Technical Report on the Coal Resource and Coal Reserve Controlled by Corsa Coal Corp., Pennsylvania and Maryland USA –

Prepared in accordance with National Instrument 43-101 Standards for Disclosure for Mineral Projects

Effective December 31, 2017

February 2018

Prepared for:

Corsa Coal Corp.

Prepared by:

MARSHALL MILLER & ASSOCIATES®

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February 2018

Prepared for:
Corsa Coal Corp.
125 Technology Drive
Suite 100
Canonsburg, PA 15317

Prepared by:
Marshall Miller & Associates, Inc.
582 Industrial Park Road
Bluefield, Virginia 24605
www.mma1.com

TITLE

Technical Report on the Coal Reserve and Coal Resource Controlled by **Corsa Coal Corp.**, Pennsylvania and Maryland, United States of America (USA) - Prepared in accordance with National Instrument 43-101 Standards for Disclosure for Mineral Projects – Effective December 31, 2017.

PROJECT LOCATION

The project area is largely situated within Somerset County in the Commonwealth of Pennsylvania, west of the capital city of Harrisburg. Corsa has additional coal property located in Garrett County, Maryland. The coal deposits which occur in the project area are part of the Northern Appalachian Basin of the eastern USA. The project area is accessible via interstate highways and secondary roads, and serviced by major rail operators.

QUALIFIED PERSONS

Justin S. Douthat, PE, MBA
Vice President, Manager of Engineering
Direct Line: 1 304 809 0597
Email: justin.douthat@mma1.com

Michael G. McClure, CPG
Principal Geologist
Direct Line +1 304 809 0611
Email: mike.mcclure@mma1.com

Kirt W. Suehs, CPG
Senior Geologist
Direct Line +1 304 809 0624
Email: kirt.suehs@mma1.com

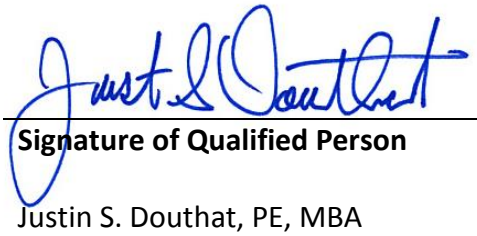
Gerard J. Enigk, PE
Principal Engineer
Direct Line +1 304 809 0630
Email: gerry.enigk@mma1.com

EFFECTIVE DATE OF REPORT

The effective date of the Technical Report (TR) is December 31, 2017.

DATE AND SIGNATURE PAGE

The effective date of this Technical Report is December 31, 2017.

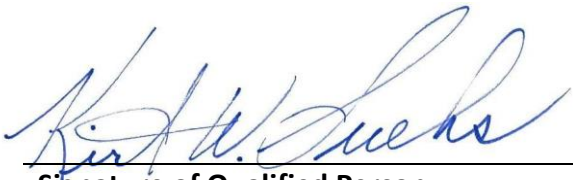


February 19, 2018
Signature of Qualified Person **Date of Signing**

Justin S. Douthat, PE, MBA
Print Name of Qualified Person

February 19, 2018
Signature of Qualified Person **Date of Signing**

Michael G. McClure, CPG
Print Name of Qualified Person



February 19, 2018
Signature of Qualified Person **Date of Signing**

Kirt Suehs, CPG
Print Name of Qualified Person

February 19, 2018
Signature of Qualified Person **Date of Signing**

Gerard J. Enigk, PE
Print Name of Qualified Person

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Item 1 Summary

1.1 Introduction, Terms of Reference

Marshall Miller & Associates, Inc. (*MM&A*) was engaged by **Corsa Coal Corp. (*Corsa*)** to conduct a Coal Resource and Coal Reserve evaluation of the bituminous coal deposits on properties controlled in the State of Maryland and in the Commonwealth of Pennsylvania, United States of America (*USA*) and to prepare a technical report (*TR*) in accordance with National Instrument 43-101 (*NI 43-101*) and Canadian Institute of Mining's Definition Standards (*CIMDS*) on Mineral Reserves and Mineral Resources, adopted May 10, 2014.

This TR provides technical information to support estimates of mineral resource and mineral reserve, hereafter referred to as coal resource and coal reserve. However, some non-coal mineral resources (limestone at Bluelick) are also discussed in this report.

Corsa is a junior natural resource company existing under the *Canada Business Corporations Act* and its common shares are listed on the **TSX Venture Exchange** (***TSXV***) under the trading symbol "CSO". Corsa is a reporting issuer in the Canadian provinces of British Columbia, Alberta, and Ontario. In August 2014, Corsa completed a transaction for the acquisition of **PBS Coals, Inc. (*PBS*)**, a wholly owned subsidiary of **Severstal Resources (*Severstal*)**. PBS, based in Somerset County, Pennsylvania, was previously acquired by Severstal in 2008. Corsa previously acquired the mines and resources of **Wilson Creek Energy, LLC (*Wilson Creek*)** in 2010. Currently, Corsa operations consist of three active underground mines and two active surface mines. Corsa operates two preparation plants and rail load-out facilities; the Cambria Preparation Plant, which is serviced by **CSX Corporation (*CSX*)** rail, and the Shade Preparation Plant, which is serviced by **Norfolk Southern** (***NS***).

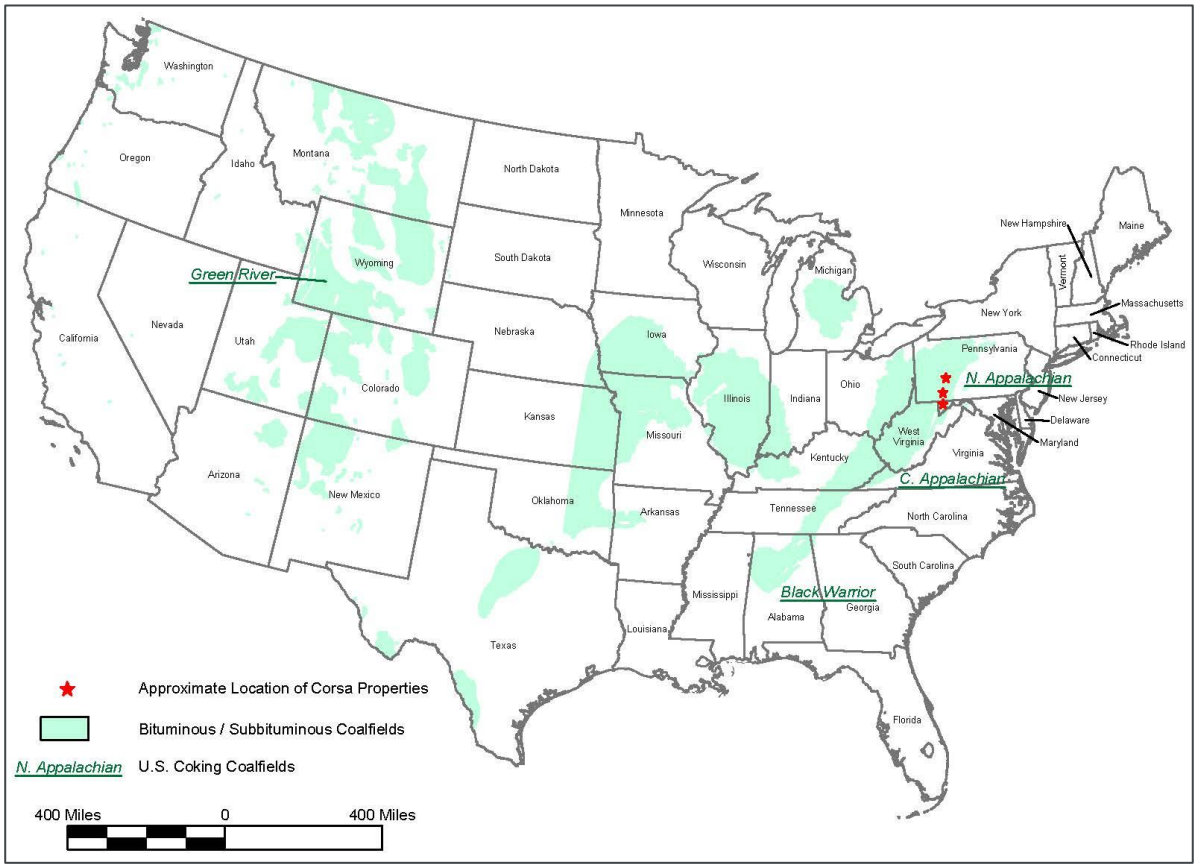
In September 2013, MM&A (then **Cardno MM&A**) completed an evaluation of the subject properties titled "*Evaluation of Coal Reserves and Resources for Severstal Resources/ PBS Coals, Inc. on Select Properties Located in Pennsylvania and Maryland (USA)"* for Corsa predecessor Severstal. The report was conducted in accordance with *United States Securities and Exchange Commission (SEC)* standards using guidelines prescribed in the **United States Geological Survey (*USGS*)** *Circular 891 Coal Resource Classification System*, which is the standard classification system for coal projects in the USA. The effective date of the evaluation was March 31, 2013 and served as the basis for a TR effective August 19, 2014 titled "*Technical Report on the Coal Resource and Coal Reserve Controlled by PBS Coals, Inc. Pennsylvania, USA*" dated October 2014. The coal resources and reserves associated with the Wilson Creek properties were previously evaluated by **Earthtech, Inc. (*Earthtech*)** in a May 9, 2014 report titled "*Wilson Creek Energy, LLC Norther Appalachian Coal Holdings, USA Technical Report on Coal Resources and Coal Reserves*" with an effective date of December 31, 2013. The coal resources and reserves controlled by Corsa were subsequently re-evaluated in a report titled *"Technical Report on the Coal*

Resource and Coal Reserve Controlled by Corsa Coal Corp., Pennsylvania and Maryland USA – Prepared in accordance with National Instrument 43-101 Standards for Disclosure for Mineral Projects Effective December 31, 2016". This current TR with an effective date of December 31, 2017 is being completed to satisfy NI 43-101 requirements, and includes changes occurring to the subject properties since the conclusion of previous work of MM&A and Earthtech.

1.2 Property Location

Bituminous coal deposits controlled by Corsa (the *Property*) and included in this TR are located in the Commonwealth of Pennsylvania within the western county of Somerset, west of the capital city of Harrisburg and in Garrett County, Maryland near the town of Grantsville (*Map 1*). Two active underground mines and two active surface mines are in Somerset County, Pennsylvania and another active underground mine is in Garrett County, Maryland. The corporate office is at Technology Drive, Suite 100, Canonsburg, Pennsylvania. The properties consist of a complex assemblage of owned and/or leased tracts that range from a few acres to several hundred acres in size. Segregation of mineral and land (surface rights) ownership is common to the properties, with Corsa acquiring the necessary rights to support development through purchase or lease agreements with predominately private owners or entities. The properties are readily accessible via interstate highways and secondary roads.

Figure 1-1: General Location Map



1.3 Regional Geological Setting, Deposit Types and Mineralization

The coal deposits in the eastern USA are among the oldest and most extensively developed in the country, containing sizeable deposits of bituminous coal, which have long supported coal production for domestic and international metallurgical and thermal markets. Properties controlled by Corsa and reported on in this TR are situated in the northern portion of the Appalachian Basin, which contains two-fifths of the nations' bituminous coal deposits and extends over 900 miles from northern Alabama to Pennsylvania. The Appalachian Basin is more than 250 miles wide and, in some portions, contains over 60 coal seams of varying economic significance. The coal-bearing formations on the properties are Pennsylvanian age and of the Monongahela, Conemaugh, Allegheny and Upper Pottsville groups. The mineable thickness for coal horizons in these formations ranges from 1 foot to more than 8 feet. Structurally, the coal horizons are typically characterized as gently dipping to the northwest (except where localized variations are present adjacent to anticlinal/synclinal axes), striking northeast-southwest.

1.4 Exploration, Drilling, Sampling, Analysis and Data Verification

The properties have been extensively explored, primarily through continuous (diamond) core and air-rotary drilling methods, which are standard industry practice. Drilling is conducted by Corsa on an on-going basis, and performed by a third-party contractor, to identify and delineate coal resources, identify geologic conditions in advance of mining, and collect core for quality sampling and analysis. In the past, Corsa typically employed the air-rotary method due to lower cost and shorter drilling duration. Air-rotary drilling provides general geologic information such as depth and approximate thickness, but does not provide details of coal seam or strata unless used in conjunction with "spot coring" and/or downhole geophysical logging. In recent history, Corsa has employed both spot coring and downhole geophysical logging in conjunction with air-rotary drilling to obtain core samples and confirm core recovery. Corsa utilizes continuous core drilling to a lesser extent, typically employed when greater geologic detail is needed or for recovery of core for sampling and analysis. Additional supplemental data is obtained from coal outcrop or surface exposures through surface mining, or from in-mine measurements as underground mining advances.

Sampling and analysis are typically carried out during exploration of coal resources and used to define the quality of resource areas prior to development. For active operations, Corsa conducts regular in-mine sampling, as well as preparation plant sampling to monitor processing performance and product sampling prior to delivery to customers. Sampling is typically conducted or supervised by Corsa personnel. For samples recovered during drilling, a geologist or company representative is present to observe core condition and verify that acceptable recovery is achieved to ensure a representative sample is used for analysis. Although MM&A has no direct involvement with the sampling programs, available data suggests that sampling and analysis is performed to American Society for Testing and Materials (*ASTM*) standards.

Data used by MM&A to evaluate the subject properties was supplied by Corsa in digital format and consisted of drill hole records, coal quality spreadsheets, copies of laboratory analysis, permit maps, underground and surface mine maps, and reserve summary reports. Drill hole records were supplied in digital format in the form of resource databases. A representative number of drill hole records in the form of drill logs were provided and used by MM&A to verify the resource database integrity on an audit basis. Geophysical logs were only available for relatively few drill holes to confirm coal seam thickness; however, these were also used to check the database. For air-rotary drill hole records, only general geologic descriptions and thickness data were available; therefore, factors such as coal seam thickness, intra-seam parting, and quality of roof and floor rock could not be verified.

The extent of sampling for geological data is generally sufficient to define the characteristics of the coal horizons based on the Qualified Person's (*QP*) examination of the data. Sampling for quality data from drill holes is limited to a relatively small percentage of the total drill holes. The available data appear to be representative of the coal seams based on known regional trends.

MM&A examined the data available for the evaluation during the course of its work and incorporated all pertinent information into the TR. Where data appeared to be anomalous or not representative, the data were not honored within the digital resource database and subsequent processing by MM&A.

1.5 Coal Resources and Coal Reserves

This TR provides a geological evaluation and estimate of coal resource and coal reserve as of December 31, 2017, in accordance with the requirements set forth in 1) NI 43-101 Rules and Policies, 2) CIMDS. This coal resource and reserve determination includes: coordination, assembly, and analysis of all pertinent resource data and processing into a resource database; the mapping of coal resources; estimation of coal resources and coal reserves; review and compilation of coal quality data; review and assessment of the economics associated with the planned mineral development and production by Corsa; and the preparation of a TR in accordance with NI 43-101 standards.

Coal resources and coal reserves are herein reported using imperial units of measurement, the prevalent units of measurement in the USA. The coal resources controlled by Corsa are summarized in *Table 1-1* below.

Table 1-1: Coal Resources Summary

Type/seam	Total Resource (in situ) Tons			
	Measured	Indicated	Total	Inferred
Surface-mineable				
Sewickley	141,600	0	141,600	0
Redstone	216,400	0	216,400	0
Upper Freeport	194,400	0	194,400	0
Lower Freeport	748,400	0	748,400	0
Upper Kittanning	3,479,600	0	3,479,600	0
Middle Kittanning	487,800	0	487,800	0
Lower Kittanning	168,200	0	168,200	0
Total	**5,436,400**	**0**	**5,436,400**	**0**
Highwall-mineable				
Upper Kittanning	995,600	0	995,600	0
Middle Kittanning	153,300	0	153,300	0
Lower Kittanning	143,300	0	143,300	0
Total	**1,292,200**	**0**	**1,292,200**	**0**
Underground-mineable				
Upper Freeport	15,517,300	3,912,000	19,429,300	0
Lower Freeport	5,261,800	39,000	5,300,800	0
Upper Kittanning	34,969,200	7,387,800	42,357,000	0
Middle Kittanning	20,596,800	5,077,500	25,674,300	0
Lower Kittanning	27,082,300	14,785,300	41,867,600	1,500,200
Brookville	23,737,000	4,487,900	28,224,900	0
Total	**127,164,300**	**35,689,500**	**162,853,800**	**1,500,200**
Grand Total				
Sewickley	141,600	0	141,600	0
Redstone	216,400	0	216,400	0
Upper Freeport	15,711,700	3,912,000	19,623,700	0
Lower Freeport	6,010,200	39,000	6,049,200	0
Upper Kittanning	39,444,400	7,387,800	46,832,200	0
Middle Kittanning	21,237,900	5,077,500	26,315,400	0
Lower Kittanning	27,393,800	14,785,300	42,179,100	1,500,200
Brookville	23,737,000	4,487,900	28,224,900	0
Grand Total	**133,892,900**	**35,689,500**	**169,582,400**	**1,500,200**

Notes: (1) Recoverable reserve tons are derived from the in-situ resource tons. (2) Coal reserves are included within coal resources.

Totals may not add due to rounding.

In summary, Corsa controls a total of 169.58 million measured and indicated in-situ coal resource tons. Of the total measured and indicated tons, 79% are measured and 21% are indicated. An additional 1.50 million inferred in-situ coal tons have been identified.

Table 1-2 below summarizes the raw in-seam coal quality for each resource area included in this TR.

Table 1-2: Summary of Raw, In-seam Quality by Seam by Property

Area	Seam	Raw Quality, Dry Basis				
		Ash%	Sulfur%	Btu/lb.	Vol.	No. of Samples*
Surface-Mineable						
Gaz	Upper Kittanning	21.82	2.27	11,377	20.20	8
Rhoades	Upper Kittanning	10.11	0.56	12,953	19.18	2
Rhoades	Middle Kittanning	23.35	2.76	11,710	15.42	8 / 8 / 8 / 5
Rhoades	Lower Kittanning	19.02	3.52	12,491	16.48	2
Schrock Run	Lower Freeport	9.01	0.72	13,966	17.69	4
Schrock Run	Upper Kittanning	14.08	2.45	13,262	18.08	13
Hamer	Upper Kittanning	17.70	2.53	12,440	22.73	5 / 3 / 2 / 1
Hamer	Middle Kittanning	21.47	-	-	-	3 / 0 / 0 / 0
Blue Lick	Sewickley	16.58	1.48	12,813	-	5
Blue Lick	Redstone	17.82	2.59	12,653	-	9
Downey	Upper Freeport	30.85	7.44	10,483	17.16	8
Downey	Lower Freeport	22.48	3.39	11,926	17.38	29
Downey	Upper Kittanning	23.49	3.43	12,131	16.03	45
Downey	Middle Kittanning	25.91	3.78	11,176	15.97	34 / 34 / 34 / 33
Hart	Lower Freeport	20.72	1.93	10,886	-	21 / 21 / 1 / 0
Hart	Upper Kittanning	24.84	1.94	11,201	-	68 / 68 / 1 / 0
Bassett	Upper Freeport	26.42	4.74	11,098	15.83	5
Berwind Lohr-EAST	Upper Freeport	17.26	3.47	12,677	15.85	11 / 11 / 11 / 3
Berwind Lohr-EAST	Lower Freeport	16.43	2.86	12,895	16.48	8 / 8 / 8 / 2
Total Composite		**19.14**	**2.50**	**12,310**	**17.64**	
Highwall-Mineable						
Gaz	Upper Kittanning	21.82	2.27	11,377	20.20	8
Rhoades	Upper Kittanning	10.11	0.56	12,953	19.18	2
Rhoades	Middle Kittanning	23.35	2.76	11,710	15.42	8 / 8 / 8 / 5
Rhoades	Lower Kittanning	19.02	3.52	12,491	16.48	2
Schrock Run	Lower Freeport	9.01	0.72	13,966	17.69	4
Schrock Run	Upper Kittanning	14.08	2.45	13,262	18.08	13
Hamer	Upper Kittanning	17.70	2.53	12,440	22.73	5 / 3 / 2 / 1
Hamer	Middle Kittanning	21.47	-	-	-	3 / 0 / 0 / 0
Total Composite		**16.24**	**2.48**	**12,879**	**18.13**	
Underground-Mineable						
QueCreek	Upper Kittanning	20.01	2.85	12,226	17.46	20 / 20 / 19 / 14
Casselman	Upper Freeport	17.51	1.66	14,039	19.97	6 / 34 / 29 / 34
Acosta	Upper Kittanning	18.93	2.67	12,578	19.12	21 / 14 / 14 / 13
Acosta	Middle Kittanning	26.62	3.42	11,269	26.90	15 / 11 / 11 / 9
Acosta	Lower Kittanning	33.10	3.00	9,612	15.16	13 / 11 / 11 / 10
Horning	Lower Freeport	10.09	2.13	14,023	17.28	10
A Seam	Brookville	31.50	1.25	10,171	16.75	33 / 33 / 33 / 32
Shaffer	Upper Kittanning	21.32	3.37	12,017	16.05	17
Laurel	Upper Kittanning	15.34	3.92	13,082	17.76	16 / 16
Keyser	Middle Kittanning	22.13	-	-	-	1 / 0
Keyser	Lower Kittanning	20.29	-	-	-	14 / 0
Total Composite		**23.32**	**2.41**	**11,761**	**19.23**	
Total						
Surface Mineable		19.14	2.50	12,310	17.64	
Highwall Mineable		16.24	2.48	12,879	18.13	
Underground Mineable		23.32	2.41	11,761	19.23	
Total Composite		**23.13**	**2.42**	**11,792**	**19.16**	

*No. of samples = if single digit, then all 4 columns are same; otherwise corresponds to column.
All seam quality reported is based on arithmetic averages. Composites are based on tons and are therefore weighted.

Proven and probable coal reserves were derived from the defined coal resources considering relevant processing, economic (including independent estimates of capital, revenue, and cost), marketing, legal, environmental, socio-economic, and regulatory factors. Mine depletion for the fourth quarter of 2017 was supplied by Corsa, and MM&A deducted this historical production from the mapped reserves in

order to estimate reserves as of December 31, 2017. The coal reserves controlled by Corsa are summarized in *Table 1-3* below.

Table 1-3: Coal Reserves Summary (Moist, Recoverable Basis)

	Total Demonstrated[1]			By Permit Status	
Type/seam	Proven	Probable	Total	Permitted	Not Permitted
Surface-mineable					
Sewickley	117,400	0	117,400	117,400	0
Redstone	178,900	0	178,900	178,900	0
Upper Freeport	26,400	0	26,400	26,400	0
Lower Freeport	502,700	0	502,700	251,700	251,000
Upper Kittanning	2,392,000	0	2,392,000	1,616,800	775,200
Middle Kittanning	319,400	0	319,400	319,400	0
Lower Kittanning	123,600	0	123,600	123,600	0
Total	**3,660,400**	**0**	**3,660,400**	**2,634,200**	**1,026,200**
Highwall-mineable					
Upper Kittanning	376,200	0	376,200	77,600	298,600
Middle Kittanning	40,800	0	40,800	40,800	0
Lower Kittanning	46,800	0	46,800	46,800	0
Total	**463,800**	**0**	**463,800**	**165,200**	**298,600**
Underground-mineable					
Upper Freeport	5,224,900	1,315,800	6,540,700	3,515,200	3,025,500
Lower Freeport	2,197,600	16,400	2,214,000	2,214,000	0
Upper Kittanning	7,410,600	1,468,200	8,878,800	164,400	8,714,300
Middle Kittanning	5,063,200	1,094,500	6,157,700	4,206,100	1,951,600
Lower Kittanning	9,149,500	4,573,900	13,723,400	0	13,723,500
Brookville	6,444,600	16,900	6,461,500	6,441,700	19,800
Total	**35,490,300**	**8,485,800**	**43,976,100**	**16,541,400**	**27,434,700**
Grand Total					
Sewickley	117,400	0	117,400	117,400	0
Redstone	178,900	0	178,900	178,900	0
Upper Freeport	5,251,300	1,315,800	6,567,100	3,541,600	3,025,500
Lower Freeport	2,700,300	16,400	2,716,700	2,465,700	251,000
Upper Kittanning	10,178,800	1,468,200	11,647,000	1,858,800	9,788,100
Middle Kittanning	5,423,400	1,094,500	6,517,900	4,566,300	1,951,600
Lower Kittanning	9,319,900	4,573,900	13,893,800	170,400	13,723,500
Brookville	6,444,600	16,900	6,461,500	6,441,700	19,800
Grand Total	**39,614,500**	**8,485,800**	**48,100,300**	**19,340,800**	**28,759,500**

Notes: (1) Proven and probable coal reserves were derived from the defined coal resources considering relevant processing, economic (including independent estimates of capital, revenue, and cost), marketing, legal, environmental, socio-economic, and regulatory factors.

Totals may not add due to rounding.

In summary, Corsa controls 48.10 million moist, recoverable proven and probable coal reserve tons, of which 82% is considered proven and 18% is considered probable, after the application of all mining factors. Of the total coal reserve, 3.66 million moist, recoverable tons are surface-mineable, 0.46 million moist, recoverable are highwall-mineable, and 43.98 million moist, recoverable tons are underground-mineable. Of the total coal reserve, 19.34 million tons are permitted for mining by appropriate federal and state regulatory authorities with the responsibility for oversight of mining operations in the USA and in Pennsylvania. The remaining 28.76 million reserve tons are not permitted. Definitions of terms stated above are defined in *Item 2.2*.

Table 1-4 below summarizes the washed in-seam coal quality for each reserve area included in this TR.

Table 1-4: Summary of Coal Reserve Quality by Seam by Property – Proximate Analysis

Reserve Area	Seam	Weighted Composite (Moist Basis)				
		Wash Recovery	Ash	Sul	Btu/lb.	Volatile Matter
Surface-Mineable						
Gaz	Upper Kittanning	89.35%	15.00%	1.72%	10,971	-
Downey	Upper Freeport	-	23.27%	5.65%	10,880	-
Downey	Lower Freeport	87.10%	15.72%	2.53%	12,144	-
Downey	Upper Kittanning	88.19%	16.61%	2.48%	12,173	-
Downey	Middle Kittanning	84.55%	19.82%	2.68%	11,366	-
Hart	Lower Freeport	87.18%	13.95%	1.45%	11,677	-
Hart	Upper Kittanning	85.14%	18.49%	1.46%	11,650	-
Rhoades	Upper Kittanning	93.95%	8.18%	0.53%	12,420	-
Rhoades	Middle Kittanning	85.47%	17.94%	2.08%	11,752	-
Rhoades	Lower Kittanning	87.81%	14.15%	2.62%	12,416	-
Schrock Run	Lower Freeport	95.00%	7.36%	0.69%	13,335	-
Schrock Run	Upper Kittanning	92.34%	11.26%	1.82%	12,801	-
Hamer	Upper Kittanning	100.00%	16.95%	2.42%	11,911	-
Hamer	Middle Kittanning	-	-	-	0	-
Blue Lick	Sewickley	-	-	-	0	-
Blue Lick	Redstone	91.37%	14.75%	2.11%	12,252	-
Total		**85.19%**	**13.55%**	**1.77%**	**11,652**	**-**
Underground-Mineable						
QueCreek	Upper Kittanning	69.36%	9.32%	1.42%	12,877	17.60%
Casselman	Upper Freeport	83.35%	7.46%	1.02%	13,276	19.70%
Horning	Lower Freeport	68.26%	5.51%	0.93%	13,533	16.20%
Acosta	Upper Kittanning	76.48%	8.53%	1.49%	13,092	18.70%
Acosta	Middle Kittanning	56.26%	10.38%	1.09%	12,714	15.60%
Acosta	Lower Kittanning	49.05%	9.13%	1.64%	12,960	16.40%
A Seam	Brookville	53.02%	10.33%	0.79%	12,629	17.50%
Keyser	Lower Kittanning	73.44%	6.74%	1.39%	13,389	18.80%
Total		**66.79%**	**8.48%**	**1.23%**	**13,059**	**17.80%**
Total						
Surface Mineable		85.19%	13.55%	1.77%	11,652	-
Underground Mineable		66.79%	8.48%	1.23%	13,059	17.80%
Total		**68.37%**	**8.92%**	**1.28%**	**12,939**	**17.80%**

1.6 Economic Evaluation

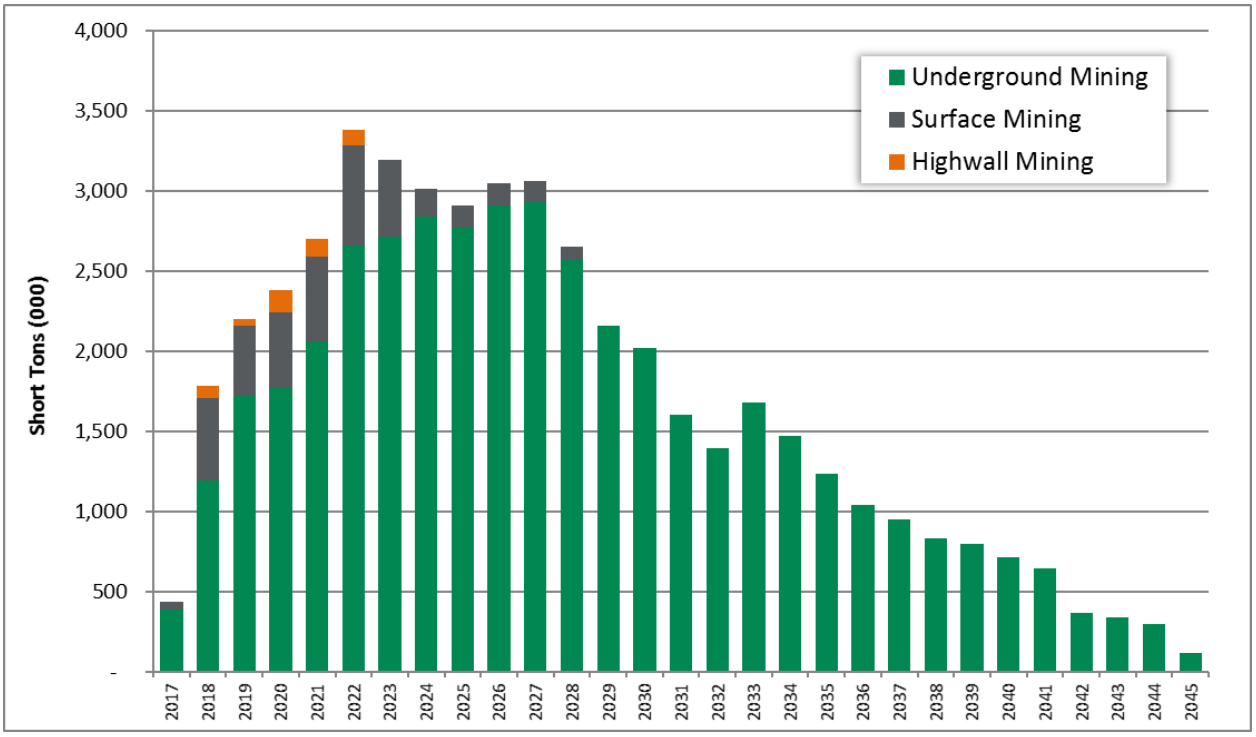
The pre-feasibility financial model, prepared for this TR, was developed to test the economic viability of each coal resource area. The results of the financial model are not intended to represent a bankable feasibility study, required for financing of any current or future mining operations contemplated for the Corsa properties, but are intended to establish the economic viability of the estimated coal reserves. The discounted cash flow analysis presented herein is based on an effective date of December 31, 2017.

Mine plans and projections were developed by Corsa or MM&A for each of the mining areas. Using the mine plans, MM&A developed a detailed financial model for each projected mine and produced a consolidated financial model. The financial model projects the revenue stream, operating costs, and capital expenditures for the life-of-reserves presently controlled by Corsa. Cash flow after tax, but before debt service, generated over the life of the project was discounted to net present value (*NPV*) at a 13.21% discount rate, which represents MM&A's estimate of the constant dollar, risk-adjusted weighted average cost of capital (*WACC*) for likely market participants if the subject coal reserves were offered for sale. The resulting NPV represents the enterprise value of the project. Sensitivity of the

project economics was tested by separately varying coal sales prices, operating costs, and capital expenditures. The terms "cash flows" and "project cash flows" used in this report refer to after-tax cash flows. Currency reported herein is expressed in USA dollars ($).

The operations are projected on a calendar year basis from 2018 through 2045. MM&A's projection of consolidated annual sales tonnage is summarized in the chart below. While all Corsa coal resources properties deemed by MM&A to have potential for classification as coal reserves were evaluated as part of the economic model, some of those resource areas were determined to be uneconomical in the current market and were therefore excluded from coal reserves as discussed below.

Figure 1-2: Projection of Sales Tons



Note: Results shown for 2017 are for fourth quarter only.

1.6.1 P&L and EBITDA Summary

Table 1-5 shows life-of-mine (*LOM*) tonnage, profit and loss before tax (*P&L*), and Earnings before Interest, Taxes, Depreciation, and Amortization (*EBITDA*) for each Corsa mine evaluated herein.

Table 1-5: Life-of-Mine Tonnage, P&L before Tax, and EBITDA

	Life of Mine Tonnage (000)	Life of Mine Pre-Tax P&L (000)	P&L Per Ton	Life of Mine EBITDA (000)	EBITDA Per Ton
Underground Mines					
A Seam	6,461	$183,326	$28.37	$218,187	$33.77
Horning D	2,214	$23,661	$10.69	$47,491	$21.45
QueCreek C	206	$2,265	$11.01	$4,121	$20.03
Casselman	6,634	$221,521	$33.39	$253,582	$38.23
Keyser LK	8,239	$140,762	$17.08	$201,059	$24.40
Acosta UK	8,714	$98,460	$11.30	$141,795	$16.27
Acosta LK	5,484	$511	$0.09	$34,662	$6.32
Acosta MK	6,196	$90,448	$14.60	$116,683	$18.83
Consolidated Deep Mines	**44,149**	**$760,953**	**$17.24**	**$1,017,581**	**$23.05**
Surface Mines					
Basset*	83	-$2,660	($32.05)	-$1,856	($22.37)
Blue Lick	296	-$1,193	($4.02)	$2,126	$7.18
Gaz	384	$5,031	$13.10	$7,895	$20.56
Downey	803	-$13,404	($16.70)	$8,016	$9.99
Hart	660	$12,074	$18.29	$16,560	$25.08
Rhoades	284	$6,092	$21.45	$7,916	$27.87
Schrock Run	1,189	$20,607	$17.33	$32,226	$27.10
Hamer	68	-$531	($7.76)	$2,113	$30.88
Consolidated Surface Mines	**3,768**	**$26,018**	**$6.90**	**$74,997**	**$19.90**
HWM Operations					
Gaz HWM	48	$259	$5.42	$312	$6.52
Rhoades HWM	79	$899	$11.41	$986	$12.52
Schrock Run HWM	299	$3,876	$12.98	$4,206	$14.09
Hamer HWM	48	$2,536	$53.18	$2,557	$53.63
Consolidated HWMs	**473**	**$7,570**	**$16.01**	**$8,062**	**$17.05**
Grand Total	**48,391**	**$794,541**	**$16.42**	**$1,100,640**	**$22.74**

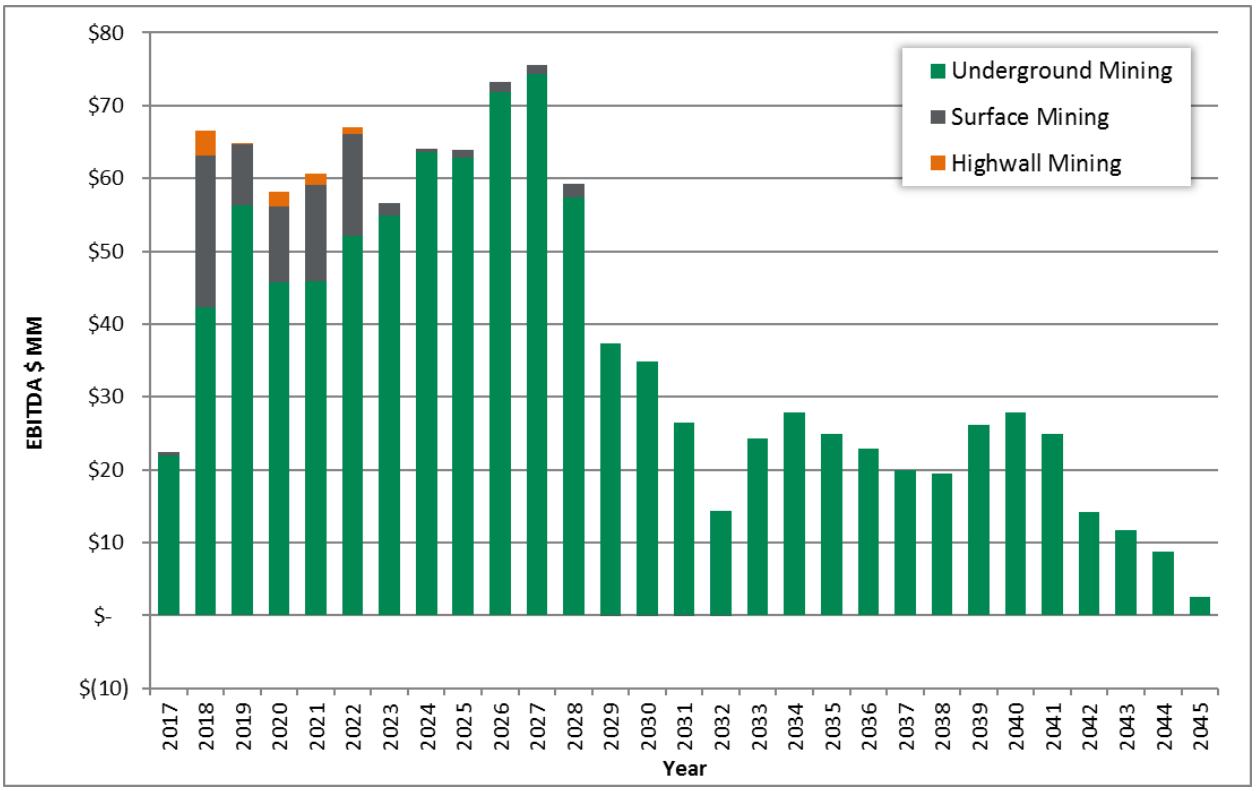
Notes: *This resource area failed to achieve positive EBITDA in the economic evaluation. Therefore, the coal tons forecasted from this mine have been excluded from the estimate of coal reserves in this TR.
**LOM tonnage evaluated in the financial model includes 83,000 tons for Basset surface mine, which failed to achieve positive economic results, as well as 4th quarter 2017 production (207,000 clean tons) which was subtracted from coal reserves in order to make the effective date of reserves December 31, 2017.

As shown in *Table 1-5,* all of the underground mines show positive EBITDA over the LOM. Regarding the surface mines, all of the mines analyzed show positive EBITDA over the LOM with the exception of Basset. A major factor contributing to the net loss of the Basset mine which does not exhibit positive EBITDA is the large reclamation accrual due to the very short life of this mine. Overall, Corsa consolidated shows positive LOM P&L and EBITDA of $0.8 billion and $1.1 billion, respectively.

Based on the negative EBITDA as shown in the results summarized above, the Basset surface mine resource area has been excluded from the estimate of coal reserves. The negative financial results for these areas are included in the consolidated results presented herein.

A breakdown of projected consolidated EBITDA by mining method is shown in the chart below.

Figure 1-3: Annual EBITDA



Note: Results shown for 2017 are for fourth quarter only.

1.6.2 Cash Flow Summary

Corsa's Consolidated Cash Flow Summary in constant 2017 dollars, excluding debt service, is shown in *Table 1-6* below.

