone, gray with fossils (Brush Creek LS)			
226.8	28.8		200 210 220	Sandy Shale, black			
227.4	0.6			Shale, black, carbonaceous			
233.4	6.0		230	Claystone, gray			
239.0	5.6		240	Sandy Shale, gray			
			240	Sandstone, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13101	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1785.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/9/2013-1/15/2013
Survey Method:	GPS					Drilled By:	Hetager Drilling
						Logged By:	Don Bergreen Jr.
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288515.29
						Easting:	1518819.61
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	270.1	1514.9	Middle Kittanning	435.0	1350.0		
Upper Freeport	328.5	1456.5	Lower Kittanning	494.3	1290.7		
Upper Kittanning	404.9	1380.1					
Upper Kittanning	412.1	1372.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
328.0	10.9	=====		Shale, black			
328.5	0.5	=====		Upper Freeport Coal			
		=====	330				
		=====					
		=====	340				
		=====					
		=====	350				
		=====					
		=====	360	Shale, gray			
		=====					
		=====	370				
		=====					
		=====	380				
		=====					
389.2	60.7	.....	390				
		.....		Sandstone, gray			
						
		.....	400				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13101	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1785.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/9/2013-1/15/2013
Survey Method:	GPS					Drilled By:	Hetager Drilling
						Logged By:	Don Bergreen Jr.
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288515.29
						Easting:	1518819.61
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning	270.1	1514.9	Middle Kittanning	435.0	1350.0		
Upper Freeport	328.5	1456.5	Lower Kittanning	494.3	1290.7		
Upper Kittanning	404.9	1380.1					
Upper Kittanning	412.1	1372.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
402.7	13.5	.....		Sandstone, gray			
404.7	2.0	=====		Shale, dark gray			
404.9	0.2	█		Upper Kittanning Coal			
410.0	5.1	.....	410	Sandstone, gray			
412.1	2.1	█		Upper Kittanning Coal			
432.8	20.7	.....	420	Sandstone, gray			
435.0	2.2	█		Middle Kittanning Coal			
440.6	5.6	.....	440	Shale, gray			
443.4	2.8	▢▢▢▢▢▢▢▢		Limestone, gray (Middle Kittanning Limestone)			
467.8	24.4	.....	450	Shale, gray			
		.....	460				
		.....	470				
		.....	480	Sandstone, gray with shale streaks			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-13101	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1785.00	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	1/9/2013-1/15/2013
Survey Method:	GPS					Drilled By:	Hetager Drilling
						Logged By:	Don Bergreen Jr.
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	288515.29
						Easting:	1518819.61
						Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:				
Mahoning	270.1	1514.9	Middle Kittanning	435.0	1350.0		
Upper Freeport	328.5	1456.5	Lower Kittanning	494.3	1290.7		
Upper Kittanning	404.9	1380.1					
Upper Kittanning	412.1	1372.9					

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
490.9	23.1	[Graphic Log: Dotted lines]	490	Sandstone, gray with shale streaks			
494.3	3.4	[Graphic Log: Solid black bar]		Lower Kittanning Coal			
509.0	14.7	[Graphic Log: Dashed lines]	500	Sandyshale, dark gray			
			510	Bottom of Hole DH 13101 Depth 509.0 feet			
			520				
			530				
			540				
			550				
			560				

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-20132	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1921.38	Date Measured	Depth (ft)	Elevation (MSL)	Notes	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND				Date Drilled:	11/10/2020-12/4/2020
Survey Method:	GPS					Drilled By:	TRC
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	293985.691
						Easting:	1523303.014
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning		453.4	1468.0				
Upper Freeport		501.3	1420.1				
Lower Kittanning		668.3	1253.1				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
17.0	17.0	[Graphic Log: 17.0 ft depth]	10	Overburden, unspecified			
42.5	25.5	[Graphic Log: 25.5 ft thickness]	20	Sandy Shale, gray		100%	0%
		[Graphic Log: 30 ft depth]	30			100%	15%
		[Graphic Log: 40 ft depth]	40			90%	11%
57.8	15.3	[Graphic Log: 15.3 ft thickness]	50	Sandstone, gray		100%	75%
		[Graphic Log: 60 ft depth]	60	Sandy Shale, gray		90%	61%
		[Graphic Log: 70 ft depth]	70			100%	70%
		[Graphic Log: 80 ft depth]	80			100%	50%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-20132	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1921.38	Date	Depth	Elevation	Method Drilling:	Continuous Core
Surveyed by:	LCT	Measured	(ft)	(MSL)	Date Drilled:	11/10/2020-12/4/2020
Survey Method:	GPS	ND			Drilled By:	TRC
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	293985.691
					Easting:	1523303.014
					Grid Coordinates:	
		Bottom Depth	Bottom Elevation	SWL measured by:		
Coal Seam ID		(ft)	(MSL)			
Mahoning		453.4	1468.0			
Upper Freeport		501.3	1420.1			
Lower Kittanning		668.3	1253.1			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
164.0	3.3	=====		Sandy Shale, gray			
172.0	8.0	#####	170	Claystone, gray, limey		100%	90%
176.0	4.0	#####		Claystone, gray, sandy			
182.0	6.0	=====	180	Sandy Shale, gray		100%	90%
220.5	38.5	=====	220	Shale, red and gray		100%	90%
		=====	200			100%	95%
		=====	210			100%	95%
		=====	230	Sandy Shale, gray		100%	80%
		=====	240			100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-20132	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1921.38	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	11/10/2020-12/4/2020
Survey Method:	GPS				Drilled By:	TRC
		SWL measured by:			Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	293985.691
					Easting:	1523303.014
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)				
Mahoning	453.4	1468.0				
Upper Freeport	501.3	1420.1				
Lower Kittanning	668.3	1253.1				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
261.0	40.5	[Graphic Log]	250	Sandy Shale, gray		100%	100%
262.1	1.1	[Graphic Log]	260	Shale, black, with fossils			
271.0	9.0	[Graphic Log]	270	Shale, gray		100%	100%
271.7	0.7	[Graphic Log]		Shale, black, with fossils			
277.5	5.8	[Graphic Log]		Claystone, gray, sandy		100%	80%
290.0	12.5	[Graphic Log]	280	Sandy Shale, gray		100%	100%
307.0	17.0	[Graphic Log]	290	Shale, red and gray		100%	90%
		[Graphic Log]	300				
		[Graphic Log]	310	Sandy Shale, gray		100%	95%
		[Graphic Log]	320				
		[Graphic Log]				100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-20132	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1921.38					Date Measured	ND	Method Drilling:	Continuous Core
Surveyed by:	LCT	Depth (ft)		Elevation (MSL)		Date Drilled:	11/10/2020-12/4/2020
Survey Method:	GPS	Notes				Drilled By:	TRC
						Logged By:	P. Mack
						Municipality:	Donegal
						County, State:	Westmoreland, PA
						Quadrangle:	Stahlstown, PA
						Laboratory:	Geochemical
						Northing:	293985.691
						Easting:	1523303.014
						Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Coal Seam ID							
Mahoning		453.4	1468.0				
Upper Freeport		501.3	1420.1				
Lower Kittanning		668.3	1253.1				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
328.0	21.0			Sandy Shale, gray		100%	95%
332.5	4.5		330	Shale, red and gray			
333.5	1.0			Limestone, gray (Brush Creek LS)			
353.0	19.5		340	Claystone, gray, limey		100%	95%
			350			100%	70%
382.7	29.7		360	Sandy Shale, gray		100%	98%
			370			100%	100%
			380			100%	100%
384.7	2.0			Shale, black, with fossils			
			390			100%	100%
			400			100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-20132	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1921.38	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	11/10/2020-12/4/2020
Survey Method:	GPS				Drilled By:	TRC
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	293985.691
					Easting:	1523303.014
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:			
Mahoning	453.4	1468.0				
Upper Freeport	501.3	1420.1				
Lower Kittanning	668.3	1253.1				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
412.7	28.0	=====	410	Sandy Shale, gray		100%	100%
424.0	11.3	#####	420	Claystone, gray, limy		100%	90%
452.2	28.8	=====	430	Sandy Shale, gray		100%	100%
453.4	1.2	=====	440			100%	100%
		=====	450			100%	90%
463.5	10.1	#####	460	Mahoning Coal		100%	75%
		=====	470	Sandy Shale, gray		100%	95%
		=====	480			100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-20132	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1921.38	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	11/10/2020-12/4/2020
Survey Method:	GPS				Drilled By:	TRC
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	293985.691
					Easting:	1523303.014
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		453.4	1468.0			
Upper Freeport		501.3	1420.1			
Lower Kittanning		668.3	1253.1			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
			490	Sandy Shale, gray		100%	100%
498.3	34.8					80%	88%
501.3	3.0		500	Upper Freeport Coal, with shale			
		#####					
		#####		Claystone, gray, sandy		100%	80%
512.0	10.7	#####	510				
			520			100%	100%
			530			100%	100%
			540	Sandy Shale, gray		100%	100%
			550			100%	100%
			560			100%	100%