Table 1-6: Project Cash Flow Summary (000)

	Total	YE 12/31 2017	YE 12/31 2018	YE 12/31 2019	YE 12/31 2020	YE 12/31 2021	YE 12/31 2022
Production & Sales tons	48,391	437	1,782	2,202	2,380	2,698	3,380
Total Revenue	$4,285,885	$56,399	$198,326	$210,362	$209,343	$231,618	$279,647
EBITDA	$1,100,640	$22,358	$66,484	$64,874	$58,113	$60,631	$67,040
Net Income	$605,242	$14,106	$40,172	$37,777	$33,135	$33,136	$34,937
Net Cash Provided by Operating Activities	$921,081	$29,387	$44,980	$53,202	$49,579	$50,614	$54,667
Purchases of Property, Plant, and Equipment	($266,606)	($2,864)	($25,321)	($23,154)	($19,917)	($26,279)	($10,477)
Net Cash Flow	$654,475	$26,523	$19,659	$30,048	$29,662	$24,335	$44,190
	YE 12/31 2023	YE 12/31 2024	YE 12/31 2025	YE 12/31 2026	YE 12/31 2027	YE 12/31 2028	YE 12/31 2029
Production & Sales tons	3,191	3,009	2,907	3,047	3,062	2,648	2,157
Total Revenue	$267,221	$258,312	$250,639	$264,230	$264,078	$225,380	$182,761
EBITDA	$56,660	$64,042	$63,938	$73,244	$75,563	$59,269	$37,226
Net Income	$25,339	$30,638	$32,124	$39,253	$41,164	$33,052	$20,900
Net Cash Provided by Operating Activities	$51,023	$51,260	$53,369	$58,678	$61,011	$50,877	$34,085
Purchases of Property, Plant, and Equipment	($14,006)	($17,627)	($13,960)	($16,167)	($14,125)	($9,001)	($4,065)
Net Cash Flow	$37,017	$33,632	$39,409	$42,510	$46,886	$41,875	$30,021

	YE 12/31 2030	YE 12/31 2031	YE 12/31 2032	YE 12/31 2033	YE 12/31 2034	YE 12/31 2035	YE 12/31 2036
Production & Sales tons	2,017	1,600	1,392	1,680	1,469	1,232	1,042
Total Revenue	$168,857	$130,551	$112,638	$142,954	$129,900	$111,116	$96,340
EBITDA	$34,862	$26,404	$14,330	$24,266	$27,854	$24,856	$22,965
Net Income	$19,205	$14,372	$5,790	$11,534	$15,782	$14,049	$13,084
Net Cash Provided by Operating Activities	$30,104	$24,648	$15,497	$19,065	$23,244	$21,519	$19,794
Purchases of Property, Plant, and Equipment	($8,983)	($16,655)	($9,211)	($9,657)	($2,684)	($1,260)	($2,897)
Net Cash Flow	$21,121	$7,993	$6,286	$9,408	$20,560	$20,259	$16,898
	YE 12/31 2037	**YE 12/31 2038**	**YE 12/31 2039**	**YE 12/31 2040**	**YE 12/31 2041**	**YE 12/31 2042**	**YE 12/31 2043**
Production & Sales tons	946	828	798	716	647	367	341
Total Revenue	$87,381	$77,037	$77,744	$72,879	$65,804	$37,329	$34,656
EBITDA	$19,980	$19,532	$26,147	$27,866	$24,916	$14,243	$11,754
Net Income	$10,907	$12,037	$17,405	$17,942	$15,700	$8,245	$6,727
Net Cash Provided by Operating Activities	$16,795	$16,538	$19,519	$20,595	$18,844	$12,869	$9,630
Purchases of Property, Plant, and Equipment	($4,479)	($6,133)	($450)	($1,791)	($450)	($2,341)	($1,734)
Net Cash Flow	$12,317	$10,405	$19,069	$18,805	$18,394	$10,528	$7,897
	YE 12/31 2044	**YE 12/31 2045**	**YE 12/31 2046**	**YE 12/31 2047**	**YE 12/31 2048**	**YE 12/31 2049**	**YE 12/31 2050**
Production & Sales tons	299	117	0	0	0	0	0
Total Revenue	$30,476	$11,909	$0	$0	$0	$0	$0
EBITDA	$8,700	$2,537	($8)	($4)	($2)	($1)	($0)
Net Income	$4,938	$1,810	($8)	($4)	($2)	($1)	($0)
Net Cash Provided by Operating Activities	$7,600	$4,071	($1,181)	($399)	($199)	($109)	($96)
Purchases of Property, Plant, and Equipment	($916)	$0	$0	$0	$0	$0	$0
Net Cash Flow	$6,683	$4,071	($1,181)	($399)	($199)	($109)	($96)

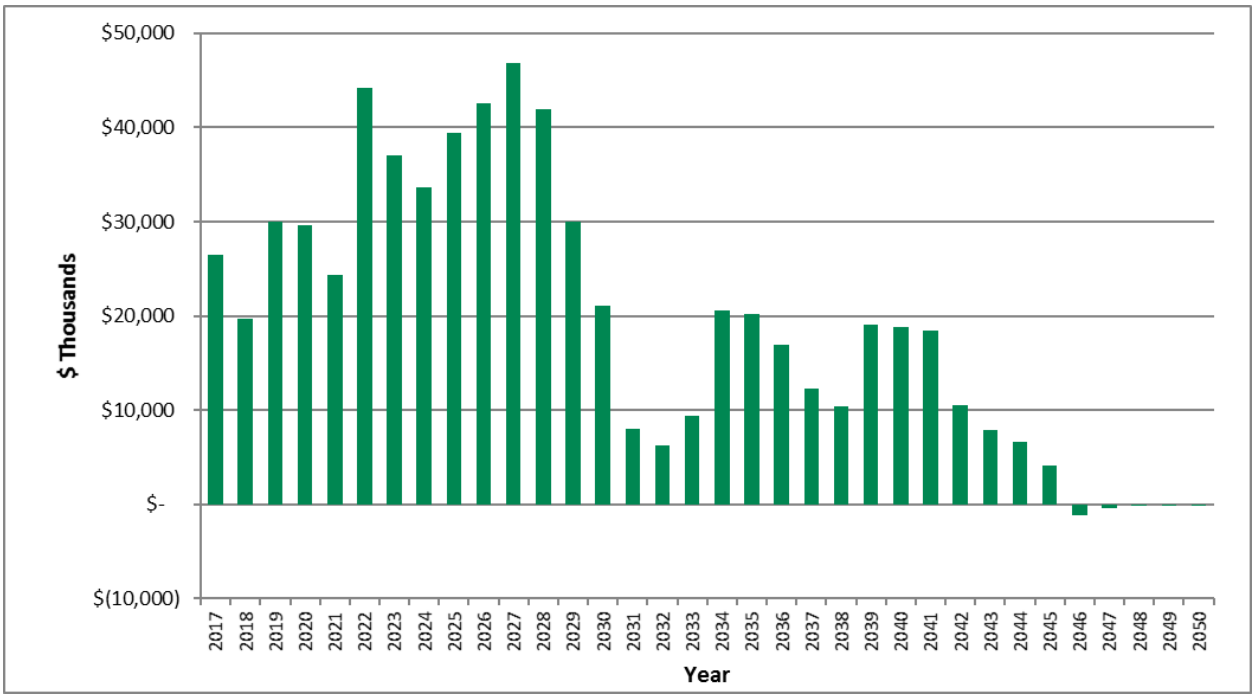
Note: Results shown for 2017 are for fourth quarter only. LOM tonnage evaluated in the financial model includes 83,000 tons for Basset surface mine, which failed to achieve positive economic results, as well as 4th quarter 2017 production (207,000 clean tons) which was subtracted from coal reserves in order to make the effective date of reserves December 31, 2017.

Consolidated cash flows are driven by annual sales tonnage, which grows from 1.8 million tons in 2018 to a peak of 3.4 million tons in 2022. Between years 2023 and 2033, sales ranges from 1.7 million to 3.2 million tons and between years 2034-2045, sales range from 0.1 million tons to 1.5 million tons. Projected consolidated revenue grows from $198.3 million in 2018 to a peak of $279.6 million in 2022. Revenue totals $4.3 billion for the project's life.

Consolidated cash flow from operations is positive throughout the projected operating period, with the exception of post-production years, due to end-of-mine reclamation spending. Consolidated cash flow from operations peaks at $61.0 million in 2027 and totals $0.92 billion over the project life. Capital expenditures total $108.0 million during the first five years and $266.6 million over the project's life. Payments to the water treatment trust fund total approximately $3.1 million through 2019.

Consolidated net cash flow after tax, but before debt service, is shown by year in the chart below:

Figure 1-4: Net Cash Flow after Tax (Before Debt Service)



Note: Results shown for 2017 are for fourth quarter only.

LOM net cash flow is positive for the Corsa properties evaluated. The cash flows in years 2046-2050 are end of mine reclamation expenditures, which are accrued over the life of the mines.

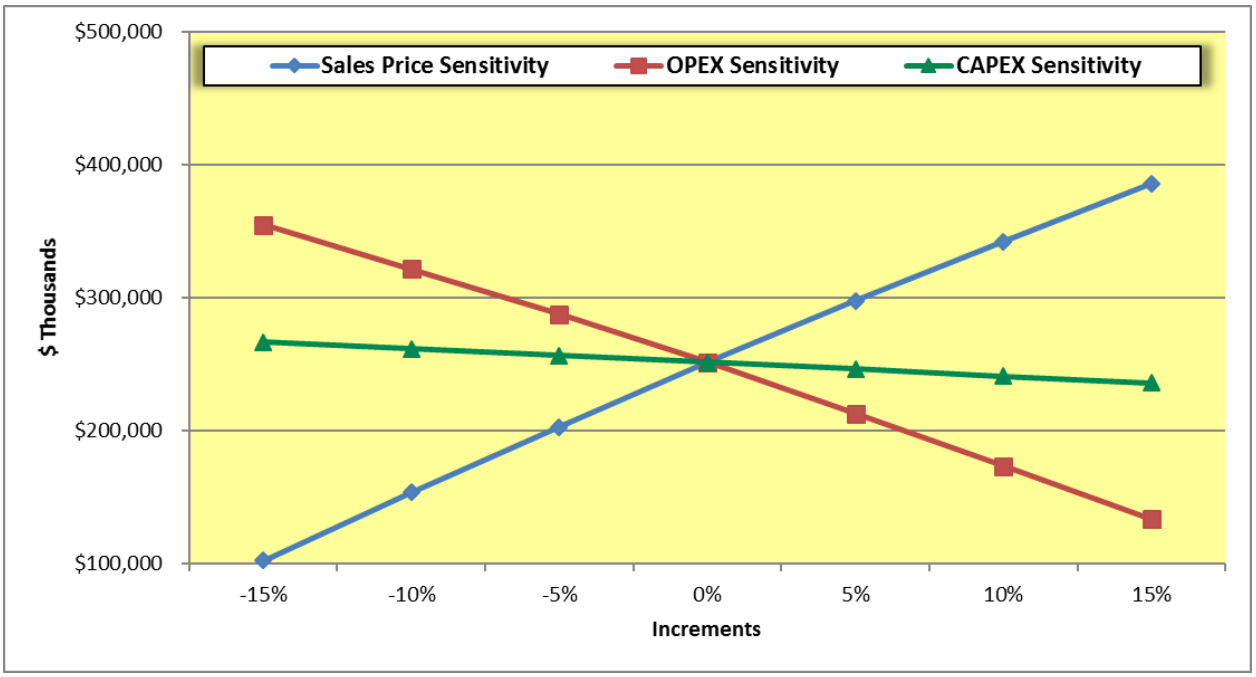
1.6.3 Discounted Cash Flow Analysis

On an un-levered basis, the NPV of the project cash flows represents the Enterprise Value of the project, and amounts to $251.6 million at a 13.21% discount rate. Corsa is an active producer and the financial model shows positive net cash flow for each year of the operating life of the reserve. Therefore, internal rate-of-return (*IRR*) and project payback were not calculated, as there was no initial investment considered in the financial model. The pre-feasibility financial model prepared for the TR was developed to test the economic viability of each coal resource area. The NPV estimate was made for purposes of confirming the economics for classification of coal reserves and not for purposes of valuing Corsa or its assets. Mine plans were not optimized and actual results of the operations may be different, but in all cases, the mine production plan assumes the properties are under competent management.

1.6.4 Sensitivity Analysis

Sensitivity of the NPV results to changes in the key drivers is presented in the chart below. The sensitivity study shows the NPV at the 13.21% discount rate when Base Case sales prices, operating costs, and capital costs are increased and decreased independently in increments of 5% within a +/- 15% range.

Figure 1-5: Sensitivity of NPV



As shown, NPV is quite sensitive to change in sales price and operating cost estimates, and slightly sensitive to changes in capital cost estimates.

1.7 Conclusions

1.7.1 Coal Resources

There has been sufficient data obtained through various exploration and sampling programs and mining operations to support the geological interpretations of structure and thickness for the coal horizons situated on the properties. The data is of sufficient density and reliability to reasonably support the classification of measured and indicated coal resource estimates in this TR under guidelines established by CIMDS.

1.7.2 Coal Reserves

The TR considering mining plans, coal quality, revenue, operating and capital cost estimates, and the coal reserve estimate conducted in accordance with CIMDS is sufficient to conclude that the coal reserves are proven and probable under reasonable expectations of market prices for metallurgical and thermal coal produced from the properties. The cash flow estimates are positive even after performing independent sensitivity analyses of up to 15% variation in sales price and up to 15% variation in the operating cost and capital expenditures. The Discounted Cash Flow (*DCF*) analysis shows a large positive value given the prevailing market for metallurgical and thermal coals and the anticipated market share available to Corsa.

1.7.3 Operations

Current operations include three company-operated underground mines, one idled underground mine, two active surface mines, and two active and one idle coal preparation plant with unit-train rail load-outs. Run-of-mine (*ROM*) raw coal is delivered to the preparation plants by truck. Raw coal is sized and shipped or washed depending on quality.

Underground operations are projected to continue until year 2045. Surface operations are projected to continue through year 2028. Corsa is committed to expanding its reserve base for both surface and underground operations going forward.

1.7.4 Recommendations

Recommendations based on the conclusions of this TR are listed below.

1. MM&A highly recommends additional exploration including quality analyses relevant to the qualification of the coals as metallurgical grade, along with geotechnical data for use in assessing the mineability of the operations.
2. Coal resources deemed to have insufficient geologic definition due to a lack of drill data to justify inclusion in the reserve estimates should be the target of future exploration programs. With sufficient drill data, some identified resources may demonstrate reserve potential in the future.
3. MM&A is not aware of any conditions that would presently prevent permitting of the surface-mineable reserves, however, the time required to acquire surface mining permits continues to increase. MM&A recommends that Corsa dedicate continuing efforts to permit mining areas well ahead of current mining to better assure that production will not be interrupted.
4. MM&A recommends that Limited Phase I Environmental Site Assessments (*ESA*) be conducted, at a minimum, on the active operations on the properties as discussed in Item 20.1.

1.8 Qualified Persons

MM&A's Qualified Persons (*QPs*) for this TR are Mr. Justin S. Douthat, PE, MBA, Supervisory Engineer, Mr. Michael G. McClure, CPG, Supervisory Geologist, Mr. Kirt W. Suehs, CPG, Senior Geologist, and Mr. Gerard J. Enigk, PE, Supervisory Engineer. Mr. McClure and Mr. Enigk conducted a site visit to the Property in October 2017 and participated in interviews with representatives of Corsa.

The QPs who are responsible for direct supervision of this TR include: Mr. Douthat graduated with a Bachelor of Science in Mining Engineering from the Virginia Polytechnic Institute & State University and a Master of Business Administration degree from The Pennsylvania State University and is licensed as a professional engineer in Virginia, West Virginia, Kentucky, Illinois, North Carolina, Kansas, Arkansas, Colorado, Mississippi, and Louisiana. He has been employed at MM&A since 1995, working on coal mining projects throughout the USA and internationally. See *Appendix 5, Résumés of Qualified Persons.*

Mr. McClure graduated from Brigham Young University with a Bachelor of Science Degree in Geology, and the University of Kentucky with a Master of Science Degree in Geology. He has certifications as a geologist in the states of Kentucky and Virginia, and is a Certified Professional Geologist with the American Institute of Professional Geologists. Mr. McClure has 40 years of experience in coal resource and mineability evaluations and has experience with project management, due diligence support, coal resource and reserve evaluations for public filing documents, and regional coal studies. Prior to his employment with MM&A in 1992, Mr. McClure worked as a mining geologist with Pittston and Island Creek coal companies.

Mr. Suehs is a senior geologist with 38 years of experience and manages projects at MM&A with a concentration in coal resource, reserve and mineability evaluations for public filings in the United States, Canada and Australia. Mr. Suehs has worked in all the domestic coal fields in the United States and on international projects in China, Turkey, and Colombia and his experience includes evaluation of industrial minerals and aggregates. He has been responsible for the design, implementation and management of major exploration projects. Mr. Suehs' contributions include reserve and resource evaluations using computer-based geologic modeling that meet **United States Security and Exchange Commission (*SEC*)**, JORC and NI 43-101 standards and requirements. Mr. Suehs graduated with a Bachelor of Science in Geology and Earth Science from Old Dominion University, is a Certified Professional Geologist in the State of Virginia and is a member of the American Institute of Professional Geologists.

Mr. Enigk has over 40 years of experience in coal-related projects, including but not limited to coal resource and coal reserve estimation, mine planning and design, mine operations, mineral valuation and appraisals, and geotechnical evaluations. He is a Registered Member of SME. Mr. Enigk holds a Bachelor of Science degree in Engineering of Mines from The Pennsylvania State University and a Master's degree in Environmental Science from the West Virginia Graduate College, and is a Registered Professional Engineer in West Virginia. Mr. Enigk has served in the capacity as Manager of Engineering and as a production supervisor for operating coal companies, and has extensive experience with surface and underground mining operations, including the use of highwall mining systems. Mr. Enigk is a certified mine foreman in the state of West Virginia.

Item 2 Introduction

2.1 Introduction

This TR is prepared for **Corsa Coal Corp. (*Corsa*)**, based in Toronto, Ontario. Corsa engaged **Marshall Miller & Associates (*MM&A*)** to conduct a Coal Resource and Coal Reserve evaluation of the bituminous coal deposits on properties controlled by Corsa in the State of Maryland and in the Commonwealth of Pennsylvania, USA and to prepare a TR in accordance with NI 43-101 and *CIMDS* on Mineral Reserves and Mineral Resources, adopted May 10, 2014. This TR provides technical information to support estimates of mineral resource and mineral reserve, hereafter referred to as coal resource and coal reserve. A non-coal mineral resource (limestone at Bluelick) is also discussed in this report.

Corsa is a junior natural resource company existing under the *Canada Business Corporations Act* and its common shares are listed on the **TSX Venture Exchange** (***TSXV***) under the trading symbol "CSO". Corsa is a reporting issuer in the Canadian provinces of British Columbia, Alberta, and Ontario. In August 2014, Corsa completed a transaction for the acquisition of **PBS Coals, Inc. (*PBS*)**, a wholly owned subsidiary of **Severstal Resources (*Severstal*)**. PBS, based in Somerset County, Pennsylvania, was acquired by Severstal in 2008. Corsa previously acquired the mines and resources of **Wilson Creek Energy, LLC (*Wilson Creek*)** in 2010. Corsa's current active operations consist of three underground mines and two surface mines; in addition, Corsa operates a preparation plant having access to **CSX Corporation (*CSX*)** railway, and one preparation plant with access to **Norfolk Southern *(NS)*** railway. Corsa operates an underground mine in Maryland and two underground and two surface mines in Pennsylvania.

In September 2013, MM&A (then Cardno MM&A) completed an evaluation of the subject properties titled "*Evaluation of Coal Reserves and Resources for Severstal Resources/ PBS Coals, Inc. on Select Properties Located in Pennsylvania and Maryland (USA)*" for predecessor Severstal. The report was conducted in accordance with United States Securities and Exchange Commission (SEC) standards using guidelines prescribed in the **United States Geological Survey (*USGS*)** Circular 891 Coal Resource Classification System, which is the standard classification system for coal projects in the USA. The effective date of the evaluation was March 31, 2013 and served as the basis for a TR effective August 19, 2014 titled "*Technical Report on the Coal Resource and Coal Reserve Controlled by PBS Coals, Inc. Pennsylvania, USA*" dated October 2014. The coal resources and reserves associated with the Wilson Creek properties were previously evaluated by **Earthtech, Inc. (*Earthtech*)** in a May 9, 2014 report titled "*Wilson Creek Energy, LLC Norther Appalachian Coal Holdings, USA Technical Report on Coal Resources and Coal Reserves*" with an effective date of December 31, 2013. Earthtech subsequently updated the resource and reserve tonnage estimates as of December 31, 2014 to account for mine depletion that occurred in year 2014. The coal resources and reserves controlled by Corsa were evaluated in a report titled *"Technical Report on the Coal Resource and Coal Reserve Controlled by Corsa Coal Corp., Pennsylvania and Maryland USA – Prepared in accordance with National Instrument 43-101 Standards*

for Disclosure for Mineral Projects Effective December 31, 2016". This current TR with an effective date of December 31, 2017 is being completed to satisfy NI 43-101 requirements, and includes changes occurring to the subject properties since the conclusion of previous work of MM&A, Cardno and Earthtech.

2.2 Terms of Reference

Definitions of mining terms used in this TR are provided in *Appendix 1, Glossary of Abbreviations and Definitions*. An independent evaluation of the coal reserves was conducted in accordance with Definitions within NI 43-101 and CIMDS[1], classifying the coal as "Resource" and "Reserve" as explained below.

Mineral Resource is defined as "…a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, continuity and other geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling."

Mineral Resources are subdivided into classes of Measured, Indicated, and Inferred, with the level of confidence reducing with each class, respectively. Coal is defined as combustible sedimentary rock in which organic matter, including residual moisture (as defined by ASTM Procedure 3180.84) comprises more than 50-perent by weight and more than 70-percent by volume of carbonaceous material formed from altered plant remains. Coal resources are reported as in-situ tonnage and are not adjusted for mining losses or mining recovery. Coal resources have been estimated and classified as *Measured*, *Indicated*, and *Inferred* following CIMDS. Measured coal resources are those lying within ¼-mile radius of a valid point of measurement. Indicated coal resources are those lying between ¼-mile and ¾-mile radius from such an observation point. Inferred coal resources lie more than a ¾-mile radius from a valid point of measurement, but less than 3 miles from one. These classifications connote the degree of tonnage estimation reliability based on distance from known points of measurements.

Mineral Reserve is defined as "…the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes dilution materials and allowances for losses, which occur when the material is mined or extracted and is defined by studies at Preliminary Feasibility or Feasibility level as appropriate that include Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified." Reserves, as defined by CIMDS, are those coal deposits that exhibit:

1. Geologic assurance of existence and continuity, and
2. Economic feasibility of recovery, as demonstrated by at least a Preliminary Feasibility Study.

[1] See Item 3.1 for specific Standards reference.

As referenced in CIMDS, *Measured*, *Indicated*, and *Inferred* in-situ coal resources (*Table 1-1*) are reported separately from the *Proven* and *Probable* coal reserves (*Table 1-2*) which are shown on a recoverable, as-received basis.

A **Preliminary Feasibility Study** is defined as "…a comprehensive study of a range of options for technical and economic viability of a mineral project that has advanced to a stage where a preferred mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, is established and an effective method of mineral processing is determined. It includes a financial analysis based on reasonable assumptions on the Modifying Factors and the evaluation of other relevant factors which are sufficient for a Qualified Person, acting reasonably, to determine if all or part of the Mineral Resource may be converted to a Mineral Reserve at the time of reporting. A Pre-feasibility Study is at a lower confidence level than a Feasibility Study."

As part of this evaluation, the following mineability factors were considered, in addition to those concerned more specifically with geologic conditions, including mining height, out-of-seam dilution, intervals between seams, depth, occurrence of faults, reserve size and configuration, and coal quality, among others.

Economic feasibility may be evaluated by interrelating coal thickness, overburden thickness, coal quality, costs of mining, processing, transportation, and expected selling price, among other factors. The coal reserve assessment provided herein addresses and summarizes the factors described above. In addition, each of the reserve areas identified was subject to a Preliminary Feasibility Study based on Corsa's current operations and plans and independent estimates of capitalization, revenue, and mining cost by MM&A.

In its examination of the economic viability of the coal reserves, mining methods and preliminary configurations of underground mines and surface support operations were reviewed and found consistent with standard industry practice. Production, processing cost, transportation, royalty obligations, regulatory constraints, market assumptions, and other related factors summarized in PBS's financial statements were found to be reasonable given observations during the site inspection by the QPs and in subsequent review by MM&A staff members.

Currencies in the TR are expressed in USA dollars ($) unless otherwise noted. Imperial units of measurement are used herein, as is customary in the USA.

2.3 Report Purpose

The purpose of this report is to provide an independent QP's TR, meeting the requirements of NI 43-101, for identified properties belonging to Corsa.

2.4 Source of Information

The primary information contained in this report has been obtained from the following sources:

All site-specific geologic information and project baseline information was provided to MM&A by Corsa, its mineral lessors, or prior owners of the properties (with permission). The information included drill hole data and the associated coal quality information developed from various exploration programs conducted on the properties.

Geologic information and mining models were prepared by MM&A staff and where feasible, utilized information from previous evaluations on the properties.

Site visits by MM&A representatives to PBS operations and water treatment sites that occurred on July 29 and 30, 2014 included Mr. Michael G. McClure, CPG, and Mr. Justin S. Douthat, PE, MBA, who are both QPs. As part of the site visits, MM&A met with Corsa personnel including Mr. Joe Gallo, Mr. Robert Bottegal, Mr. Doug Berkley, Ms. Melissa Mitchell, Mr. John Weir, and Mr. D.J. Elliot to discuss Corsa's current and planned future operations. MM&A also visited all of the locations for proposed surface and underground mines; MM&A personnel also visited the Corsa coal preparation plants, refuse disposal areas, water treatment facilities, unit-train rail load-outs, and all active surface and underground operations. These site visits were conducted on multiple occasions between May of 2013 and November of 2016. Mr. McClure and Mr. Enigk conducted a site visit to the Property in October 2017 and participated in interviews with representatives of Corsa.

Work completed in conjunction with separate projects (not part of 43-101 TRs) on geological review, preliminary mine planning, design and mine costing by MM&A.

MM&A has not carried out independent title verification of property control, by assignment and has relied on property boundaries and representations of title supplied by Corsa.

All information in the TR related to acquisitions and transfers of property ownership are based on public news announcements and other similar records. MM&A is not aware of any encumbrances on the properties. Other information provided by Corsa is as follows:

> *Metallurgical coal price data*

> *Bonding and Asset Retirement Obligations as reported by Corsa*

> *Historical Production at Active Mines as reported by Corsa*

> *Historical Costs of Active Mines as Reported by Corsa*

MM&A has previously performed geologic evaluations of property holdings for various predecessors-in-title. The following is a list of the previous reports prepared by MM&A.

> *'Technical Report on the Coal Resource and Coal Reserve Controlled by Corsa Coal Corp., Pennsylvania and Maryland USA' – Prepared in accordance with National Instrument 43-101 Standards for Disclosure for Mineral Projects Effective December 31, 2016*

- *'Phase 3 Analysis of Geologic and Related Conditions within the Southern Portion of the A Seam Deep-Mineable Reserve Area; Prepared for Corsa Coal Corporation; July 2017*
- *'Evaluation of Coal Reserves and Resources for Severstal Resources / PBS Coals, Inc. on Select Properties Located in Pennsylvania and Maryland (USA)'; Prepared for PBS Coals, Inc.; September 2013.* This was an evaluation of select properties identified by PBS as having reserve potential, but did not include all properties controlled by PBS.
- *'Reserve Evaluation of Mincorp, Inc. Somerset and Indiana Counties, PA'; Prepared for Citicorp Venture Capital, Ltd.; January 1998*
- *'Modified Phase I Environmental Site Assessment of Pennsylvania Subsidiaries of Mincorp, Inc.'; Prepared for Citicorp Venture Capital, Ltd., Bank of Scotland; January 1998*
- *'Reserve Evaluation of PBS Coals for First Reserve Corporation'; Prepared for First Reserve Corporation; April 1997*
- *'Preliminary Comments Coal Preparation Plants - PBS Coals, Inc. Somerset, Pennsylvania'; Prepared for Appalachian Fuels, LLC; June 2001*
- *'Reserve Audit of PBS Coals, Inc.'; Prepared for Appalachian Fuels, LLC; June 2001*
- *'Executive Summary - Modified Phase I Environmental Site Assessment - PBS Coals, Inc. - Somerset County, Pennsylvania'; Prepared for Appalachian Fuels, LLC; June 2001*
- *'Assessment of Mine Roof Water and Gas Influx, Quecreek No. 1 Mine, Somerset County, Pennsylvania'; Prepared for PBS Coals, Inc.; February 2005*

In addition to work performed by MM&A, the following is a list of previous reports generated by others with respect to the properties.

- "*Underground Mining Feasibility & Coal Reserve Study, A Seam, 1975*" prepared for Penn Pocahontas Coal Company by John T. Boyd Company.
- "*Reserve Study and Mining Plan, PBS Coals, Inc., 1978*" prepared for major mining company by John T. Boyd Company.
- "*Review of PBS Coals, Inc. as Coal Supplier to Morgantown and/or Chalk Point Generating Stations, 1984 & 1990*" prepared for Potomac Electric Power Company by John T. Boyd Company.
- *"Field Inspection and Determination of Decreased Capacity and Reduced yield at Shade Creek Coal Preparation Plant, 1987"* prepared for Mincorp, Inc. by John T. Boyd Company.
- *"Independent Coal Reserve Estimate, 1990"* prepared for PBS Coals, Inc. & Mincorp, Inc. by John T. Boyd Company.
- "*Preliminary Independent Valuation of PBS Coals, Inc.'s U.S. Coal Holdings, 1990*" prepared for PBS Coals, Inc. & Mincorp, Inc. by John T. Boyd Company.

- "*Preliminary Business Interruption Claim – Diamond T Mine, B Seam, Roxcoal, Inc., 1992*" prepared for GAB Business Services, Inc. by John T. Boyd Company.
- "*Preliminary Claim Review of Roof Fall and Equipment Damage at Roxcoal, Inc.'s Longview Mine, 1995*" prepared for GAB Business Services, Inc. by John T. Boyd Company.
- "*Advisory Services Related to Insurance Claim for Equipment Lost Due to Roof Fall at Diamond B Mine, Roxcoal, Inc., 1996*" prepared for GAB Robins North America, Inc. by John T. Boyd Company.
- "*Insurance Claim Review Related to Underground Inundation of PBS's Quecreek No. 1 Mine from Saxman Mine No. 2 on July 24, 2002*" prepared for GAB Robins North America, Inc. by John T. Boyd Company.
- "*Provide Assistance Regarding Evaluation of Future Mine Plans for PBS Coals, Inc., 2003*" prepared for Brikis Financial Services Co. by John T. Boyd Company.
- "Review of Insurance Claim Related to Stacking Conveyor Failure at PBS Coals, Inc.'s Shade Creek Preparation Plant, 2003" prepared for York Claims Service, Inc. by John T. Boyd Company.
- "*Independent Audit of Internally Prepared Coal Reserve Estimates, Coal Holdings of PBS Coals, Inc., 2006"* prepared for PBS Coals, Inc. by John T. Boyd Company.
- "*Independent Technical Report Coal Reserves and Mining Operations PBS Coals, Inc., Somerset County, Pennsylvania, U.S.A., May 2008*" prepared for PBS Coals, Inc. by John T. Boyd Company.
- "*Wilson Creek Energy, LLC Norther Appalachian Coal Holdings, USA Technical Report on Coal Resources and Coal Reserves*" with an effective date of December 31, 2013, prepared for Corsa by Earthtech. Tonnage estimates were subsequently updated by Earthtech effective December 31, 2014 in a letter report to Corsa.

2.5 Involvement of Qualified Persons

MM&A is a United States of America-based mining geological and engineering firm based in Bluefield, Virginia. MM&A has provided project feasibility studies and related engineering and geological services at coal projects and mines worldwide since 1975. MM&A has been involved extensively in coal projects throughout the Appalachian region for more than 40 years and has been involved in prior work on the properties for the current and previous operators and third parties.

This TR was prepared under the supervision of Mr. Kirt W. Suehs, CPG, Senior Geologist, Mr. Michael G. McClure, CPG, Supervisory Geologist; Mr. Justin S. Douthat, PE, MBA, Supervisory Engineer; and Mr. Gerard J. Enigk, PE, Supervisory Engineer. Mr. McClure and Mr. Enigk were involved in the 2017 visits to the properties and assisted in preparing the resource and reserve evaluation in accordance with NI 43-101, CIMDS and the assessment of mining operations, infrastructure, transportation, conceptual mine plans, prefeasibility financial model, and marketing and production costs. These individuals were supported by additional geological and mining engineering staff members and associates.

Neither MM&A nor its employees have any financial interest in Corsa or the properties. The work completed in the preparation of this TR was paid for by Corsa under the terms of its project engagement and was not contingent upon any pre-determined results or conclusions.

Item 3 Reliance on Other Experts

In preparing this TR, MM&A has relied on information provided by other experts, who are not QPs, concerning legal, environmental, political, and/or other relevant issues and factors. In particular, MM&A has relied upon property control, mine and financial information directly from Corsa's personnel: Messrs. Robert Bottegal, D.J. Elliot, and Dan Bonacci, including income statements and balance sheets, depreciation expense reports, and fixed asset schedules. This information was used in the development of the capital and operating costs provided in *Item 21*, along with the economic analysis provided in *Item 22*.

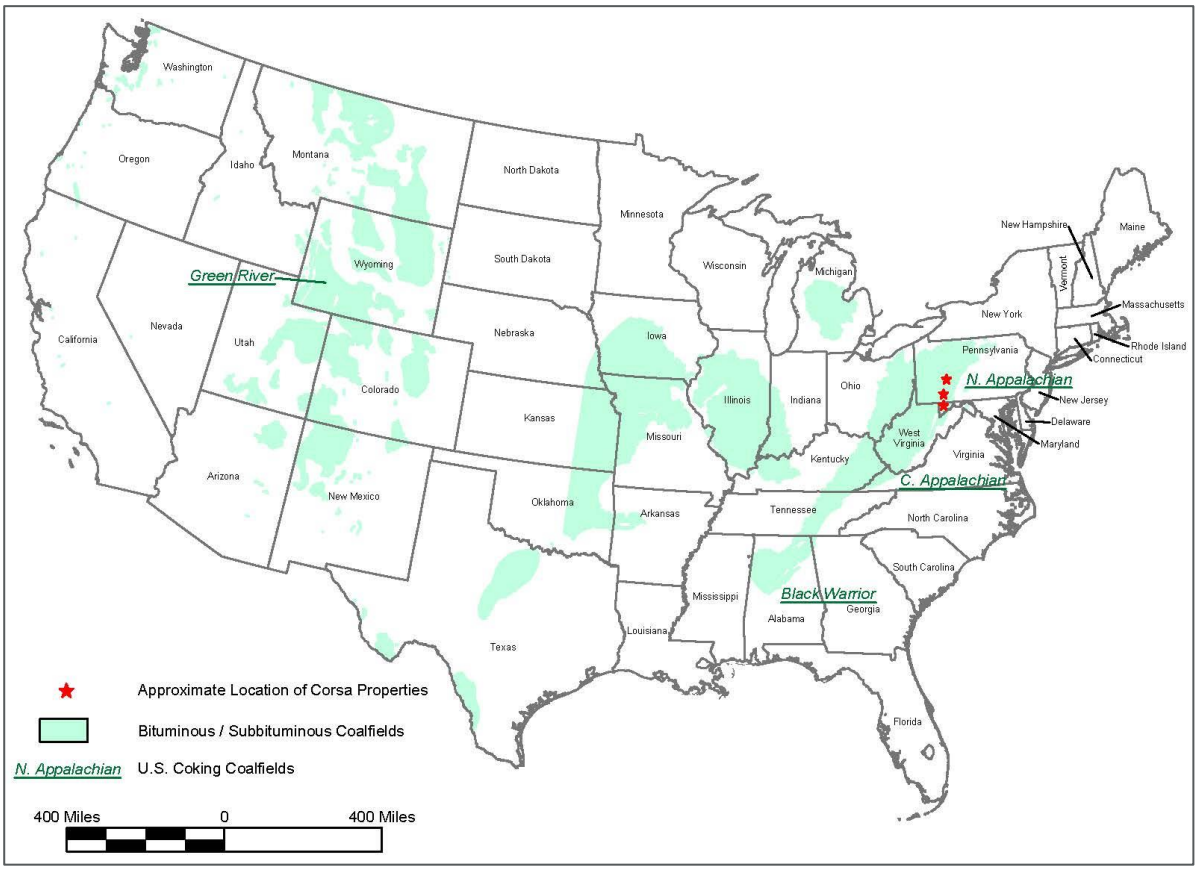
Metallurgical coal price information was provided by Corsa. MM&A has relied on this information for *Item 19* and preparing the financial model underpinning the coal reserves contained in this TR, which is summarized in *Item 22*.

Item 4 Property Description and Location

4.1 Location

The properties are located in Pennsylvania and Maryland, approximately 60 miles southeast of Pittsburgh and 120 miles west of Pennsylvania's capital city of Harrisburg, within the Northern Appalachian coal-producing region of the eastern USA.

Figure 4-1: General Location Map



4.2 Description

The coal resource properties consist of approximately 36,000 acres of mineral and/or surface control located in Somerset County Pennsylvania and Garrett County, Maryland. The properties are located on portions of eleven **United States Geological Survey (*USGS*)** quadrangles shown in *Table 4-1* and generally consist of a complex assemblage of owned and/or leased tracts that range from a few acres to several hundred acres in size. Segregation of mineral and surface ownership is common to the properties, with Corsa acquiring the necessary rights to support development through purchase or lease agreements with predominately private owners or entities. Corsa typically only acquires rights for areas required for development of resources and therefore does not have contiguous property control throughout the project area.

Table 4-1: USGS 7.5-Minute Quadrangles on which Corsa Properties are Located

Grantsville, MD	Wittenberg, PA	
Bakersville, PA	Central City, PA	New Baltimore, PA
Berlin, PA	Hooversville, PA	Somerset, PA
Boswell, PA	Murdock, PA	Stoystown, PA

Corsa operations currently consists of five active mines (see *Table 4-2*). Three of these are underground mines (Acosta, Quecreek and Casselman) and two are active surface mines (Hamer and Schrock Run Extension). Corsa operates one preparation plant and rail load-out facility (Cambria Preparation Plant) which is serviced by CSX rail, and one preparation plant (Shade) which is serviced by NS. In addition, Corsa has another preparation plant, the Rockwood plant, which is on care-and-maintenance status. In addition to the active mines, Corsa maintains an idled underground mine (Horning), which is scheduled to re-commence operations in the first quarter of 2018.

Table 4-2: Active and Idle Mines

Mine	Status	Coal Seam
Casselman (UG)	Active	Upper Freeport
Quecreek (UG)	Active	Upper Kittanning
Acosta	Active	Middle Kittanning
Schrock Run	Active	Lower Freeport
Hamer	Active	Upper & Middle Kittanning
Horning (UG)	Idle[1]	Lower Freeport

Note: 1) Horning is scheduled to re-commence operations in the first quarter of 2018

By assignment, MM&A has not independently verified property boundaries, lease agreements or royalty rates, rather has utilized royalty rates as provided by Corsa. Typical royalty rates range from 5% to 16% of the gross sales price. All surface facilities for accessing the coal seams and processing, storing and shipping the production are controlled by Corsa.

Pennsylvania South and Maryland West North American Datum (*NAD*) 83 State Plane coordinate systems were utilized to represent the geographic position of all data presented herein.

4.3 Regulation of Mining Activities on the Properties

Mining is one of the most heavily regulated industries in the USA. Mining activities are controlled and regulated by both federal and state laws, which establish policy, set goals, and provide a system of enforcement. Each of the properties is thus subject to certain environmental permits authorized by federal authorities. The federal laws relevant to mining include:

> The Clean Air Act of 1970, as amended

> The Clean Water Act of 1977

> The Surface Mining Control and Reclamation Act (*SMCRA*) of 1977, and

> The Resource Conservation and Recovery Act of 1976

> The **Commonwealth of Pennsylvania Department of Environmental Protection (*DEP*)** has responsibility of enforcing these Acts with aid of numerous state laws and legislative rules defined in the Codes of State Rules (*CS*). Relevant codes governing coal exploration, mining and preparation include:

> The Surface Mining Conservation and Reclamation Act, of May 31, 1945 (P.L. 1198, No. 412), as amended, 52 P.S. §§1396.1 et seq.

> Clean Streams Law, Act of June 22, 1937 (P.L>1984) 35 P.S. §§ 691.1 et seq.

> Bituminous Mine Subsidence and Land Conservation Act, Act of April 27, 1966 (P.L. 31, No.1), as amended, 52 P.S. §§ 1406.1 et seq. 25 Pa. Code §§ 86-90.

4.4 Permits

The properties are the subject of numerous permits for surface and underground mining, for coal preparation and related facilities, and for haul roads and other incidental permits necessary for mining to occur. A listing of all current Pennsylvania and Maryland mining permits held by Corsa is provided in *Table 4-3*. Permits generally require that the permittee post a performance bond in an amount established by the regulatory program to provide assurance that any disturbance or liability created during mining operations is properly restored to an approved post-mining land use and that all regulations and requirements of the permits are fully satisfied before the bond is returned to the permittee. Significant penalties exist for any permittee who fails to meet the obligations of the permits including cessation of mining operations, which can lead to potential forfeiture of the bond. Any company, and its directors, owners and officers, which are subject to bond forfeiture, can be denied future permits under the program.[2]

New permits or permit revisions will be necessary from time to time to facilitate the expansion or addition of new mining areas on the properties. New or modified mining permits are subject to a public advertisement process and comment period, and the public is provided an opportunity to raise an objection to any proposed mining operation. While there is some public opposition to mining in the USA, it is rare for objections to cause issuance of a permit to be denied. However, recent **United States Environmental Protection Agency (*EPA*)** intervention in the surface mine permitting process in Pennsylvania and other states has resulted in lengthy delays in issuance of Section 401, 402 and 404 permits required under the Clean Water Act. Unless specific prohibitions against surface mining impacts were identified, other delays in obtaining necessary mining permits and authorizations for mining to occur are not reflected herein. MM&A is not aware of any prohibition of mining on the

[2] Monitored under the Applicant Violator System (AVS) by the Federal Office of Surface Mining.

properties and, given sufficient time and planning, Corsa should be able to secure new permits to maintain its planned mining operations within the context of the current regulations. Necessary permits are in place to support current production on the properties.

The Corsa properties and adjacent properties have supported surface and underground mining operations for more than 70 years. Consequently, numerous abandoned mines and related facilities exist within and adjacent to the properties. Each of the known abandoned mines and facilities within or adjacent to the properties has been identified to assess their potential impact on the remaining coal reserves. To the extent past mining impacts classification of coal reserves, all relevant factors were taken into consideration. The extent of these abandoned mines is shown in the figures accompanying this report or on the detailed maps included in MM&A's files. MM&A largely depended on data provided by Corsa and obtained from state agencies to identify the presence of previous mining.

Portions of the properties are located near local communities. Regulations prohibit mining activities within 300 feet of a residential dwelling, school, church or similar structure unless written consent is first obtained from the owner of the structure. Where required, such consents have been obtained where mining is proposed beyond the regulatory limits. All known mining restrictions have been considered for estimation of reserves herein.

Table 4-3: Summary of Corsa Permits

SMCRA Permit No.	Facility Name	Type	Current Permit Status	Permit Acres
56110106	Hamer	Surface	Active	107.7
08-30	Casselman	Underground	Active	3,040.0
56111302	Acosta MK Mine	Underground	Active	2,776.4
Pending	Keyser	Underground	Pending	6,942.1
56951301	Augustus Mine	Underground	Active	1,341.0
56101301	A-Seam Mine	Underground	Active	163.0
56101302	A-Seam Mine	Underground	Active	3,174.4
56851303	Barbara B	Underground	Water Treatment[1]	2,668.8
56971301	Geronimo Mine	Underground	Reclaimed	3,009.7
56071301	Horning Mine	Underground	Active	2,545.4
56061301	Kimberly Run Mine	Underground	Active	2638.0
56961302	Miller Mine	Underground	-	-
32981301	North Branch Mine	Underground	Not Active	2,670.0
56981301	Quecreek Mine	Underground	Active	3,666.0
56021301	Roytown Mine	Underground	Active	1,104.8
56961301	Sarah Mine	Underground	Active	895.7
56841608	Cambria Preparation Plant	Plant	Active	56.0
56841603	Shade Preparation Plant	Plant	Active	103.3
56950702	Cambria Refuse Area (Job 93)	Refuse	Water Treatment[1]	67.1
56910701	Job 10 Refuse Area	Refuse	Water Treatment[1]	68.1
56900701	Job 12 Expansion	Refuse	Active	296.8
32980701	North Branch Rock Refuse Area	Refuse	Not Active	24.0
56773707	Cambria Fuels Refuse Area	Refuse	Water Treatment[1]	38.7
56090701	Schrock Run Refuse Area	Refuse	Active	263.0
56960107	Acosta Mine	Surface	Water Treatment[1]	135.0
56090102	Barta Mine	Surface	Active	83.5
56120106	Bassett Mine	Surface	Active	150.4

SMCRA Permit No.	Facility Name	Type	Current Permit Status	Permit Acres
56823033	Bluelick #2 Strip	Surface	Active	126.6
56880109	Bluelick #3 Strip	Surface	Active	154.2
56880108	Bluelick #4 Strip	Surface	Active	377.7
56030105	Buffalo Operation	Surface	Active	317.2
56000104	Camper Mine	Surface	Reclaimed	147.2
56090111	Friedens Mine	Surface	Active	233.6
56823143	Fritz No. 2 Mine	Surface	Inactive	202.0
56120111	GAZ Mine	Surface	Not Active	91.1
56100102	Hart Mine	Surface	Active	448.0
56960110	Hartman Mine	Surface	Reclaimed	312.2
56823008	Hauger Mine	Surface	Reclaimed	176.0
40A77AM12	Job 21 Surface	Surface	Water Treatment[1]	1,128.0
56100101	Berwind-Lohr Mine	Surface	Active	238.9
3366BSM2	Magnetto	Surface	Water Treatment[1]	299.6
56020102	Merrill III Strip	Surface	Active	170.8
56900109	Mostoller	Surface	Active	48.2
56890115	Paxton	Surface	Active	299.2
56890101	Pine Hill Strip	Surface	Reclaimed	226.6
56120113	Rhoads #2 Strip	Surface	Active	228.7
56753119	Rhoads Strip	Surface	Active	485.9
56813104	Roberts Mine	Surface	Water Treatment[1]	344.7
56070110	Schrock Run Mine	Surface	Active	282.4
56080109	Sheep Ridge Mine	Surface	Reclamation Only	320.7
56050109	Spoerlein Mine	Surface	Active	43.0
56090113	Tipple Mine	Surface	Active	204.9
56070103	Trent Mine	Surface	Active	338.3
56950106	Walker II Mine	Surface	Active	62.8
56823123	Walker Mine	Surface	Active	231.0
56663135	Walker-Zubek	Surface	Reclaimed	27.5
56060111	Weaver Mine	Surface	Reclaimed	111.3
56120105	Yachere Mine	Surface	Active	44.3
56920112	Clear Run	Surface	Water Treatment[1]	285.9
4074AM28	Garrett	Surface	Water Treatment[1]	377.2
-	Jolin Strip	Surface	Water Treatment[1]	-
56841605	Goodtown Prep Plant	Plant	Water Treatment[1]	13.5

Notes: 1. Water treatment refers to perpetual water treatment sites covered under the Consent Order & Agreement (*COA*) dated March 22, 2012 with the Commonwealth of Pennsylvania Department of Environmental Protection.