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-20132	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1921.38	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	11/10/2020-12/4/2020
Survey Method:	GPS				Drilled By:	TRC
		SWL measured by:			Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	293985.691
					Easting:	1523303.014
					Grid Coordinates:	
Coal Seam ID	Bottom Depth (ft)	Bottom Elevation (MSL)				
Mahoning	453.4	1468.0				
Upper Freeport	501.3	1420.1				
Lower Kittanning	668.3	1253.1				

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
564.0	52.0	[Graphic Log: Dotted lines]		Sandy Shale, gray			
			570			100%	100%
			580			100%	100%
			590	Sandstone, gray, with some shale beddings		100%	100%
600.7	36.7	[Graphic Log: Dotted lines]	600			100%	100%
605.0	4.3	[Graphic Log: Dotted lines]		Sandy Shale, gray			
613.0	8.0	[Graphic Log: Dotted lines]	610	Sandstone, gray, hard		100%	100%
616.0	3.0	[Graphic Log: Dotted lines]		Sandstone, gray, hard, with Middle Kittanning Horizon coal streaks		100%	100%
625.0	9.0	[Graphic Log: Dotted lines]	620	Sandstone, gray, hard		100%	100%
627.2	2.2	[Graphic Log: Dotted lines]		Sandy Shale, gray		100%	98%
634.5	7.3	[Graphic Log: Dotted lines]	630	Limestone, gray (Middle Kittanning LS)			
638.5	4.0	[Graphic Log: Dotted lines]		Clayshale, gray		100%	100%
			640	Sandy Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	DH-20132	Measured Static Water Levels			Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1921.38	Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Continuous Core
Surveyed by:	LCT	ND			Date Drilled:	11/10/2020-12/4/2020
Survey Method:	GPS				Drilled By:	TRC
					Logged By:	P. Mack
					Municipality:	Donegal
					County, State:	Westmoreland, PA
					Quadrangle:	Stahlstown, PA
					Laboratory:	Geochemical
					Northing:	293985.691
					Easting:	1523303.014
					Grid Coordinates:	
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		
Coal Seam ID						
Mahoning		453.4	1468.0			
Upper Freeport		501.3	1420.1			
Lower Kittanning		668.3	1253.1			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
645.6	7.1	=====		Sandy Shale, gray			
650.3	4.7	=====	650	Shale, gray, with interbedded sandy shale		100%	100%
655.3	5.0	=====		Shale, dark gray			
665.6	10.3	.....	660	Sandstone, light gray, with some shale laminations		100%	100%
665.65	0.05	#####		Lower Kittanning - Shale, black			
665.90	0.25	#####		Lower Kittanning - Coal, dull			
667.40	1.50	#####		Lower Kittanning - Coal, bright, crushed		100%	62%
668.30	0.90	#####		Lower Kittanning - Coal, bright, hard			
669.6	1.3	#####	670	Clayshale, dark gray to gray, some sandy			
670.9	1.3	#####		Clayshale, gray			
674.2	3.3	#####		Clayshale, gray, solid, some sandy			
678.4	4.2	.....		Sandstone, light gray		100%	100%
682.0	3.6	=====	680	Sandy Ghale, gray			
				Bottom of Hole DH 20132 Depth 682.0 feet			
			690				
			700				
			710				
			720				