4.5 Liabilities against the Property

The **United States Department of Labor Mine Safety and Health Administration (*MSHA*)** conducts regular inspections of the mines and related facilities. Notices of violations, often accompanied by fines, are issued as a result of the inspections if the inspector determines that regulatory requirements are not fulfilled. It is Corsa's practice to attempt to rectify the violations promptly to secure the termination of the violation. The fines are typically considered to not be material.

Certain environmental liabilities have been created from previous mining operations under the approved permits. An assessment of the reclamation liabilities for the properties is updated on an annual basis. Corsa is aware of the liabilities created under its permits. The timing to satisfy all liabilities under the permits will vary based on the extent to which the permits support current or planned mining

operations. As such, these liabilities are expected to be satisfied on an ongoing basis as part of the execution of Corsa's business plan.

Long-term water treatment liabilities exist for 17 of the PBS properties. These liabilities are covered under two separate Consent Order & Agreements (*COA*) between PBS and the DEP. Under these COAs, two trust funds designed to cover operating and capital expenses associated with the treatment of the 13 perpetual water treatment sites were established. The first, dated March 17, 1999 for the Clear Run watershed Permits (#s 56813006, 56840107, 56920112 and 56663112) is currently fully funded at approximately $3.8 million.

The second fund, The Global Treatment Trust under the COA dated March 22, 2012 covers 12 properties:

Table 4-4: Permits Included in Global Treatment Trust

Property	Permit #
Acosta Mine	56960107
Cambria Fuels Refuse Area	56773707
Garrett	4074AM28
Goodtown Prep Plant	56841605
Job 21	40A77AM12
Job 10 Refuse Area	56910701
Jolin Strip	no longer exists
Magnetto	3366BSM2
Roberts	56813104
Job 12 Expansion	56900701
Cambria Refuse (Job 93)	56950702
Barbara B	56851303

The Global Trust was established on March 30, 2012 with a $1.00 million payment, and PBS has continued to deposit funds into the account each year. The trust agreement was renegotiated in 2016 to include two additional surface mines: Trent Mine and Acosta 2 Mine. As of the effective date of this report, the fund balance amounted to $17.6 million. Under the amended agreement, PBS is required to deposit a total of approximately $3.1 million through 2019.

MM&A visited each of these properties in July 2014, and observed them to be well-maintained.

Reclamation activities at the active operations are an ongoing process completed contemporaneously with production activities in keeping with industry standards and regulations of federal law.

Item 5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Topography, Elevation and Vegetation

The properties are situated within the northern portion of the Appalachian Plateau physiographic province, where terrain is typically characterized by gently undulating hills with narrow to relatively shallow dendritic patterned erosional valleys. Ground surface elevations are typically between 1,400 and 2,000 feet above-mean sea level (*MSL*) along the major drainages to greater than 2,500 feet on the higher hilltop areas. Normal topography relief between areas of higher elevation on the property and the adjacent drainages are 300 to 600 feet. The properties are moderately vegetated, with a mixture of mature hardwood and conifer forest and pasture land typical of rural farmland. The properties are not situated close to any major urban centers.

5.2 Access

General access to the properties is via a well-developed network of primary, secondary and unimproved roads. Primary highways include Interstate 76 (*Pennsylvania Turnpike*) and Interstate 68 in Maryland both of which travel east-west, passing through Somerset County, Pennsylvania and Garrett County, Maryland respectively. Numerous secondary and unimproved roads maintained by state and local governments provide direct access to the properties, although it is common for municipalities to require a surety bond from mining companies for possible damages incurred during use or to maintain/upgrade roadways for heavy truck usage. These roads are typically open throughout the year.

There are currently railroad service and unit train load-outs at the active Cambria and Shade preparation plants operated by Corsa.

5.3 Proximity to Population Center and Transport

The general location of the Pennsylvania properties lies 60 miles southeast of Pittsburgh, near the town of Somerset. The western Maryland property is located near the town of Grantsville in Garrett County approximately 30 miles south of the Pennsylvania properties. As of the 2010 census, the population of Somerset County was approximately 77,742 and Garrett County was 30,097.

Transportation of coal from Corsa's mines and processing facility to market is predominately by rail, which is serviced by CSX (Cambria and Rockwood Preparation Plants) and NS (Shade Preparation Plant). Coal transportation within the properties and between mine and processing facility is typically performed by third-party trucking contractors.

5.4 Climate and Length of Operating Season

The climate in the northern portion of the Appalachian Plateau physiographic province is humid continental, with four distinct seasons: cold winters, warm summers, and moderate fall and spring seasons. Average annual rainfall is approximately 43 inches per year in most of the region, with a greater percentage occurring during winter and spring months. Winters (mid-November to early-March) are typically cold with temperatures generally in the low-10s to lower-30 degrees Fahrenheit. Primary precipitation during winter months is in the form of snow, with the occasional severe snowstorm. Summer (late-May to mid-September) temperatures range from high-40s to lower-80s degrees Fahrenheit.

Seasonal variations in the weather seldom limit the ability to conduct mining operations in Pennsylvania; however, efficiency may be negatively impacted at surface and preparation plant operations.

5.5 Surface Rights and Infrastructure

As is common in the mining industry, it is necessary to acquire surface rights to conduct and support surface mining operations. Corsa reports it controls adequate surface rights to sustain current mining operations in the near future, however, typical of mines producing in the northern Appalachian region, additional surface rights will be required to support future mine plans. While these rights cannot be guaranteed, operating companies typically are able to secure those rights under favorable economic terms. For the purposes of this TR, only resources for which Corsa controls both surface and mineral rights have been considered as surface-mineable reserves. Proposed surface mining requiring acquisition of surface rights after the effective date of this report have been excluded from reserve estimates provided herein.

Sources of power, water, supplies, and materials are readily available to the properties. Power service is provided to mines and facilities by regional utility companies *Penelec* (subsidiary of *First Energy*) or *Somerset Rural Electric Cooperative.* Water is supplied to some of the mines and facilities by public water services. Water is also supplied from surface impoundments, or water wells installed and operated by Corsa.

The three Corsa coal preparation plants have permitted areas for disposal of coal refuse.

Item 6 History

6.1 Prior Ownership

Prior to acquisition by Corsa, extensive surface and underground mining has occurred by previous owners and operators. The extent of previous mining shown in the TR is a result of MM&A's

interpretation of information provided by Corsa. MM&A did not perform an independent verification of previous mining, as it was beyond the scope of this report.

The extent of previous mining and its effects on Corsa's ability to exploit the reserves on the Property has been examined carefully. Records of previous mining were provided by Corsa, or in the case of past surface mining, were projected from USGS topographic or flown maps or taken from maps generated by prior owners of the Property. Other sources of previous mining include USGS (1997) and National Agricultural Imagery Program (*NAIP*) aerial photography.

6.2 Previous Exploration and Development

The properties have been extensively developed by mining activities for more than 50 years. Drilling has been carried out by numerous entities during that period. A significant amount of exploration was carried out by the previous entities, prior to acquisition by Corsa. Upon acquisition of the property, Corsa obtained copies of drilling records within or adjacent to its mineral leases. Refer to *Item 9* for details of previously completed exploration drilling. All exploration data that has been made available to MM&A has been incorporated into this TR, where appropriate.

Coal mining has occurred within the region for well over 100 years. Rapid growth in the coal industry was led by extensive operations within the large, easily accessible coal deposits throughout the Appalachian coal fields. Over the years, with the depletion of the larger, thicker coal deposits, and the introduction of mechanization, traditional labor was replaced by more economical means of extracting coal. With the introduction of mechanization came the ability to mine thinner seams through both surface and underground mining methods. The development of improved technology and increased demand for high quality coal products has resulted in the feasibility of extracting previously uneconomical and unmineable coal deposits.

Primary seams found on the properties have been extensively mined throughout the history of coal mining in the region. The remaining coal deposits within the properties are typically characterized by thinner coal horizons that were generally passed over in favor for thicker, more easily accessible coal in the past. Mining on the property typically consists of single seam mining by underground methods. In areas lying close to the surface, surface mining methods typically mine multiple seams through area removal, contour mining, and highwall mining, which allow for the recovery of thin coal seams, which may or may not exhibit continuity across the entire mining area, and do not exhibit adequate thickness and continuity for mining by underground mining methods.

A summary of historical clean coal production from 2013 through 2017 for the Corsa properties is provided in the table below.

Table 6-1: Historical Clean Coal Production Summary

	Clean Tons				
	2013	2014	2015	2016	2017
Casselman	248,522	291,947	471,111	518,982	525,620
Wilson Creek Surface	106,896	61,646	44,663	9,613	32,181
Wilson Creek HWM	98,355	36,678	39,956	23,943	10,095
PBS Mines	108,484	15,210	5,308	4,133	26,699
Barbara B	59,689	33,792	0	0	0
Acosta	0	0	0	0	71,273
Quecreek	312,558	313,959	273,017	239,333	167,444
Kimberly Run	652,325	406,037	0	0	0
Roytown	55,217	0	0	0	0
Sarah	31,450	0	0	0	0
Total	**1,673,496**	**1,159,269**	**834,055**	**796,004**	**833,312**

Source: U.S. Mine Safety and Health Administration

6.3 Historic Resource and Reserve Estimates

MM&A and others have previously performed geologic evaluations of property holdings for Corsa and/or other entities. The following is a list of the previous reports of which MM&A is aware:

- "*Underground Mining Feasibility & Coal Reserve Study, A Seam, 1975*" prepared for Penn Pocahontas Coal Company by John T. Boyd Company.
- "*Reserve Study and Mining Plan, PBS Coals, Inc., 1978*" prepared for major mining company by John T. Boyd Company.
- "*Review of PBS Coals, Inc. as Coal Supplier to Morgantown and/or Chalk Point Generating Stations, 1984 & 1990*" prepared for Potomac Electric Power Company by John T. Boyd Company.
- *"Field Inspection and Determination of Decreased Capacity and Reduced yield at Shade Creek Coal Preparation Plant, 1987" p*repared for Mincorp, Inc. by John T. Boyd Company.
- *"Independent Coal Reserve Estimate, 1990"* prepared for PBS Coals, Inc. & Mincorp, Inc. by John T. Boyd Company.
- "*Preliminary Independent Valuation of PBS Coals, Inc.'s U.S. Coal Holdings, 1990*" prepared for PBS Coals, Inc. & Mincorp, Inc. by John T. Boyd Company.
- "*Preliminary Business Interruption Claim – Diamond T Mine, B Seam, Roxcoal, Inc., 1992*" prepared for GAB Business Services, Inc. by John T. Boyd Company.
- "*Preliminary Claim Review of Roof Fall and Equipment Damage at Roxcoal, Inc.'s Longview Mine, 1995*" prepared for GAB Business Services, Inc. by John T. Boyd Company.
- "*Advisory Services Related to Insurance Claim for Equipment Lost Due to Roof Fall at Diamond B Mine, Roxcoal, Inc., 1996*" prepared for GAB Robins North America, Inc. by John T. Boyd Company.

- "*Insurance Claim Review Related to Underground Inundation of PBS's Quecreek No. 1 Mine from Saxman Mine No. 2 on July 24, 2002*" prepared for GAB Robins North America, Inc. by John T. Boyd Company.
- "*Provide Assistance Regarding Evaluation of Future Mine Plans for PBS Coals, Inc., 2003*" prepared for Brikis Financial Services Co. by John T. Boyd Company.
- *"Review of Insurance Claim Related to Stacking Conveyor Failure at PBS Coals, Inc.'s Shade Creek Preparation Plant, 2003"* prepared for York Claims Service, Inc. by John T. Boyd Company.
- "*Independent Audit of Internally Prepared Coal Reserve Estimates, Coal Holdings of PBS Coals, Inc., 2006"* prepared for PBS Coals, Inc. by John T. Boyd Company.
- "*Independent Technical Report Coal Reserves and Mining Operations PBS Coals, Inc., Somerset County, Pennsylvania, U.S.A., May 2008*" prepared for PBS Coals, Inc. by John T. Boyd Company.
- *"Reserve Evaluation of Mincorp, Inc. Somerset and Indiana Counties, PA";* Prepared for Citicorp Venture Capital, Ltd.; January 1998 by MM&A.
- *"Modified Phase I Environmental Site Assessment of Pennsylvania Subsidiaries of Mincorp, Inc.";* Prepared for Citicorp Venture Capital, Ltd., Bank of Scotland; January 1998 by MM&A.
- *"Reserve Evaluation of PBS Coals for First Reserve Corporation";* Prepared for First Reserve Corporation; April 1997 by MM&A.
- *"Preliminary Comments Coal Preparation Plants - PBS Coals, Inc. Somerset, Pennsylvania";* Prepared for Appalachian Fuels, LLC; June 2001 by MM&A.
- *"Reserve Audit of PBS Coals, Inc.";* Prepared for Appalachian Fuels, LLC; June 2001 by MM&A.
- *"Executive Summary • Modified Phase I Environmental Site Assessment • PBS Coals, Inc. • Somerset County, Pennsylvania"*; Prepared for Appalachian Fuels, LLC; June 2001 by MM&A.
- *"Assessment of Mine Roof Water and Gas Influx, Quecreek No. 1 Mine, Somerset County, Pennsylvania"*; Prepared for PBS Coals, Inc.; February 2005 by MM&A.
- "*Evaluation of Coal Reserves and Resources for Severstal Resources/ PBS Coals, Inc. on Select Properties Located in Pennsylvania and Maryland (USA)";* prepared for Severstal Resources in 2013 by MM&A. This was an evaluation of select properties identified by PBS as having reserve potential, but did not include all properties controlled by PBS. This report estimated 58.6 million recoverable tons of demonstrated reserves and an additional 21.9 million tons of resource according to *U.S. Securities and Exchange Commission (SEC) Industry 7* guidelines. The estimate of coal reserves in the current TR differ significantly from the 2013 SEC reserve estimates based on numerous factors including changes in mineral property control, mine plans, and/or results of the economic evaluation completed as part of this TR. August 19, 2014 titled *"Technical Report on the Coal Resource and Coal Reserve Controlled by PBS Coals, Inc. Pennsylvania, USA*" dated October 2014. Cardno MM&A estimated a total of 74.2 million measured and indicated in-situ coal

resource tons and 3.1 million inferred in-situ coal resource tons and 19.9 million moist, recoverable proven and probable coal reserve tons in the 2014 TR.

> "*Wilson Creek Energy, LLC Norther Appalachian Coal Holdings, USA Technical Report on Coal Resources and Coal Reserves*" with an effective date of December 31, 2013, prepared for Corsa by Earthtech. Earthtech estimated a total of 123.3 million measured and indicated in-situ coal resource tons and 0.03 million inferred in-situ coal resource tons and 37.0 million moist, recoverable proven and probable coal reserve tons. In the December 31, 2014 update, Earthtech reported an estimated 73.0 million measured and indicated in-place resource coal tons and 19.0 million recoverable proven and probable reserve coal tons.

> Technical Report on the Coal Resource and Coal Reserve Controlled by Corsa Coal Corp., Pennsylvania and Maryland USA – Prepared in accordance with National Instrument 43-101 Standards for Disclosure for Mineral Projects Effective December 31, 2016 *issued February 2017*. MM&A estimated a total of 168.9 million measured and indicated in-situ coal resource tons and 45.0 million moist, recoverable proven and probable coal reserve tons for the Corsa properties in the 2017 TR.

> *'Phase 3 Analysis of Geologic and Related Conditions within the Southern Portion of the A Seam Deep-Mineable Reserve Area; Prepared for Corsa Coal Corporation; July 2017*

Item 7 Geological Setting and Mineralization

7.1 Regional Geology

The coal deposits in the eastern USA are the oldest and most extensively developed coal deposits in the country. The coal-bearing formations on the properties are Carboniferous in age, being in the Pennsylvanian system, which includes the Monongahela, Conemaugh, Alleghany, and Upper Pottsville groups. These coal-bearing formations contain two-fifths of the nation's bituminous coal deposits, extend over 900 miles from northern Alabama to Pennsylvania, and are part of what is known as the Appalachian Basin. The Appalachian Basin is more than 250 miles wide and in some portions, contains over 60 coal seams of varying economic significance. Seams are typically between 1 foot and 6 feet in thickness, with relatively little structural deformation. Coal in the region is classified as high- to low-volatile bituminous with rank increasing to the east. Coals are typically characterized as low to medium sulfur and high heat content.

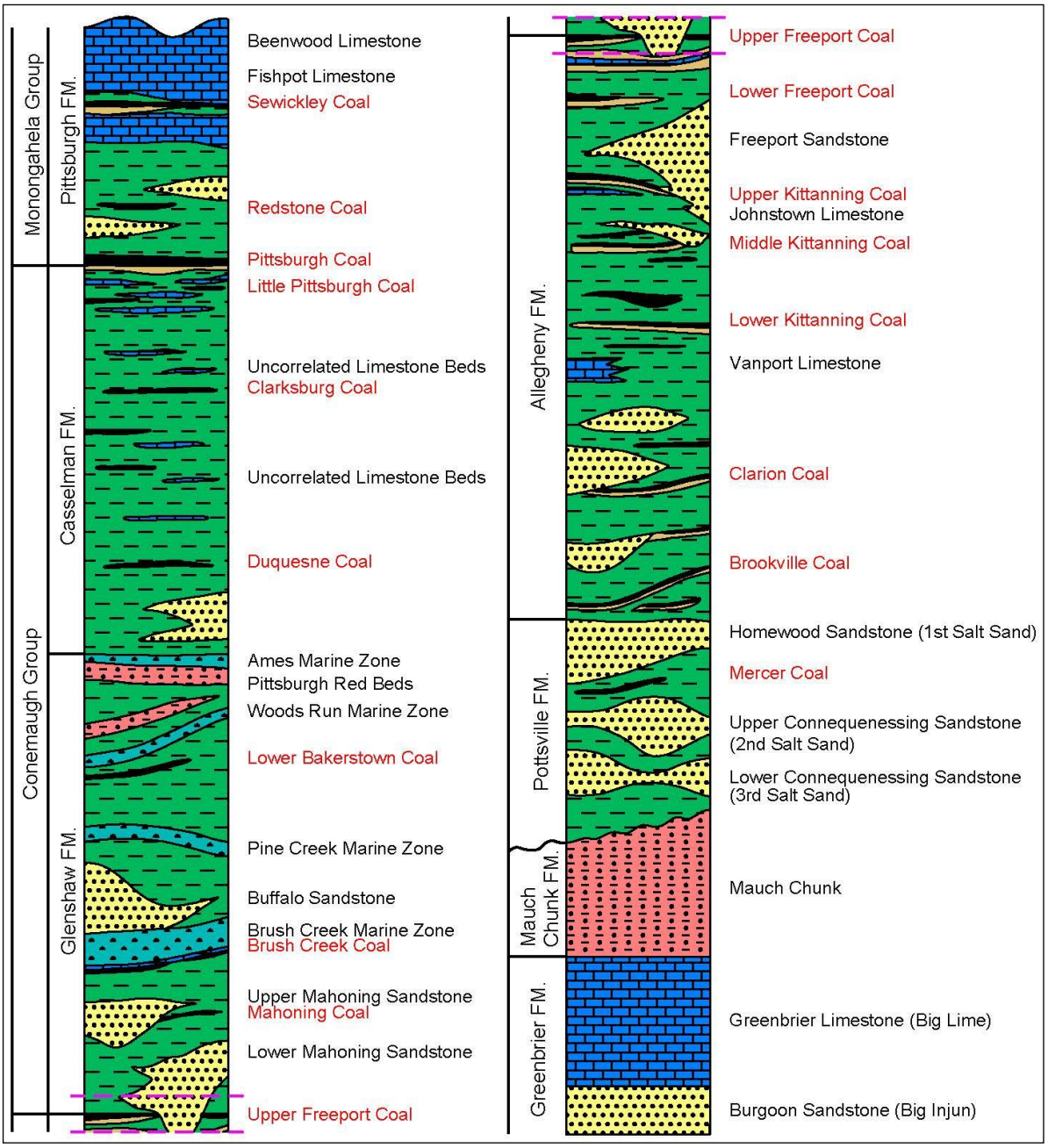
Seams in which reserves and/or resources are reported by Corsa include the following (in descending stratigraphic order). Within each seam, there may be multiple benches consisting of riders (overlying the main seam), leaders (underlying the main seam), and splits (where main seam separates into two or more benches).

Table 7-1: Coal Seams in which Corsa Reserves/Resources Are Located

Seam	Alternate Name 1	Alternate Name 2
Sewickley		
Redstone		
Upper Freeport	E	Kelly
Lower Freeport	D	
Upper Kittanning	C'	
Middle Kittanning	C	
Lower Kittanning	B	
Brookville	A	Gordon

As illustrated on *Figure 7-1, Generalized Stratigraphic Column* below, Corsa reserves and resources are found primarily within four Pennsylvanian-age coal-bearing formations: Pittsburgh, Glenshaw, Allegheny, and Pottsville. Generalized lithologic composition of each formation in which the major coal beds are enclosed is shown on this figure including: claystone, shale, sandy shale, sandstone, limestone, and various marine zones. The majority of Corsa reserves occur within the Allegheny formation.

Figure 7-1: Generalized Stratigraphic Column for the Northern Appalachian Basin (not to scale)



7.2 Stratigraphy

7.2.1 Monongahela Group

The Monongahela Group is named after the Monongahela River in West Virginia and southwestern Pennsylvania. The formations in this group are the Pittsburgh and Uniontown, of which the majority of coal-bearing unit strata are located in the Pittsburgh formation. The formations are comprised of sequences of limestone, calcareous mudstone, shale, siltstone, and coal. The only significant sandstone occurrences lie directly above the Pittsburgh coal seam. The formations extend from the top of the

Conemaugh Group, or base of the Pittsburgh coal seam, upward to the top of the Waynesburg coal seam and include the Sewickley, Redstone, and Pittsburgh coal seams, which are of economic importance on the properties.

7.2.2 Conemaugh Group

The Conemaugh Group is named after Conemaugh River in western Pennsylvania and includes the Glenshaw and Casselman formations. These formations are comprised of sequences of limestone, mudstone, shale, siltstone, sandstone, and coal. The formations extend form the Mahoning Limestone near the base of the Glenshaw Formation to the Pittsburgh Limestone, occurring at the top of the Casselman Formation and base of the Monongahela Group. The Bakerstown coal seam, which is of economic importance on portions of the properties, lies within the Glenshaw Formation.

7.2.3 Allegheny Group

The Allegheny Group is named after the Allegheny River in Pennsylvania and contains the majority of economically mineable coal in Pennsylvania. The formations in this group are comprised of sequences of sandstone, siltstone, shale, thin limestone, clay, and coal. The Allegheny Formation includes the following coal seams of economic importance in stratigraphically descending order: Upper Freeport, Lower Freeport, Upper Kittanning, Middle Kittanning, Lower Kittanning, and Brookville.

7.2.4 Pottsville Group

The Pottsville Group is named after the locality of which it was first described near Pottsville, Pennsylvania and contains major coal-bearing formations from Pennsylvania to Alabama. The Pottsville Group contains the majority of economically mineable coal within the Appalachian Basin outside of Pennsylvania and includes more than 10 formations, depending on the state in which it occurs. The formations are comprised of sequences of sandstone, siltstone, clay, and coal.

7.2.5 Structure

The counties in which the properties are located are situated along the eastern edge of the Alleghany Plateau, bordering the Alleghany Front, the major southeast facing escarpment of the Alleghany Mountains. Regional structure is typically characterized as gently dipping with a series of north-northeast trending folds (anticlinal and synclinal) including the Youghiogheny, New Lexington/Johnstown, Somerset, Berlin, and Wellersburg synclines and Laurel Hill, Centerville Dome, Boswell Dome, and Negro Mountain anticlines. Within the major structural trends, there are typically minor undulations and local flexures. No major structural faulting or tectonic features are known to occur on the properties.

7.2.6 Geology of the Properties

The geology of the properties is consistent with regional trends. Coal seams of economic importance on the properties typically range from 1 foot to 6 feet in thickness and are primarily low-volatile in rank. There are 11 coal seams on the properties that demonstrate reserve or resource potential including

(not all of which are included within this report), in descending stratigraphic order: Sewickley, Redstone, Pittsburgh, Bakerstown, Upper Freeport, Lower Freeport, Upper Kittanning, Middle Kittanning, Lower Kittanning, Brookville, and Mercer (see *Table 7-1* for list of coal seams and alternate names).

7.2.7 Mineralization

Mineable coal seams within the properties are typically low-ash, low to high-sulfur, and high-thermal content bituminous coals. Regionally, the coals are typically low-volatile in rank, with rank increasing from west to east. The maximum seam thickness may reach over 6.0 feet where multiple coal benches occur in proximity to one another; however, the average mineable thickness of the seams in this evaluation generally ranges from 1 foot to 4 feet. Seams are generally continuous, but may be locally absent. Secondary discontinuity due to erosional features is present in most areas, resulting in seam outcropping, or visible exposure of the seam at the surface. Other than oxidation of the coal exposed at the surface, erosion of the seams has no significant impact on the mineralized deposits. Mineable seams associated with the properties are generally outcrop-accessible. Coal seams are characterized by both single-bench and multiple-bench coal horizons with parting (non-coal) material varying by seam and area. Seam parting is common within the coal seams on the properties with intra-seam parting material increasing drastically in some areas. Roof strata are typically shale or sandy shale with zones of sandstone roof being common. Floor strata are typically sandstone, shale, sandy shale, fireclay, or in the case of the Upper Kittanning, limestone. The general stratigraphic relationship of each of the coal horizons is shown on the generalized stratigraphic section (see *Figure 7-1*).

Limestone beds occur within the various stratigraphic groups of the region. Some of these limestone beds are extracted in conjunction with surface mining of the Sewickley coal in particular.

7.3 Coal Seams of Interest

7.3.1 Surface-mineable Seams

There are seven primary coal seams (and associated splits) identified on the properties exhibiting surface-mineable potential. Surface-mineable coal seams are contained within the upper and middle portions of the stratigraphic section and include coal seams from the Sewickley through the Lower Kittanning coal seam. There are 10 areas within the properties where coal seams exhibit surface-mineable potential including: Bassett, Berwind Lohr, Bluelick 4, GAZ, Downey, Hart, Rhoads II, Schrock Run, Hamer and Shaffer.

7.3.2 Underground-mineable Seams

There are six coal seams identified on the properties exhibiting underground-mineable potential. These coal seams are contained within the middle to lower portions of the stratigraphic section and include the Upper Freeport (E), Lower Freeport (D), Upper Kittanning (C'), Middle Kittanning (C), Lower Kittanning (B), and Brookville (A) coal seams.

Item 8 Deposit Types

The coal reserves reported herein are bituminous coals. The primary coal-bearing formations on the properties are Carboniferous in age, being in the Pennsylvanian system, which includes the Monongahela, Conemaugh, Allegheny, and Pottsville groups. The average mineable seam thickness for coal horizons in these formations ranges from 1 foot to over 6 feet. The coal seams are generally continuous and non-complex but may vary in thickness and may also be locally absent. Seams retain normal stratigraphic sequence throughout the properties and no evidence has been observed that seams have been modified from pre-deformational thicknesses.

MM&A reviewed the criteria for classification of coal deposits by geology type and the complexity of seam geometry within deposits, as outlined in Paper 88-21 of the **Geological Survey of Canada (*GSC*)** titled *A Standardized Coal Resource/Reserve Reporting System for Canada.* Primary categories are **low, moderate, complex** and **severe**. The low category is subdivided into three subdivisions, Type A, Type B and Type C, in ascending order of complexity. MM&A concluded that the coal and limestone deposits should be classified as Low – Type C because:

> The deposits are relatively unaffected by tectonic deformation;

> The deposits are near flat-lying to gentle dipping (typically less than 5 degrees);

> The deposits are generally not faulted, although small-displacement normal faults and compaction related faults may occur;

> The deposits are rarely greater than 6 feet thick;

> The deposits are characterized by seam splitting and lateral variation in thickness;

> Deposits are rarely modified from their pre-deformational thickness; and

> The deposits retain normal stratigraphic sequence.

Item 9 Exploration

The properties have been extensively explored through exploratory drilling by Corsa and predecessors. Records from exploration drilling comprise the primary data used in the evaluation of resources on the properties. Drill records, in most cases, have been compiled by Corsa into geologic databases which include drill hole location, coal thickness, and detailed lithologic data (thickness, description, and elevation). Details such as drill dates, drilling company, and other header information are generally excluded from the database, but are contained on hard or digital copies of drill logs in Corsa's records. Additional supplemental exploration data is available on the properties in the form of coal outcrop or surface exposure measurements, or in-mine measurements from ongoing or previous underground

mining. This data is utilized to a lesser extent, but is incorporated into the geologic database in the absence of drill data or to aid in delineation of geologic conditions not evident from exploration drilling.

The extent of exploration varies by property and is largely dependent on the intended development and geologic conformity. Exploration is typically extensive for areas of proposed surface and/or underground mining (which total approximately 36,000 acres), unless adverse mining or geologic conditions are encountered or expected; at which time additional, and often more closely-spaced drilling will then be carried out to identify such conditions. Drilling on the properties is generally sufficient for delineation and estimation of surface and underground mineable reserves such as those on the property, which are of low geologic complexity. However, available exploration data limits the ability to map future underground mineable conditions, specifically related to the roof and floor rock. Data is typically in the form of simplified drillers' logs that are general in nature and do not describe with sufficient detail, the roof and floor rock of each coal seam. Data typically consists of coal thickness and seam interval information and does not contain detailed lithologic or geotechnical descriptions. Thus, definitive mapping for the prediction of future mining conditions is not possible.

A total of more than 3,000 individual exploration data points, including drill holes, in-mine measurements, pit measurements, and outcrop measurements were incorporated into the digital geologic database, and were used for modeling the geology of the properties. This data is used to delineate the resources on the property and to determine geologic reliability of coal resource and coal reserve estimates. The drill hole data density is sufficient to adequately support the geological trends and projected reserves on the properties. *Maps 2 through 20B* show the location of the drill holes on the properties that have been used for this TR. MM&A has reviewed all new exploration data provided by Corsa for this report and checked it against previously completed MM&A work for consistency.

MM&A reviewed and verified exploration data through the generation of stratigraphic columnar sections using cross-sectional analysis to confirm coal seam correlations. After establishing that correlations were consistent, or determining that edits to coal seam correlations were needed, coal seams were identified in the geologic database. During the investigation, some of the data from a relatively small number of holes were deemed to be questionable (e.g., unlikely or uncharacteristic elevations, thicknesses or intervals) and were not honored for the purposes of geologic mapping. The locations of drill holes and outcrop measurements have not been independently verified by MM&A.

Data verification and statements regarding the reliability of the data MM&A are included in *Item 12.*

Item 10 Drilling

The properties have been extensively explored, primarily through continuous (diamond) core and air-rotary drilling methods, which are standard industry practice. Drilling is conducted by Corsa on an on-going basis, and performed by a third-party contractor, to identify and delineate coal reserves, identify

mine and geologic conditions in advance of mining, and collect core for quality sampling and analysis. Drilling on the properties typically requires drilling to depths typically within the range of 50 feet to 1,000 feet depending on the target coal seam(s). In the past, Corsa typically employed air-rotary (6-inch diameter) methods due to lower cost and shorter drilling duration. Air-rotary drilling provides general geologic information such as depth and approximate thickness, but does not provide details of coal seam or strata unless used in conjunction with "spot coring" and/or downhole geophysical logging. Spot coring utilizes the advantages of the air-rotary method to drill to within proximity of the coal seam, then employs coring for an interval that typically includes the coal seam and immediate roof and floor. The air-rotary method is typically used to economically explore for coal seams in areas of sparse data to identify target coal seams for "twin" drilling of an offset continuous core or spot core drill hole to obtain detailed geologic data and/or obtain core samples for analysis. The air-rotary method is also used to obtain general geologic data between existing exploration drill holes where only general geologic data is needed to confirm the presence of coal seams or to locate coal seam subcrop for surface mineable areas. Air-rotary drilling does not provide sufficient geologic data alone to allow for classification of reserves, but is a useful method of economical exploration.

Corsa utilizes continuous core drilling to a lesser extent, typically employing when greater geologic detail is needed or for recovery of core for sampling and analysis. Core drilling provides continuous recovery of typically NX-size (2.16 inch or 5.4 centimeter) core. Recovery of core, specifically coal core, is supervised by a geologist or representative of Corsa prior to delivery to a certified laboratory for sampling for analysis. Core recovery for coal seams on the properties is reported by Corsa to generally be greater than 90 percent, however the coal seams are typically soft in nature and core recoveries of less than 90 percent are not uncommon. To ensure adequate recovery of core prior to sampling and analysis, downhole geophysical logging is performed, typically consisting of natural gamma and density logs and allowing for differentiation of lithology and determination of thickness. Although utilized in recent exploration efforts, downhole geophysical logging has been performed on relatively few of the total holes drilled on the properties.

Although MM&A has not had direct involvement with implementing and supervising the drilling on the properties, drilling information has been reviewed in detail and deemed reliable and sufficient for delineation and estimation of resources and reserves. Drill records were provided by Corsa in digital format in the form of electronic databases, driller logs, and geophysical logs. Additional data was obtained from previous geologic evaluations conducted by MM&A and others on the properties.

The strata encountered during drilling are generally horizontal to gently dipping and therefore considered perpendicular to drilling. As such, thicknesses recorded on drill hole records represent the true thickness and do not demonstrate vertical exaggeration.

Item 11 Sample Preparation, Analyses, and Security

11.1 Sample Preparation Methods

Application tests are laboratory procedures that measure some characteristic of coal that has been empirically related to some application or handling or processing step. Typically, these procedures attempt to duplicate some aspect of the commercial application at laboratory scale and may produce information in the form of an index. Application procedures do not measure a single component of the coal but infer the combined effect of multiple components.

The American Society for Testing and Materials (*ASTM*) publishes the most inclusive reference to analytical procedures. This publication, which is revised annually, provides extensive information concerning generally accepted methods of laboratory analysis. ASTM also provides standards for sampling and some information concerning sample handling.

Ultimate analysis is a process typically used which gives the composition of coal in terms of carbon, hydrogen, nitrogen, oxygen, ash, and sulfur without regard to origin. The ash determination can be found by ASTM D-3174. Sulfur is determined either by wet chemistry methods (ASTM D-3177) or by measuring the sulfur content of the gas released through high-temperature combustion of the coal sample (ASTM D-4239). Carbon and hydrogen are also determined through a combustion process (ASTM D-3178) and nitrogen by a wet chemistry method (D-3179). Oxygen is not determined directly. The sum of the carbon, hydrogen, nitrogen, sulfur, and ash are subtracted from 100 to calculate oxygen percent (ASTM D-3176).

Heating value or calorific value is a measure of the heat produced from a unit weight of coal. In the United States, it is commonly expressed in British thermal units per pound (*Btu/lb.*). Other units are calories per gram (*cal/g*) and joules per gram (J/g). Heating value is generally determined by burning a weighed coal sample, in oxygen, in a calorimeter.

The ASTM method used by the laboratories to determine calorific value (in Btu/lb.), was D-5865. These labs determined sulfur content with ASTM Method D-4239, Method B. Ash content was calculated from ASTM method D-3174.

The extent of sampling for geological data is generally sufficient to define characteristics of the mineable coal horizons based on the QP's examination of the data. The sampling of quality data from drill holes is less than the total drill holes; however, available data appears to be representative of the coal seams based on historical knowledge and regional trends.

11.2 Integrity of Sampling Process

Corsa previously maintained an in-house laboratory staffed by experienced laboratory personnel, which conducted coal analysis using ASTM testing procedures (except for minimum sample sizes too

small to meet ASTM weight specifications). The laboratory performed proximate, screen sizing, washability, and other basic coal analyses. Procedures such as sulfur forms, ultimate analysis, ash fusion and mineral, trace element, and metallurgical analyses were outsourced to independent commercial laboratories including: *Geochemical Testing* in Somerset, Pennsylvania; *Summit Technical Laboratories* in Meyersdale, Pennsylvania; *CoalTech Petrographic Associates, Inc*. in Murrysville, Pennsylvania; and *Clark Coal and Coke Laboratory*, Jefferson Hills, Pennsylvania; *Geochemical Testing* is currently the primary laboratory for conducting analytical testing for Corsa All of the independent commercial laboratories utilized by Corsa strictly conform and adhere to ASTM and ISO practices and procedures. These laboratories have varied accreditations and certifications, and all routinely submit to audits of their laboratory quality control/quality assurance systems. The commercial laboratory used most often by Corsa is *Geochemical Testing*. *Geochemical Testing* holds accreditation under the **NELAC Institute (*TNI*)** 2009 standard. The purpose of the National Environmental Laboratory Accreditation Program (*NELAP*) is to establish and implement a program for the accreditation of environmental laboratories. The TNI standard for laboratories is modeled after ISO/IEC 17025:2005 "*General Requirements for the Competence of Testing and Calibration Laboratories*." The Laboratory Accreditation Program of Pennsylvania DEP has accredited Geochemical Testing (Pennsylvania DEP Lab # 56-00306) for coal testing methods in the Solid and Chemical Materials (*SCM*) category.

Independent laboratories contracted for outsourced analyses are privately-owned companies that are paid a fee for analytical work performed and to MM&A's knowledge hold no equity or material interest in any of its client's operations or businesses.

11.3 Security Methods

For coal exploration practice in the United States, it is unusual to employ security methods (other than those described in the chain-of-custody procedures) for the shipping and storage of samples, because coal is a low value bulk commodity and good security conditions prevail domestically. MM&A is aware Corsa's procedures for handling and shipping coal samples and for sample security was essentially the same as that of other operators in the region. Since only a minority of the drill holes have coal seam thickness verification by downhole geophysical logging, most of the available sample analyses do not have qualitative assurance of complete and representative coal core sample recovery. However, efforts have been made by both mining company and MM&A geologists to disqualify coal samples which clearly have material core loss problems. While many of the samples do not meet current best practice standards for recovery assurance, the lab data verification procedures and sample preparation methods (as described above) do meet typical industry standards. It is the QP's opinion that the sample preparation, security measures, and analytical procedures, as reported to Corsa by the laboratories, are adequate.

The following procedures summarize the major aspects of chain of custody.

> Sample Labels – include the following information: a unique sample number, sample type, name of collector, date and time of collection, place of collection, and sample preservative.

- Sample Seals – to detect unauthorized tampering with samples up to the time of analysis.
- Field Log Book or approved electronic data collector – to record all information pertinent to a field survey.
- Chain of Custody Record – including the sample number, name of collector, date and time of collection, signatures of persons involved in the chain of possession, and inclusive dates and times of possession.
- Sample analysis request sheet – including pertinent information from driller's log book, and information completed by company engineer or technician regarding sample number, date of receipt and condition of sample.
- Delivery to the laboratory – as soon as practicable after collection, typically within one week.
- Receipt and logging of sample – general core description is completed by the driller (contractor). Detailed core description is performed by Corsa. Geophysical logging is performed by a contractor.
- Assignment of sample for analysis – sample is delivered to laboratory by Corsa.
- Disposal, after the data has been reviewed and accepted, in accordance with local, state and U.S. EPA-approved standards.

It is MM&A's opinion that there are no known factors that may materially impact the accuracy or reliability of the results of the samples.

Item 12 Data Verification

MM&A has relied upon geologic information and mapping provided by Corsa and examined carefully prior to use in this TR. Any data deemed anomalous or unreliable has been excluded from this TR.

MM&A reviewed and verified drill hole exploration data through the generation of stratigraphic columnar sections for cross-sectional analysis to identify and confirm coal seam correlations. After establishing that stratigraphic correlations were consistent, coal seams were identified in the geologic database, which was used to generate individual coal seam thickness and elevation data maps. During the investigation, some of the data from a relatively small number of holes were deemed to be questionable (e.g., unlikely or uncharacteristic elevations, thicknesses or intervals) and were not honored for the purposes of geologic mapping.

For the coal and limestone resource estimates in this TR, MM&A conducted a detailed independent geological evaluation. This included: the review of exploration drill holes and detailed seam correlation; the coordination, assembly and analysis of data into a digital resource database; and mapping and estimation of coal resources and coal reserves and associated coal quality. Furthermore, an independent evaluation consists of delineating and/or verifying seam thickness trends, defining intra-seam splitting, characterizing seam quality, estimating projected surface mining ratios and

overburden volumes. Coal quality analyses were performed to ASTM standards by a qualified laboratory as described in *Item 11*. The exploration data evaluated and processed in preparation of this TR are considered adequate for estimation of coal resources and provide reliable and reasonable prospects for development and extraction of such coal resources.

MM&A did not conduct an independent verification of property-control surveys or other property-control instruments, but relied upon representations supplied by Corsa. MM&A has not independently surveyed the mining locations, but has relied on information compiled from maps prepared by current or previous owners, and does not warrant or otherwise certify the location of such mining or associated features, nor have the location of data points been independently verified. Most of the mining activity represented on the maps occurred in the past and the mines are now abandoned, sealed, and are inaccessible. Final maps prepared by previous mine operators are filed with state and federal agencies. Overall, the available data, used for reporting the mineral resource and mineral reserve, was sufficient for the low geologic complexity deposit.

Item 13 Mineral Processing and Metallurgical Testing

Coal seam quality data, available from exploration drill holes, have been utilized to assist in the determination of coal quality. Drill hole quality data was tabulated on a seam-by-seam basis for individual resource and reserve areas on computer spreadsheets (using *Microsoft Excel* software) to allow for computation of basic statistical analyses (average, maximum, minimum) of the data sets. Raw coal quality for each resource area is shown in *Table 13-1*, while saleable coal quality for each reserve area is shown in *Table 13-2.* The arithmetic average of the coal quality data by area was applied to the mine plans and production forecasts, and used to represent the coal quality of the reserve areas in *Table 13-2*. Where laboratory test results or sample intervals were judged to be anomalous and unrepresentative of the seam quality within the reserve area (based on other compelling data), the anomalous data were not used in computation of the area averages. Testing services used by Corsa for recent coal sample analysis are mentioned in *Item 11.1.*

Drill hole seam quality data was adequate to provide reasonable confidence about seam characteristics in most areas. Due to variability in the statistical validity of coal quality averages from one reserve area to another, the number of samples available to represent the coal reserve is shown on detailed quality spreadsheets (see *Appendix 4*). Petrographic analyses for the various Corsa properties are also included in *Appendix 4*. In locations where only limited data is available to represent coal quality, additional sampling, and laboratory testing is recommended to confirm yield and quality projections.

Readers should recognize limitations to the use of the average coal quality estimations presented herein. Drill hole data for average quality characterization is limited to a relatively small percentage of the total number of holes. However, due to extensive history of successful mining within seams

discussed in this TR, the overall quality used for the sales price forecasting can be considered as reasonably assured.

Table 13-1 below summarizes the raw in-seam coal quality for each resource area included in this TR.

Table 13-1: Summary of Raw, In-seam Quality by Seam by Property

Area	Seam	Raw Quality, Dry Basis				
		Ash%	Sulfur%	Btu/lb.	Vol.	No. of Samples*
Surface-Mineable						
Gaz	Upper Kittanning	21.82	2.27	11,377	20.20	8
Rhoades	Upper Kittanning	10.11	0.56	12,953	19.18	2
Rhoades	Middle Kittanning	23.35	2.76	11,710	15.42	8 / 8 / 8 / 5
Rhoades	Lower Kittanning	19.02	3.52	12,491	16.48	2
Schrock Run	Lower Freeport	9.01	0.72	13,966	17.69	4
Schrock Run	Upper Kittanning	14.08	2.45	13,262	18.08	13
Hamer	Upper Kittanning	17.70	2.53	12,440	22.73	5 / 3 / 2 / 1
Hamer	Middle Kittanning	21.47	-	-	-	3 / 0 / 0 / 0
Blue Lick	Sewickley	16.58	1.48	12,813	-	5
Blue Lick	Redstone	17.82	2.59	12,653	-	9
Downey	Upper Freeport	30.85	7.44	10,483	17.16	8
Downey	Lower Freeport	22.48	3.39	11,926	17.38	29
Downey	Upper Kittanning	23.49	3.43	12,131	16.03	45
Downey	Middle Kittanning	25.91	3.78	11,176	15.97	34 / 34 / 34 / 33
Hart	Lower Freeport	20.72	1.93	10,886	-	21 / 21 / 1 / 0
Hart	Upper Kittanning	24.84	1.94	11,201	-	68 / 68 / 1 / 0
Bassett	Upper Freeport	26.42	4.74	11,098	15.83	5
Berwind Lohr-EAST	Upper Freeport	17.26	3.47	12,677	15.85	11 / 11 / 11 / 3
Berwind Lohr-EAST	Lower Freeport	16.43	2.86	12,895	16.48	8 / 8 / 8 / 2
Total Composite		**19.14**	**2.50**	**12,310**	**17.64**	
Highwall-Mineable						
Gaz	Upper Kittanning	21.82	2.27	11,377	20.20	8
Rhoades	Upper Kittanning	10.11	0.56	12,953	19.18	2
Rhoades	Middle Kittanning	23.35	2.76	11,710	15.42	8 / 8 / 8 / 5
Rhoades	Lower Kittanning	19.02	3.52	12,491	16.48	2
Schrock Run	Lower Freeport	9.01	0.72	13,966	17.69	4
Schrock Run	Upper Kittanning	14.08	2.45	13,262	18.08	13
Hamer	Upper Kittanning	17.70	2.53	12,440	22.73	5 / 3 / 2 / 1
Hamer	Middle Kittanning	21.47	-	-	-	3 / 0 / 0 / 0
Total Composite		**16.24**	**2.48**	**12,879**	**18.13**	
Underground-Mineable						
QueCreek	Upper Kittanning	20.01	2.85	12,226	17.46	20 / 20 / 19 / 14
Casselman	Upper Freeport	17.51	1.66	14,039	19.97	6 / 34 / 29 / 34
Acosta	Upper Kittanning	18.93	2.67	12,578	19.12	21 / 14 / 14 / 13
Acosta	Middle Kittanning	26.62	3.42	11,269	26.90	15 / 11 / 11 / 9
Acosta	Lower Kittanning	33.10	3.00	9,612	15.16	13 / 11 / 11 / 10
Horning	Lower Freeport	10.09	2.13	14,023	17.28	10
A Seam	Brookville	31.50	1.25	10,171	16.75	33 / 33 / 33 / 32
Shaffer	Upper Kittanning	21.32	3.37	12,017	16.05	17
Laurel	Upper Kittanning	15.34	3.92	13,082	17.76	16 / 16
Keyser	Middle Kittanning	22.13	-	-	-	1 / 0
Keyser	Lower Kittanning	20.29	-	-	-	14 / 0
Total Composite		**23.32**	**2.41**	**11,761**	**19.23**	
Total						
Surface Mineable		19.14	2.50	12,310	17.64	
Highwall Mineable		16.24	2.48	12,879	18.13	
Underground Mineable		23.32	2.41	11,761	19.23	
Total Composite		**23.13**	**2.42**	**11,792**	**19.16**	

*No. of samples = if single digit, then all 4 columns are same; otherwise corresponds to column.
All seam quality reported is based on arithmetic averages. Composites are based on tons and are therefore weighted.

Table 13-2 below summarizes the washed in-seam coal quality for each reserve area included in this TR.

Table 13-2: Summary of Coal Reserve Quality by Seam by Property – Proximate Analysis

Reserve Area	Seam	Weighted Composite (Moist Basis)				
		Wash Recovery	Ash	Sul	Btu/lb.	Volatile Matter
Surface-Mineable						
Gaz	Upper Kittanning	89.35%	15.00%	1.72%	10,971	-
Downey	Upper Freeport	-	23.27%	5.65%	10,880	-
Downey	Lower Freeport	87.10%	15.72%	2.53%	12,144	-
Downey	Upper Kittanning	88.19%	16.61%	2.48%	12,173	-
Downey	Middle Kittanning	84.55%	19.82%	2.68%	11,366	-
Hart	Lower Freeport	87.18%	13.95%	1.45%	11,677	-
Hart	Upper Kittanning	85.14%	18.49%	1.46%	11,650	-
Rhoades	Upper Kittanning	93.95%	8.18%	0.53%	12,420	-
Rhoades	Middle Kittanning	85.47%	17.94%	2.08%	11,752	-
Rhoades	Lower Kittanning	87.81%	14.15%	2.62%	12,416	-
Schrock Run	Lower Freeport	95.00%	7.36%	0.69%	13,335	-
Schrock Run	Upper Kittanning	92.34%	11.26%	1.82%	12,801	-
Hamer	Upper Kittanning	100.00%	16.95%	2.42%	11,911	-
Hamer	Middle Kittanning	-	-	-	0	-
Blue Lick	Sewickley	-	-	-	0	-
Blue Lick	Redstone	91.37%	14.75%	2.11%	12,252	-
Total		**85.19%**	**13.55%**	**1.77%**	**11,652**	**-**
Underground-Mineable						
QueCreek	Upper Kittanning	69.36%	9.32%	1.42%	12,877	17.60%
Casselman	Upper Freeport	83.35%	7.46%	1.02%	13,276	19.70%
Horning	Lower Freeport	68.26%	5.51%	0.93%	13,533	16.20%
Acosta	Upper Kittanning	76.48%	8.53%	1.49%	13,092	18.70%
Acosta	Middle Kittanning	56.26%	10.38%	1.09%	12,714	15.60%
Acosta	Lower Kittanning	49.05%	9.13%	1.64%	12,960	16.40%
A Seam	Brookville	53.02%	10.33%	0.79%	12,629	17.50%
Keyser	Lower Kittanning	73.44%	6.74%	1.39%	13,389	18.80%
Total		**66.79%**	**8.48%**	**1.23%**	**13,059**	**17.80%**
Total						
Surface Mineable		85.19%	13.55%	1.77%	11,652	-
Underground Mineable		66.79%	8.48%	1.23%	13,059	17.80%
Total		**68.37%**	**8.92%**	**1.28%**	**12,939**	**17.80%**

Estimated wash recoveries shown in *Table 13-2* are based on average in-seam float-sink washability analysis and inclusion of out-of-seam dilution (*OSD*) from mining based information provided by Corsa. Float-sink washability analysis parameters are determined by Corsa to simulate preparation plant circuits to estimate post processing quality and meet desired coal quality specifications. The reader is referred to *Table 16-2* for raw production wash recoveries, which account for OSD and losses due to plant processing inefficiencies.

Coal quality and processing parameters have been considered within the economic analysis of the TR. *Item 19* summarizes the economic impact of quality on coal pricing while *Item 22* and *Appendices 2 and 3* include sales price assumptions and quality adjustments used in the economic analysis. While coal quality impacts the coal sales price, coal processing contributes to operating cost. Variances in mining

conditions such as seam splitting, which would increase intra-seam parting and reduce in-seam wash recovery, or poor roof and/or floor conditions resulting in higher OSD, could result in lower plant yields and, therefore, higher processing cost.

Item 14 Mineral Resource Estimates

14.1 Introduction

The coal resource estimates were prepared in accordance with CIMDS (as adopted May 10, 2014). The tonnage estimates provided herein report in-situ resources as measured and indicated, and those resources are reported inclusive of the reported reserve tons, since they include the in-situ tons from which the recoverable coal reserve is derived. Inferred coal resources are also reported. No coal reserve tons have been estimated from inferred coal resources.

As is customary in the USA, the categories for *Measured*, *Indicated*, and *Inferred* coal resources are based on the distances from valid points of measurement as prescribed in *USGS Circular 891*.[3]

The coal resources estimates are presented in the *Table 14-2*.

14.2 Definitions and Applicable Standards

In accordance with NI 43-101, MM&A has classified the coal as "resource" and "reserve" as defined in CIMDS as adopted in May 2014. In this standard, a **Mineral Resource** is defined as "…a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, continuity and other geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling."

Coal resources are subdivided into classes of *Measured, Indicated*, and *Inferred*, with the level of confidence reducing for each class, respectively. Coal resources are reported as in-situ tonnage and are not adjusted for mining losses or mining recovery.

Coal resources have been estimated and classified as *Measured*, *Indicated*, and *Inferred* following USA guidelines provided for in the *USGS Circular 891*. Measured coal resources are those lying within ¼-mile radius of a valid point of measurement. Indicated coal resources are those lying between ¼-mile and ¾-mile radius from such an observation point. Inferred coal resources lie more than a ¾-mile radius from a valid point of measurement, but less than 3 miles from one. These classifications connote the degree of resource estimation reliability based on distance from known points of measurements.

[3] The Mineral Resources are subdivided into classes of: Measured resource, those lying within ¼-mile radius of a valid point of measurement. Indicated Resources are those lying between ¼-mile and ¾-mile of a valid point of measurement. Inferred Resources lie more than a ¾-mile radius from a valid point of measurement, but less than 3 miles from one.

As referenced in the CIMDS, coal resources and coal reserves are herein reported inclusively. The tonnage estimates provided herein report in-situ coal resources as measured and indicated, and those coal resources are reported inclusive of the reported reserve tons, since they include the in-situ tons from which the recoverable coal reserve is derived. Inferred coal resources are also reported. No coal reserve tons have been estimated from inferred coal resources. Detailed maps representing the resource areas are not included in this TR but are available upon request from Corsa or MM&A.

14.3 Methodology Used to Estimate Coal Resources

After establishing that correlations were consistent, or determining that edits to coal seam correlations were needed, coal seams were identified in the geologic database, which was used to generate coal seam data control maps. These maps form the basis for coal seam mapping and coal resource estimations. During the investigation, some of the data from a relatively small number of holes were deemed to be questionable (e.g., unlikely or uncharacteristic elevations, thicknesses or intervals) and were not honored for the purposes of geologic mapping. The locations of drill holes and outcrop measurements have not been independently verified.

A model of the deposit was created to estimate coal resources. Seam grids, including seam thickness roof and floor grids, plus the topographic surfaces were generated for individual coal seams using Carlson Software® for Mining (*Carlson*). The grids were then used in conjunction with coal resource criteria outlined in *Table 14-1* to delineate resource boundaries used for the generation of coal resource estimates. Base-of-coal-seam structure and topographic surface grids were generated to determine the intersection between projected coal horizons and topography of the properties. Coal seam outcrop boundaries were generated at the intersection points of these grid files, defining the limits of coal deposits where eroded by dendritic patterned erosional valleys. Once delineated, resource area acreage, average seam thickness, and coal tonnages were generated in Carlson, Vulcan™, and MM&A proprietary software and tabulated in Microsoft® Excel (*Excel*) computer spreadsheets. After processing, independent estimate of coal resources was prepared using guidelines outlined in CIMDS.

14.4 Coal Resource Estimation Criteria

Resource estimation criteria were established to assure that coal resource estimates have been prepared using generally accepted industry methodology to provide reasonable prospects for economic extraction. *Table 14-1* below outlines the criteria used for estimation of coal resources provided herein.

Table 14-1: Coal Resource Criteria

	Parameter	Technical Notes
• **Coal Resource Classification**		
Geologic Reliability	<¼ mile radius	Measured
	¼ to ¾ mile radius	Indicated
	>¾ mile radius	Inferred
Unit of Measure	Mile, Feet	USA customary unit of measure of distance (except where noted)
Unit of Area	Acre	USA customary unit of area
Unit of Weight	Short Ton	USA customary unit of measure of weight
Effective Date of TR	December 31, 2017	
• **Underground-Mineable Criteria**		
Mining Type	Underground	Existing pillar/barriers remaining in areas of previous underground mining not considered except at Que Creek.
Basis for Coal Tonnage	Total seam thickness for underground-mineable coal	Out-of-seam dilution not considered in tonnage and quality estimates, but was considered for mine productivity and economics
Coal Density	Used laboratory apparent specific gravity data where available. Otherwise use raw ash formula: Sp. Gr. = (% Raw Ash/100) + 1.25	
	Used estimated specific gravity based on 1.30 specific gravity for coal and 2.25 specific gravity for rock where no lab data was available.	This is also referred to as EVR or Estimated Visual Recovery method
Minimum Total Seam Thickness	2.50 feet	
Minimum Total Coal Thickness	2.50 feet	
Minimum Cover	100 feet	
Mine Barrier	200 feet	Applied around old underground mines or sealed-off sections, augered or high-wall mined areas
	100 feet	Where certified mine maps available
	50 feet	Where mine intends to penetrate existing mine works.
• **Surface-mineable Criteria**		
Mining Type	Surface mining	
	Highwall mining (HWM)	
Coal Density	Used laboratory apparent specific gravity data where available. Otherwise use raw ash formula: Sp. Gr. = (% Raw Ash/100) + 1.25	
	Used estimated specific gravity based on 1.30 specific gravity for coal and 2.25 specific gravity for rock where no lab data was available.	This is also referred to as EVR or Estimated Visual Recovery method. EXCEPTION: Used 1800 tons per acre foot for seams with no quality data on surface reserve calculation
Surface Property Control	Controlled	Surface-mineable coal resource estimated where mineral and surface rights are controlled. No resource estimated if mineral rights are not controlled.
	Uncontrolled	Surface-mineable coal resource estimated where surface is uncontrolled if mineral rights are controlled.
Basis for Coal Tonnage	Thickness of recoverable coal less removable partings	Minimum thickness of removable parting for surface-mineable seam is 0.25-foot generally.
Minimum Total seam thickness for Single Cut Contour	2.0 feet (*)	
Minimum Thickness of Principal Seam in Multi-Seam Areas	1.0 foot (*)	
Minimum Thickness of Secondary Seam	0.5 foot	Secondary seam is within 2.5 feet of principal seam
Areas Considered for Surface-mineable Coal Resource	Permitted and potential permit areas provided by Corsa	

** Practical exceptions based on well-demonstrated mining success were made as warranted.*

14.5 Coal Resource Estimate Summary

The results of this TR define an estimated 169.58 million tons of measured and indicated coal resources. Of the total measured and indicated tons, 79% are measured and 21% are indicated. An additional 1.50

million inferred in-situ coal tons have been identified. Coal resource tons are presented on a dry, in-situ basis and provide reasonable prospects for economic extraction. The following table summarizes the coal resource controlled by Corsa.

Table 14-2: Coal Resources Summary

Type/seam	Total Resource (in situ) Tons			
	Measured	Indicated	Total	Inferred
Surface-mineable				
Sewickley	141,600	0	141,600	0
Redstone	216,400	0	216,400	0
Upper Freeport	194,400	0	194,400	0
Lower Freeport	748,400	0	748,400	0
Upper Kittanning	3,479,600	0	3,479,600	0
Middle Kittanning	487,800	0	487,800	0
Lower Kittanning	168,200	0	168,200	0
Total	**5,436,400**	**0**	**5,436,400**	**0**
Highwall-mineable				
Upper Kittanning	995,600	0	995,600	0
Middle Kittanning	153,300	0	153,300	0
Lower Kittanning	143,300	0	143,300	0
Total	**1,292,200**	**0**	**1,292,200**	**0**
Underground-mineable				
Upper Freeport	15,517,300	3,912,000	19,429,300	0
Lower Freeport	5,261,800	39,000	5,300,800	0
Upper Kittanning	34,969,200	7,387,800	42,357,000	0
Middle Kittanning	20,596,800	5,077,500	25,674,300	0
Lower Kittanning	27,082,300	14,785,300	41,867,600	1,500,200
Brookville	23,737,000	4,487,900	28,224,900	0
Total	**127,164,300**	**35,689,500**	**162,853,800**	**1,500,200**
Grand Total				
Sewickley	141,600	0	141,600	0
Redstone	216,400	0	216,400	0
Upper Freeport	15,711,700	3,912,000	19,623,700	0
Lower Freeport	6,010,200	39,000	6,049,200	0
Upper Kittanning	39,444,400	7,387,800	46,832,200	0
Middle Kittanning	21,237,900	5,077,500	26,315,400	0
Lower Kittanning	27,393,800	14,785,300	42,179,100	1,500,200
Brookville	23,737,000	4,487,900	28,224,900	0
Grand Total	**133,892,900**	**35,689,500**	**169,582,400**	**1,500,200**

Notes: (1) Recoverable reserve tons are derived from the in-situ resource tons. (2) Coal reserves are included within coal resources.

Totals may not add due to rounding.

Because the coal resources are reported inclusive of the coal reserves, the extent to which the coal resources may be affected by any known environmental, permitting, legal, title, variation, socio-economic, marketing, political, or other relevant issues is less rigorously tested than the coal reserves. Similarly, the extent to which the coal resource estimate may be materially affected by mining, metallurgical, infrastructure, and other relevant factors has also not been rigorously reviewed for estimation of coal resources.

Table 14-3 below summarizes the raw in-seam coal quality for each resource area included in this TR.

Table 14-3: Summary of Raw, In-seam Quality by Seam by Property

Area	Seam	Raw Quality, Dry Basis				
		Ash%	Sulfur%	Btu/lb.	Vol.	No. of Samples*
Surface-Mineable						
Gaz	Upper Kittanning	21.82	2.27	11,377	20.20	8
Rhoades	Upper Kittanning	10.11	0.56	12,953	19.18	2
Rhoades	Middle Kittanning	23.35	2.76	11,710	15.42	8 / 8 / 8 / 5
Rhoades	Lower Kittanning	19.02	3.52	12,491	16.48	2
Schrock Run	Lower Freeport	9.01	0.72	13,966	17.69	4
Schrock Run	Upper Kittanning	14.08	2.45	13,262	18.08	13
Hamer	Upper Kittanning	17.70	2.53	12,440	22.73	5 / 3 / 2 / 1
Hamer	Middle Kittanning	21.47	-	-	-	3 / 0 / 0 / 0
Blue Lick	Sewickley	16.58	1.48	12,813	-	5
Blue Lick	Redstone	17.82	2.59	12,653	-	9
Downey	Upper Freeport	30.85	7.44	10,483	17.16	8
Downey	Lower Freeport	22.48	3.39	11,926	17.38	29
Downey	Upper Kittanning	23.49	3.43	12,131	16.03	45
Downey	Middle Kittanning	25.91	3.78	11,176	15.97	34 / 34 / 34 / 33
Hart	Lower Freeport	20.72	1.93	10,886	-	21 / 21 / 1 / 0
Hart	Upper Kittanning	24.84	1.94	11,201	-	68 / 68 / 1 / 0
Bassett	Upper Freeport	26.42	4.74	11,098	15.83	5
Berwind Lohr-EAST	Upper Freeport	17.26	3.47	12,677	15.85	11 / 11 / 11 / 3
Berwind Lohr-EAST	Lower Freeport	16.43	2.86	12,895	16.48	8 / 8 / 8 / 2
Total Composite		**19.14**	**2.50**	**12,310**	**17.64**	
Highwall-Mineable						
Gaz	Upper Kittanning	21.82	2.27	11,377	20.20	8
Rhoades	Upper Kittanning	10.11	0.56	12,953	19.18	2
Rhoades	Middle Kittanning	23.35	2.76	11,710	15.42	8 / 8 / 8 / 5
Rhoades	Lower Kittanning	19.02	3.52	12,491	16.48	2
Schrock Run	Lower Freeport	9.01	0.72	13,966	17.69	4
Schrock Run	Upper Kittanning	14.08	2.45	13,262	18.08	13
Hamer	Upper Kittanning	17.70	2.53	12,440	22.73	5 / 3 / 2 / 1
Hamer	Middle Kittanning	21.47	-	-	-	3 / 0 / 0 / 0
Total Composite		**16.24**	**2.48**	**12,879**	**18.13**	
Underground-Mineable						
QueCreek	Upper Kittanning	20.01	2.85	12,226	17.46	20 / 20 / 19 / 14
Casselman	Upper Freeport	17.51	1.66	14,039	19.97	6 / 34 / 29 / 34
Acosta	Upper Kittanning	18.93	2.67	12,578	19.12	21 / 14 / 14 / 13
Acosta	Middle Kittanning	26.62	3.42	11,269	26.90	15 / 11 / 11 / 9
Acosta	Lower Kittanning	33.10	3.00	9,612	15.16	13 / 11 / 11 / 10
Horning	Lower Freeport	10.09	2.13	14,023	17.28	10
A Seam	Brookville	31.50	1.25	10,171	16.75	33 / 33 / 33 / 32
Shaffer	Upper Kittanning	21.32	3.37	12,017	16.05	17
Laurel	Upper Kittanning	15.34	3.92	13,082	17.76	16 / 16
Keyser	Middle Kittanning	22.13	-	-	-	1 / 0
Keyser	Lower Kittanning	20.29	-	-	-	14 / 0
Total Composite		**23.32**	**2.41**	**11,761**	**19.23**	
Total						
Surface Mineable		19.14	2.50	12,310	17.64	
Highwall Mineable		16.24	2.48	12,879	18.13	
Underground Mineable		23.32	2.41	11,761	19.23	
Total Composite		**23.13**	**2.42**	**11,792**	**19.16**	

*No. of samples = if single digit, then all 4 columns are same; otherwise corresponds to column.
All seam quality reported is based on arithmetic averages. Composites are based on tons and are therefore weighted.

The resources identified below in *Sections 14.6* through *14.7.6* are resources *only*– no reserves have been calculated for these areas.

14.6 Limestone Resources (Only)

Corsa controls limestone resources that will be extracted as part of the Bluelick surface mine operations. MM&A has reviewed the testing results for the limestone; it appears that this formation has potential for use as coarse aggregate. It is MM&A's opinion that the limestone at Bluelick has reasonable prospects for economic extraction.

MM&A estimates the in-situ resource for the Fishpot limestone at Bluelick 4 to be 1.28 million tons. Due to the limited testing data, and absence of a market study or sales history, no reserve estimate has been made for the limestone.

Table 14-4: Bluelick 4 Fishpot Limestone Resource Summary

	Total Resource (in situ) Tons			
Seam	Measured	Indicated	Total	Inferred
Limestone	1,280,900	0	1,280,900	0

Note: Totals may not add due to rounding.

14.7 Coal Resources (Only)

14.7.1 Shaffer – Upper Kittanning Seam Resource (*Map 7*)

Shaffer is in Somerset County, Pennsylvania within the USGS Hooversville and Stoystown 7.5-minute quadrangles. Shaffer is an inactive underground mine property in the Upper Kittanning seam. Mineral control is through lease and the property is completely permitted. The seam is presumed to be a thermal product due to the higher washed ash and sulfur content. Average seam thickness is 3.4 feet. Shaffer is classified in this TR as a resource. No metallurgical coal quality has been provided for this area; furthermore, a significant mineral lease was released within the past year, which significantly impacts the potential for future development of the Shaffer underground resource area.

Table 14-5: Shaffer Underground Resource Summary

	Total Resource (in situ) Tons			
Seam	Measured	Indicated	Total	Inferred
Upper Kittanning	2,052,600	167,600	2,220,200	0

Note: Totals may not add due to rounding.

14.7.2 Barbara B – Lower Kittanning Seam Resource (*Map 8*)

Barbara B property is in Somerset County, Pennsylvania, within the USGS Berlin 7.5-Minute quadrangle. Barbara B, an underground mine which operated in the Lower Kittanning seam, is permitted but has been closed. The former leased property has been relinquished yet some owned coal resource remains; however, the face up area has been backfilled. Since the leased property has been dropped, there is no longer direct access to the remaining controlled coal and therefore this mineral property has been classified as a resource. Average seam thickness is 4.6 feet.

14.7.3 Laurel – Upper Kittanning Seam Resource (*Map 9*)

Laurel is in Somerset County, Pennsylvania, within the USGS Central City 7.5-Minute quadrangles. Laurel is an inactive underground mine property in the Upper Kittanning seam. Mineral control is through lease and the property is not permitted. The seam has been mined to the north and east of the property and the resource is the area of greater than 2.5 feet seam thickness that remains. Average seam thickness is 3.1 feet. The property is to the west of the Shade Preparation Plant. Corsa identifies this property as a resource only.

Table 14-6: Laurel Underground Resource Summary

	Total Resource (in situ) Tons			
Seam	Measured	Indicated	Total	Inferred
Upper Kittanning	4,824,300	0	4,824,300	0

Note: Totals may not add due to rounding.

14.7.4 Keyser – Middle Kittanning Seam Resource (*Map 10A*)

Keyser is in Somerset County, Pennsylvania, within the USGS Boswell and Hooversville 7.5-Minute quadrangles. The Keyser Middle Kittanning seam is an inactive underground property and could potentially produce a metallurgical-grade coal. The property is controlled largely through ownership and is not permitted. The resource area occurs entirely within the owned property. The seam is relatively thin, in comparison to other Corsa underground mineable coals, with an average thickness of 2.9 feet. The available analytical data is insufficient to characterize the quality of the seam. The mineable Lower Kittanning seam also occurs within the Keyser property boundary at an interval of 53 feet below the Middle Kittanning. The Middle Kittanning seam at Keyser has been identified as a resource, while the Lower Kittanning has been evaluated as a reserve.

Table 14-7: Keyser MK Underground Coal Resource Summary

	Total Resource (in situ) Tons			
Type/seam	Measured	Indicated	Total	Inferred
Middle Kittanning	4,332,400	1,231,000	5,563,500	0

Note: Totals may not add due to rounding.

14.7.5 Bassett – Upper Freeport Seam Surface Resource (*Map 18*)

Bassett is in Somerset County, Pennsylvania within the USGS Somerset and Hooversville 7.5-Minute quadrangles. The property is classified as an inactive surface mine property. Surface mining rights are reported as controlled on this property, the mineral is controlled through lease and the resource is permitted. Bassett is classified in this TR as a resource since it failed to achieve a positive economic evaluation.

Table 14-8: Bassett Surface Resource Summary

	Total Resource (in situ) Tons			
Type/seam	Measured	Indicated	Total	Inferred
Upper Freeport	122,600	0	122,600	0

Note: Totals may not add due to rounding.

14.7.6 Berwind Lohr – Upper and Lower Freeport Seams Surface Resource (*Maps 19A and B*)

Berwind Lohr is in Somerset County, Pennsylvania within the USGS Hooversville 7.5-Minute quadrangle. The property is classified as an inactive surface mine property. Surface mining rights are reported as controlled on this property, the mineral is controlled through lease and the resources are permitted. Berwind Lohr is classified in this TR as a resource because of insufficient tonnage due to the release of mineral leases in the larger, western section of the property.

Table 14-9: Berwind Lohr Surface Resource Summary

	Total Resource (in situ) Tons			
Type/seam	**Measured**	**Indicated**	**Total**	**Inferred**
Upper Freeport	31,400	0	31,400	0
Lower Freeport	30,900	0	30,900	0
Total	**62,300**	**0**	**62,300**	0

Note: Totals may not add due to rounding.

Item 15 Mineral Reserve Estimates

15.1 Introduction

The coal reserve estimates were prepared in accordance with CIMDS (as adopted May 10, 2014). Proven and probable coal reserves were derived from the defined coal resource considering relevant processing, economic (including independent estimates of capital, revenue, and cost), marketing, legal, environmental, socio-economic, and regulatory factors and are presented on a moist, recoverable basis.

As is customary in the USA, the categories for *Proven* and *Probable* coal reserves are based on the distances from valid points of measurement used for *Measured* and *Indicated* coal resources prescribed in *USGS Circular 891*.[4]

The coal reserve estimates are presented in *Table 15-2*.

15.2 Definitions and Applicable Standards

In accordance with NI 43-101, MM&A has classified the coal as "coal resource" and "coal reserve" according to definitions published in CIMDS as adopted in May 2014. In this standard, a **Mineral Reserve** is defined as "…the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes dilution materials and allowances for losses, which occur when the material is mined or extracted and is defined by studies at Preliminary Feasibility or Feasibility level as appropriate

[4] The Mineral Reserves are subdivided into classes of: Proven Mineral Reserves, those lying within ¼-mile radius of a valid point of measurement; Probable Mineral Reserves are those lying between ¼-mile and ¾-mile of a valid point of measurement.

that include Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified."

Coal is defined as combustible sedimentary rock in which organic matter, including residual moisture (as defined by ASTM Procedure 3180.84) comprises more than 50% by weight and more than 70% by volume of carbonaceous material formed from altered plant remains.

As referenced in the CIMDS, coal resources and coal reserves are herein reported inclusively. The *Measured*, *Indicated*, and *Inferred* in-situ coal resources are reported inclusive of the reported reserve tons, since they include the in-situ tons from which the recoverable coal reserve is derived.

A *Preliminary Feasibility Study* is defined as "…a comprehensive study of a range of options for technical and economic viability of a mineral project that has advanced to a stage where a preferred mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, is established and an effective method of mineral processing is determined. It includes a financial analysis based on reasonable assumptions on the Modifying Factors and the evaluation of other relevant factors which are sufficient for a Qualified Person, acting reasonably, to determine if all or part of the Mineral Resource may be converted to a Mineral Reserve at the time of reporting. A Pre-feasibility Study is at a lower confidence level than a Feasibility Study."

Reserves, as defined by the CIMDS, are those coal deposits that exhibit:

1. Geologic assurance of existence and continuity; and
2. Economic feasibility of recovery, as demonstrated by at least a Preliminary Feasibility Study.

Economic feasibility may be evaluated by interrelating coal thickness; overburden thickness; coal quality; costs of mining, processing, and transportation; and expected selling price, among other factors. The reserve assessment provided herein addresses and summarizes the factors described above. In addition, each of the reserve areas identified was subject to a preliminary feasibility study based on Corsa's plans, which were reviewed by MM&A for reasonableness and incorporated into this TR, and independent estimates of capitalization, revenue, and mining cost by MM&A.

15.3 Impact of Over- and/or Undermining

An understanding of the potential for sterilization of otherwise underground-mineable resources through subsidence from overlying or underlying seams is essential for coal reserve classification and estimation. In conjunction with the impact associated with subsidence, reserves can also be adversely impacted by the presence of flooded and abandoned (primarily overlying) mine workings which can, in some instances, impede or entirely prevent development within such areas. Hence, evaluation of resource areas in relation to superjacent or subjacent mined-out seams is germane to the assessment of mineability.

Because detailed analysis is beyond the scope of the present investigation, an approximate 40-foot interval has been assumed by MM&A as the *minimum* interval between a potential mineable seam and an overlying or underlying mined-out seam.[5] Additional analysis of the lithologic composition and geotechnical properties of the strata comprising the interval between two seams, as well as details concerning the underground mined area (pillar location, geometry, areas of second mining, pooled water, etc.), is always recommended to determine optimal layout and mine design to operate safely and to maximize mineral recovery.

15.4 Limitations to Mineability

There are limitations to determining the mineability of the seams from interpretation of the drill hole data as provided. A large portion of the drill hole data contains only rock-coal descriptions, no driller or geologist log and only a minority of the drill holes contain downhole geophysical logs. The majority of the available coal sample analyses do not have qualitative assurance of complete and representative coal core sample recovery. This weakness in the data set of verifiable and accurate coal seam thickness, quality and detailed lithologic composition of the roof and floor material makes for less accurate predictions of coal classification, recovery and other factors associated with mining conditions.

15.5 Methodology Used to Estimate Coal Reserves

Coal reserve estimates were derived from the defined coal resource considering relevant processing, economic (including independent estimates of capital, revenue, and cost), marketing, legal, environmental, socio-economic, and regulatory factors and are presented herein on a moist, recoverable basis.

Upon completion of delineation and calculation of coal resources, MM&A generated LOM plans for each mining complex (*Maps 2 through 19B*). Mine plans were generated based on forecasted mine plans and permit plans provided by Corsa with modifications by MM&A in certain areas. Previous reserve evaluations defined general locations for the primary coal reserve areas. Additional drilling, detailed topography maps, aerial photography, and updated reserve criteria refined these earlier selected locations. MM&A used property development plans established by Corsa, and modified plans where necessary due to current property control limits, modifications to geologic mapping due to additional exploration, etc.

Carlson – (or other software) generated grid files were used to build geologic elevation models for coal seams demonstrating mineable potential. Coal seam thickness and base-of-coal-seam structure grid files were used to define the top and bottom of each coal horizon. The grid models were used to develop LOM and timing sequence plans for underground-mineable coal seams, based on volume productivity schedules provided by Corsa for active mining operations. Underground mining heights of 42 to 44 inches, based on current mining practices and/or equipment capabilities, were used to

[5] The assumption has been established through previous work of MM&A in the Appalachian region and is considered reasonable for pre-feasibility determination.

determine OSD and to project raw production tons. In the case of the active Casselman Mine, MM&A applied a minimum OSD of 6 inches in addition to the minimum 42-inch mining height after inspection of the extraction heights posted on the mine map. The same 6-inch minimum OSD and 42-inch minimum mining height assumptions were also applied to the proposed Acosta deep mines.

For surface-mineable coal seams, surface topography grids were generated using USGS digital elevation models or more detailed digital flown topography provided by Corsa, where available. Surface LOM and timing plans were sequenced using Carlson based on surface equipment productivity and equipment expansion plans determined to be reasonable by MM&A. Estimates of surface-mineable coal reserves and associated bank cubic yard (*bcy*) overburden volumes were generated based on an economic ratio limit (bcy of overburden to recoverable coal tons), which is a function of coal prices and operating costs. For coal seams that demonstrate the potential for surface mining methods, seam product thickness grid files, excluding scalpable (removable) in-seam partings, were generated for the surface-mineable seam thickness.

Raw, ROM production data outputs from LOM sequencing were processed into Excel spreadsheets and summarized on an annual basis for use in the economic model. Average seam densities for underground and surface-mineable coal seams were estimated to determine raw coal tons produced from the LOM plan. Average mine recovery and wash recovery factors, determined by available quality or estimated from specific gravities, were applied to determine recoverable tons.

Coal reserve tons in this evaluation are reported on a moist (8.0 percent for washed product and 4.25 percent for raw product), recoverable basis, and represent the saleable product from the Properties.

15.6 Coal Reserve Estimation Criteria

Coal reserve estimation criteria were established to assure that the basic geologic characteristics of the coal reserves (e.g., minimum coal thickness and wash recovery, interval between underground-mineable seams, etc.) are in reasonable conformity with present and past mine operations capabilities on the properties. The coal reserve estimates have been prepared using generally accepted industry methodology to provide reasonable assurance that the coal reserves are economic and recoverable at the time of evaluation.

Table 15-1: Coal Reserve Criteria

	Parameter	Technical Notes
Coal Reserve Classification		
Reliability of Geologic Conditions and Modifying Factors	Proven	<¼-mile radius from valid point of measurement and economically mineable part of a Measured Resource. Implies the highest degree of confidence.
	Probable	¼- to ¾-mile radius from valid point of measurement and economically mineable part of an Indicated Resource, and in some circumstances, a Measured Resource. Implies lower level of confidence than Proven.
Unit of Measure	Mile, Feet	USA customary unit of measure of distance (except where noted)
Unit of Area	Acre	USA customary unit of area
Unit of Weight	Short Ton	USA customary unit of measure of weight
Coal Sales Prices	$47.00 to $52.46 per ton for thermal coal; $86.78 to $135.32 per ton for metallurgical coal	Prices are in terms of FOB Mine
Effective Date of TR	December 31, 2017	
Underground-Mineable		
Mining Type	Underground	Existing pillar/barriers remaining in areas of previous underground mining not considered
Coal Density	Used laboratory apparent specific gravity data where available. Otherwise use raw ash formula: Sp. Gr. = (% Raw Ash/100) + 1.25	
	Used estimated specific gravity based on 1.30 specific gravity for coal and 2.25 specific gravity for reject where no lab data was available.	This is also referred to as EVR or Estimated Visual Recovery method.
Minimum Total Seam Thickness	2.50 feet	Minimum mineable thickness, rock partings removed
Minimum Total Coal Thickness	2.50 feet	Minimum mineable thickness
Minimum In-seam Wash Recovery	40% to 50% (case-by-case)	Case-by-case exceptions based on mining height, haul distance, seam quality, etc.
Wash Recovery Factor	Based on arithmetic average of all holes in reserve area	Recovery estimated for core holes within reserve area that lack washability data. (Based on 1.30 coal specific gravity, 2.25 reject specific gravity, 95% recovery of "clean" coal.)
Preparation Plant Efficiency	95%	
Moisture	8% for washed product	
Product Tons	Moist, in-seam undiluted, washed basis	
Minimum Cover	100 feet	
Mine Barrier	200 feet	Applied around old underground mines or sealed-off sections, augered or high-wall mined areas
	100 feet	Where certified mine maps available
	50 feet	Where mine intends to penetrate existing mine works.
Mine Recovery	80 feet of advance (equivalent) based on Corsa experience	Mine recovery varies depending on geology, mine plan, and depth of cover; mine recovery indicates average mine in the LOM plan panel recovery. Only applied at Que Creek in current TR.
Minimum Interval between Seams	40 feet	Normal mine recovery. Reduced mine recovery on a by seam basis if less than 40 feet.
	<40 feet	Mine recovery reduced or not considered Coal Reserve, case-by-case
Areas Considered for Underground-mineable Tonnage	Permitted and/or potential permit areas identified by Corsa	
• **Surface-Mineable**		
Mining Type	Surface mining	
	Highwall (HWM) mining	
Coal Density	Used laboratory apparent specific gravity data where available. Otherwise use raw ash formula: Sp. Gr. = (% Raw Ash/100) +1.25	
	Used estimated specific gravity based on 1.30 specific gravity for coal and 2.25 specific gravity for reject where no lab data was available. This is also referred to as EVR or Estimated Visual Recovery method.	EXCEPTION: Used 1800 tons per acre foot for seams with no quality data on surface reserve calculations

Parameter		Technical Notes
• Surface-Mineable (Con't)		
Surface Property Control	Controlled	Surface-mineable coal considered for coal reserve where mineral rights are controlled
	Uncontrolled	Surface-mineable coal considered for coal resource (not considered for coal reserve)
Basis for Coal Tonnage	Thickness of recoverable coal less removable partings	Minimum thickness of removable parting for surface-mineable seam is 0.25-foot generally.
Product Tons	4.25% moisture added to raw, direct ship product tons and 8.0% moisture added to washed product tons	
Maximum Overall Strip Ratio	Target 16:1 to 20:1	Higher ratios may be encountered occasionally
Product Quality	Dry, in-seam basis raw quality	Dry, in-seam washed basis for highwall miner quality
Minimum Total Coal Thickness for Single Cut Surface Mine	2.0 feet (*)	Local exceptions considered for high-quality coal seams
Minimum Thickness of Principal Seam in Multi-Seam Areas	2.0 foot	Local exceptions considered for high-quality coal seams
Minimum Thickness of Secondary Seam	0.5 foot	Secondary seam is within 2.5 feet of principal seam
Mineable Recovery	Surface mining 90% (**)	
	Previously underground mined 25%	
	Previously augered	Not considered
Minimum In-seam Wash Recovery	40% to 50% (case-by-case) for highwall miner	Case-by-case exceptions based on mining height, haul distance, seam quality, etc.
Wash Recovery Factor	Based on arithmetic average of all holes in mineral resource area	Recovery estimated for core holes within reserve area that lack washability data. (Based on 1.30 coal specific gravity, 2.25 reject specific gravity, 95% recovery of "clean" coal.)
Areas Considered for Surface-mineable Tonnage	Permitted and/or potential permit areas identified by Corsa	

* Practical exceptions based on well-demonstrated mining success were made as warranted.
**Lower overall mine recovery percent will be noted in the coal reserve tables as a result of various mine recoveries in previously augered or underground mined areas.

15.7 Coal Reserve Estimate Summary

The coal reserves reported in *Table 15-2* below represents the economically viable coal tonnage controlled by Corsa on a moist recoverable basis. The coal reserves are based on an independent evaluation of the coal geology and a pre-feasibility study of the coal reserve deposits. Mine depletion for fourth quarter 2017 was supplied by Corsa, and MM&A deducted this historical production from the mapped reserves in order to estimate reserves as of December 31, 2017.