7.1A GEOLOGIC DRILL LOG

Hole No.	<u>PZ-7D</u>	Measured Static Water Levels				Operation Name :	<u>Rustic Ridge #1 Mine-Expansion</u>	
Surface Elev.	<u>1640.64</u>					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Air Rotary
Surveyed by:	<u>LCT</u>	<u>8/17/2020</u>	<u>177.95</u>	<u>1465.27</u>	Notes	Date Drilled:	<u>1/7/2020-1/8/2020</u>	
Survey Method:	<u>GPS</u>	SWL measured by:				<u>LCT</u>	Drilled By:	<u>Holt Drilling</u>
	Bottom Depth (ft)	Bottom Elevation (MSL)					Logged By:	
Coal Seam ID							Municipality:	<u>Donegal</u>
Upper Freeport	330.0	1310.6	Middle Kittanning	408.0	1232.6	County, State:	<u>Westmoreland, PA</u>	
Upper Kittanning	371.0	1269.6	Middle Kittanning	433.0	1207.6	Quadrangle:	<u>Stahlstown, PA</u>	
Upper Kittanning	375.0	1265.6	Lower Kittanning	481.0	1159.6	Laboratory:	<u>Geochemical</u>	
Upper Kittanning	389.0	1251.6				Northing:	<u>300222.623</u>	
						Easting:	<u>1522059.262</u>	
						Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
6.0	6.0			Unconsolidated			
27.0	21.0		10 20	Sandstone, brown			
35.0	8.0		30	Sand, brown, weathered			
50.0	15.0		40 50	Sandy Shale, gray			
72.0	22.0		60 70	Sandstone, gray			
			80	Sandy Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	<u>PZ-7D</u>	Measured Static Water Levels				Operation Name :	<u>Rustic Ridge #1 Mine-Expansion</u>	
Surface Elev.	<u>1640.64</u>					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Air Rotary
Surveyed by:	<u>LCT</u>	<u>8/17/2020</u>	<u>177.95</u>	<u>1465.27</u>	Notes	Date Drilled:	<u>1/7/2020-1/8/2020</u>	
Survey Method:	<u>GPS</u>	SWL measured by:				<u>LCT</u>	Drilled By:	<u>Holt Drilling</u>
	Bottom Depth (ft)	Bottom Elevation (MSL)					Logged By:	
Coal Seam ID							Municipality:	<u>Donegal</u>
Upper Freeport	330.0	1310.6	Middle Kittanning	408.0	1232.6	County, State:	<u>Westmoreland, PA</u>	
Upper Kittanning	371.0	1269.6	Middle Kittanning	433.0	1207.6	Quadrangle:	<u>Stahlstown, PA</u>	
Upper Kittanning	375.0	1265.6	Lower Kittanning	481.0	1159.6	Laboratory:	<u>Geochemical</u>	
Upper Kittanning	389.0	1251.6				Northing:	<u>300222.623</u>	
						Easting:	<u>1522059.262</u>	
						Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
100.0	28.0		100	Sandy Shale, gray			
110.0	10.0		110	Sandstone, gray			
125.0	15.0		120	Shale, red			
128.0	3.0		130	Sandy Shale, gray			
135.0	7.0		140	Shale, red			
			150	Sandy Shale, gray			
			160	Sandy Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	<u>PZ-7D</u>	Measured Static Water Levels				Operation Name :	<u>Rustic Ridge #1 Mine-Expansion</u>	
Surface Elev.	<u>1640.64</u>					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Air Rotary
Surveyed by:	<u>LCT</u>	<u>8/17/2020</u>	<u>177.95</u>	<u>1465.27</u>	Notes	Date Drilled:	<u>1/7/2020-1/8/2020</u>	
Survey Method:	<u>GPS</u>	SWL measured by:				<u>LCT</u>	Drilled By:	<u>Holt Drilling</u>
	Bottom Depth (ft)	Bottom Elevation (MSL)					Logged By:	
Coal Seam ID							Municipality:	<u>Donegal</u>
Upper Freeport	330.0	1310.6	Middle Kittanning	408.0	1232.6	County, State:	<u>Westmoreland, PA</u>	
Upper Kittanning	371.0	1269.6	Middle Kittanning	433.0	1207.6	Quadrangle:	<u>Stahlstown, PA</u>	
Upper Kittanning	375.0	1265.6	Lower Kittanning	481.0	1159.6	Laboratory:	<u>Geochemical</u>	
Upper Kittanning	389.0	1251.6				Northing:	<u>300222.623</u>	
						Easting:	<u>1522059.262</u>	
						Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
200.0	65.0		200	Sandy Shale, gray	▼		
240.0	40.0		240	Shale, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	<u>PZ-7D</u>	Measured Static Water Levels				Operation Name :	<u>Rustic Ridge #1 Mine-Expansion</u>
Surface Elev.	<u>1640.64</u>					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Air Rotary