Table 15-2: Coal Reserve Summary (Moist Recoverable Basis)

Type/seam	Total Demonstrated[1]			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Surface-mineable					
Sewickley	117,400	0	117,400	117,400	0
Redstone	178,900	0	178,900	178,900	0
Upper Freeport	26,400	0	26,400	26,400	0
Lower Freeport	502,700	0	502,700	251,700	251,000
Upper Kittanning	2,392,000	0	2,392,000	1,616,800	775,200
Middle Kittanning	319,400	0	319,400	319,400	0
Lower Kittanning	123,600	0	123,600	123,600	0
Total	**3,660,400**	**0**	**3,660,400**	**2,634,200**	**1,026,200**
Highwall-mineable					
Upper Kittanning	376,200	0	376,200	77,600	298,600
Middle Kittanning	40,800	0	40,800	40,800	0
Lower Kittanning	46,800	0	46,800	46,800	0
Total	**463,800**	**0**	**463,800**	**165,200**	**298,600**

Type/seam	Total Demonstrated[1]			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Underground-mineable					
Upper Freeport	5,224,900	1,315,800	6,540,700	3,515,200	3,025,500
Lower Freeport	2,197,600	16,400	2,214,000	2,214,000	0
Upper Kittanning	7,410,600	1,468,200	8,878,800	164,400	8,714,300
Middle Kittanning	5,063,200	1,094,500	6,157,700	4,206,100	1,951,600
Lower Kittanning	9,149,500	4,573,900	13,723,400	0	13,723,500
Brookville	6,444,600	16,900	6,461,500	6,441,700	19,800
Total	**35,490,300**	**8,485,800**	**43,976,100**	**16,541,400**	**27,434,700**
Grand Total					
Sewickley	117,400	0	117,400	117,400	0
Redstone	178,900	0	178,900	178,900	0
Upper Freeport	5,251,300	1,315,800	6,567,100	3,541,600	3,025,500
Lower Freeport	2,700,300	16,400	2,716,700	2,465,700	251,000
Upper Kittanning	10,178,800	1,468,200	11,647,000	1,858,800	9,788,100
Middle Kittanning	5,423,400	1,094,500	6,517,900	4,566,300	1,951,600
Lower Kittanning	9,319,900	4,573,900	13,893,800	170,400	13,723,500
Brookville	6,444,600	16,900	6,461,500	6,441,700	19,800
Grand Total	**39,614,500**	**8,485,800**	**48,100,300**	**19,340,800**	**28,759,500**

Note: (1) Proven and probable coal reserves were derived from the defined coal resources considering relevant processing, economic (including independent estimates of capital, revenue, and cost), marketing, legal, environmental, socio-economic, and regulatory factors.

In summary, Corsa controls 48.10 million moist, recoverable proven and probable coal reserve tons, of which 82% is considered proven and 18% is considered probable, after the application of all mining factors. Of the total coal reserve, 3.66 million moist, recoverable tons are surface-mineable, 0.46 million moist, recoverable are highwall-mineable, and 43.98 million moist, recoverable tons are underground-mineable. Of the total coal reserve, 19.34 million tons are permitted for mining by appropriate federal and state regulatory authorities with the responsibility for oversight of mining operations in the USA and in Pennsylvania. The remaining 28.76 million reserve tons are not permitted.

The extent to which the coal reserves may be affected by any known environmental, permitting, legal, title, variation, socio-economic, marketing, political, or other relevant issues has been reviewed rigorously for estimation of coal reserves. Similarly, the extent to which the estimates of coal reserves may be materially affected by mining, metallurgical, infrastructure, and other relevant factors has also been considered. MM&A is not aware of any of these factors that impede classification of the reserves.

Table 15-3 below summarizes the washed in-seam coal quality for each reserve area included in this TR.

Table 15-3: Summary of Coal Reserve Quality by Seam by Property – Proximate Analysis

Reserve Area	Seam	Weighted Composite (Moist Basis)				
		Wash Recovery	Ash	Sul	Btu/lb.	Volatile Matter
Surface-Mineable						
Gaz	Upper Kittanning	89.35%	15.00%	1.72%	10,971	-
Downey	Upper Freeport	-	23.27%	5.65%	10,880	-
Downey	Lower Freeport	87.10%	15.72%	2.53%	12,144	-
Downey	Upper Kittanning	88.19%	16.61%	2.48%	12,173	-
Downey	Middle Kittanning	84.55%	19.82%	2.68%	11,366	-
Hart	Lower Freeport	87.18%	13.95%	1.45%	11,677	-
Hart	Upper Kittanning	85.14%	18.49%	1.46%	11,650	-
Rhoades	Upper Kittanning	93.95%	8.18%	0.53%	12,420	-
Rhoades	Middle Kittanning	85.47%	17.94%	2.08%	11,752	-
Rhoades	Lower Kittanning	87.81%	14.15%	2.62%	12,416	-
Schrock Run	Lower Freeport	95.00%	7.36%	0.69%	13,335	-
Schrock Run	Upper Kittanning	92.34%	11.26%	1.82%	12,801	-
Hamer	Upper Kittanning	100.00%	16.95%	2.42%	11,911	-
Hamer	Middle Kittanning	-	-	-	0	-
Blue Lick	Sewickley	-	-	-	0	-
Blue Lick	Redstone	91.37%	14.75%	2.11%	12,252	-
Total		**85.19%**	**13.55%**	**1.77%**	**11,652**	**-**
Underground-Mineable						
QueCreek	Upper Kittanning	69.36%	9.32%	1.42%	12,877	17.60%
Casselman	Upper Freeport	83.35%	7.46%	1.02%	13,276	19.70%
Horning	Lower Freeport	68.26%	5.51%	0.93%	13,533	16.20%
Acosta	Upper Kittanning	76.48%	8.53%	1.49%	13,092	18.70%
Acosta	Middle Kittanning	56.26%	10.38%	1.09%	12,714	15.60%
Acosta	Lower Kittanning	49.05%	9.13%	1.64%	12,960	16.40%
A Seam	Brookville	53.02%	10.33%	0.79%	12,629	17.50%
Keyser	Lower Kittanning	73.44%	6.74%	1.39%	13,389	18.80%
Total		**66.79%**	**8.48%**	**1.23%**	**13,059**	**17.80%**
Total						
Surface Mineable		85.19%	13.55%	1.77%	11,652	-
Underground Mineable		66.79%	8.48%	1.23%	13,059	17.80%
Total		**68.37%**	**8.92%**	**1.28%**	**12,939**	**17.80%**

A summary of each surface and underground mineable reserve area is provided below. Properties listed as "inactive" include both those properties that are currently idle and those properties that have not yet been developed or started.

15.8 Underground Reserve Areas

15.8.1 Quecreek - Upper Kittanning Seam (*Map 2*)

Quecreek is in Somerset County, Pennsylvania within the USGS Bakersville and Somerset 7.5-Minute quadrangles. Quecreek is an active underground mine property, has historically been producing metallurgical-grade coal, and is projected to continue producing metallurgical grade coal. Mine life has been and will continue to be extended by retreat mining of pillars in selected areas. The mine is projected to finish in 2018. MSHA approval of retreat mining in certain previously-developed areas could extend mine life beyond 2018; however, the current reserve estimate does not include any such extension. The remaining reserve contains leased and owned property and is completely permitted. Average seam thickness is 4.2 feet.

Table 15-4: Quecreek Underground Coal Reserve Summary (Moist Recoverable Basis)

Seam	Total Demonstrated			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Upper Kittanning	164,400	0	164,400	164,400	0

Note: Totals may not add due to rounding.

15.8.2 Casselman – Upper Freeport Seam Reserve (*Map 3*)

Casselman underground mine is an active mine in Garrett County, Maryland within the USGS Grantsville 7.5-Minute quadrangle. The mine currently produces from the Upper Freeport seam using two continuous miner sections, with the ROM production being hauled by truck to the Cambria preparation plant. Information from Corsa indicated that the production from the mine goes to the metallurgical market. The property is controlled through lease and slightly more than half of the resource area is permitted. Low-cover barriers exist along the streams within the property that exclude mining. Crossing exceptions through these barriers have been approved at specific locations to access additional resources. First mining only is allowed in these crossings. Corsa plans include a new portal which will provide access to reserve areas north of some of the low-cover barriers.

The eastern portion of the Upper Freeport reserve at Casselman contains a rider coal within 10 feet of the main seam. The lithology between the seam and the rider generally consists of a soft shale, clay or shale with coal streaks. This has the potential to create difficult roof conditions within the area identified on the resource map. To account for these roof conditions, roof control costs were increased for the Casselman economic evaluation compared with the cost data provided by Corsa. Average seam thickness is 3.4 feet.

Table 15-5: Casselman Underground Coal Reserve Summary (Moist Recoverable Basis)

Seam	Total Demonstrated			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Upper Freeport	5,224,900	1,315,800	6,540,700	3,515,200	3,025,500

Note: Totals may not add due to rounding.

15.8.3 Acosta - Upper Kittanning Seam Reserve (*Map 4A*)

Acosta is located in Somerset County, Pennsylvania within the USGS Somerset 7.5-Minute quadrangle. The larger portion of the property is controlled through ownership while the extreme northern portion of the property is leased. The Upper Kittanning seam at Acosta is not permitted and is classified as an inactive underground mine property. This reserve will be accessed via inter-seam slope from the active mine workings in the Middle Kittanning seam. Acosta's Upper Kittanning seam reserve has been incorporated with the former Wells Creek property in the south (owned property). It has been projected that this coal is viable for sale into the metallurgical coal market. Underground mine workings exist in the north, west and east side of the reserve area. Average seam thickness of the reserve is 3.4 feet. First mining only is projected for the Upper Kittanning seam since it is underlain by the mineable Middle Kittanning seam at approximately 39 feet.

Table 15-6: Acosta UK Underground Coal Reserve Summary (Moist Recoverable Basis)

Seam	Total Demonstrated			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Upper Kittanning	7,246,100	1,468,200	8,714,300	0	8,714,300

Note: Totals may not add due to rounding.

15.8.4 Acosta - Middle Kittanning Seam (*Map 4B*)

Acosta's Middle Kittanning seam property encompasses the same property boundary as Acosta's Upper Kittanning seam. The Middle Kittanning seam lies on average 39 feet below the Upper Kittanning seam, and first mining only is projected. The largest portion of the property is controlled through ownership while the extreme northern portion of the property is leased. Approximately two thirds of the northern portion of the Acosta Middle Kittanning seam is permitted. In the northwestern portion of the property, a small area of highwall mining in the Middle Kittanning seam has occurred. This is the only previous mining in the Middle Kittanning seam within the property.

A face-up area for the underground reserve was completed in the extreme northwestern portion of the property; production began in June 2017. Coal quality characteristics of this coal are sufficient for shipment into the current metallurgical coal market. Acosta's Middle Kittanning seam reserve is classified as a partially permitted active underground mine property. Overlying underground mine workings in the Upper Kittanning exist in the north, west and east side of the reserve area; in the northern area, the Middle Kittanning permit includes reserves beneath the previously mined Upper Kittanning. Average seam thickness is 3.0 feet.

Table 15-7: Acosta MK Underground Coal Reserve Summary (Moist Recoverable Basis)

Seam	Total Demonstrated			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Middle Kittanning	5,063,200	1,094,500	6,157,700	4,206,100	1,951,600

Note: Totals may not add due to rounding.

15.8.5 Acosta - Lower Kittanning Seam Reserve (*Map 4C*)

Acosta's Lower Kittanning seam property encompasses the same boundary as the Acosta Upper and Middle Kittanning seam. This reserve will be accessed via inter-seam slope from the active mine workings in the Middle Kittanning seam. The Lower Kittanning seam lies on average 44 feet below the Middle Kittanning seam, as a result, first mining only is projected. The largest portion of the property is controlled through lease while the extreme southern portion of the property is owned. The Acosta Lower Kittanning seam is not permitted. No previous mining in the Lower Kittanning seam has occurred within the boundary of the property It has been projected that this coal to likely be viable for sale into the metallurgical coal market. Acosta's Lower Kittanning reserve is classified as an inactive underground mine property. Overlying underground mine workings in the Upper Kittanning exist in the north, west and east side of the reserve area. Mine plans have not been projected underneath of these mine works and therefore coal resources have not been included in the tonnage estimate. Average seam thickness is 3.6 feet.

Table 15-8: Acosta LK Underground Coal Reserve Summary (Moist Recoverable Basis)

Seam	Total Demonstrated			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Lower Kittanning	4,426,200	1,058,300	5,484,500	0	5,484,500

Note: Totals may not add due to rounding.

15.8.6 Horning - Lower Freeport Seam (*Map 5*)

Horning D is in Somerset County, Pennsylvania, within the USGS Berlin 7.5-Minute quadrangle. Horning D is classified as a "hot idle" underground mine property, has historically been producing metallurgical-grade coal, and is projected to resume production of metallurgical-grade coal in the first quarter of 2018. The property consists of owned and leased coal with lesser areas of internal uncontrolled coal and it is fully permitted. The mine plans have been extended further north toward Schrock Run into an area that, in the 2014 TR, identified an existing underground mine in the Lower Freeport seam. Further review by Corsa, along with drilling, reveals that if this mine exists in this location it is not in the Lower Freeport or overlying seams. Average seam thickness is 3.0 feet.

Table 15-9: Horning Underground Coal Reserve Summary (Moist Recoverable Basis)

Seam	Total Demonstrated			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Lower Freeport	2,197,600	16,400	2,214,000	2,214,000	0

Note: Totals may not add due to rounding.

15.8.7 A-Seam – Brookville Seam Reserve (*Map 6*)

The A Seam property is in Somerset County, Pennsylvania within portions of the USGS Berlin and Murdock 7.5-Minute quadrangles. Based on information provided by Corsa, MM&A has estimated that approximately 100 percent of coal production from this property could potentially enter the metallurgical coal market. A Seam is classified as an inactive underground mine property. As other underground mining operations exhaust their reserves, the A Seam reserve is planned for future development. The A-Seam mine plan contains three distinct areas separated by an Absent-Low Coal Zone as identified on the resource map. Average seam thickness is 6.6 feet. The A-Seam property consists of permitted and not permitted reserve areas.

Table 15-10: A-Seam Underground Coal Reserve Summary (Moist Recoverable Basis)

Seam	Total Demonstrated			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Brookville	6,444,600	16,900	6,461,500	6,441,700	19,800

Note: Totals may not add due to rounding.

15.8.8 Keyser – Lower Kittanning Seam Reserve (*Map 10B*)

Keyser is in Somerset County, Pennsylvania, within the USGS Boswell and Hooversville 7.5-Minute quadrangles. Keyser is an inactive underground property with the potential to produce metallurgical-grade coal. The property is controlled largely through ownership and is not permitted but in the permit process. The reserve area occurs entirely within the owned property. The Lower Kittanning seam has

an average thickness of 4.4 feet and underlies the Middle Kittanning seam at an interval of 53 feet. The water pool elevation in the overmined Upper Kittanning seam acts as a mine barrier to northward expansion of the Lower Kittanning resource area. A hydraulic barrier to the south prohibits the mineable resource from extending beyond the 1,750 feet seam elevation which is the bottom of the box cut elevation. These two barriers have reduced the area of mineable coal as originally projected by Wilson Creek Energy. This mine will be brought into production as replacement production as the Que Creek mine reserves are exhausted.

Table 15-11: Keyser LK Underground Coal Reserve Summary (Moist Recoverable Basis)

	Total Demonstrated			By Permit Status	
Seam	Proven	Probable	Total	Permitted	Not Permitted
Lower Kittanning	4,723,400	3,515,600	8,239,000	0	8,239,000

Note: Totals may not add due to rounding.

15.9 Surface Reserve Areas

15.9.1 Hamer – Upper and Middle Kittanning Seams Surface Reserve (*Maps 14A and B*)

Hamer is in Somerset County, Pennsylvania within the USGS Somerset 7.5-Minute quadrangle. The property contains surface and associated highwall mineable reserves. The mine was producing at the date of site visits by MM&A. Surface mining rights are reported as controlled on this property, and the mineral is controlled through lease and the reserves are permitted. Based on information provided by Corsa, it has been estimated that approximately 100 percent of the Middle Kittanning coal production from this property and 65 percent of the Upper Kittanning production could potentially enter the metallurgical coal market, with the remainder going to the steam market. The property is projected to produce a metallurgical grade product although the average sulfur content of the Upper Kittanning is 1.7%. Surface mining ratios within the reserve area are approximately 15.8:1.

Table 15-12: Hamer Surface Reserve Summary

	Total Demonstrated			By Permit Status	
Type/seam	Proven	Probable	Total	Permitted	Not Permitted
Surface-mineable					
Upper Kittanning	19,000	0	19,000	19,000	0
Middle Kittanning	32,700	0	32,700	32,700	0
Total	51,700	0	51,700	51,700	**0**
Highwall-mineable					
Upper Kittanning	8,700	0	8,700	8,700	0
Middle Kittanning	29,800	0	29,800	29,800	0
Total	38,500	0	38,500	38,500	**0**
Grand Total					
Total	90,200	0	90,200	90,200	**0**

Note: Totals may not add due to rounding.

15.9.2 Bluelick 4 - Sewickley and Redstone Seams Surface Reserve (*Maps 15A, B and C*)

Bluelick 4 is in Somerset County, Pennsylvania within the USGS Wittenberg and Berlin 7.5-Minute quadrangles. This is the only property, evaluated in this TR, on which Corsa controls the Sewickley and Redstone seams of coal. It is classified as an inactive surface mine property. Each of the main seams contains a rider coal. The volume associated with each of the rider coals is of minor value, but has been incorporated into the main seam reserve tonnage. In the process of mining these coal seams, Corsa also intends to extract the overlying Fishpot Limestone for potential aggregate use. Resource tons associated with the Fishpot Limestone are shown for informational purposes in *Section 14.6* and are not included with any of the coal seam results. Surface mining rights are reportedly controlled, the mineral control is by lease and the coal reserves and limestone resource are permitted. Surface mining ratios within the reserve area are approximately 16.0:1.

Table 15-13: Bluelick 4 Surface Reserve Summary (Moist Recoverable Basis)

	Total Demonstrated			By Permit Status	
Type/seam	Proven	Probable	Total	Permitted	Not Permitted
Lower Freeport	117,400	0	117,400	117,400	0
Upper Kittanning	178,900	0	178,900	178,900	0
Total	**296,300**	**0**	**296,300**	**296,300**	**0**

Note: Totals may not add due to rounding.

15.9.3 GAZ - Surface Reserves (*Map 11*)

GAZ is in Somerset County, Pennsylvania within the USGS Stoystown 7.5-Minute quadrangle. Based on information provided by Corsa, it has been estimated that approximately 55 percent of the Upper Kittanning coal production from this property could potentially enter the metallurgical coal market, with the remainder going to the steam market. GAZ, along with associated highwall mining, is classified as an inactive surface mine property. Surface mining rights are reportedly controlled on this property, the mineral control is by lease and the reserve is permitted. Surface mining ratios within the reserve area are approximately 13.3:1.

Table 15-14: GAZ Surface Coal Reserve Summary (Moist Recoverable Basis)

	Total Demonstrated			By Permit Status	
Type/seam	Proven	Probable	Total	Permitted	Not Permitted
Surface-mineable					
Upper Kittanning	384,100	0	384,100	384,100	0
Highwall-mineable					
Upper Kittanning	47,900	0	47,900	47,900	0
Grand Total					
Total	**432,000**	**0**	**432,000**	**432,000**	**0**

Note: Totals may not add due to rounding.

15.9.4 Rhoads II – Upper, Middle and Lower Kittanning Seams Reserve (*Maps 12A, B and C*)

Rhoads is in Somerset County, Pennsylvania within the USGS Boswell 7.5-Minute quadrangle. Based on information provided by Corsa, it has been estimated that approximately 70 percent of coal production

from this property could potentially enter the metallurgical coal market, with the remainder going to the steam market. The Rhoads property is classified as an inactive surface mine property along with associated highwall mining. Surface mining rights are reported as controlled on this property, the mineral is controlled through lease and the reserves are permitted. Surface mining ratios of approximately 11.0:1 are estimated within the reserve area. The Lower Freeport seam, previously addressed in the 2014 TR has since been exhausted by auger mining.

Table 15-15: Rhoads II Surface Coal Reserve Summary (Moist Recoverable Basis)

	Total Demonstrated			By Permit Status	
Type/seam	Proven	Probable	Total	Permitted	Not Permitted
Surface-mineable					
Lower Freeport	0	0	0	0	0
Upper Kittanning	96,600	0	96,600	96,600	0
Middle Kittanning	63,900	0	63,900	63,900	0
Lower Kittanning	123,600	0	123,600	123,600	0
Total	**284,100**	**0**	**284,100**	**284,100**	**0**
Highwall-mineable					
Lower Freeport	0	0	0	0	0
Upper Kittanning	21,000	0	21,000	21,000	0
Middle Kittanning	11,000	0	11,000	11,000	0
Lower Kittanning	46,800	0	46,800	46,800	0
Total	**78,800**	**0**	**78,800**	**78,800**	**0**
Grand Total					
Total	**362,900**	**0**	**362,900**	**362,900**	**0**

Note: Totals may not add due to rounding.

15.9.5 Schrock Run – Lower Freeport and Upper Kittanning Seams Reserve (*Maps 13A and B*)

Schrock Run (and the associated Extension area) is located in Somerset County, Pennsylvania within portions of the USGS Stoystown and Berlin 7.5-Minute quadrangles. This property is immediately west of the Cambria Preparation Plant. The Lower Freeport seam has been previously surface and underground mined within the project boundary of this property. Lower Freeport reserve tonnage will include some surface remining of existing underground mine workings. The Upper Kittanning seam reserves include highwall miner tons. Based on information provided by Corsa, it has been estimated that approximately 55 percent of coal production from this property could potentially enter the metallurgical coal market, with the remainder going to the steam market.

The Schrock Run property is active. Surface mining rights are reported as controlled on this property, the mineral is controlled through lease and ownership and the reserves are permitted. Surface mining ratios are 21.0: 1 within the reserve area. The non-permitted reserve is highwall miner tons. The Wills Farm Property, which is adjacent to the west of Schrock Run Extension, has been dropped since the 2014 TR. Seams previously considered as resource on Wills Farm included the Middle and Lower Kittanning's.

Table 15-16: Schrock Run Surface Coal Reserve Summary (Moist Recoverable Basis)

Type/seam	Total Demonstrated			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Surface-mineable					
Lower Freeport	279,000	0	279,000	28,000	251,000
Upper Kittanning	902,200	0	902,200	127,000	775,200
Total	1,181,200	0	1,181,200	155,000	1,026,200
Higwall-mineable					
Lower Freeport	0	0	0	0	0
Upper Kittanning	298,600	0	298,600	0	298,600
Total	298,600	0	298,600	0	298,600
Grand Total					
Total	1,479,800	0	1,479,800	155,000	1,324,800

Note: Totals may not add due to rounding.

15.9.6 Downey – Upper and Lower Freeport, Upper and Lower Kittanning Seams Reserve (*Maps 16A, B, C and D*)

Downey is in Somerset County, Pennsylvania within the USGS Central City and New Baltimore 7.5-Minute quadrangles. Based on information provided by Corsa, it has been estimated that approximately 50 percent of coal production from this property could potentially enter the metallurgical coal market, with the remainder going to the steam market. Downey is classified as an inactive surface mine property. In previous studies, the northern pit, referred to as Glade, was classified as a resource; however, in this TR, Glade is no longer considered a viable surface-mineable resource area. Surface mining ratios of approximately 17.0:1 are estimated within the Downey pit reserve area. Surface mining rights are reportedly controlled on this property, mineral control is through lease and ownership and the reserves are permitted.

Table 15-17: Downey Surface Coal Reserve Summary (Moist Recoverable Basis)

Type/seam	Total Demonstrated			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Upper Freeport	26,400	0	26,400	26,400	0
Lower Freeport	165,500	0	165,500	165,500	0
Upper Kittanning	388,100	0	388,100	388,100	0
Middle Kittanning	222,800	0	222,800	222,800	0
Total	**802,800**	**0**	**802,800**	**802,800**	**0**

Note: Totals may not add due to rounding.

15.9.7 Hart – Lower Freeport and Upper Kittanning Seams Reserve (*Maps 17A and B*)

Hart is in Somerset County, Pennsylvania within the USGS Stoystown 7.5-Minute quadrangle. Based on information provided by Corsa, it has been estimated that approximately 44% of (unoxidized) coal production from this property could potentially enter the metallurgical coal market, with the remainder (oxidized) going to the steam market. The geographic distribution of oxidized coal is not well defined across the property. Hart is classified as an idle surface mine property. Surface mining rights are reported as controlled on this property, the mineral is owned and the reserves are permitted. Surface mining ratios are approximately 10.7:1 within the reserve area.

Table 15-18: Hart Surface Coal Reserve Summary (Moist Recoverable Basis)

Type/seam	Total Demonstrated			By Permit Status	
	Proven	Probable	Total	Permitted	Not Permitted
Lower Freeport	58,200	0	58,200	58,200	0
Upper Kittanning	602,000	0	602,000	602,000	0
Total	**660,200**	**0**	**660,200**	**660,200**	**0**

Note: Totals may not add due to rounding.

15.10 Comparison of Previous and Current Estimates

Reserve tonnage estimates reported herein (as of December 31, 2017) were compared to previous estimates (from 1997 to 2016). The following are contributing factors in understanding the nature of any differences that may exist between current and previous tonnage estimates.

1. Changes in mineral control.
2. Changes in surface control.
3. Changes in mine plans.
4. Changes in market conditions.
5. Changes in permitting requirements from state and/or federal regulatory agencies
6. Updated/revised reserve parameters.
7. Depletion / sterilization of reserves associated with mining operations, or previously undefined limits of abandoned mines.
8. Limited information from which data could be extracted (digital map files, geologic models, and spreadsheets).
9. Incorporation of results from recent exploration, coal quality testing, and active mining.
10. Updated economic analysis.
11. Classification of reserves and resources according to NI 43-101 guidelines.

Item 16 Mining Methods

16.1 Introduction

The resource base for the properties consists of eight coal seams extending from the Sewickley coal seam at the top of the stratigraphic column down through the Brookville coal seam (see *Figure 7-1*). The majority of the resource tons occurs in the coal seams from the Upper Freeport to the Lower Kittanning. The topographic location of the many coal seams and the physical characteristics of the coal seams provide abundant opportunities to apply several of the coal mining methods routinely employed in Northern Appalachia.

Coal seams that outcrop along the hillside or that are located near the surface may be considered for surface mining methods including, contour and/or area removal. The surface mining methods allow recovery of resources that lie close to the surface and are not suitable for safe underground mining. Coal seams that are too thin to be underground mined economically can often be recovered successfully with surface mining methods. Contour mines advance along the coal seam outcrops with overburden back-stacked in the pit to eliminate the highwall. The proposed mine plan and financial model forecast approximately 4.2 million surface/highwall mine tons; however, only 4.1 million surface/highwall-mineable tons were determined to be economical for inclusion as reserves.

Underground reserves are mined using continuous mining room and pillar methods. Production sections are configured as single-unit sections, employing one continuous miner and one or two roof bolters per section; many are configured as continuous haulage units. The basic production design employed at the active mines was applied to projected operations where possible. The mine plan and financial model includes approximately 1.2 million underground tons in 2018, ramping up to approximately 2.7 million tons per year in 2022 and up to a maximum of 2.93 million tons in 2027.

A summary of each mine is provided in the *Appendices 2 and 3*. Mine plans and projected timing by seam are shown in *Maps 2 through 19B*. The appendix descriptions are classified by underground mines or surface mines including highwall mining. Details provided for each mine include the location, coal lease(s) mined, mine equipment configuration, personnel, distance to the plant and load-out, production schedule, capital expenditures schedule, and financial highlights.

16.2 Surface Mining Methods

There are currently two active surface mines on the property; however, Corsa has numerous idled and planned surface mines within its operational plan.

The proposed surface mines are planned to be operated by a mobile equipment spread built around Hitachi EX3600 or Komatsu PC 2000 shovels as the principal excavators. The surface mine operations are linked in the financial model by the progression of equipment spreads and crews from resource area to resource area. The configuration of this equipment spread, or fleet is projected to be maintained for the future mine projections. Surface-mining activities are projected to occur from 2017 through 2028 at annual production rates up to 724,000 tons. Equipment replacements are scheduled at appropriate times over the period for the equipment.

The Hitachi and Komatsu shovels are supported with a fleet of equipment including:

> Caterpillar 785 Rock Trucks;

> Caterpillar D11 Tractors;

> Caterpillar 140M Road Graders; and

> Other support equipment including backhoes and service trucks.

The mine model generally targeted overburden strip ratio limits of 16 to 20 bcy of overburden per ton. Higher ratios may be encountered occasionally, and the stripping ratios for each mine for each year is presented in *Appendix 3*.

Direct mining operating costs for financial model include:

Table 16-1: Direct Mining Operating Costs (Excluding Labor)

Cost Category	Cost ($/bcy)
Contract Mining and Services	$0.00
Drilling and Blasting	$0.16
Diesel Fuel and Lubes	$0.37
Repairs and Maintenance Supplies	$0.20
Other Operating Supplies	$0.01
Total	**$ 0.74**

16.3 Underground Mining Methods

16.3.1 Introduction

There are currently three active underground mines operated by Corsa: Acosta, Quecreek and Casselman. In addition to the active mines, Corsa has one idled underground mine planned to resume operations in the first quarter of 2018 (Horning). Corsa has a short-term forecast that includes four active underground mines, with the Keyser underground mine replacing Quecreek when it is depleted in 2018. Production in Acosta will be expanded to include all 3 seams mined simultaneously.

Projected annual production peaks at approximately 2.9 million clean tons. Mine plans are designed to project operating each resource area to depletion. Crews and equipment are scheduled to move to subsequent resource areas as depletion occurs.

The projected mines are assumed to operate similarly to the active mines, using the same equipment, crews, and methodology. Each mine is scheduled to operate one or two production sections, each configured as a single continuous miner section, most using continuous haulage. In all cases, mines are forecasted to produce coal two shifts each day and reserve the third shift for maintenance, as well as belt and power moves. Production is scheduled Monday through Friday each week, and alternate Saturdays for some of the crews.

All of the mines can be accessed by box cut openings or highwall exposed by surface mining operations. Pillar extraction is only assumed for Quecreek, but not any of the other current or future operations since no such plans have been approved by the appropriate regulatory agencies for those operations.

A brief description of each mine plan, financial model highlights, and the capital expenditures schedule is included in *Appendix 2*. Financial highlights for each year list production, sales price, total cash cost, total cost of operations, and profit or loss. The capital expenditures schedule detail costs for production

equipment and conveyor belt terminal groups. "Other" costs include expenditures for mine access and construction, mine extension capital, and miscellaneous costs.

16.3.2 General Mine Plan

Individual coal mines are projected with one or two production sections. The production sections are configured as single continuous miner sections. Mine ventilation system design includes 2 to 4 intake airways per section. Upon sweeping the production faces, the return air is carried away from the section in the 2 to 3 return entries. Each production section is equipped with one continuous miner. Two roof bolters are provided to install roof support on the section soon after the mine roof is exposed during production. Coal is transported from the face to the section feeder-breaker by means of continuous haulage systems or by as many as three electric shuttle cars. It is then conveyed to the surface through the section belt, followed by the main belt. Two battery-powered scoops are provided for support services on each section.

Mine conveyor belts range in width from 42 inches for section belts to 48 inches within mains and sub-mains. The mine fans are located on the surface and are arranged for blowing or exhausting ventilation.

Production and mine development timing were based upon coal seam characteristics and continuous miner cutting heights of 42 to 60 inches. Mine productivity was projected based on expected geological conditions, coal seam height, and production section configuration. Coal pillar sizes were tested using the Analysis of Retreat Mining Pillar Stability (*ARMPS*) software program developed by the **National Institute for Occupational Safety and Health (*NIOSH*)**. Because the mining heights assigned in the model are often greater than coal seam heights, roof or floor material must be mined, and the OSD affects the ultimate clean coal recovery from the coal preparation plant. Underground production is transported by trucks to a Corsa preparation plant for washing. The table below presents the in-seam wash recovery for the in-situ coal and the plant recovery reflecting the impact of OSD, along with a plant efficiency of 95%.

Table 16-2: Coal Seam Thickness and Wash Recovery

Mine	Seam Thickness (Feet)	Recovery % (In-Seam)	Recovery % (Plant)
A-Seam	6.63	55.48	47.7
Casselman	3.36	81.20	61.7
Horning	3.05	90.49	71.2
Quecreek	3.89	77.27	69.5
Acosta (UK)	3.39	78.63	59.9
Acosta (MK)	3.03	63.20	47.8
Acosta (LK)	3.60	65.67	52.3
Keyser (LK)	4.43	73.44	60.0

Direct mining cost inputs to the financial model are supported by schedules for labor, roof support, maintenance and repairs, supplies, indirect mining costs, and sales variable costs, including royalties

and state coal severance taxes. Coal transportation costs are based upon unit costs for coal truck haulage and the distance to the preparation plant. Productivity rates are based on historical information provided by Corsa, and in some cases, were adjusted to reflect uncertainty around possible future mining conditions.

Table 16-3: Mine Productivity and Selected Mine Costs*

Mine	Productivity (feet/unit-shift)	Roof Support ($ per ft.)	Mine Supplies ($ per ft.)	M&R ($ per raw ton)
A-Seam	180	$22.00	$17.71	$2.15
Horning	140	$11.00	$17.71	$2.15
Quecreek	117	$11.50	$20.44	$2.44
Casselman	250	$8.21 to $11.00	$8.47	$2.01
Keyser (LK)	180	$11.00	$17.71	$2.15
Acosta (UK)	250	$11.00	$17.71	$2.15
Acosta (MK)	250	$11.00	$17.71	$2.15
Acosta (LK)	250	$11.00	$17.71	$2.15

* Acosta (MK), Casselman and Quecreek mines are active and actual costs as shown were used for these operations. Casselman roof control costs were based on $8.21 per ft. historic levels through 2018, and then increased to $11.00 per ft. thereafter due to potential for difficult roof conditions in the future (see *Item 15.8.2*). All other mines include projected costs based on anticipated conditions.

Item 17 Recovery Methods

17.1 Materials Handling and Coal Preparation

17.1.1 Raw Coal Transport

Raw coal produced from the mine is currently delivered by truck to the Cambria and Shade coal preparation facilities. In addition to the Cambria and Shade plants, Corsa has the Rockwood plant on care-and-maintenance status which can be reactivated in the future when production level exceeds the capacity at the Cambria and Shade plants.

Some raw coal produced from the mine is shipped directly to the customer on a raw basis or blended with processed or purchased coal, depending on coal quality and specific customer requirements. Corsa preparation facilities have raw coal handling systems consisting of a rotary breaker and screen used to remove large rock and size raw coal. Raw coal is then shipping on a raw basis or blended with washed coals from the preparation plant.

Raw coal to be processed is stockpiled, then loaded by a wheel-loader into a hopper for conveyor transport into the coal preparation plant.

Raw stockpile capacity includes approximately 70,000 tons of raw coal ground storage at the Shade Creek plant and 60,000 tons of raw coal ground storage at the Cambria plant.

17.1.2 Coal Preparation

Corsa currently operates two preparation plants, the Cambria Preparation Plant and the Shade Preparation Plant.

The Cambria Preparation Plant is designed for 400-tons per hour (*tph*) raw coal feed. It was relocated from its original site in 2009 incorporating design upgrades at that time. Raw coal at the Cambria plant is crushed screened to provide sized material to each of the following process circuits.

Table 17-1: Summary of Sized material and Cleaning Circuits – Cambria Preparation Plant

Fraction	Size	Feed %	Circuit
Coarse	2 in x 1 mm	70.0	Heavy Media Cyclone
Fine	1 mm x 100 mesh	20.0	Water-only Cyclone/Spirals
Ultra-fine	100 mesh x 0	10.0	Column Flotation & SCI Solid Bowl

The Cambria complex has the capacity to store 120,000 tons of clean coal. The plant is serviced by CSX and has a unit-train loading capacity of 2,000 tph and can load a 130-car unit train. The power requirement for the Cambria plant as currently configured averages approximately 5,500 kilovolt-ampere (*kVA*). Water consumption at the plant averages approximately 100 gallons per minute (*gpm*).

The Shade Creek Preparation Plant is designed for 500 tph raw coal feed. Currently the plant is used primarily for toll washing of 3rd party coal, in addition to processing Corsa production which is shipped on NS.

The Shade plant was updated in 2008 with improvements including: increase in heavy media cyclone clean coal and reject drain and rinse screen capacity, addition of the Teeter Bed Separator circuit, the addition of the column flotation circuit, increase in fine clean coal centrifuge capacity, and addition of a high capacity thickener. Raw coal is crushed and screened to provide sized material to each of the following process circuits.

Table 17-2: Summary of Sized material and Cleaning Circuits – Shade Creek Preparation Plant

Fraction	Size	Feed %	Circuit
Coarse	3 in x 3/8 in.	10.0	Heavy Media Vessel
Intermediate	3/8 in x 1 mm	60.0	Heavy Media Cyclone
Fine	1 mm x 100 mesh	20.0	Teeter Bed Separator
Ultra-fine	100 mesh x 0	10.0	Column Flotation

The Shade Creek complex has the capacity to store 120,000 tons of clean coal, including 10,000-ton storage building and a 5,000-ton capacity silo. The plant is serviced by the NS, with a unit-train loading capacity of 2,000 tph and can load a 100-car unit train. The power requirement for the Shade plant, as currently configured, averages approximately 6,500 kVA. Water consumption at the plant averages approximately 160 gpm.

Clean coal and refuse products are dewatered with vibratory screens, sieve screens, and centrifugal dryers. The thickener underflow is concentrated by belt presses and is transported to the combined refuse disposal facility by off-road trucks. Coarse coal refuse is trucked from the plant to the combined refuse disposal facility.

The Rockwood plant was acquired from Wilson Creek Energy. This plant is a heavy-media type plant with a rated capacity of 400 tph, with three primary circuits.

Table 17-3: Summary of Sized material and Cleaning Circuits – Rockwood Preparation Plant

Fraction	Size	Feed %	Circuit
Coarse	2 in x 1 mm	70.0	Heavy Media Cyclone
Fine	1 mm x 100 mesh	20.0	Spirals
Ultra-fine	100 mesh x 0	10.0	Column Flotation

The Rockwood plant currently has the capacity to store 24,000 tons of clean coal, with a permitted area for expansion. The plant is connected to high voltage power through four transformers that total 5,000 kVA. Make-up water consumption is estimated at 85 to 90 gpm.

Historical data indicates that in previous years, the Cambria preparation plant processed in excess of 1.5 million raw tons of coal with an average annual plant recovery of over 62%, while the Shade Creek preparation plant processed over 2.6 million tons with an average recovery of 68%. Given this range of plant recoveries, the projected plant recoveries in *Table 16-2* appear reasonable and achievable for future production from the Corsa properties, and Corsa has the preparation plant capacity to achieve the production levels projected by MM&A's plan. In addition, Corsa has existing loadouts on both the NS and CSX rail lines, giving it access to a wide range of markets and customers.

Item 18 Project Infrastructure

Existing project infrastructure includes: two operating preparation plant facilities operated by Corsa, including raw and clean coal storage, unit-train rail load-out, and refuse disposal; one idle preparation plant on care and maintenance (Rockwood); three active underground mines and associated surface support facilities, one idle underground mine and associated support facilities, two active surface mines. Coal can be shipped to various customers via rail through both the CSX (Cambria or Rockwood) and Norfolk Southern (Shade) rail network.

Item 19 Market Studies and Contracts

Metallurgical coal price information was provided by Corsa, and assessed for reasonableness by MM&A for use in the financial model. Thermal coal price data was provided to MM&A by its associate, **Commonwealth Coal Marketing, Inc. (*Commonwealth*)** for use in the financial model. Coal produced

from the properties from Corsa's mines is projected to be sold into the domestic and international metallurgical markets and domestic thermal market. For metallurgical coal, pricing penalties were applied to each respective coal seam in accordance with their dry sulfur contents. A $3.00-penalty per saleable ton was assumed for each one-tenth percentage of sulfur above 1.0-percent. Thermal prices were adjusted to reflect a premium or penalty for higher or lower BTU coals. Sales price assumptions used in the economic analysis presented in *Item 22*.

Corsa is a reliable supplier of high quality thermal coal and metallurgical coal to the Mid-Atlantic region and metallurgical coal to international customers in Asia, Europe and South America, via export terminals in Baltimore, Maryland.

Item 20 Environmental Studies, Permitting and Social or Community Impact

20.1 Environmental Studies

MM&A is not aware of any recent environmental study conducted on the properties. Corsa reports not having conducted such a study since 1998. In 2008, as part of the report *Independent Technical Report Coal Reserves and Mining Operations, PBS Coals, Inc.,* Boyd reports that a limited investigation utilizing federal, state and local agencies did not identify environmental hindrances preventing future development of the properties, however investigations do not extend indefinitely and should be conducted on a regular basis. MM&A recommends at minimum Corsa conduct a Limited Phase I Environmental Site Assessment (*ESA*) of the operations associated with the properties. The assessment should include a site inspection, review of historical records, a database search of State and Federal regulatory records and interviews to identify potential recognized environmental conditions (*RECs*) that may create environmental liability for the sites.

Based on data provided by Corsa and reviewed by MM&A, it is MM&A's opinion that PBS has a generally typical coal industry record of compliance with applicable mining, water quality, and environmental laws.

20.2 Permitting and Social or Community Impacts

All mining operations are subject to federal and state laws and must obtain permits to operate underground and surface mines, coal preparation and related facilities, haul roads, and other incidental surface disturbances necessary for mining to occur. Permits generally require that the permittee post a performance bond in an amount established by the regulatory program to provide assurance that any disturbance or liability created during mining operations is properly restored to an approved post-mining land use and that all regulations and requirements of the permits are fully satisfied before the bond is returned to the permittee. Significant penalties exist for any permittee who fails to meet the

obligations of the permits including cessation of mining operations, which can lead to potential forfeiture of the bond. Any company, and its directors, owners and officers, which are subject to bond forfeiture can be denied future permits under the program.[6]

New permits or permit revisions will occasionally be necessary to facilitate the expansion or addition of new mining areas on the properties, such as amendments to existing permits and new permits for mining of reserve areas. Exploration permits also are required. Property under lease includes provisions for exploration among the terms of the lease. New or modified mining permits are subject to a public advertisement process and comment period, and the public is provided an opportunity to raise objections to any proposed mining operation. MM&A is not aware of any specific prohibition of mining on the subject property and given sufficient time and planning, Corsa should be able to secure new permits to maintain its planned mining operations within the context of current regulations. Necessary permits are in place to support current production on the properties, but future permits are required to maintain and expand production.

Recent EPA intervention in the surface mine permitting process has resulted in lengthy delays in issuance of Section 401, 402 and 404 permits required under the Clean Water Act. However, Corsa's ability to operate without the need for valley fills has minimized the impact of such delays in their permitting efforts. Residential and public concerns such as blasting, view shed, or transportation are not expected to prevent the issuance of future permits.

Portions of the properties are located near local communities. Regulations prohibit mining activities within 300 feet of a residential dwelling, school, church, or similar structure unless written consent is first obtained from the owner of the structure. Where required, such consents have been obtained where mining is proposed beyond the regulatory limits.

20.3 Mine Closure and Reclamation

Applicable regulations require that mines be properly closed and reclamation commenced immediately upon abandonment. In general, site reclamation includes removal of structures, backfilling, regrading, and revegetation of disturbed areas. For surface mines, the majority of the expense for backfilling and regrading is completed as part of ongoing mining operations, with only reclamation of final pits required at end-of-mine life. Sediment control is required during the establishment of vegetation, and bond release generally requires a minimum five-year period of site maintenance, water sampling, and sediment control following mine completion. This requirement is reduced to two years for certain operations involving re-mining. Reclamation of underground mines includes closure and sealing of mine openings such as portals and shafts in addition to the items listed above.