Surveyed by:	<u>LCT</u>	<u>8/17/2020</u>	<u>177.95</u>	<u>1465.27</u>	Notes	Date Drilled:	<u>1/7/2020-1/8/2020</u>
Survey Method:	<u>GPS</u>					Logged By:	<u>Holt Drilling</u>
	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		<u>LCT</u>	Municipality:	<u>Donegal</u>
Coal Seam ID						County, State:	<u>Westmoreland, PA</u>
Upper Freeport	330.0	1310.6	Middle Kittanning	408.0	1232.6	Quadrangle:	<u>Stahlstown, PA</u>
Upper Kittanning	371.0	1269.6	Middle Kittanning	433.0	1207.6	Laboratory:	<u>Geochemical</u>
Upper Kittanning	375.0	1265.6	Lower Kittanning	481.0	1159.6	Northing:	<u>300222.623</u>
Upper Kittanning	389.0	1251.6				Easting:	<u>1522059.262</u>
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
241.0	1.0			Coal			
250.0	9.0		250	Sandy Shale, gray			
275.0	25.0		260 270	Sandstone, gray			
300.0	25.0		280 290	Shale, medium dark			
315.0	15.0		300 310	Shale, gray			
			320	Sandstone, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	PZ-7D	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1640.64					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Air Rotary
Surveyed by:	LCT	8/17/2020	177.95	1465.27	Notes	Date Drilled:	1/7/2020-1/8/2020
Survey Method:	GPS					Logged By:	Holt Drilling
	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		LCT	Municipality:	Donegal
Coal Seam ID						County, State:	Westmoreland, PA
Upper Freeport	330.0	1310.6	Middle Kittanning	408.0	1232.6	Quadrangle:	Stahlstown, PA
Upper Kittanning	371.0	1269.6	Middle Kittanning	433.0	1207.6	Laboratory:	Geochemical
Upper Kittanning	375.0	1265.6	Lower Kittanning	481.0	1159.6	Northing:	300222.623
Upper Kittanning	389.0	1251.6				Easting:	1522059.262
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
325.0	10.0	[Graphic Log]		Sandstone, gray			
327.0	2.0	[Graphic Log]		Shale, gray			
330.0	3.0	[Graphic Log]	330	Upper Freeport Coal			
340.0	10.0	[Graphic Log]	340	Shale, gray			
365.0	25.0	[Graphic Log]	350 360	Sandstone, gray			
370.0	5.0	[Graphic Log]	370	Shale, dark gray			
371.0	1.0	[Graphic Log]		Upper Kittanning Coal			
373.0	2.0	[Graphic Log]		Shale, dark gray			
375.0	2.0	[Graphic Log]		Upper Kittanning Coal			
380.0	5.0	[Graphic Log]	380	Shale, dark gray			
387.0	7.0	[Graphic Log]					
389.0	2.0	[Graphic Log]		Upper Kittanning Coal			
		[Graphic Log]	390 400	Sandstone, gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	PZ-7D	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1640.64					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Air Rotary
Surveyed by:	LCT	8/17/2020	177.95	1465.27	Notes	Date Drilled:	1/7/2020-1/8/2020
Survey Method:	GPS					Logged By:	Holt Drilling
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		Municipality:	Donegal
						County, State:	Westmoreland, PA
Coal Seam ID						Quadrangle:	Stahlstown, PA
Upper Freeport	330.0	1310.6	Middle Kittanning	408.0	1232.6	Laboratory:	Geochemical
Upper Kittanning	371.0	1269.6	Middle Kittanning	433.0	1207.6	Northing:	300222.623
Upper Kittanning	375.0	1265.6	Lower Kittanning	481.0	1159.6	Easting:	1522059.262
Upper Kittanning	389.0	1251.6				Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
406.0	17.0	[Graphic Log: Dotted pattern]		Sandstone, gray			
408.0	2.0	[Graphic Log: Solid black]		Middle Kittanning Coal			
432.0	24.0	[Graphic Log: Dotted pattern]	410	Sandstone, gray			
433.0	1.0	[Graphic Log: Solid black]		Middle Kittanning Coal			
440.0	7.0	[Graphic Log: Dashed pattern]	440	Sandy Shale, gray			
465.0	25.0	[Graphic Log: Dotted pattern]	450	Sandstone, gray			
477.0	12.0	[Graphic Log: Dashed pattern]	470	Shale, dark gray			
		[Graphic Log: Solid black]	480	Lower Kittanning Coal			