Federal and State law states that reclamation bonds cannot be released for mining sites where long-term water treatment is necessary. Water treatment issues, which have been identified on the

[6] Monitored under the Applicant Violator System (AVS) by the Federal Office of Surface Mining.

properties, could result in long-term financial obligations. Sites with perpetual water treatment requirements have been identified by regulatory agencies, and trust funds have been, or are currently being implemented to insure money is available to operate these sites in perpetuity. Long-term water treatment liabilities exist for 17 of the PBS properties. These liabilities are covered under two separate COAs between PBS and the DEP. Under these COAs, two trust funds designed to cover operating and capital expenses associated with the treatment of the 13 perpetual water treatment sites were established. The first, dated March 17, 1999 for the Clear Run watershed Permits (#s 56813006, 56840107, 56920112 and 56663112) is currently fully funded at approximately $3.8 million.

The second fund, The Global Treatment Trust under the COA dated March 22, 2012 covers 12 properties:

Table 20-1: Permits Included in Global Treatment Trust

Property	Permit #
Acosta Mine	56960107
Cambria Fuels Refuse Area	56773707
Garrett	4074AM28
Goodtown Prep Plant	56841605
Job 21	40A77AM12
Job 10 Refuse Area	56910701
Jolin Strip	no longer exists
Magnetto	3366BSM2
Roberts	56813104
Job 12 Expansion	56900701
Cambria Refuse (Job 93)	56950702
Barbara B	56851303

The Global Trust was established on March 30, 2012 with a $1.00 million payment, and PBS has continued to deposit funds into the account each year. The trust agreement was renegotiated in 2016 to include two additional surface mines: Trent Mine and Acosta 2 Mine. As of the effective date of this report, the fund balance amounted to $17.6 million. Under the amended agreement, PBS is required to deposit a total of approximately $3.1 million through 2019.

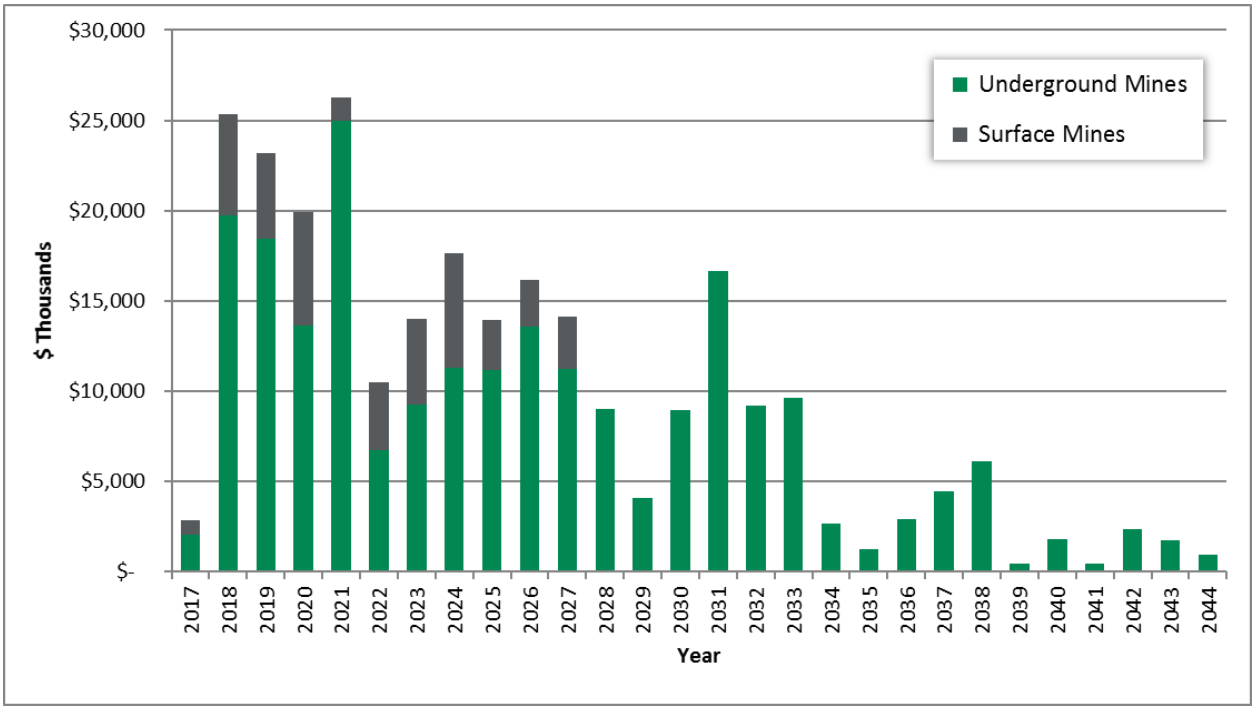
Item 21 Capital and Operating Costs

Capital expenditures total $108.0 million during the first five years (through 2022) and $266.6 million over the project's life. Underground mine capital is projected by mine and includes the purchase and rebuilds of major equipment such as continuous miners, roof bolters, continuous haulage systems, and shuttle cars, as well as construction and development capital. Surface mine capital is projected for equipment owned by Corsa, which move to the various reserve areas, including the Hitachi EX3600 excavator. Surface mine capital also includes the related dozers, overburden haulers, and coal haulers,

as well as the necessary support equipment. Projected capital also includes the necessary replacement expenditures in subsequent years.

Capital expenditures are detailed in tabular form in *Appendices 2 and 3* and summarized in the chart below:

Figure 21-1: Consolidated Annual Capital Expenditures

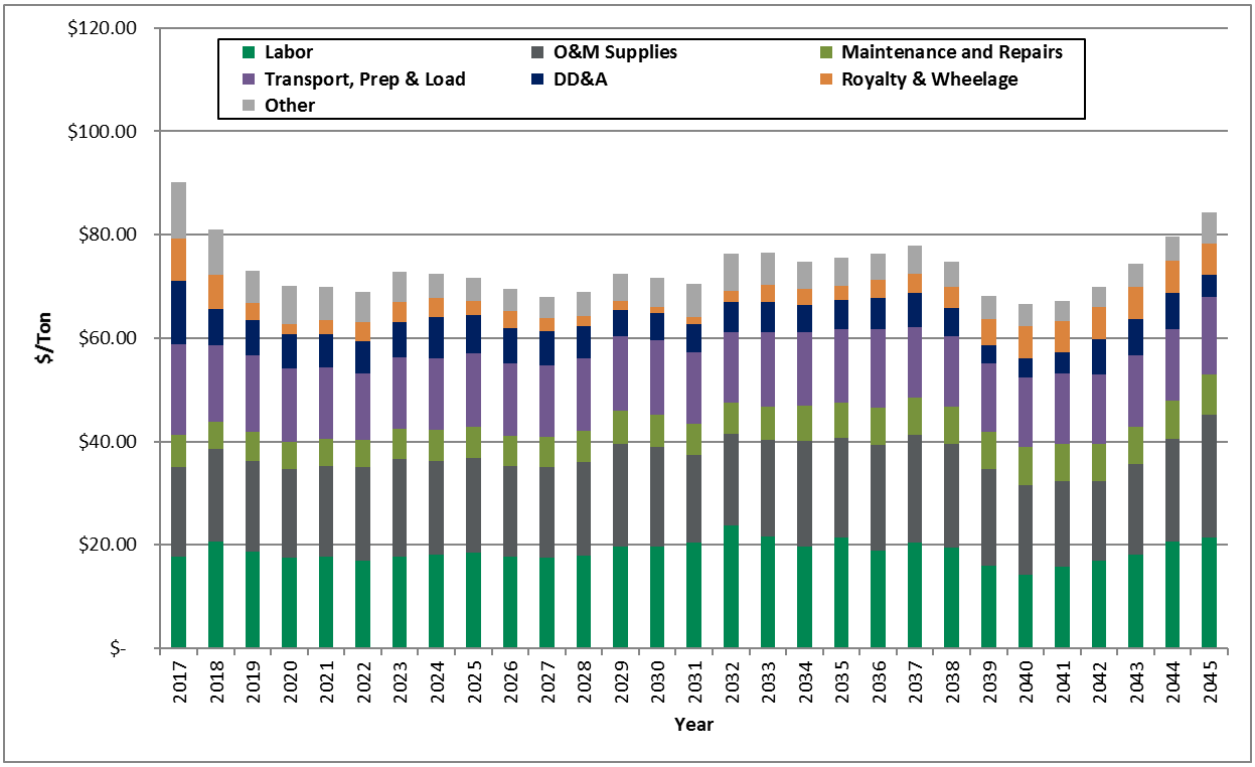


Note: Results shown for 2017 are for fourth quarter only.

Operating costs are projected for each mine, taking into account projected annual tonnage, overburden moved, and feet of advance, as appropriate. Operating cost projections are based on MM&A estimates of staffing, wage and salary levels, employee benefits, operating and maintenance (*O&M*), and supply costs per yard of overburden, per foot of advance, and per ton produced or processed. Key operating cost assumptions are provided in *Tables 16-1 and 16-3*, and a summary of the operating costs for each proposed mine is provided in *Appendices 2 and 3*.

A breakdown of the projected total costs per ton before interest expense is shown in the chart below for the consolidated entity.

Figure 21-2: Operating Costs (Total Costs per Ton Excluding Interest)



Note: Results shown for 2017 are for fourth quarter only.

Item 22 Economic Analysis

22.1 Economic Evaluation

22.1.1 Introduction

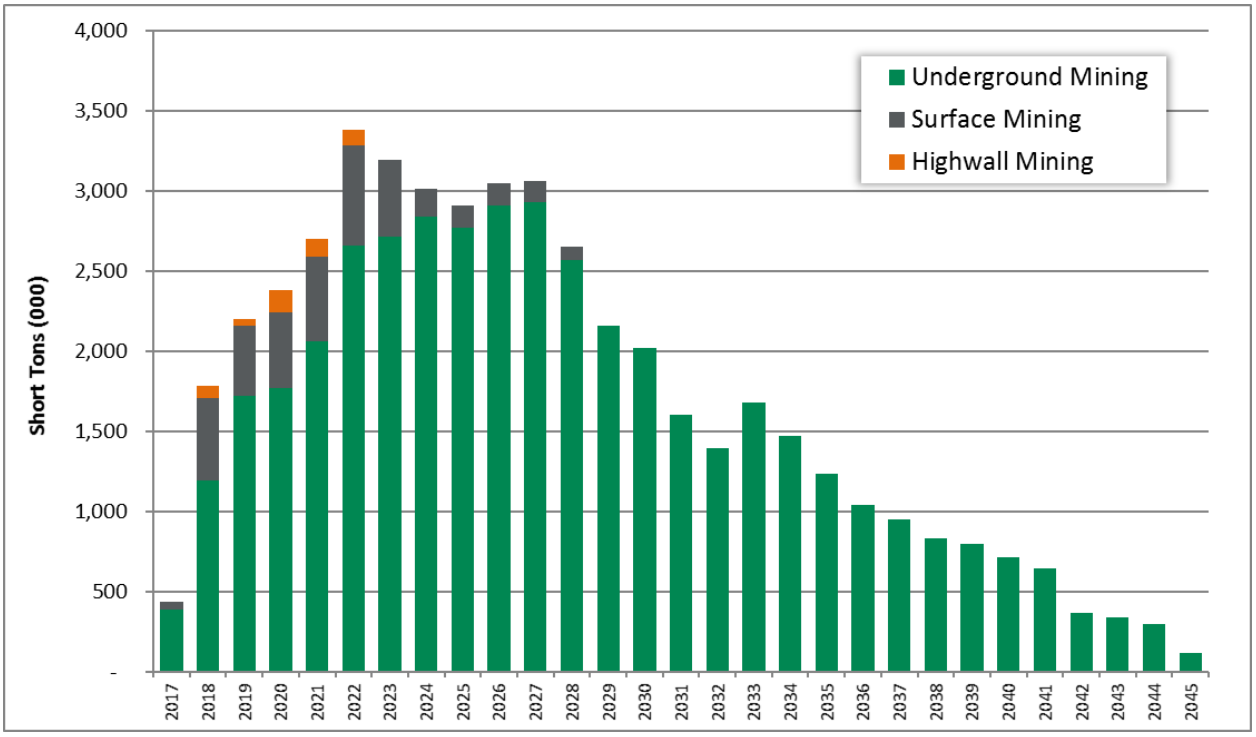
The pre-feasibility financial model prepared for this TR was developed to test the economic viability of each coal resource area. The results of this financial model are not intended to represent a bankable feasibility study, required for financing of any current or future mining operations contemplated for the Corsa properties, but are intended to establish the economic viability of the estimated coal reserves. Cash flows are simulated on an annual basis based on projected production from the coal reserves. The discounted cash flow analysis presented herein is based on an effective date of December 31, 2017.

On an un-levered basis, the NPV of the project cash flow after taxes represents the Enterprise Value of the project. The project cash flow, excluding debt service, is calculated by subtracting direct and indirect operating expenses and capital expenditures from revenue. Direct costs include labor, drilling and blasting, operating supplies, maintenance and repairs, facilities costs for materials handling, coal preparation, refuse disposal, coal loading, sampling and analysis services, reclamation and general and administrative costs. Indirect costs include statutory and legally agreed upon fees related to direct extraction of the mineral. The indirect costs are the Federal black lung tax, Federal and State

reclamation taxes, property taxes, coal production royalties, and income taxes. The Corsa mines' historical costs provided a useful reference for MM&A's cost estimates.

The operations are projected on a calendar year basis. MM&A's projection of annual sales tonnage is summarized in the chart below. While all Corsa coal resources properties deemed by MM&A to have potential for classification as coal reserves were evaluated as part of the economic model, some of those resource areas were determined to be uneconomical in the current market and were therefore excluded from coal reserves as discussed below.

Figure 22-1: Projection of Sales Tons



Note: Results shown for 2017 are for fourth quarter only.

Sales revenue is based on the metallurgical coal price information provided to MM&A by Corsa along with thermal coal pricing data provided to MM&A by Commonwealth. Corsa washes coal under toll washing agreements and also purchases coal for resale; however, only the revenue from Corsa's captive mining operations is included in the financial model used for this TR.

The P&L projections of the individual mines of Corsa are then aggregated by mining method and ultimately consolidated into a P&L and cash flow schedule for further testing of the economics. Projected debt service is excluded from the P&L and cash flow model in order to determine Enterprise Value of the aggregated entity.

The financial model expresses coal sales prices, operating costs, and capital expenditures in current day dollars without adjustment for inflation. Capital expenditures and reclamation costs are included based

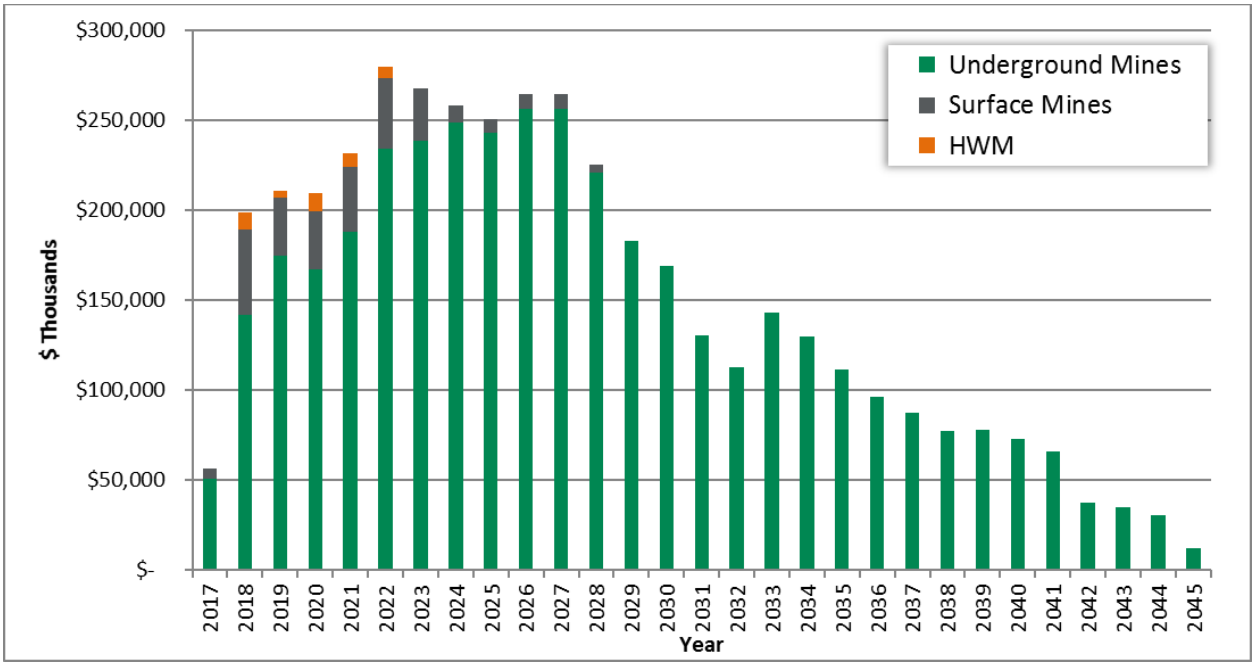
on engineering estimates for each mine by year. The Corsa NAPP Division's existing allocations of administrative costs are continued in the future projections.

Corsa will pay royalties for the various current and projected operations. The royalty rates vary by mining method and location. The royalty rates vary between 6-15% of the sales revenue for both the underground and surface mines.

The projection model also includes consolidated income tax calculations at the Corsa level, incorporating statutory depletion calculations, as well as state income taxes, and a federal tax rate of either 20% or 35%, depending on whether the alternative minimum tax applies. To the extent the Corsa mines generate net operating losses for tax purposes, the losses are carried over to offset future taxable income from Corsa mines. The terms "cash flows" and "project cash flows" used in this report refer to after tax cash flows.

Corsa's projected consolidated annual revenue, broken down by mining method is shown in the chart below:

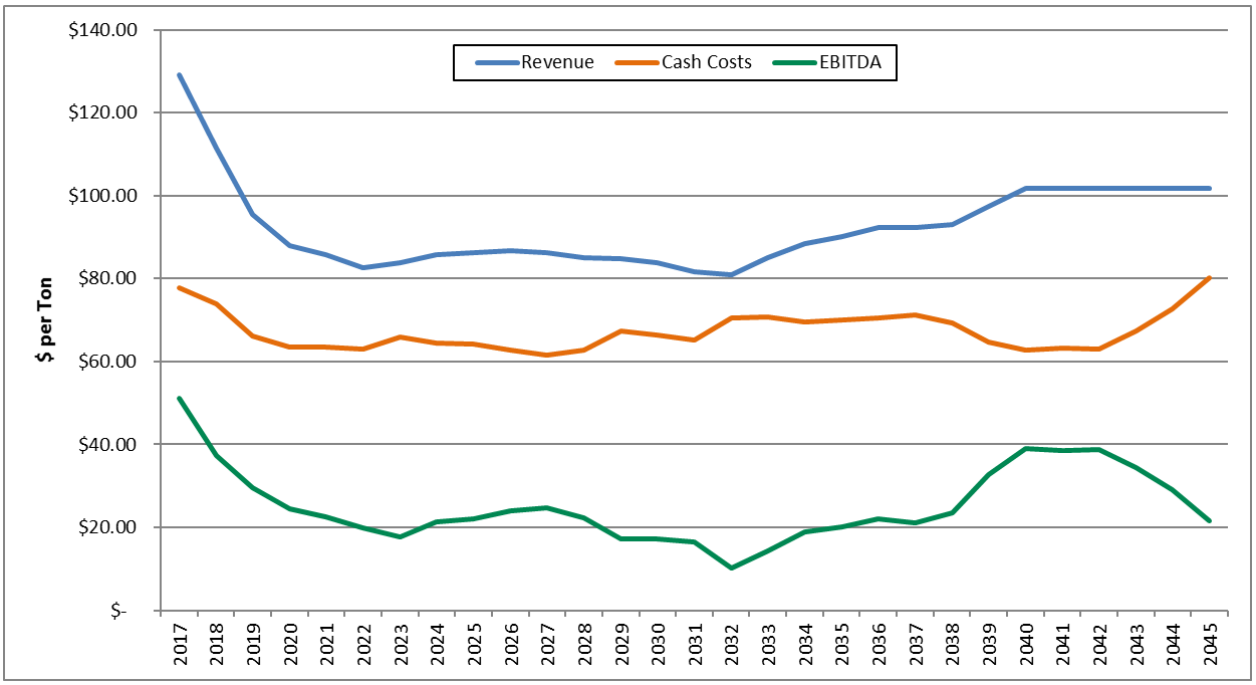
Figure 22-2: Consolidated Annual Revenue



Note: Results shown for 2017 are for fourth quarter only.

Corsa projected consolidated revenue, cash costs, and EBITDA, are expressed in dollars per ton in the graph below.

Figure 22-3: Revenue, Cash Costs, and EBITDA



Note: Results shown for 2017 are for fourth quarter only.

The above chart shows 2018 revenue of $111.31 per ton, cash costs of $74.00 per ton and EBITDA of $37.31 per ton. Margins vary thereafter due to changes in overburden ratios, coal processing recovery rates, and the mix of tons from surface and underground mining methods. Beginning in 2029, all tonnage for the remainder of the project period results from the underground mines and positive EBITDA per ton ranges from approximately $10.29 per ton to $38.92 per ton through 2045. A P&L and EBITDA Summary is shown in *Table 22-1* below.

Table 22-1 shows LOM tonnage, P&L, and EBITDA for each Corsa mine.

Table 22-1: Life-of-Mine Tonnage, P&L before Tax, and EBITDA

Underground Mines	Life of Mine Tonnage (000)	Life of Mine Pre-Tax P&L (000)	P&L Per Ton	Life of Mine EBITDA (000)	EBITDA Per Ton
A Seam	6,461	$183,326	$28.37	$218,187	$33.77
Horning D	2,214	$23,661	$10.69	$47,491	$21.45
QueCreek C	206	$2,265	$11.01	$4,121	$20.03
Casselman	6,634	$221,521	$33.39	$253,582	$38.23
Keyser LK	8,239	$140,762	$17.08	$201,059	$24.40
Acosta UK	8,714	$98,460	$11.30	$141,795	$16.27
Acosta LK	5,484	$511	$0.09	$34,662	$6.32
Acosta MK	6,196	$90,448	$14.60	$116,683	$18.83
Consolidated Deep Mines	**44,149**	**$760,953**	**$17.24**	**$1,017,581**	**$23.05**

	Life of Mine Tonnage (000)	Life of Mine Pre-Tax P&L (000)	P&L Per Ton	Life of Mine EBITDA (000)	EBITDA Per Ton
Surface Mines					
Basset*	83	-$2,660	($32.05)	-$1,856	($22.37)
Blue Lick	296	-$1,193	($4.02)	$2,126	$7.18
Gaz	384	$5,031	$13.10	$7,895	$20.56
Downey	803	-$13,404	($16.70)	$8,016	$9.99
Hart	660	$12,074	$18.29	$16,560	$25.08
Rhoades	284	$6,092	$21.45	$7,916	$27.87
Schrock Run	1,189	$20,607	$17.33	$32,226	$27.10
Hamer	68	-$531	($7.76)	$2,113	$30.88
Consolidated Surface Mines	**3,768**	**$26,018**	**$6.90**	**$74,997**	**$19.90**
HWM Operations					
Gaz HWM	48	$259	$5.42	$312	$6.52
Rhoades HWM	79	$899	$11.41	$986	$12.52
Schrock Run HWM	299	$3,876	$12.98	$4,206	$14.09
Hamer HWM	48	$2,536	$53.18	$2,557	$53.63
Consolidated HWMs	**473**	**$7,570**	**$16.01**	**$8,062**	**$17.05**
Grand Total	**48,391**	**$794,541**	**$16.42**	**$1,100,640**	**$22.74**

Note: *This resource area failed to achieve positive EBITDA in the economic evaluation. Therefore, the coal tons forecasted from this mine have been excluded from the estimate of coal reserves in this TR.

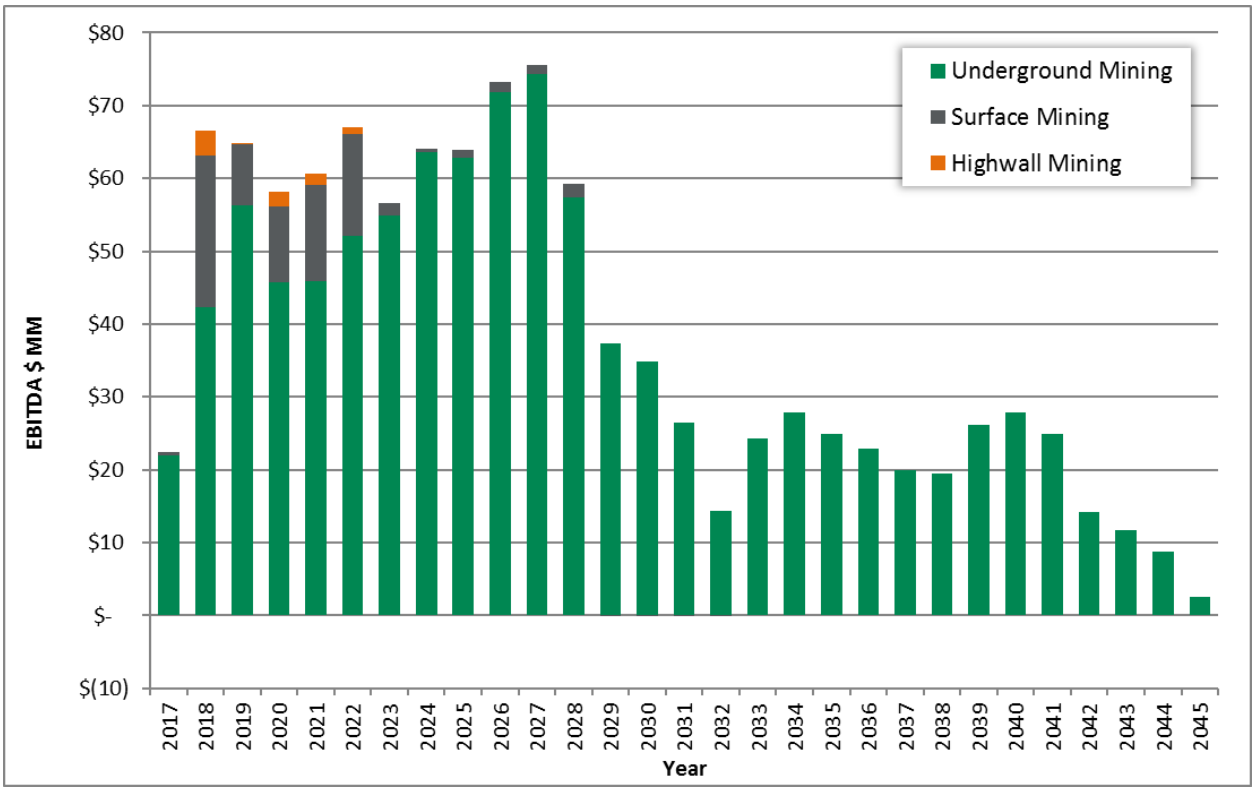
**LOM tonnage evaluated in the financial model includes 83,000 tons for Basset surface mine, which failed to achieve positive economic results, as well as 4th quarter 2017 production (207,000 clean tons) which was subtracted from coal reserves in order to make the effective date of reserves December 31, 2017.

As shown in *Table 22-1,* all of the underground mines show positive EBITDA over the LOM. Regarding the surface mines, all of the mines analyzed show positive EBITDA over the LOM with the exception of Basset. A major factor contributing to the net loss of the Basset mine, which does not exhibit positive EBITDA, is the large reclamation accrual due to the very short life of this mine. Overall, Corsa consolidated shows positive LOM P&L and EBITDA of $0.8 billion and $1.1 billion, respectively.

Based on the negative EBITDA as shown in the results summarized above, the Basset surface mine resource area has been excluded from the estimate of coal reserves. The negative financial results for this area is included in the consolidated results presented herein.

A breakdown of projected EBITDA by mining method is shown in the chart below:

Figure 22-4: Annual EBITDA



Note: Results shown for 2017 are for fourth quarter only.

22.1.2 Cash Flow Summary

PBS's Consolidated Cash Flow Summary in constant dollars, excluding debt service, is shown in *Table 22-2* below.

Table 22-2: Project Cash Flow Summary (000)

	Total	YE 12/31 2017	YE 12/31 2018	YE 12/31 2019	YE 12/31 2020	YE 12/31 2021	YE 12/31 2022
Production & Sales tons	48,391	437	1,782	2,202	2,380	2,698	3,380
Total Revenue	$4,285,885	$56,399	$198,326	$210,362	$209,343	$231,618	$279,647
EBITDA	$1,100,640	$22,358	$66,484	$64,874	$58,113	$60,631	$67,040
Net Income	$605,242	$14,106	$40,172	$37,777	$33,135	$33,136	$34,937
Net Cash Provided by Operating Activities	$921,081	$29,387	$44,980	$53,202	$49,579	$50,614	$54,667
Purchases of Property, Plant, and Equipment	($266,606)	($2,864)	($25,321)	($23,154)	($19,917)	($26,279)	($10,477)
Net Cash Flow	$654,475	$26,523	$19,659	$30,048	$29,662	$24,335	$44,190
	YE 12/31 2023	YE 12/31 2024	YE 12/31 2025	YE 12/31 2026	YE 12/31 2027	YE 12/31 2028	YE 12/31 2029
Production & Sales tons	3,191	3,009	2,907	3,047	3,062	2,648	2,157
Total Revenue	$267,221	$258,312	$250,639	$264,230	$264,078	$225,380	$182,761
EBITDA	$56,660	$64,042	$63,938	$73,244	$75,563	$59,269	$37,226
Net Income	$25,339	$30,638	$32,124	$39,253	$41,164	$33,052	$20,900
Net Cash Provided by Operating Activities	$51,023	$51,260	$53,369	$58,678	$61,011	$50,877	$34,085
Purchases of Property, Plant, and Equipment	($14,006)	($17,627)	($13,960)	($16,167)	($14,125)	($9,001)	($4,065)
Net Cash Flow	$37,017	$33,632	$39,409	$42,510	$46,886	$41,875	$30,021

	YE 12/31 2030	YE 12/31 2031	YE 12/31 2032	YE 12/31 2033	YE 12/31 2034	YE 12/31 2035	YE 12/31 2036
Production & Sales tons	2,017	1,600	1,392	1,680	1,469	1,232	1,042
Total Revenue	$168,857	$130,551	$112,638	$142,954	$129,900	$111,116	$96,340
EBITDA	$34,862	$26,404	$14,330	$24,266	$27,854	$24,856	$22,965
Net Income	$19,205	$14,372	$5,790	$11,534	$15,782	$14,049	$13,084
Net Cash Provided by Operating Activities	$30,104	$24,648	$15,497	$19,065	$23,244	$21,519	$19,794
Purchases of Property, Plant, and Equipment	($8,983)	($16,655)	($9,211)	($9,657)	($2,684)	($1,260)	($2,897)
Net Cash Flow	$21,121	$7,993	$6,286	$9,408	$20,560	$20,259	$16,898
	YE 12/31 2037	YE 12/31 2038	YE 12/31 2039	YE 12/31 2040	YE 12/31 2041	YE 12/31 2042	YE 12/31 2043
Production & Sales tons	946	828	798	716	647	367	341
Total Revenue	$87,381	$77,037	$77,744	$72,879	$65,804	$37,329	$34,656
EBITDA	$19,980	$19,532	$26,147	$27,866	$24,916	$14,243	$11,754
Net Income	$10,907	$12,037	$17,405	$17,942	$15,700	$8,245	$6,727
Net Cash Provided by Operating Activities	$16,795	$16,538	$19,519	$20,595	$18,844	$12,869	$9,630
Purchases of Property, Plant, and Equipment	($4,479)	($6,133)	($450)	($1,791)	($450)	($2,341)	($1,734)
Net Cash Flow	$12,317	$10,405	$19,069	$18,805	$18,394	$10,528	$7,897
	YE 12/31 2044	YE 12/31 2045	YE 12/31 2046	YE 12/31 2047	YE 12/31 2048	YE 12/31 2049	YE 12/31 2050
Production & Sales tons	299	117	0	0	0	0	0
Total Revenue	$30,476	$11,909	$0	$0	$0	$0	$0
EBITDA	$8,700	$2,537	($8)	($4)	($2)	($1)	($0)
Net Income	$4,938	$1,810	($8)	($4)	($2)	($1)	($0)
Net Cash Provided by Operating Activities	$7,600	$4,071	($1,181)	($399)	($199)	($109)	($96)
Purchases of Property, Plant, and Equipment	($916)	$0	$0	$0	$0	$0	$0
Net Cash Flow	$6,683	$4,071	($1,181)	($399)	($199)	($109)	($96)

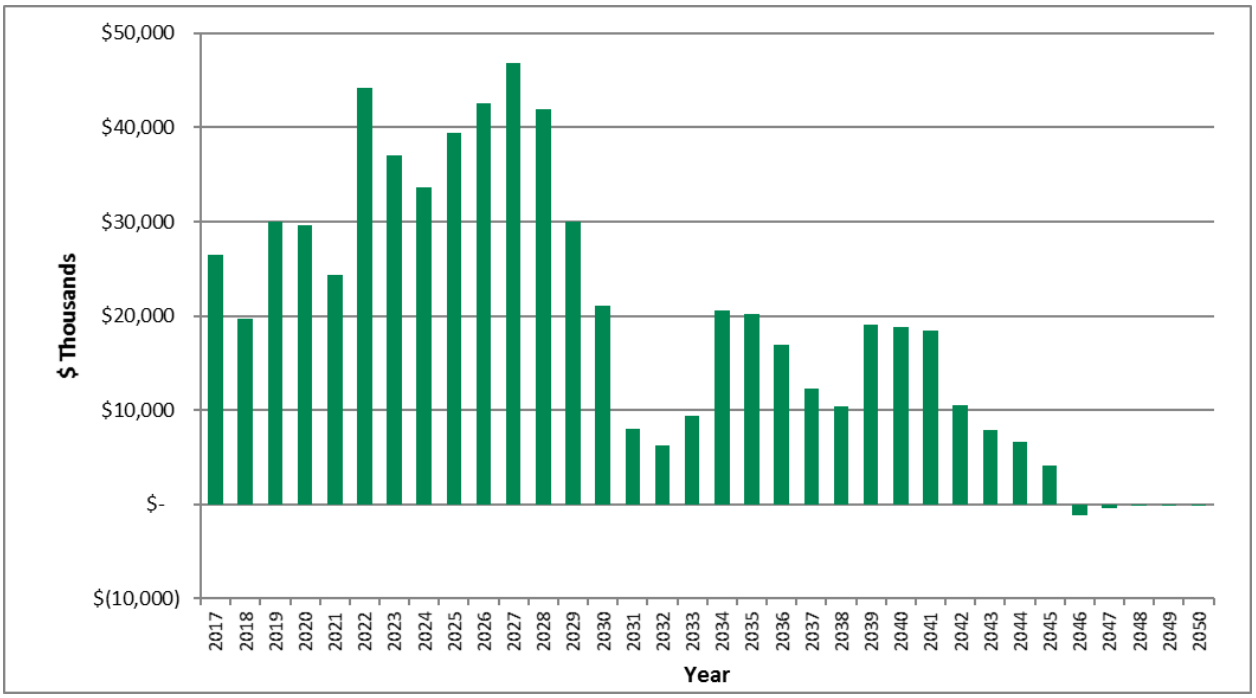
Note: Results shown for 2017 are for fourth quarter only. LOM tonnage evaluated in the financial model includes 83,000 tons for Basset surface mine, which failed to achieve positive economic results, as well as 4th quarter 2017 production (207,000 clean tons) which was subtracted from coal reserves in order to make the effective date of reserves December 31, 2017.

Consolidated cash flows are driven by annual sales tonnage, which grows from 1.8 million tons in 2018 to a peak of 3.4 million tons in 2022. Between years 2023 and 2033, sales ranges from 1.7 million to 3.2 million tons and between years 2034-2045, sales range from 0.1 million tons to 1.5 million tons. Projected consolidated revenue grows from $198.3 million in 2018 to a peak of $279.6 million in 2022. Revenue totals $4.3 billion for the project's life.

Consolidated cash flow from operations is positive throughout the projected operating period, with the exception of post-production years, due to end-of-mine reclamation spending. Consolidated cash flow from operations peaks at $61.0 million in 2027 and totals $0.92 billion over the project life. Capital expenditures total $108.0 million during the first five years and $266.6 million over the project's life. Payments to the water treatment trust fund total approximately $3.1 million through 2019.

Consolidated net cash flow after tax, but before debt service, is shown by year in the chart below:

Figure 22-5: Net Cash Flow after Tax (Before Debt Service)



Note: Results shown for 2017 are for fourth quarter only.

LOM Net cash flow is positive for this project. The cash flows in years 2046-2050 are end of mine reclamation expenditures, which are accrued over the life of the mines.

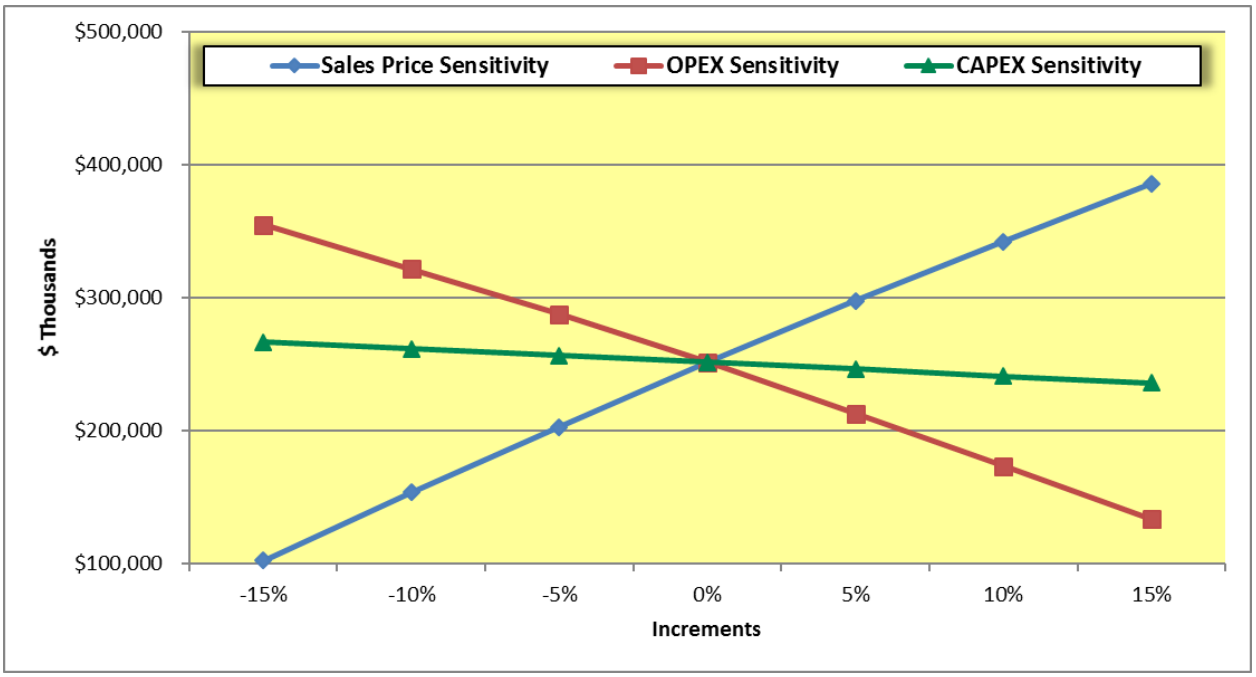
22.1.3 Discounted Cash Flow Analysis

Cash flow after tax, but before debt service, generated over the life of the project was discounted to NPV at a 13.21% discount rate, which represents MM&A's estimate of the constant dollar, risk adjusted WACC for likely market participants if the subject reserves were offered for sale. On an un-levered basis, the NPV of the project cash flows represents the Enterprise Value of the project, and amounts to $251.6 million. Corsa is an active producer and the financial model shows positive net cash flow for each year of the operating life of the reserves. Therefore, internal rate-of-return (*IRR*) and project payback were not calculated as there was no initial investment considered in the financial model. The pre-feasibility financial model prepared for the TR was developed to test the economic viability of each coal resource area. The NPV estimate was made for purposes of confirming the economics for classification of coal reserves and not for purposes of valuing Corsa or its assets. Mine plans were not optimized and actual results of the operations may be different, but in all cases, the mine production plan assumes the properties are under competent management.

22.1.4 Sensitivity Analysis

Sensitivity of the NPV results to changes in the key drivers is presented in the chart below. The sensitivity study shows the NPV at the 13.21% discount rate when Base Case sales prices, operating costs, and capital costs are increased and decreased in increments of 5% within a +/- 15% range.

Figure 22-6: Sensitivity of NPV



As shown, NPV is quite sensitive to change in sales price and operating cost estimates, and slightly sensitive to changes in capital cost estimates.

Item 23 Adjacent Properties

Information for the adjacent properties was not included in the evaluation, unless provided by Corsa. Furthermore, the TR does not include any estimates of coal resources or coal reserves associated with the adjacent properties.

Item 24 Other Relevant Data and Information

Independent verification of leases, deeds, surveys, or property-control instruments pertinent to the subject coal resources and coal reserves was beyond the scope of work for this TR. Corsa has represented to MM&A that it controls mining rights to the properties as shown on its property maps, and MM&A has accepted these as being a true and accurate depiction of such rights.

Economic viability of the coal reserves is based on a preliminary feasibility study prepared by MM&A (discussed in *Item 22*). Mine projections were prepared for each reserve area and mining costs and production were forecasted based upon productivity assumptions determined to be reasonable by MM&A. Capital requirements were forecast for the LOM plans, which were extended through depletion of the coal reserves. Economic performance of the current and projected mining operations

that make up the reserves may improve or worsen based on changes in sales realization, mining costs, and/or capital requirements.

MM&A has not conducted an independent assessment of the current financial condition of Corsa and MM&A expresses no opinion as to matters of a financial nature other than those considered in its assessment of the coal reserves.

Corsa, along with all mining companies in the USA operating underground mines, has been affected by the implementation of the Mine Improvement and New Emergency Response Act of 2006 (*MINER Act*). The MINER Act was passed by Congress and signed by President George W. Bush on June 15, 2006, in the wake of two tragic coal-mining accidents in early 2006. The MINER Act amended the Mine Safety and Health Act of 1997 and is intended to improve safety and health in USA coal mines. Requirements of the MINER Act have increased mining costs. The accompanying change in the regulatory enforcement environment has adversely affected mining productivity. Costs will continue to increase as all sections of the MINER Act are implemented. MSHA has proposed more stringent respirable dust standards, and compliance requirements for underground mines may adversely affect mining plans and productivity. Congress is expected to amend the MINER Act in the future, which could further affect underground mining productivity and cost. The impact of the MINER Act on productivity and cost, as currently enforced by Federal and State regulatory authorities, is reflected in the financial model and economic analysis.

Recent EPA intervention in the surface mine permitting process has resulted in lengthy delays in issuance of Section 401, 402 and 404 permits required under the Clean Water Act. However, Corsa's ability to operate without the need for valley fills has minimized the impact of such delays in their permitting efforts. Residential and public concerns such as blasting, visual appearance (as observed from publicly accessible areas), or transportation are not expected to prevent the issuance of future permits.

The development of new coal mines in Northern Appalachia is occurring while many experienced miners are retiring. Possible related outcomes include intense competition for skilled miners, a short-term adverse impact on productivity, and an increase in the price of labor.

Item 25 Interpretation and Conclusions

25.1 Interpretation

Sufficient data has been obtained through various exploration and sampling programs and mining operations to support the geological interpretations of seam structure and thickness for coal horizons situated on the properties. The data is of sufficient quantity and reliability to reasonably support the coal resource and coal reserve estimates in this TR under guidelines established by the CIMDS.

The geological data and preliminary feasibility study, which consider mining plans, revenue, and operating and capital cost estimates are sufficient to support the classification of coal resources and coal reserves provided herein.

25.2 Conclusion

This geologic evaluation conducted in accordance with CIMDS and in conjunction with the preliminary feasibility study is sufficient to conclude that the 48.10 million tons of surface and underground coal reserves identified on the properties are economically mineable under reasonable expectations of market prices for thermal and metallurgical coal products, estimated operation costs, and capital expenditures.

Item 26 Recommendations

Recommendations based on the conclusions of this TR are listed below.

1. MM&A highly recommends additional exploration including quality analyses relevant to the qualification of the coals as metallurgical grade, along with geotechnical data for use in assessing the mineability of the operations.
2. Coal resources deemed to have insufficient geologic definition due to a lack of drill or quality data to justify inclusion in the reserve estimates may reasonably become the target of future exploration programs. With sufficient drill data, some identified resources may demonstrate reserve potential in the future. Exploration should include the collection of core samples to be analysed for metallurgical coal quality
3. MM&A is aware of no conditions that presently would prevent permitting of the surface-mineable reserves, however, the time required to acquire surface mining permits continues to increase. MM&A recommends that Corsa dedicate continuing efforts to permit mining areas well ahead of current mining to better assure that production will not be interrupted.
4. MM&A recommends that an independent ESA and ARO evaluation be conducted on, at a minimum, the active operations on the properties as discussed in Item 20.1.

Item 27 References

1. Standardized Coal Resource/Reserve Reporting System used by the Geological Survey of Canada.
2. National Instrument 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 (effective June 30, 2011) and Companion Policy 43-101CP.

3. CIM Definition Standards – On Mineral Resources and Mineral Reserves – adopted May 10, 2014 – Canadian Institute of Mining, Metallurgy and Petroleum (CIM) (10 pp).

4. Standards and Guidelines for Valuation of Mineral Properties Special Committee of the Canadian Institute of Mining, Metallurgy and Petroleum Valuation of Mineral Properties (CIMVAL) February 2003 (final version), 33 pp.

5. Exploration Best Practices Guidelines, Canadian Institute of Mining, Metallurgy and Petroleum (CIM), March 9, 2003.

6. Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines, Canadian Institute of Mining, Metallurgy and Petroleum (CIM): Adopted by CIM Council on November 23, 2003.

7. A Standardized Coal Resource/Reserve Reporting System for Canada, Geological Survey of Canada Paper 88-21, 46 pp.

All previously completed work as noted in *Items 6.3 & 2.4*.

MAPS

MARSHALL MILLER & ASSOCIATES®

See separate file

APPENDIX

1

GLOSSARY OF ABBREVIATIONS AND DEFINITIONS

Appendix 1. Glossary of Abbreviations and Definitions

Abbreviation	Definition
ARMPS	Analysis of Retreat Mining Pillar Stability
ASTM	American Society for Testing and Materials
AVS	Applicant Violator System
bcy	Bank cubic yards
Btu/lb.	British Thermal Unit per pound
C.P.G.	Certified Professional Geologist
Cardno MM&A or Cardno	Cardno, Inc. (previous owner of Marshall Miller & Associates, Inc.'s mining group)
Carlson	Carlson Mining – formerly SurvCADD® – a prevalent software package used for modeling in the Appalachian region
CFR	Code of Federal Regulations
CIMDS	Canadian Institute of Mining's Definition Standards on Mineral Resources and Mineral Reserves
Corsa	Corsa Coal Corp.
CSR	Codes of State Rules
CSX	CSX Corporation, a rail-based freight transportation company
Demonstrated reserves	Demonstrated reserves are the sum of proven and probable reserves.
DEP	Department of Environmental Protection
Earthtech	Earthtech, Inc.
EBITDA	Earnings before Interest, Taxes, Depreciation, and Amortization
EOM	End-of-mine reclamation
EPA	United States Environmental Protection Agency
ESA	Limited Phase I Environmental Site Assessment
EVR	Estimated Visual Recovery
Feasibility Study	"…a comprehensive technical and economic study of the selected development option for a mineral project that includes appropriately detailed assessments of applicable Modifying Factors together with any other relevant operational factors and detailed financial analysis that are necessary to demonstrate, at the time of reporting, that extraction is reasonably justified (economically mineable). The results of the study may reasonably serve as the basis for a final decision by a proponent or financial institution to proceed with, or finance, the development of the project. The confidence level of the study will be higher than that of a Pre-Feasibility Study."
GSC	Geological Survey of Canada
HWM	Highwall mining
In situ	Its natural position; said specific of a rock, soil, or fossil when in the situation in which was originally formed or deposited
Indicated Resources	Indicated resources are those lying between ¼-mile and ¾-mile radius from such an observation point and reported herein as in-situ mineral resources.
Inferred Resources	Inferred resources lie more than a ¾-mile radius from a valid point of measurement but less than 3 miles from one, and reported herein as in-situ mineral resources.

Abbreviation	Definition
lb. SO_2 / mm Btu	Pounds per sulfur dioxide per million British thermal units
LJ Hughes	LJ Hughes & Sons, Inc. - drilling Company
LOM	Life-of-mine
M&R	Maintenance and repair
M.B.A.	Master of Business Administration
Measured Resources	Measured resources are those lying within ¼-mile radius from a valid point of measurement and reported herein as in-situ mineral resources.
MINER Act	Mine Improvement and New Emergency Response Act of 2006
Mineral Reserve	"…the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes dilution materials and allowances for losses, which occur when the material is mined or extracted and is defined by studies at Preliminary Feasibility or Feasibility level as appropriate that include Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified."
Mineral Resource	"…a concentration or occurrence of solid material of economic interest or on the Earth's crust in such form, grade or quality that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, continuity and other geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling."
MM&A	Marshall Miller & Associates, Inc.
Modifying Factors	"…considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors."
MSHA	United States Department of Labor Mine Safety and Health Administration
MSL	Mean sea level
NAIP	National Agricultural Imagery Program
NI43-101	National Instrument 43-101
NIOSH	National Institute for Occupational Safety and Health
NPV	Net Present Value
NS	Norfolk Southern Corporation, a rail-based freight transportation company
O&M	Operating and maintenance
OSD	Out-of-seam dilution
OSM	U.S. Office of Surface Mining Reclamation and Enforcement
P&L	Profit and loss before tax
PBS	PBS Coals, Inc.
P.E.	Professional Engineer
Preliminary Feasibility Study	"…a comprehensive study of a range of options for technical and economic viability of a mineral project that has advanced to a stage where a preferred mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, is established and an effective method of mineral processing is determined. It includes a financial analysis based on reasonable assumptions on the Modifying Factors and the evaluation of other relevant factors which are sufficient for a Qualified Person, acting reasonably, to determine if all or part of the Mineral Resource may be converted to a Mineral Reserve at the time of reporting. A Pre-feasibility Study is at a lower confidence level than a Feasibility Study"

Abbreviation	Definition
Property	Bituminous coal deposits located in Cambria, Fayette, Indiana and Somerset Counties, Pennsylvania and in Garrett County, Maryland either owned or leased by Corsa.
QP	Qualified Person
Rec.	Recovery
RECs	Recognized Environmental Conditions
Reserve	As strictly defined by the CIMDS, are those coal deposits that exhibit: (1) Geological assurance of existence and continuity, and (2) Economic feasibility of recovery, as demonstrated by at least a Preliminary Feasibility Study
Resource Database	The Resource Database is established by the collection, validation, recording, storing and processing of data and forms the foundation necessary for the estimation of Mineral Resource and Mineral Reserve. A quality assurance and quality control program is essential and must be established to govern the collection of all data. In reporting, a Mineral Resource must meet the minimum requirement of "reasonable prospects for economic extraction". This will require the concurrent collection and storage of preliminary economic, mining, metallurgical, environmental, legal and social data and other information for use in the estimation of MRMR. The Resource Database will include both "primary" (observation and measurement) and "interpreted" data. It is recommended that data be stored digitally, using a documented, standard format and a reliable storage medium that allows for easy and complete retrieval of the data.
ROM	Run-of-mine
SCM	Solid and Chemical Materials
SEC	U.S. Securities and Exchange Commission
Severstal	Severstal Resources, prior owner of PBS
SMCRA	Surface Mining Control and Reclamation Act of 1977 is the primary federal law that regulates the environmental effects of coal mining in the United States.
Strip Ratio	Represented by bcy of overburden to recoverable coal tons
TNI	The NELAC Institute
tph	tons per hour
TR	Technical Report
TSXV	TSX Venture Exchange
USA	United States of America
USGS	United States Geologic Survey
Vulcan™	Vulcan™ software is a product of Maptek™, a provider of software for the global mining industry.
WACC	Weighted average cost of capital
Wilson Creek	Wilson Creek Energy, LLC

APPENDIX

2

UNDERGROUND MINE SUMMARIES

Appendix 2. Underground Mine Summaries

2.1 Introduction

In the 4th quarter of 2017, underground mine operations were active at the Acosta (MK), Quecreek and Casselman operations with one or two active mining sections at each location. Underground mining operations are expected to expand to five sections in 2018, then to ten sections by 2022. Annual deep mine production peaks at approximately 2.93 million tons in 2027. Eight underground and eight surface resource areas were modeled and tested economically. Mine plans have been designed to project operating each resource area to depletion, with crews and equipment scheduled to move to subsequent mining areas as depletion occurs. Beginning in 2035, underground mine operations are projected to begin winding down before finally exhausting the underground reserves in 2045. The projected mines are set up similarly to present operations. Each mine is scheduled to operate one to two production sections. The production sections are configured with a single continuous miner in each section. In all cases, mines are forecasted to produce coal two shifts each day and reserve the third shift for maintenance and belt and power moves. Production is scheduled Monday through Friday each week.

All of the mines can be accessed either by box cut openings or by highwall drift access left behind by surface mining operations. Following is a brief description of each mine plan, financial model highlights, and the capital expenditures schedule. Financial highlights list production, sales price, total cash cost, total cost of operations and profit or loss for each year of production. The capital expenditures schedule details costs for production equipment and conveyor belt terminal groups. "Other" costs include expenditures for mine access and construction, mine extension capital and miscellaneous costs.

Table A-2-1: Underground Mine Production Schedule (x 1,000 Saleable Tons)

Mine Name	Q4 2017	2018	2019	2020	2021	2022	2023	2024
A Seam	0	0	0	0	0	0	0	0
Horning D	0	117	177	174	170	164	159	161
Quecreek C	43	163	0	0	0	0	0	0
Casselman	198	489	633	648	608	615	626	594
Acosta UK	0	0	0	0	0	643	711	713
Acosta LK	0	0	0	0	340	302	253	326
Acosta MK	142	426	487	500	493	481	487	480
Keyser LK	0	0	419	445	452	451	475	567
Total	**383**	**1,195**	**1,716**	**1,767**	**2,063**	**2,657**	**2,710**	**2,841**
Mine Name	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
A Seam	0	0	0	0	0	0	0	27
Horning D	103	169	185	173	142	120	109	91
Quecreek C	0	0	0	0	0	0	0	0
Casselman	643	694	618	267	0	0	0	0
Acosta UK	711	710	710	699	698	711	712	713
Acosta LK	280	292	367	363	254	299	303	296
Acosta MK	485	472	481	462	456	331	14	0
Keyser LK	547	571	567	600	608	556	462	266
Total	**2,770**	**2,907**	**2,928**	**2,564**	**2,157**	**2,017**	**1,600**	**1,392**
Mine Name	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**

A Seam	461	551	546	597	564	559	670	716
Horning D	0	0	0	0	0	0	0	0
Quecreek C	0	0	0	0	0	0	0	0
Casselman	0	0	0	0	0	0	0	0
Acosta UK	687	297	0	0	0	0	0	0
Acosta LK	296	266	332	257	262	270	127	0
Acosta MK	0	0	0	0	0	0	0	0
Keyser LK	235	356	354	189	120	0	0	0
Total	**1,680**	**1,469**	**1,232**	**1,042**	**946**	**828**	**798**	**716**
Mine Name	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**
A Seam	647	367	341	299	117	0	0	0
Horning D	0	0	0	0	0	0	0	0
Quecreek C	0	0	0	0	0	0	0	0
Casselman	0	0	0	0	0	0	0	0
Acosta UK	0	0	0	0	0	0	0	0
Acosta LK	0	0	0	0	0	0	0	0
Acosta MK	0	0	0	0	0	0	0	0
Keyser LK	0	0	0	0	0	0	0	0
Total	**647**	**367**	**341**	**299**	**117**	**0**	**0**	**0**

2.2 Mine: A-Seam

The proposed A-Seam mine is scheduled to begin production in the third quarter of 2032. The Brookville A seam is accessed via box cut entry along the outcrop. This mine is projected to be a metallurgical coal operation on leased mineral property.

Production is scheduled for 255 days each year, which represents production on Monday through Friday. On each day, two production sections are scheduled to produce coal on two shifts; the third shift is reserved for maintenance and mine conveyor belt and power moves. The sections are configured as regular sections with one continuous miner available for production on each section. Productivity is planned at the rate of 180 feet of advance per shift of operation. A total of 97 employees are assigned to the mine.

Principal production equipment includes two continuous miners, four roof bolters, six shuttle cars, and two scoops. Coal is extracted from the production face with the continuous miner and hauled to the mine conveyor in shuttle cars. At the conveyor belt, the coal is discharged from the shuttle cars onto a feeder breaker for transfer onto the conveyor. The conveyors carry the coal to the outside, where it is stacked on the ground to await truck transport to the preparation plant and load-out. The truck haul distance is approximately 10 miles.

Expected annual production averages approximately 606,000 marketable tons at steady state. Following are financial highlights:

Table A-2-2: A-Seam Mine Financial Summary

Item	2029	2030	2031	2032	2033
Production (000 tons)	0	0	0	27	461
Sales Price ($ per ton)	$101.78	$101.78	$101.78	$101.78	$101.78
Total Cash Cost ($ per ton)	$0.00	$0.00	$0.00	$86.75	$71.64
Total Cost of Production ($ per ton)	$0.00	$0.00	$0.00	$101.48	$77.89
EBITDA ($ per ton)	$0.00	$0.00	$0.00	$15.03	$30.14
Income from Operations ($ per ton)	$0.00	$0.00	$0.00	$0.30	$23.89
Capital Expenditures ($000)	$0	$0	$11,028	$5,574	$0
Mine Name	**2034**	**2035**	**2036**	**2037**	**2038**
Production (000 tons)	551	546	597	564	559
Sales Price ($ per ton)	$101.78	$101.78	$101.78	$101.78	$101.78
Total Cash Cost ($ per ton)	$70.19	$72.04	$69.94	$69.95	$69.23
Total Cost of Production ($ per ton)	$75.72	$77.72	$75.75	$76.81	$74.51
EBITDA ($ per ton)	$31.59	$29.74	$31.84	$31.83	$32.56
Income from Operations ($ per ton)	$26.06	$24.06	$26.03	$24.97	$27.27
Capital Expenditures ($000)	$450	$450	$2,135	$3,067	$4,667
Mine Name	**2039**	**2040**	**2041**	**2042**	**2043**
Production (000 tons)	670	716	647	367	341
Sales Price ($ per ton)	$101.78	$101.78	$101.78	$101.78	$101.78
Total Cash Cost ($ per ton)	$64.37	$62.85	$63.24	$62.94	$67.26
Total Cost of Production ($ per ton)	$67.87	$66.56	$67.22	$69.86	$74.45
EBITDA ($ per ton)	$37.41	$38.93	$38.54	$38.84	$34.52
Income from Operations ($ per ton)	$33.91	$35.23	$34.56	$31.93	$27.33
Capital Expenditures ($000)	$450	$1,791	$450	$2,341	$1,734
Mine Name	**2044**	**2045**	**2046**	**2047**	**2048**
Production (000 tons)	299	117	0	0	0
Sales Price ($ per ton)	$101.78	$101.78	$0.00	$0.00	$0.00
Total Cash Cost ($ per ton)	$72.72	$80.10	$0.00	$0.00	$0.00
Total Cost of Production ($ per ton)	$79.72	$84.33	$0.00	$0.00	$0.00
EBITDA ($ per ton)	$29.06	$21.68	$0.00	$0.00	$0.00
Income from Operations ($ per ton)	$22.06	$17.45	$0.00	$0.00	$0.00
Capital Expenditures ($000)	$916	$0	$0	$0	$0

The mine is scheduled to operate from the fourth quarter of 2032 and terminate during 2045.

Table A- 2-3: A-Seam Mine Capital Expenditures Schedule ($000)

Item	Total	2029	2030	2031	2032
Continuous Miner Purchase	**$3,994**	$0	$0	$3,994	$0
Continuous Miner Rebuild	**$4,793**	$0	$0	$0	$0
Roof Bolter Purchase	**$1,785**	$0	$0	$1,785	$0
Roof Bolter Rebuild	**$3,213**	$0	$0	$0	$0
Shuttle Car Purchase	**$3,810**	$0	$0	$3,810	$0
Shuttle Car Rebuild	**$3,810**	$0	$0	$0	$0
Continuous Haulage Purchase	**$0**	$0	$0	$0	$0
Continuous Haulage Rebuild	**$0**	$0	$0	$0	$0
Feeder Breaker Purchase	**$920**	$0	$0	$0	$920
Feeder Breaker Rebuild	**$552**	$0	$0	$0	$0
Scoop Purchase	**$2,160**	$0	$0	$0	$720
Conveyor Terminals	**$2,700**	$0	$0	$0	$0
Conveyor Purchase	**$2,666**	$0	$0	$0	$2,666
Conveyor Replace	**$1,600**	$0	$0	$0	$0
Mantrips	**$1,032**	$0	$0	$0	$688
Power centers	**$360**	$0	$0	$0	$360
Belt Storage Unit Purchase	**$220**	$0	$0	$0	$220
Fan & Accessories	**$439**	$0	$0	$439	$0
Other	**$1,000**	$0	$0	$1,000	$0
Total	**$35,053**	**$0**	**$0**	**$11,028**	**$5,574**

Mine Name	2033	2034	2035	2036	2037
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$0	$0	$0	$0	$1,198
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$0	$0	$1,071	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$1,143
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$0	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$0	$0	$0	$276
Scoop Purchase	$0	$0	$0	$720	$0
Conveyor Terminals	$0	$450	$450	$0	$450
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$0	$0	$0
Mantrips	$0	$0	$0	$344	$0
Power centers	$0	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$0**	**$450**	**$450**	**$2,135**	**$3,067**

Mine Name	2038	2039	2040	2041	2042
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$1,198	$0	$0	$0	$1,198
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$0	$1,071	$0	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$1,143	$0	$0	$0	$1,143
continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$0	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$276	$0	$0	$0	$0
Scoop Purchase	$0	$0	$720	$0	$0
Conveyor Terminals	$450	$450	$0	$450	$0
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$1,600	$0	$0	$0	$0
Mantrips	$0	$0	$0	$0	$0
Power centers	$0	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$4,667**	**$450**	**$1,791**	**$450**	**$2,341**

Mine Name	2043	2044	2045	2046	2047
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$1,198	$0	$0	$0	$0
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$535	$535	$0	$0	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$381	$0	$0	$0
continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$0	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$0	$0	$0	$0
Scoop Purchase	$0	$0	$0	$0	$0
Conveyor Terminals	$0	$0	$0	$0	$0
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$0	$0	$0
Mantrips	$0	$0	$0	$0	$0
Power centers	$0	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$1,734**	**$916**	**$0**	**$0**	**$0**

2.3 Mine: Horning D

The idle Horning D mine is scheduled to resume production in 2018. The Lower Freeport D seam is accessed via an existing boxcut along the outcrop. This mine is projected to be a metallurgical coal operation with approximately 74% of production on leased mineral property and the remaining 26% on mineral property owned by PBS.

Production is scheduled for 255 days each year, which represents production on Monday through Friday. On each day, a single production section is scheduled to produce coal on two shifts; the third shift is reserved for maintenance and mine conveyor belt and power moves. The section is configured as regular sections with one continuous miner available for production. Productivity is planned at the rate of 180 feet of advance per shift of operation. A total of 57 employees are assigned to the mine.

Principal production equipment includes a continuous miner, two roof bolters, a continuous haulage system, and one scoop. Coal is extracted from the production face with the continuous miner and hauled to the mine conveyor via continuous haulage. At the conveyor belt, the coal is discharged from the haulage system onto a feeder breaker for transfer onto the conveyor. The conveyors carry the coal to the outside, where it is stacked on the ground to await truck transport to the preparation plant and load-out. The truck haul distance is approximately 2 miles.

Expected annual production averages approximately 197,000 marketable tons. Following are financial highlights:

Table A-2-4: Horning D Mine Financial Summary

Item	Q4 2017	2018	2019	2020	2021
Production (000 tons)	0	117	177	174	170
Sales Price ($ per ton)	$0.00	$125.21	$108.90	$101.78	$101.78
Total Cash Cost ($ per ton)	$0.00	$96.28	$72.62	$74.21	$79.49
Total Cost of Production ($ per ton)	$0.00	$114.62	$84.84	$85.17	$90.34
EBITDA ($ per ton)	$0.00	$28.92	$36.28	$27.57	$22.29
Income from Operations ($ per ton)	$0.00	$10.58	$24.06	$16.61	$11.44
Capital Expenditures ($000)	$500	$10,145	$0	$0	$0
Mine Name	**2022**	**2023**	**2024**	**2025**	**2026**
Production (000 tons)	164	159	161	103	169
Sales Price ($ per ton)	$101.78	$101.78	$101.78	$101.78	$101.78
Total Cash Cost ($ per ton)	$78.62	$79.79	$75.70	$100.99	$76.65
Total Cost of Production ($ per ton)	$90.75	$93.59	$91.14	$110.89	$84.27
EBITDA ($ per ton)	$23.16	$21.99	$26.08	$0.80	$25.13
Income from Operations ($ per ton)	$11.03	$8.19	$10.64	($9.11)	$17.51
Capital Expenditures ($000)	$1,144	$2,050	$2,820	$352	$1,316
Mine Name	**2027**	**2028**	**2029**	**2030**	**2031**
Production (000 tons)	185	173	142	120	109
Sales Price ($ per ton)	$101.78	$101.78	$101.78	$101.78	$101.78
Total Cash Cost ($ per ton)	$69.85	$77.49	$87.91	$89.11	$95.47
Total Cost of Production ($ per ton)	$76.88	$84.94	$95.58	$100.27	$103.95
EBITDA ($ per ton)	$31.93	$24.29	$13.87	$12.67	$6.31
Income from Operations ($ per ton)	$24.90	$16.84	$6.20	$1.51	($2.17)
Capital Expenditures ($000)	$0	$0	$0	$3,963	$0
Mine Name	**2032**	**2033**	**2034**	**2035**	**2036**
Production (000 tons)	91	0	0	0	0
Sales Price ($ per ton)	$101.78	$0.00	$0.00	$0.00	$0.00
Total Cash Cost ($ per ton)	$111.17	$0.00	$0.00	$0.00	$0.00
Total Cost of Production ($ per ton)	$120.58	$0.00	$0.00	$0.00	$0.00
EBITDA ($ per ton)	($9.39)	$0.00	$0.00	$0.00	$0.00
Income from Operations ($ per ton)	($18.80)	$0.00	$0.00	$0.00	$0.00
Capital Expenditures ($000)	$0	$0	$0	$0	$0

The mine is scheduled to operate beginning in the second quarter of 2018 and terminate during 2032.

Table A- 2-5: Horning D Mine Capital Expenditures Schedule

Item	Total	Q4 2017	2018	2019	2020
Continuous Miner Purchase	**$1,997**	$0	$1,997	$0	$0
Continuous Miner Rebuild	**$2,396**	$0	$0	$0	$0
Roof Bolter Purchase	**$892**	$0	$892	$0	$0
Roof Bolter Rebuild	**$1,071**	$0	$0	$0	$0
Shuttle Car Purchase	**$0**	$0	$0	$0	$0
Shuttle Car Rebuild	**$0**	$0	$0	$0	$0
Continuous Haulage Purchase	**$1,906**	$0	$1,906	$0	$0
Continuous Haulage Rebuild	**$3,431**	$0	$0	$0	$0
Feeder Breaker Purchase	**$460**	$0	$460	$0	$0
Feeder Breaker Rebuild	**$552**	$0	$0	$0	$0
Scoop Purchase	**$1,080**	$0	$360	$0	$0
Conveyor Terminals	**$2,250**	$0	$900	$0	$0
Conveyor Purchase	**$2,666**	$0	$2,666	$0	$0
Conveyor Replace	**$1,600**	$0	$0	$0	$0
Mantrips	**$688**	$0	$344	$0	$0
Power centers	**$360**	$0	$180	$0	$0
Belt Storage Unit Purchase	**$0**	$0	$0	$0	$0
Fan & Accessories	**$439**	$0	$439	$0	$0
Other	**$500**	$500	$0	$0	$0
Total	**$22,289**	**$500**	**$10,145**	**$0**	**$0**

Mine Name	2021	2022	2023	2024	2025
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$0	$0	$0	$1,198	$0
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$0	$0	$535	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$1,144	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$0	$0	$276	$0
Scoop Purchase	$0	$0	$0	$360	$0
Conveyor Terminals	$0	$0	$450	$450	$0
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$1,600	$0	$0
Mantrips	$0	$0	$0	$0	$172
Power centers	$0	$0	$0	$0	$180
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$0**	**$1,144**	**$2,050**	**$2,820**	**$352**
Mine Name	**2026**	**2027**	**2028**	**2029**	**2030**
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$0	$0	$0	$0	$1,198
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$0	$0	$0	$535
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$1,144	$0	$0	$0	$1,144
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$0	$0	$0	$276
Scoop Purchase	$0	$0	$0	$0	$360
Conveyor Terminals	$0	$0	$0	$0	$450
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$0	$0	$0
Mantrips	$172	$0	$0	$0	$0
Power centers	$0	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	$1,316	$0	$0	$0	$3,963

2.4 Mine: Quecreek C'

The Quecreek C' mine is active with a single production section. The Upper Kittanning C' seam is accessed via an existing boxcut along the outcrop. This mine is a metallurgical coal operation with all of its remaining production on leased mineral property.

Production is scheduled for 255 days each year, which represents production on Monday through Friday. On each day, one production section is scheduled to produce coal on two shifts; the third shift is reserved for maintenance and mine conveyor belt and power moves. The section is configured as a regular section with one continuous miner available for production. Productivity is planned at the rate of 117 feet of advance per shift of operation. A total of 57 employees are assigned to the mine.

Principal production equipment includes a continuous miner, two roof bolters, three shuttle cars, and two scoops. Coal is extracted from the production face with the continuous miner and hauled to the mine conveyor in shuttle cars. At the conveyor belt, the coal is discharged from the shuttle cars onto a feeder breaker for transfer onto the conveyor. The conveyors carry the coal to the outside, where it is stacked on the ground to await truck transport to the preparation plant and load-out. The truck haul distance is approximately 15 miles.

Expected annual production averages approximately 163,000 marketable tons. Following are financial highlights:

Table A-2--6: Quecreek C' Mine Financial Summary

Item	Q4 2017	2018
Production (000 tons)	43	163
Sales Price ($ per ton)	$123.32	$110.21
Total Cash Cost ($ per ton)	$91.91	$92.80
Total Cost of Production ($ per ton)	$111.39	$99.08
EBITDA ($ per ton)	$31.41	$17.41
Income from Operations ($ per ton)	$11.93	$11.12
Capital Expenditures ($000)	$1,122	$0

The mine is scheduled to terminate during 2018.

Table A- 2-7: Quecreek C' Mine Capital Expenditures Schedule

Item	Total	Q4 2017
Continuous Miner Purchase	$0	$0
Continuous Miner Rebuild	$0	$0
Roof Bolter Purchase	$0	$0
Roof Bolter Rebuild	$672	$672
Shuttle Car Purchase	$0	$0
Shuttle Car Rebuild	$0	$0
Feeder Breaker Purchase	$0	$0
Feeder Breaker Rebuild	$0	$0
Scoop Purchase	$0	$0
Conveyor Terminals	$450	$450
Conveyor Purchase	$0	$0
Conveyor Replace	$0	$0
Mantrips	$0	$0
Power centers	$0	$0
Belt Storage Unit Purchase	$0	$0
Fan & Accessories	$0	$0
Other	$0	$0
Total	**$1,122**	**$1,122**

2.5 Mine: Casselman

The Casselman mine is an active mine in the Upper Freeport seam. This mine is a metallurgical coal operation on leased mineral property.

Production is scheduled for 255 days each year, which represents production on Monday through Friday. On each day, one production section is scheduled to produce coal on two shifts; the third shift

is reserved for maintenance and mine conveyor belt and power moves. The sections are configured as regular sections with one continuous miner available for production on each section. Productivity is planned at the rate of 250 feet of advance per shift of operation. A total of 97 employees are assigned to the mine.

Principal production equipment includes two continuous miners, four roof bolters, three shuttle cars, a continuous haulage system, and two scoops. Coal is extracted from the production face with the continuous miner and hauled to the mine conveyor in shuttle cars or via continuous haulage. At the conveyor belt, the coal is discharged onto a feeder breaker for transfer onto the conveyor. The conveyors carry the coal to the outside, where it is stacked on the ground to await truck transport to the preparation plant and load-out. The truck haul cost is estimated to be $7.36 per ton.

Expected annual production averages approximately 617,000 marketable tons. Following are financial highlights:

Table A-2--8: Casselman Mine Financial Summary

Item	Q4 2017	2018	2019	2020	2021
Production (000 tons)	198	489	633	648	608
Sales Price ($ per ton)	$135.32	$122.21	$105.90	$98.78	$98.78
Total Cash Cost ($ per ton)	$64.32	$74.75	$65.72	$63.99	$64.19
Total Cost of Production ($ per ton)	$68.35	$82.31	$70.88	$68.48	$68.53
EBITDA ($ per ton)	$71.00	$47.46	$40.18	$34.79	$34.59
Income from Operations ($ per ton)	$66.97	$39.89	$35.02	$30.30	$30.25
Capital Expenditures ($000)	$450	$450	$2,399	$2,460	$3,524
Mine Name	**2022**	**2023**	**2024**	**2025**	**2026**
Production (000 tons)	615	626	594	643	694
Sales Price ($ per ton)	$98.78	$98.78	$98.78	$98.78	$98.78
Total Cash Cost ($ per ton)	$62.96	$62.08	$63.90	$61.90	$59.33
Total Cost of Production ($ per ton)	$67.11	$66.42	$68.58	$66.51	$63.78
EBITDA ($ per ton)	$35.82	$36.70	$34.88	$36.88	$39.45
Income from Operations ($ per ton)	$31.67	$32.36	$30.20	$32.27	$35.00
Capital Expenditures ($000)	$1,594	$1,427	$1,338	$1,876	$3,417
Mine Name	**2027**	**2028**	**2029**	**2030**	**2031**
Production (000 tons)	618	267	0	0	0
Sales Price ($ per ton)	$98.78	$98.78	$0.00	$0.00	$0.00
Total Cash Cost ($ per ton)	$63.31	$66.39	$0.00	$0.00	$0.00
Total Cost of Production ($ per ton)	$68.03	$72.85	$0.00	$0.00	$0.00
EBITDA ($ per ton)	$35.47	$32.39	$0.00	$0.00	$0.00
Income from Operations ($ per ton)	$30.75	$25.93	$0.00	$0.00	$0.00
Capital Expenditures ($000)	$1,997	$1,525	$0	$0	$0

The mine is scheduled to terminate during 2028.

Table A- 2-9: Casselman Mine Capital Expenditures Schedule

Item	Total	Q4 2017	2018	2019	2020
Continuous Miner Purchase	**$3,994**	$0	$0	$0	$0
Continuous Miner Rebuild	**$2,396**	$0	$0	$0	$1,198
Roof Bolter Purchase	**$0**	$0	$0	$0	$0
Roof Bolter Rebuild	**$2,142**	$0	$0	$535	$535
Shuttle Car Purchase	**$0**	$0	$0	$0	$0
Shuttle Car Rebuild	**$381**	$0	$0	$0	$0
Continuous Haulage Purchase	**$0**	$0	$0	$0	$0
Continuous Haulage Rebuild	**$4,575**	$0	$0	$1,144	$0
Feeder Breaker Purchase	**$0**	$0	$0	$0	$0
Feeder Breaker Rebuild	**$1,104**	$0	$0	$0	$276
Scoop Purchase	**$1,440**	$0	$0	$720	$0
Conveyor Terminals	**$2,700**	$450	$450	$0	$450
Conveyor Purchase	**$0**	$0	$0	$0	$0
Conveyor Replace	**$3,199**	$0	$0	$0	$0
Mantrips	**$344**	$0	$0	$0	$0
Power centers	**$180**	$0	$0	$0	$0
Belt Storage Unit Purchase	**$0**	$0	$0	$0	$0
Fan & Accessories	**$0**	$0	$0	$0	$0
Other	**$0**	$0	$0	$0	$0
Total	**$22,455**	**$450**	**$450**	**$2,399**	**$2,460**

Mine Name	2021	2022	2023	2024	2025
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$1,198	$0	$0	$0	$0
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$0	$535	$535	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$1,144	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$276	$0	$0	$0	$276
Scoop Purchase	$0	$0	$720	$0	$0
Conveyor Terminals	$450	$450	$0	$450	$0
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$1,600	$0	$0	$0	$1,600
Mantrips	$0	$0	$172	$172	$0
Power centers	$0	$0	$0	$180	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$3,524**	**$1,594**	**$1,427**	**$1,338**	**$1,876**

Mine Name	2026	2027	2028	2029	2030
Continuous Miner Purchase	$1,997	$1,997	$0	$0	$0
Continuous Miner Rebuild	$0	$0	$0	$0	$0
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$0	$0	$0	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$381	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$1,144	$0	$1,144	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$276	$0	$0	$0	$0
Scoop Purchase	$0	$0	$0	$0	$0
Conveyor Terminals	$0	$0	$0	$0	$0
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$0	$0	$0
Mantrips	$0	$0	$0	$0	$0
Power centers	$0	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$3,417**	**$1,997**	**$1,525**	**$0**	**$0**

2.6 Mine: Acosta UK

The proposed Acosta UK mine is scheduled to begin production in the first quarter of 2022. The Upper Kittanning seam is accessed via inter-seam slope from the proposed underlying Acosta MK mine. This mine is projected to be a metallurgical coal operation on owned and leased mineral property.

Production is scheduled for 255 days each year, which represents production on Monday through Friday. On each day, two production sections are scheduled to produce coal on two shifts; the third shift is reserved for maintenance and mine conveyor belt and power moves. The sections are configured as regular sections with one continuous miner available for production on each section. Productivity is planned at the rate of 250 feet of advance per shift of operation. A total of 96 employees are assigned to the mine.

Principal production equipment includes two continuous miners, four roof bolters, two continuous haulage units, and two scoops. Coal is extracted from the production face with the continuous miner and hauled to the mine conveyor via continuous haulage. At the conveyor belt, the coal is discharged from the haulage units onto a feeder breaker for transfer onto the conveyor. The conveyors carry the coal to the outside, where it is stacked on the ground to await truck transport to the preparation plant and load-out. The truck haul cost is estimated to be $4.47 per ton.

Expected annual production averages approximately 701,000 marketable tons at steady state production levels. Following are financial highlights:

Table A-2-14: Acosta UK Mine Financial Summary

Item	2021	2022	2023	2024	2025
Production (000 tons)	0	643	711	713	711
Sales Price ($ per ton)	$0.00	$77.78	$77.78	$77.78	$77.78
Total Cash Cost ($ per ton)	$0.00	$67.72	$64.42	$62.25	$59.55
Total Cost of Production ($ per ton)	$0.00	$73.07	$69.45	$67.34	$65.25
EBITDA ($ per ton)	$0.00	$10.06	$13.36	$15.53	$18.23
Income from Operations ($ per ton)	$0.00	$4.71	$8.33	$10.44	$12.53
Capital Expenditures ($000)	$17,604	$0	$450	$450	$3,279
Mine Name	**2026**	**2027**	**2028**	**2029**	**2030**
Production (000 tons)	710	710	699	698	711
Sales Price ($ per ton)	$77.78	$77.78	$77.78	$77.78	$77.78
Total Cash Cost ($ per ton)	$58.23	$57.99	$60.37	$63.11	$61.64
Total Cost of Production ($ per ton)	$64.77	$65.22	$64.43	$67.56	$66.35
EBITDA ($ per ton)	$19.55	$19.79	$17.41	$14.67	$16.14
Income from Operations ($ per ton)	$13.01	$12.56	$13.35	$10.22	$11.44
Capital Expenditures ($000)	$4,640	$3,524	$1,594	$1,791	$1,946
Mine Name	**2031**	**2032**	**2033**	**2034**	**2035**
Production (000 tons)	712	713	687	297	0
Sales Price ($ per ton)	$77.78	$77.78	$77.78	$77.78	$0.00
Total Cash Cost ($ per ton)	$58.19	$61.39	$65.11	$58.70	$0.00
Total Cost of Production ($ per ton)	$62.82	$65.37	$69.04	$61.20	$0.00
EBITDA ($ per ton)	$19.59	$16.39	$12.67	$19.08	$0.00
Income from Operations ($ per ton)	$14.96	$12.41	$8.74	$16.58	$0.00
Capital Expenditures ($000)	$276	$276	$4,088	$0	$0

The mine is scheduled to operate from the first quarter of 2022 and terminate during 2034.

Table A- 2-15: Acosta UK Mine Capital Expenditures Schedule

Item	Total	2021	2022	2023	2024
Continuous Miner Purchase	**$5,991**	$3,994	$0	$0	$0
Continuous Miner Rebuild	**$3,595**	$0	$0	$0	$0
Roof Bolter Purchase	**$2,677**	$1,785	$0	$0	$0
Roof Bolter Rebuild	**$2,142**	$0	$0	$0	$0
Shuttle Car Purchase	**$0**	$0	$0	$0	$0
Shuttle Car Rebuild	**$0**	$0	$0	$0	$0
Continuous Haulage Purchase	**$3,812**	$3,812	$0	$0	$0
Continuous Haulage Rebuild	**$3,431**	$0	$0	$0	$0
Feeder Breaker Purchase	**$920**	$920	$0	$0	$0
Feeder Breaker Rebuild	**$1,104**	$0	$0	$0	$0
Scoop Purchase	**$2,160**	$720	$0	$0	$0
Conveyor Terminals	**$2,700**	$0	$0	$450	$450
Conveyor Purchase	**$2,666**	$2,666	$0	$0	$0
Conveyor Replace	**$1,600**	$0	$0	$0	$0
Mantrips	**$1,204**	$688	$0	$0	$0
Power centers	**$541**	$360	$0	$0	$0
Belt Storage Unit Purchase	**$220**	$220	$0	$0	$0
Fan & Accessories	**$439**	$439	$0	$0	$0
Other	**$4,716**	$2,000	$0	$0	$0
Total	**$39,917**	**$17,604**	**$0**	**$450**	**$450**

Mine Name	2025	2026	2027	2028	2029
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$0	$1,198	$1,198	$0	$0
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$1,071	$0	$0	$0	$1,071
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$1,144	$0	$0	$1,144	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$276	$276	$0	$0
Scoop Purchase	$720	$0	$0	$0	$720
Conveyor Terminals	$0	$450	$450	$450	$0
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$1,600	$0	$0
Mantrips	$344	$0	$0	$0	$0
Power centers	$0	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$2,716	$0	$0	$0
Total	**$3,279**	**$4,640**	**$3,524**	**$1,594**	**$1,791**

Mine Name	2030	2031	2032	2033	2034
Continuous Miner Purchase	$0	$0	$0	$1,997	$0
Continuous Miner Rebuild	$0	$0	$0	$1,198	$0
Roof Bolter Purchase	$0	$0	$0	$892	$0
Roof Bolter Rebuild	$0	$0	$0	$0	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$1,144	$0	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$276	$276	$0	$0
Scoop Purchase	$0	$0	$0	$0	$0
Conveyor Terminals	$450	$0	$0	$0	$0
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$0	$0	$0
Mantrips	$172	$0	$0	$0	$0
Power centers	$180	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$1,946**	**$276**	**$276**	**$4,088**	**$0**

2.7 Mine: Acosta MK

The Acosta MK mine is an active mine in the Middle Kittanning seam which is accessed via box cut entry along the outcrop. This mine is a metallurgical coal operation on leased mineral property.

Production is scheduled for 255 days each year, which represents production on Monday through Friday. On each day, two production sections are scheduled to produce coal on two shifts; the third shift is reserved for maintenance and mine conveyor belt and power moves. The sections are configured as regular sections with one continuous miner available for production on each section. Productivity is planned at the rate of 250 feet of advance per shift of operation. A total of 97 employees are assigned to the mine during steady state production.

Principal production equipment includes two continuous miners, four roof bolters, two continuous haulage systems, and two scoops. Coal is extracted from the production face with the continuous miner and hauled to the mine conveyor via continuous haulage. At the conveyor belt, the coal is discharged from the haulage units onto a feeder breaker for transfer onto the conveyor. The conveyors carry the coal to the outside, where it is stacked on the ground to await truck transport to the preparation plant and load-out. The truck haul cost is estimated to be $4.47 per ton.