7.1A GEOLOGIC DRILL LOG

Hole No.	<u>PZ-7D</u>	Measured Static Water Levels			Operation Name :	<u>Rustic Ridge #1 Mine-Expansion</u>
Surface Elev.	<u>1640.64</u>	Date	Depth	Elevation	Method Drilling:	<u>Air Rotary</u>
Surveyed by:	<u>LCT</u>	Measured	(ft)	(MSL)	Date Drilled:	<u>1/7/2020-1/8/2020</u>
Survey Method:	<u>GPS</u>	8/17/2020	177.95	1465.27	Drilled By:	<u>Holt Drilling</u>
					Logged By:	
		SWL measured by:	<u>LCT</u>		Municipality:	<u>Donegal</u>
					County, State:	<u>Westmoreland, PA</u>
					Quadrangle:	<u>Stahlstown, PA</u>
					Laboratory:	<u>Geochemical</u>
					Northing:	<u>300222.623</u>
					Easting:	<u>1522059.262</u>
					Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
481.0	4.0			Lower Kittanning Coal			
482.0	1.0	=====		Sandy Shale, gray			
				Bottom of Hole PZ-7D Depth 482 feet			
			490				
			500				
			510				
			520				
			530				
			540				
			550				
			560				

7.1A GEOLOGIC DRILL LOG

Hole No.	PZ-9D	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1744.06					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Air Rotary
Surveyed by:	LCT	8/17/2020	65.6	1678.5	Notes	Date Drilled:	4/21/2020-4/22/2020
Survey Method:	GPS	SWL measured by:				Logged By:	Holt Drilling
	Bottom Depth (ft)	Bottom Elevation (MSL)			Municipality:	Donegal	
Coal Seam ID					County, State:	Westmoreland, PA	
Mahoning	138.0	1606.1	Lower Freeport	220.0	1524.1	Quadrangle:	Stahlstown, PA
Upper Freeport	170.0	1574.1	Upper Kittanning	253.0	1491.1	Laboratory:	Geochemical
Lower Freeport	210.0	1534.1	Middle Kittanning	279.0	1465.1	Northing:	290839.098
Lower Freeport	213.0	1531.1	Lower Kittanning	342.0	1402.1	Easting:	1507885.325
					Grid Coordinates:		

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
			90				
			100				
			110	Sandstone, Gray			
			120				
130.0	80.0		130				
135.0	5.0			Shale, gray			
138.0	3.0			Mahoning Coal			
142.0	4.0	#####	140	Clay, gray			
			150				
			160	Sandstone, Gray			

7.1A GEOLOGIC DRILL LOG

Hole No.	PZ-9D	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1744.06					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Air Rotary
Surveyed by:	LCT	8/17/2020	65.6	1678.5	Notes	Date Drilled:	4/21/2020-4/22/2020
Survey Method:	GPS					Logged By:	Holt Drilling
		Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		Municipality:	Donegal
Coal Seam ID						County, State:	Westmoreland, PA
Mahoning	138.0	1606.1	Lower Freeport	220.0	1524.1	Quadrangle:	Stahlstown, PA
Upper Freeport	170.0	1574.1	Upper Kittanning	253.0	1491.1	Laboratory:	Geochemical
Lower Freeport	210.0	1534.1	Middle Kittanning	279.0	1465.1	Northing:	290839.098
Lower Freeport	213.0	1531.1	Lower Kittanning	342.0	1402.1	Easting:	1507885.325
				Grid Coordinates:			

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
168.0	26.0	[Graphic Log]		Sandstone, Gray			
170.0	2.0	[Graphic Log]	170	Upper Freeport Coal			
204.0	34.0	[Graphic Log]	180 190 200	Sandstone, Gray			
209.0	5.0	[Graphic Log]		Sandy Shale, gray			
210.0	1.0	[Graphic Log]	210	Lower Freeport Coal			
212.0	2.0	[Graphic Log]		Shale, dark gray			
213.0	1.0	[Graphic Log]		Lower Freeport Coal			
219.0	6.0	[Graphic Log]		Sandy Shale, gray			
220.0	1.0	[Graphic Log]	220	Lower Freeport Coal			
		[Graphic Log]	230	Sandstone, Gray			
		[Graphic Log]	240				

7.1A GEOLOGIC DRILL LOG

Hole No.	PZ-9D	Measured Static Water Levels				Operation Name :	Rustic Ridge #1 Mine-Expansion
Surface Elev.	1744.06					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Air Rotary
Surveyed by:	LCT	8/17/2020	65.6	1678.5	Notes	Date Drilled:	4/21/2020-4/22/2020
Survey Method:	GPS	SWL measured by:				Logged By:	Holt Drilling
	Bottom Depth (ft)	Bottom Elevation (MSL)				Municipality:	Donegal
Coal Seam ID						County, State:	Westmoreland, PA
Mahoning	138.0	1606.1	Lower Freeport	220.0	1524.1	Quadrangle:	Stahlstown, PA
Upper Freeport	170.0	1574.1	Upper Kittanning	253.0	1491.1	Laboratory:	Geochemical
Lower Freeport	210.0	1534.1	Middle Kittanning	279.0	1465.1	Northing:	290839.098
Lower Freeport	213.0	1531.1	Lower Kittanning	342.0	1402.1	Easting:	1507885.325
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
252.0	32.0	[Graphic Log: Dotted lines]	250	Sandstone, Gray			
253.0	1.0	[Graphic Log: Solid black]		Upper Kittanning Coal			
275.0	22.0	[Graphic Log: Dotted lines]	260	Sandstone, Gray			
279.0	4.0	[Graphic Log: Solid black]		Middle Kittanning Coal			
290.0	11.0	[Graphic Log: Dotted lines]	280	Sandstone, Gray			
310.0	20.0	[Graphic Log: Dotted lines]	290	Limestone (Middle Kittanning LS)			
316.0	6.0	[Graphic Log: Dotted lines]	300	Sandstone, Gray			
		[Graphic Log: Dotted lines]	310	Sandy Shale, gray			
		[Graphic Log: Dotted lines]	320				

7.1A GEOLOGIC DRILL LOG

Hole No.	<u>PZ-9D</u>	Measured Static Water Levels				Operation Name :	<u>Rustic Ridge #1 Mine-Expansion</u>
Surface Elev.	<u>1744.06</u>					Date Measured	Depth (ft)	Elevation (MSL)	Method Drilling:	Air Rotary
Surveyed by:	<u>LCT</u>	<u>8/17/2020</u>	<u>65.6</u>	<u>1678.5</u>	Notes	Date Drilled:	<u>4/21/2020-4/22/2020</u>
Survey Method:	<u>GPS</u>					Drilled By:	<u>Holt Drilling</u>
	Bottom Depth (ft)	Bottom Elevation (MSL)	SWL measured by:		<u>LCT</u>	Logged By:	
Coal Seam ID							
Mahoning	138.0	1606.1	Lower Freeport	220.0	1524.1	Municipality:	<u>Donegal</u>
Upper Freeport	170.0	1574.1	Upper Kittanning	253.0	1491.1	County, State:	<u>Westmoreland, PA</u>
Lower Freeport	210.0	1534.1	Middle Kittanning	279.0	1465.1	Quadrangle:	<u>Stahlstown, PA</u>
Lower Freeport	213.0	1531.1	Lower Kittanning	342.0	1402.1	Laboratory:	<u>Geochemical</u>
						Northing:	<u>290839.098</u>
						Easting:	<u>1507885.325</u>
						Grid Coordinates:	

Depth (ft)	Thickness (ft)	Graphic Log	Scale (feet)	Lithologic Description: rock type, weathering, color, fossils, carbonate, minerals, concentrations, pyrite, etc.	Water Conditions	% Recovery	% RQD
338.0	22.0		330	Sandy Shale, gray			
342.0	4.0		340	Lower Kittanning Coal			
343.0	1.0	#####		Clay, gray			
				Bottom of Hole PZ-9 Depth 343 feet			
			350				
			360				
			370				
			380				
			390				
			400				