Expected annual production averages approximately 476,000 marketable tons at steady state production levels. Following are financial highlights:

Table A-2-14: Acosta MK Mine Financial Summary

Item	Q4 2017	2018	2019	2020	2021
Production (000 tons)	142	426	487	500	493
Sales Price ($ per ton)	$129.32	$116.21	$99.90	$92.78	$92.78
Total Cash Cost ($ per ton)	$83.50	$85.91	$75.22	$73.87	$75.39
Total Cost of Production ($ per ton)	$85.25	$90.97	$78.73	$77.32	$78.77
EBITDA ($ per ton)	$45.82	$30.29	$24.68	$18.91	$17.39
Income from Operations ($ per ton)	$44.07	$25.23	$21.16	$15.46	$14.01
Capital Expenditures ($000)	$0	$1,144	$450	$985	$2,571
Mine Name	**2022**	**2023**	**2024**	**2025**	**2026**
Production (000 tons)	481	487	480	485	472
Sales Price ($ per ton)	$92.78	$92.78	$92.78	$92.78	$92.78
Total Cash Cost ($ per ton)	$75.92	$75.77	$76.87	$74.03	$76.97
Total Cost of Production ($ per ton)	$79.46	$79.81	$81.62	$78.72	$81.71
EBITDA ($ per ton)	$16.86	$17.01	$15.91	$18.75	$15.81
Income from Operations ($ per ton)	$13.32	$12.97	$11.16	$14.06	$11.07
Capital Expenditures ($000)	$1,924	$1,924	$2,301	$1,255	$630
Mine Name	**2027**	**2028**	**2029**	**2030**	**2031**
Production (000 tons)	481	462	456	331	14
Sales Price ($ per ton)	$92.78	$92.78	$92.78	$92.78	$92.78
Total Cash Cost ($ per ton)	$74.40	$76.80	$79.12	$79.73	$100.78
Total Cost of Production ($ per ton)	$79.31	$81.70	$84.03	$83.71	$107.24
EBITDA ($ per ton)	$18.38	$15.98	$13.66	$13.05	($8.00)
Income from Operations ($ per ton)	$13.47	$11.08	$8.75	$9.07	($14.46)
Capital Expenditures ($000)	$1,876	$2,010	$1,734	$0	$0

The mine is scheduled to terminate during 2031.

Table A- 2-15: Acosta MK Mine Capital Expenditures Schedule

Item	Total	2018	2019	2020	2021
Continuous Miner Purchase	**$0**	$0	$0	$0	$0
Continuous Miner Rebuild	**$4,793**	$0	$0	$0	$0
Roof Bolter Purchase	**$0**	$0	$0	$0	$0
Roof Bolter Rebuild	**$3,213**	$0	$0	$535	$535
Shuttle Car Purchase	**$0**	$0	$0	$0	$0
Shuttle Car Rebuild	**$0**	$0	$0	$0	$0
Continuous Haulage Purchase	**$0**	$0	$0	$0	$0
Continuous Haulage Rebuild	**$3,431**	$1,144	$0	$0	$1,144
Feeder Breaker Purchase	**$0**	$0	$0	$0	$0
Feeder Breaker Rebuild	**$1,104**	$0	$0	$0	$0
Scoop Purchase	**$1,440**	$0	$0	$0	$720
Conveyor Terminals	**$2,700**	$0	$450	$450	$0
Conveyor Purchase	**$0**	$0	$0	$0	$0
Conveyor Replace	**$1,600**	$0	$0	$0	$0
Mantrips	**$344**	$0	$0	$0	$172
Power centers	**$180**	$0	$0	$0	$0
Belt Storage Unit Purchase	**$0**	$0	$0	$0	$0
Fan & Accessories	**$0**	$0	$0	$0	$0
Other	**$0**	$0	$0	$0	$0
Total	**$18,804**	**$1,144**	**$450**	**$985**	**$2,571**
Mine Name	**2022**	**2023**	**2024**	**2025**	**2026**
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$1,198	$1,198	$0	$0	$0
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$0	$535	$535	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$0	$1,144	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$276	$276	$0	$0	$0
Scoop Purchase	$0	$0	$0	$720	$0
Conveyor Terminals	$450	$450	$450	$0	$450
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$0	$0	$0
Mantrips	$0	$0	$172	$0	$0
Power centers	$0	$0	$0	$0	$180
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$1,924**	**$1,924**	**$2,301**	**$1,255**	**$630**

Mine Name	2027	2028	2029	2030	2031
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$0	$1,198	$1,198	$0	$0
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$535	$535	$0	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$0	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$276	$276	$0	$0	$0
Scoop Purchase	$0	$0	$0	$0	$0
Conveyor Terminals	$0	$0	$0	$0	$0
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$1,600	$0	$0	$0	$0
Mantrips	$0	$0	$0	$0	$0
Power centers	$0	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$1,876**	**$2,010**	**$1,734**	**$0**	**$0**

2.8 Mine: Acosta LK

The proposed Acosta LK mine is scheduled to begin production in the first quarter of 2021. The Lower Kittanning seam is accessed via inter-seam slope from the proposed overlying Middle Kittanning seam mine. This mine is projected to be a metallurgical coal operation on leased mineral property.

Production is scheduled for 255 days each year, which represents production on Monday through Friday. On each day, one production section is scheduled to produce coal on two shifts; the third shift is reserved for maintenance and mine conveyor belt and power moves. The section is configured as a regular section with one continuous miner available for production. Productivity is planned at the rate of 250 feet of advance per shift of operation. A total of 57 employees are assigned to the mine during steady state production.

Principal production equipment includes one continuous miner, two roof bolters, a continuous haulage system, and one scoop. Coal is extracted from the production face with the continuous miner and hauled to the mine conveyor via continuous haulage. At the conveyor belt, the coal is discharged from the haulage system onto a feeder breaker for transfer onto the conveyor. The conveyors carry the coal to the outside, where it is stacked on the ground to await truck transport to the preparation plant and load-out. The truck haul cost Is estimated to be $4.47 per ton.

Expected annual production averages approximately 298,000 marketable tons at steady state levels. Following are financial highlights:

Table A-2-16: Acosta LK Mine Financial Summary

Item	2020	2021	2022	2023	2024
Production (000 tons)	0	340	302	253	326
Sales Price ($ per ton)	$0.00	$74.78	$74.78	$74.78	$74.78
Total Cash Cost ($ per ton)	$0.00	$65.92	$69.40	$78.33	$66.99
Total Cost of Production ($ per ton)	$0.00	$72.41	$76.23	$86.43	$74.67
EBITDA ($ per ton)	$0.00	$8.86	$5.39	($3.55)	$7.79
Income from Operations ($ per ton)	$0.00	$2.37	($1.45)	($11.65)	$0.11
Capital Expenditures ($000)	$10,167	$810	$450	$450	$2,489
Mine Name	**2025**	**2026**	**2027**	**2028**	**2029**
Production (000 tons)	280	292	367	363	254
Sales Price ($ per ton)	$74.78	$74.78	$74.78	$74.78	$74.78
Total Cash Cost ($ per ton)	$71.67	$70.85	$58.28	$59.24	$75.82
Total Cost of Production ($ per ton)	$80.58	$80.35	$62.47	$64.19	$82.45
EBITDA ($ per ton)	$3.11	$3.93	$16.50	$15.54	($1.04)
Income from Operations ($ per ton)	($5.80)	($5.57)	$12.31	$10.59	($7.67)
Capital Expenditures ($000)	$532	$1,997	$910	$2,661	$540
Mine Name	**2030**	**2031**	**2032**	**2033**	**2034**
Production (000 tons)	299	303	296	296	266
Sales Price ($ per ton)	$74.78	$74.78	$74.78	$74.78	$74.78
Total Cash Cost ($ per ton)	$68.31	$68.56	$69.68	$68.69	$72.65
Total Cost of Production ($ per ton)	$74.69	$74.00	$75.92	$75.05	$79.37
EBITDA ($ per ton)	$6.47	$6.22	$5.10	$6.09	$2.13
Income from Operations ($ per ton)	$0.09	$0.78	($1.14)	($0.27)	($4.59)
Capital Expenditures ($000)	$1,600	$726	$2,091	$2,356	$450
Mine Name	**2035**	**2036**	**2037**	**2038**	**2039**
Production (000 tons)	332	257	262	270	127
Sales Price ($ per ton)	$74.78	$74.78	$74.78	$74.78	$74.78
Total Cash Cost ($ per ton)	$64.02	$72.87	$72.05	$69.69	$66.26
Total Cost of Production ($ per ton)	$68.64	$77.41	$77.22	$75.10	$69.76
EBITDA ($ per ton)	$10.76	$1.91	$2.74	$5.09	$8.52
Income from Operations ($ per ton)	$6.14	($2.63)	($2.44)	($0.32)	$5.02
Capital Expenditures ($000)	$360	$0	$1,411	$1,466	$0

The mine is scheduled to operate from the first quarter of 2021 and terminate during 2039.

Table A- 2-17: Acosta LK Mine Capital Expenditures Schedule

Item	Total	2020	2021	2022	2023
Continuous Miner Purchase	**$1,997**	$0	$0	$0	$0
Continuous Miner Rebuild	**$3,595**	$1,198	$0	$0	$0
Roof Bolter Purchase	**$1,785**	$892	$0	$0	$0
Roof Bolter Rebuild	**$1,606**	$0	$0	$0	$0
Shuttle Car Purchase	**$0**	$0	$0	$0	$0
Shuttle Car Rebuild	**$0**	$0	$0	$0	$0
Continuous Haulage Purchase	**$3,812**	$1,906	$0	$0	$0
Continuous Haulage Rebuild	**$3,431**	$0	$0	$0	$0
Feeder Breaker Purchase	**$460**	$0	$0	$0	$0
Feeder Breaker Rebuild	**$552**	$276	$0	$0	$0
Scoop Purchase	**$2,520**	$360	$360	$0	$0
Conveyor Terminals	**$4,050**	$0	$450	$450	$450
Conveyor Purchase	**$2,666**	$2,666	$0	$0	$0
Conveyor Replace	**$1,600**	$0	$0	$0	$0
Mantrips	**$1,032**	$688	$0	$0	$0
Power centers	**$360**	$180	$0	$0	$0
Belt Storage Unit Purchase	**$0**	$0	$0	$0	$0
Fan & Accessories	**$0**	$0	$0	$0	$0
Other	**$2,000**	$2,000	$0	$0	$0
Total	**$31,466**	**$10,167**	**$810**	**$450**	**$450**

Mine Name	2024	2025	2026	2027	2028
Continuous Miner Purchase	$0	$0	$1,997	$0	$0
Continuous Miner Rebuild	$0	$0	$0	$0	$0
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$535	$0	$0	$0	$535
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$1,144	$0	$0	$0	$1,144
Feeder Breaker Purchase	$0	$0	$0	$460	$0
Feeder Breaker Rebuild	$0	$0	$0	$0	$0
Scoop Purchase	$360	$360	$0	$0	$360
Conveyor Terminals	$450	$0	$0	$450	$450
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$0	$0	$0
Mantrips	$0	$172	$0	$0	$172
Power centers	$0	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$2,489**	**$532**	**$1,997**	**$910**	**$2,661**

Mine Name	2029	2030	2031	2032	2033
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$0	$0	$0	$1,198	$0
Roof Bolter Purchase	$0	$0	$0	$892	$0
Roof Bolter Rebuild	$0	$0	$0	$0	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$1,906
Continuous Haulage Rebuild	$0	$0	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$0	$276	$0	$0
Scoop Purchase	$360	$0	$0	$0	$0
Conveyor Terminals	$0	$0	$450	$0	$450
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$1,600	$0	$0	$0
Mantrips	$0	$0	$0	$0	$0
Power centers	$180	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$540**	**$1,600**	**$726**	**$2,091**	**$2,356**

Mine Name	2034	2035	2036	2037	2038
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$0	$0	$0	$0	$1,198
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$0	$0	$268	$268
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$0	$0	$1,144	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$0	$0	$0	$0
Scoop Purchase	$0	$360	$0	$0	$0
Conveyor Terminals	$450	$0	$0	$0	$0
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$0	$0	$0
Mantrips	$0	$0	$0	$0	$0
Power centers	$0	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$450**	**$360**	**$0**	**$1,411**	**$1,466**

2.9 Mine: Keyser LK

The proposed Keyser LK mine is scheduled to begin production in the first quarter of 2019. The Lower Kittanning seam is accessed via a proposed box cut. This mine is projected to be a metallurgical coal operation on owned mineral property.

Production is scheduled for 255 days each year, which represents production on Monday through Friday. On each day, two production sections are scheduled to produce coal on two shifts; the third shift is reserved for maintenance and mine conveyor belt and power moves. The sections are configured as regular sections with one continuous miner each available for production. Productivity is planned at the rate of 180 feet of advance per shift of operation. A total of 97 employees are assigned to the mine during steady state production.

Principal production equipment includes two continuous miners, four roof bolters, six shuttle cars, and two scoops. Coal is extracted from the production face with the continuous miner and hauled to the mine conveyor in shuttle cars. At the conveyor belt, the coal is discharged from the shuttle cars onto a feeder breaker for transfer onto the conveyor. The conveyors carry the coal to the outside, where it is stacked on the ground to await truck transport to the preparation plant and load-out. The truck haul cost is estimated to be $4.26 per ton.

Expected annual production averages approximately 517,000 marketable tons at steady state levels. Following are financial highlights:

Table A-2-18: Keyser LK Mine Financial Summary

Item	2018	2019	2020	2021	2022
Production (000 tons)	0	419	445	452	451
Sales Price ($ per ton)	$0.00	$93.90	$86.78	$86.78	$86.78
Total Cash Cost ($ per ton)	$0.00	$64.24	$66.65	$65.66	$64.39
Total Cost of Production ($ per ton)	$0.00	$75.33	$76.96	$75.15	$73.94
EBITDA ($ per ton)	$0.00	$29.66	$20.13	$21.12	$22.39
Income from Operations ($ per ton)	$0.00	$18.57	$9.82	$11.63	$12.84
Capital Expenditures ($000)	$8,000	$15,602	$0	$450	$1,593
Mine Name	**2023**	**2024**	**2025**	**2026**	**2027**
Production (000 tons)	475	567	547	571	567
Sales Price ($ per ton)	$86.78	$86.78	$86.78	$86.78	$86.78
Total Cash Cost ($ per ton)	$62.50	$56.07	$57.35	$55.73	$55.93
Total Cost of Production ($ per ton)	$72.50	$65.14	$65.56	$60.05	$60.98
EBITDA ($ per ton)	$24.28	$30.71	$29.43	$31.05	$30.85
Income from Operations ($ per ton)	$14.28	$21.64	$21.22	$26.73	$25.80
Capital Expenditures ($000)	$2,934	$1,924	$3,884	$1,556	$2,897
Mine Name	**2028**	**2029**	**2030**	**2031**	**2032**
Production (000 tons)	600	608	556	462	266
Sales Price ($ per ton)	$86.78	$86.78	$86.78	$86.78	$86.78
Total Cash Cost ($ per ton)	$54.59	$55.26	$58.63	$65.10	$80.76
Total Cost of Production ($ per ton)	$59.61	$59.88	$63.20	$71.15	$88.94
EBITDA ($ per ton)	$32.19	$31.52	$28.15	$21.68	$6.02
Income from Operations ($ per ton)	$27.17	$26.90	$23.58	$15.63	($2.16)
Capital Expenditures ($000)	$1,212	$0	$1,474	$4,625	$1,270
Mine Name	**2033**	**2034**	**2035**	**2036**	**2037**
Production (000 tons)	235	356	354	189	120
Sales Price ($ per ton)	$86.78	$86.78	$86.78	$86.78	$86.78
Total Cash Cost ($ per ton)	$87.01	$74.82	$72.45	$68.34	$75.76
Total Cost of Production ($ per ton)	$97.05	$81.40	$78.76	$76.49	$83.76
EBITDA ($ per ton)	($0.23)	$11.96	$14.33	$18.44	$11.02
Income from Operations ($ per ton)	($10.27)	$5.38	$8.02	$10.29	$3.02
Capital Expenditures ($000)	$3,214	$1,784	$450	$762	$0

The mine is scheduled to operate from the first quarter of 2019 and terminate during 2037.

Table A- 2-19: Keyser LK Mine Capital Expenditures Schedule

Item	Total	2018	2019	2020	2021
Continuous Miner Purchase	**$3,994**	$0	$3,994	$0	$0
Continuous Miner Rebuild	**$4,793**	$0	$0	$0	$0
Roof Bolter Purchase	**$1,785**	$0	$1,785	$0	$0
Roof Bolter Rebuild	**$3,213**	$0	$0	$0	$0
Shuttle Car Purchase	**$7,620**	$0	$3,810	$0	$0
Shuttle Car Rebuild	**$5,334**	$0	$0	$0	$0
Continuous Haulage Purchase	**$0**	$0	$0	$0	$0
Continuous Haulage Rebuild	**$0**	$0	$0	$0	$0
Feeder Breaker Purchase	**$920**	$0	$920	$0	$0
Feeder Breaker Rebuild	**$1,104**	$0	$0	$0	$0
Scoop Purchase	**$3,600**	$0	$720	$0	$0
Conveyor Terminals	**$3,600**	$0	$0	$0	$450
Conveyor Purchase	**$2,666**	$0	$2,666	$0	$0
Conveyor Replace	**$3,199**	$0	$0	$0	$0
Mantrips	**$2,064**	$0	$688	$0	$0
Power centers	**$1,081**	$0	$360	$0	$0
Belt Storage Unit Purchase	**$220**	$0	$220	$0	$0
Fan & Accessories	**$439**	$0	$439	$0	$0
Other	**$8,000**	$8,000	$0	$0	$0
Total	**$53,631**	**$8,000**	**$15,602**	**$0**	**$450**

Mine Name	2022	2023	2024	2025	2026
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$0	$0	$1,198	$1,198	$0
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$1,071	$0	$0	$0
Shuttle Car Purchase	$0	$0	$0	$0	$0
Shuttle Car Rebuild	$1,143	$1,143	$0	$0	$762
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$0	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$0	$276	$276	$0
Scoop Purchase	$0	$720	$0	$0	$0
Conveyor Terminals	$450	$0	$450	$450	$450
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$0	$1,600	$0
Mantrips	$0	$0	$0	$0	$344
Power centers	$0	$0	$0	$360	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$1,593**	**$2,934**	**$1,924**	**$3,884**	**$1,556**

Mine Name	2027	2028	2029	2030	2031
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$0	$0	$0	$1,198	$1,198
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$1,071	$0	$0	$0	$1,071
Shuttle Car Purchase	$0	$0	$0	$0	$1,270
Shuttle Car Rebuild	$762	$762	$0	$0	$0
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$0	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$0	$0	$276	$276
Scoop Purchase	$720	$0	$0	$0	$0
Conveyor Terminals	$0	$450	$0	$0	$450
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$0	$0	$0	$0
Mantrips	$344	$0	$0	$0	$0
Power centers	$0	$0	$0	$0	$360
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$2,897**	**$1,212**	**$0**	**$1,474**	**$4,625**

Mine Name	2032	2033	2034	2035	2036
Continuous Miner Purchase	$0	$0	$0	$0	$0
Continuous Miner Rebuild	$0	$0	$0	$0	$0
Roof Bolter Purchase	$0	$0	$0	$0	$0
Roof Bolter Rebuild	$0	$0	$0	$0	$0
Shuttle Car Purchase	$1,270	$1,270	$0	$0	$0
Shuttle Car Rebuild	$0	$0	$0	$0	$762
Continuous Haulage Purchase	$0	$0	$0	$0	$0
Continuous Haulage Rebuild	$0	$0	$0	$0	$0
Feeder Breaker Purchase	$0	$0	$0	$0	$0
Feeder Breaker Rebuild	$0	$0	$0	$0	$0
Scoop Purchase	$0	$0	$1,440	$0	$0
Conveyor Terminals	$0	$0	$0	$450	$0
Conveyor Purchase	$0	$0	$0	$0	$0
Conveyor Replace	$0	$1,600	$0	$0	$0
Mantrips	$0	$344	$344	$0	$0
Power centers	$0	$0	$0	$0	$0
Belt Storage Unit Purchase	$0	$0	$0	$0	$0
Fan & Accessories	$0	$0	$0	$0	$0
Other	$0	$0	$0	$0	$0
Total	**$1,270**	**$3,214**	**$1,784**	**$450**	**$762**

APPENDIX

3

SURFACE MINE SUMMARIES

Appendix 3. Surface Mine Summaries

3.1 Introduction

There are currently two active surface mining operations, Schrock Run and Hamer.

Eight resource areas were modeled and tested economically. Mining operations are projected to utilize area mining methods. The projected operations will employ equipment capable of a combined production rate of approximately 1,700 bcy/hour between two spreads of equipment. The production and financial model assumes that they continue at this production rate as mining progresses throughout all future permitted areas. The models assume that the operations will work two, 10-hour production shifts, 5 days per week with sufficient staffing to float vacation during the year. A total of 36 employees are assumed for the surface mines. Highwall miner operations are assumed to be conducted by a contractor.

It is assumed that most of the spoil movement goes through a shovel bucket and is eventually returned to the pit for final reclamation. The dozer's primary responsibility is cutting the initial benches for the drill and shaping the reclaimed contour highwall.

Spoil for final highwall reclamation is expected to come from strategic placement of spoil on pre-existing benches by haul trucks such that they are within the push distance of the reclamation dozer.

Surface mine recovery is assumed to be 90% from solid coal.

Coals from the surface operations are hauled to the preparation plant. Saleable product from the surface operations are projected to be sold into both the metallurgical and thermal coal markets. Roughly 50% of the proposed production planned for the thermal market is assumed to be washed, while the remainder of the thermal coal product is assumed to be shipped raw to customers.

Table A-3-1: Surface Mine Production Schedule (x 1,000 Saleable Tons)

Mine Name	Q4 2017	2018	2019	2020	2021	2022	2023	2024
Basset	0	0	0	0	0	0	83	0
Blue Lick	0	0	0	0	0	0	256	40
Gaz	0	0	0	0	0	384	0	0
Downey	0	0	0	0	0	39	142	128
Hart	0	0	57	177	253	173	0	0
Rhoades	0	173	111	0	0	0	0	0
Schrock Run	15	306	270	295	274	29	0	0
Hamer	39	29	0	0	0	0	0	0
Total	**54**	**508**	**438**	**473**	**526**	**626**	**481**	**168**

Mine Name	2025	2026	2027	2028	2029	2030	2031	2032
Basset	0	0	0	0	0	0	0	0
Blue Lick	0	0	0	0	0	0	0	0
Gaz	0	0	0	0	0	0	0	0
Downey	137	140	134	84	0	0	0	0
Hart	0	0	0	0	0	0	0	0
Rhoades	0	0	0	0	0	0	0	0
Schrock Run	0	0	0	0	0	0	0	0
Hamer	0	0	0	0	0	0	0	0
Total	**137**	**140**	**134**	**84**	**0**	**0**	**0**	**0**

Table A-3-2: Highwall Miner Production Schedule (x1,000 Saleable Tons)

Mine Name	Q4 2017	2018	2019	2020	2021	2022
Rhoades HWM	0	31	48	0	0	0
Gaz HWM	0	0	0	0	0	48
Schrock Run HWM	0	0	0	141	108	50
Hamer HWM	0	48	0	0	0	0
Total	**0**	**79**	**48**	**141**	**108**	**98**

Table A-3-3: Surface Capital Expenditures Schedule ($000)

Item	Cost	Q4 2017	2018	2019	2020
777 Haul Truck	**$2,640**	$0	$0	$0	$0
777 Haul Truck R	**$3,168**	$792	$0	$792	$0
785 Haul Truck	**$0**	$0	$0	$0	$0
785 Haul Truck R	**$11,550**	$0	$1,650	$1,650	$1,650
D11 Track Tractor	**$0**	$0	$0	$0	$0
D11 Track Tractor R	**$5,284**	$0	$1,321	$1,321	$0
D9T Track Tractor	**$0**	$0	$0	$0	$0
D9T Track Tractor R	**$0**	$0	$0	$0	$0
988H Large Wheel Loader	**$0**	$0	$0	$0	$0
988H Large Wheel Loader R	**$2,880**	$0	$480	$480	$0
140M Motor Grader	**$300**	$0	$0	$300	$0
140M Motor Grader R	**$540**	$0	$0	$0	$180
PC2000 Excavator	**$0**	$0	$0	$0	$0
PC2000 Excavator R	**$5,915**	$0	$1,972	$0	$0
EX3600 Excavator	**$0**	$0	$0	$0	$0
EX3600 Excavator R	**$8,951**	$0	$0	$0	$4,475
Water Truck	**$640**	$0	$160	$160	$0
Total	**$41,867**	**$792**	**$5,583**	**$4,703**	**$6,305**

Mine Name	2021	2022	2023	2024	2025
777 Haul Truck	$1,320	$3,773	$4,771	$6,305	$2,782
777 Haul Truck R	$0	$0	$0	$0	$792
785 Haul Truck	$0	$0	$0	$0	$0
785 Haul Truck R	$0	$0	$1,650	$1,650	$1,650
D11 Track Tractor	$0	$0	$0	$0	$0
D11 Track Tractor R	$0	$1,321	$1,321	$0	$0
D9T Track Tractor	$0	$0	$0	$0	$0
D9T Track Tractor R	$0	$0	$0	$0	$0
988H Large Wheel Loader	$0	$0	$0	$0	$0
988H Large Wheel Loader R	$0	$480	$480	$0	$0
140M Motor Grader	$0	$0	$0	$0	$0
140M Motor Grader R	$0	$0	$0	$180	$180
PC2000 Excavator	$0	$0	$0	$0	$0
PC2000 Excavator R	$0	$1,972	$0	$0	$0
EX3600 Excavator	$0	$0	$0	$0	$0
EX3600 Excavator R	$0	$0	$0	$4,475	$0
Water Truck	$0	$0	$0	$0	$160
Total	**$1,320**	**$3,773**	**$4,771**	**$6,305**	**$2,782**

Mine Name	2026	2027	2028	2029	2030
777 Haul Truck	$0	$0	$0	$0	$0
777 Haul Truck R	$0	$792	$0	$0	$0
785 Haul Truck	$0	$0	$0	$0	$0
785 Haul Truck R	$0	$1,650	$0	$0	$0
D11 Track Tractor	$0	$0	$0	$0	$0
D11 Track Tractor R	$0	$0	$0	$0	$0
D9T Track Tractor	$0	$0	$0	$0	$0
D9T Track Tractor R	$0	$0	$0	$0	$0
988H Large Wheel Loader	$0	$0	$0	$0	$0
988H Large Wheel Loader R	$480	$480	$0	$0	$0
140M Motor Grader	$0	$0	$0	$0	$0
140M Motor Grader R	$0	$0	$0	$0	$0
PC2000 Excavator	$0	$0	$0	$0	$0
PC2000 Excavator R	$1,972	$0	$0	$0	$0
EX3600 Excavator	$0	$0	$0	$0	$0
EX3600 Excavator R	$0	$0	$0	$0	$0
Water Truck	$160	$0	$0	$0	$0
Total	**$2,612**	**$2,922**	**$0**	**$0**	**$0**

3.2 Mine: Bassett

This area was deemed uneconomical under current market conditions and cannot be qualified as reserve. Figures and descriptions presented in this section are for informational purposes only.

Bassett is an idle surface mine scheduled to resume and complete production in 2023. Expected production for the operations totals approximately 83,000 marketable tons. Following are financial highlights:

Table A-3-4: Bassett Mine Financial Summary

Item	2023
Ratio (Bank cubic yards per ton)	17.34
Production (000 tons)	83
Sales Price ($ per ton)	$47.00
Total Cash Cost ($ per ton)	$67.16
Total Cost of Production ($ per ton)	$76.84
EBITDA ($ per ton)	($20.17)
Income from Operations ($ per ton)	($29.85)

3.3 Mine: Blue Lick #4

Blue Lick #4 is a projected surface mine scheduled to be mined in 2023 and 2024. Expected production for the operations totals approximately 296,000 marketable tons. Following are financial highlights:

Table A-3-5: Blue Lick #4 Mine Financial Summary

Item	2023	2024
Ratio (Bank cubic yards per ton)	16.26	14.68
Production (000 tons)	256	40
Sales Price ($ per ton)	$65.95	$64.20
Total Cash Cost ($ per ton)	$56.67	$66.78
Total Cost of Production ($ per ton)	$65.82	$90.96
EBITDA ($ per ton)	$9.28	($2.57)
Income from Operations ($ per ton)	$0.13	($26.76)

3.4 Mine: GAZ

GAZ is a projected surface mine scheduled to be mined in 2022. Expected production for the operations totals approximately 384,000 marketable tons. Following are financial highlights:

Table A-3-6: GAZ Surface Mine Financial Summary

Item	2022
Ratio (Bank cubic yards per ton)	13.33
Production (000 tons)	384
Sales Price ($ per ton)	$61.29
Total Cash Cost ($ per ton)	$40.37
Total Cost of Production ($ per ton)	$47.82
EBITDA ($ per ton)	$20.92
Income from Operations ($ per ton)	$13.47

The Gaz Highwall Miner operates in 2022 and mines 48,000 marketable tons.

Table A-3-7: GAZ Highwall Miner Financial Summary

Item	2022
Production (000 tons)	48
Sales Price ($ per ton)	$61.29
Total Cash Cost ($ per ton)	$54.76
Total Cost of Production ($ per ton)	$55.87
EBITDA ($ per ton)	$6.52
Income from Operations ($ per ton)	$5.42

3.5 Mine: Downey

Downey is a projected surface mine scheduled to be mined in 2022 to 2028. Expected production for the operations totals approximately 803,000 marketable tons. Following are financial highlights:

Table A-3-8: Downey Surface Mine Financial Summary

Item	2022	2023	2024	2025	2026
Ratio (Bank cubic yards per ton)	22.27	16.91	19.07	17.61	17.25
Production (000 tons)	39	142	128	137	140
Sales Price ($ per ton)	$54.58	$55.57	$55.68	$57.35	$58.52
Total Cash Cost ($ per ton)	$55.51	$46.21	$49.63	$48.01	$47.70
Total Cost of Production ($ per ton)	$66.62	$55.68	$80.60	$80.66	$77.40
EBITDA ($ per ton)	($0.93)	$9.36	$6.06	$9.34	$10.82
Income from Operations ($ per ton)	($12.04)	($0.11)	($24.92)	($23.32)	($18.88)
Mine Name	**2027**	**2028**	**2029**	**2030**	**2031**
Ratio (Bank cubic yards per ton)	18.09	8.71	0.00	0.00	0.00
Production (000 tons)	134	84	0	0	0
Sales Price ($ per ton)	$57.36	$58.71	$0.00	$0.00	$0.00
Total Cash Cost ($ per ton)	$47.43	$35.88	$0.00	$0.00	$0.00
Total Cost of Production ($ per ton)	$74.76	$76.61	$0.00	$0.00	$0.00
EBITDA ($ per ton)	$9.93	$22.83	$0.00	$0.00	$0.00
Income from Operations ($ per ton)	($17.40)	($17.90)	$0.00	$0.00	$0.00

3.6 Mine: Hart

Hart is an idle surface mine scheduled to resume and complete production in 2019 to 2022. Expected production for the operations totals approximately 660,000 marketable tons. Following are financial highlights:

Table A-3-9: Hart Mine Financial Summary

Item	2019	2020	2021	2022	2023
Ratio (Bank cubic yards per ton)	17.64	13.41	9.06	8.12	0.00
Production (000 tons)	57	177	253	173	0
Sales Price ($ per ton)	$71.29	$68.15	$67.85	$67.85	$0.00
Total Cash Cost ($ per ton)	$57.86	$48.24	$39.39	$37.66	$0.00
Total Cost of Production ($ per ton)	$65.77	$56.38	$45.99	$42.99	$0.00
EBITDA ($ per ton)	$13.44	$19.91	$28.47	$30.19	$0.00
Income from Operations ($ per ton)	$5.52	$11.76	$21.86	$24.87	$0.00

3.7 Mine: Rhoades

Rhoades is a projected surface mine scheduled to be mined in 2018 to 2019. Expected production for the operations totals approximately 284,000 marketable tons. Following are financial highlights:

Table A-3-10: Rhoades Surface Mine Financial Summary

Item	2018	2019
Ratio (Bank cubic yards per ton)	10.42	12.01
Production (000 tons)	173	111
Sales Price ($ per ton)	$94.53	$72.96
Total Cash Cost ($ per ton)	$57.55	$57.89
Total Cost of Production ($ per ton)	$63.72	$64.70
EBITDA ($ per ton)	$36.98	$15.07
Income from Operations ($ per ton)	$30.81	$8.26

Rhoades Highwall Miner operates in 2018 to 2019 and mines an additional 79,000 marketable tons.

Table A-3-11: Rhoades Highwall Miner Financial Summary

Item	2018	2019
Production (000 tons)	31	48
Sales Price ($ per ton)	$94.61	$73.07
Total Cash Cost ($ per ton)	$70.90	$67.85
Total Cost of Production ($ per ton)	$72.01	$68.95
EBITDA ($ per ton)	$23.71	$5.22
Income from Operations ($ per ton)	$22.61	$4.12

3.8 Mine: Schrock Run

Schrock Run is an active surface mine scheduled to be completed in 2022. Expected production for the operations totals approximately 1,189,000 marketable tons. Following are financial highlights:

Table A-3-12: Schrock Run Surface Mine Financial Summary

Item	Q4 2017	2018	2019	2020	2021
Ratio (Bank cubic yards per ton)	96.99	18.73	21.28	19.46	21.32
Production (000 tons)	15	306	270	295	274
Sales Price ($ per ton)	$98.93	$90.69	$75.57	$70.07	$69.98
Total Cash Cost ($ per ton)	$151.07	$46.54	$53.54	$46.44	$48.17
Total Cost of Production ($ per ton)	$218.06	$53.65	$62.17	$56.43	$58.81
EBITDA ($ per ton)	($52.14)	$44.15	$22.03	$23.63	$21.81
Income from Operations ($ per ton)	($119.13)	$37.03	$13.41	$13.64	$11.17
Mine Name	**2022**	**2023**	**2024**	**2025**	**2026**
Ratio (Bank cubic yards per ton)	15.23	0.00	0.00	0.00	0.00
Production (000 tons)	29	0	0	0	0
Sales Price ($ per ton)	$68.28	$0.00	$0.00	$0.00	$0.00
Total Cash Cost ($ per ton)	$44.27	$0.00	$0.00	$0.00	$0.00
Total Cost of Production ($ per ton)	$52.50	$0.00	$0.00	$0.00	$0.00
EBITDA ($ per ton)	$24.01	$0.00	$0.00	$0.00	$0.00
Income from Operations ($ per ton)	$15.77	$0.00	$0.00	$0.00	$0.00

Schrock Run Highwall Miner operates in 2020 to 2022 and mines an additional 299,000 marketable tons.

Table A-3-13: Schrock Run Highwall Miner Financial Summary

Item	2020	2021	2022
Production (000 tons)	141	108	50
Sales Price ($ per ton)	$70.01	$69.95	$68.27
Total Cash Cost ($ per ton)	$56.05	$55.48	$54.67
Total Cost of Production ($ per ton)	$57.16	$56.59	$55.77
EBITDA ($ per ton)	$13.96	$14.47	$13.61
Income from Operations ($ per ton)	$12.86	$13.36	$12.50

3.9 Mine: Hamer

Hamer is an active surface mine scheduled to be completed in 2018. Expected production for the operations totals approximately 68,000 marketable tons. Following are financial highlights:

Table A-3-14: Hamer Surface Mine Financial Summary

Item	Q4 2017	2018
Ratio (Bank cubic yards per ton)	15.00	16.91
Production (000 tons)	39	29
Sales Price ($ per ton)	$113.72	$116.17
Total Cash Cost ($ per ton)	$82.52	$83.28
Total Cost of Production ($ per ton)	$144.98	$90.18
EBITDA ($ per ton)	$31.20	$32.89
Income from Operations ($ per ton)	($31.26)	$25.99

The Hamer Highwall Miner operates in 2018 and mines an additional 40,000 marketable tons.

Table A-3-15: Hamer Highwall Miner Financial Summary

Item	2018
Production (000 tons)	48
Sales Price ($ per ton)	$126.74
Total Cash Cost ($ per ton)	$73.11
Total Cost of Production ($ per ton)	$73.57
EBITDA ($ per ton)	$53.63
Income from Operations ($ per ton)	$53.18

APPENDIX

4

DETAILED COAL QUALITY TABLES

Corsa Coal Corporation

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

GAZ Area

Upper Freeport, Lower Freeport, and Upper Kittanning Seam

Table 1Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.55 Float)							Clean	
		Mapped						SO2/mm							SO2/mm			Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	Foot[3]	Comments
Upper Kittanning Seam																			
10437_GZ	4.33	4.33	4.33	*1.42*	16.62	0.43	11,050	0.78	23.24										Source: denner property raws#1.xls
10438_GZ	4.40	4.41	4.41	*1.38*	13.35	2.34	13,227	3.54	19.48		86.55	9.53	1.46	13,864	2.11	20.09		3.21	lost 1.6' of core (source is Lab sheet)
10438_GZ	4.42	4.41	4.41	*1.46*	20.59	1.76	11,742	3.00	17.75										Source: denner property raws#1.xls
10439_GZ	4.00	4.00	4.00	*1.43*	18.44	0.39	9,864	0.79	26.23										Source: denner property raws#1.xls
10440_GZ	3.60	3.58	3.58	*1.34*	9.41	1.19	13,776	1.73	18.69		94.04	7.88	0.70	14,041	1.00	18.90		2.75	lost 1.7' of core (source is lab sheet)
10440_GZ	3.58	3.58	3.58	*1.62*	36.96	0.95	8,831	2.15	20.83										Source: denner property raws#1.xls
10442_GZ	3.33	3.33	3.33	*1.46*	20.89	3.75	12,087	6.21	18.31										Source: denner property raws#1.xls
10443_GZ	2.95			*1.39*	14.31	2.70	13,259	4.07	18.25		85.79	9.92	1.40	13,982	2.00	18.79			Top Lift; source is lab sheet
10443_GZ	0.25			*1.56*	30.53	5.37	10,583	10.15	15.57		59.78	18.68	4.87	12,596	7.73	17.40			Bottom Lift; source is lab sheet
10443_GZ	3.20	3.50	3.50	*1.41*	16.25	3.02	12,939	4.67	17.93		82.68	10.97	1.81	13,816	2.63	18.62		2.49	Composite (composited by weights)
10443	3.50	3.50	3.50	*1.47*	21.65	3.49	12,069	5.78	17.46										Source: denner property raws#1.xls
10445_GZ	4.33	4.33	4.33	*1.50*	24.91	2.15	10,531	4.08	17.56										Source: denner property raws#1.xls
10446_GZ	3.75	3.75	3.75	*1.49*	23.93	0.36	9,820	0.73	26.38										Source: denner property raws#1.xls
10447_GZ	4.17	4.16	4.16	*1.45*	20.40	0.43	9,945	0.86	25.66										Source: denner property raws#1.xls
10448_GZ	3.67	7.66	7.66	*1.42*	16.76	0.38	10,697	0.71	25.35										Source: denner property raws#1.xls
10449_GZ	2.90			*1.38*	13.44	2.45	13,339	3.67	17.25		88.96	9.90	1.25	13,941	1.79	17.73			Top Lift; source is lab sheet
10449_GZ	1.60			*1.56*	31.43	6.22	10,404	11.96	15.70		33.28	13.30	5.26	13,496	7.79	18.85			Bottom Lift; lost 0.9' of core; source is lab sheet
10449_GZ	4.50	4.50	4.50	*1.42*	17.31	3.26	12,708	5.13	16.92		76.99	10.63	2.11	13,845	3.05	17.97		3.00	Composite (composited by weights)
10449_GZ	4.50	4.50	4.50	*1.55*	30.38	4.68	10,349	9.04	15.03										Source: denner property raws#1.xls
HOLT-1	3.75	3.75	3.75	*1.50*	24.55	0.67			23.48	51.97									
HOLT-2	4.00	4.00	4.00	*1.57*	32.48	0.62			20.36		79.87	22.87	0.60			21.73			
HOLT-3	2.00	2.00	2.00	*1.70*	44.77				13.40	41.83									3' void below coal, possible coal core loss.
		Average		***1.47***	**21.82**	**2.27**	**11377**	**4.43**	**20.20**	**51.97**	**72.48**	**13.75**	**2.47**	**13613**	**4.17**	**18.73**		**2.74**	
		Moist Basis (8%)			**21.82**	**2.09**	**10,467**	**4.07**	**18.59**	**47.81**	**72.48**	**12.65**	**2.27**	**12,524**	**3.63**	**17.23**		**2.53**	
		Maximum		1.50	24.91	3.75	12,939	6.21	26.38	0.00	82.68	10.97	2.11	13,845	3.05	18.62		3.00	
		Minimum		1.41	16.25	0.36	9,820	0.73	16.92	0.00	76.99	10.63	1.81	13,816	2.63	17.97		2.49	
		No. of Samples		8	8	8	8	8	8	0	2	2	2	2	2	2		2	

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

Gray lines indicate the benches that were composited together to show mineable section.

Corsa Coal Corporation

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Rhoades Areas

Upper, Middle & Lower Kittanning Seams

Table 2Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.55 Float)							Clean	
		Mapped						SO2/mm							SO2/mm			Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1][2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	Foot[3]	Comments
Upper Kittanning Seam																			
12049_KL	4.00	3.33	3.33	*1.33*	8.00	0.55	13,450	0.82	17.74		95.88	6.84	0.55	13,655	0.81	17.83		2.59	Mapped thickness appeas to be total coal only
12051_KL	4.00	3.25	3.25	*1.37*	12.21	0.56	12,456	0.90	20.62		87.87	7.36	0.58	13,385	0.87	19.41		2.39	Mapped thickness appeas to be total coal only
			Average	**1.35**	**10.11**	**0.56**	**12,953**	**0.86**	**19.18**		**91.88**	**7.10**	**0.57**	**13,520**	**0.84**	**18.62**		**2.49**	
			Moist Basis (8%)		**9.30**	**0.51**	**11,917**	**0.79**	**17.65**		**91.88**	**6.53**	**0.52**	**12,438**	**0.84**	**17.13**			
			Maximum	1.37	12.21	0.56	13,450	0.90	20.62		95.88	7.36	0.58	13,655	0.87	19.41		2.59	
			Minimum	1.33	8.00	0.55	12,456	0.82	17.74		87.87	6.84	0.55	13,385	0.81	17.83		2.39	
			No. of Samples	2	2	2	2	2	2		2	2	2	2	2	2		2	
Middle Kittanning Seam																			
DH_9884_KL	2.80	2.80	2.80	*1.45*	19.78	2.38	12,226	3.89			78.68	11.27	0.86	13,816	1.24			1.94	
DH_9885_KL	2.90	3.00	3.00	*1.47*	21.66	3.04	11,919	5.10	15.43		68.85	15.00	3.00	13,186	4.55	16.46		1.84	
DH_9886_KL	3.20	3.20	3.20	*1.47*	22.41	2.26	11,861	3.81			67.56	11.52	0.82	13,802	1.19			1.94	
DH_9889A_KL	3.00	3.00	3.00	*1.42*	16.77	2.66	12,748	4.17			79.04	9.48	1.03	14,086	1.46			2.05	
DH_0861_KL	2.33	2.33	2.33	*1.55*	29.71	3.15	10,748	5.86	14.74		52.36	13.29	1.35	13,505	2.00	16.21		1.15	Lost 8" of core
DH_0863	0.58			*1.75*	49.59	3.39	7,373	9.20	13.35		11.43	18.46	2.12	12,707	3.34	17.29			Top Lift
DH_0863	1.50			*1.46*	21.01	2.54	12,179	4.17	16.06		75.52	12.37	1.06	13,662	1.55	16.72			Bottom Lift; lost 3" of core
DH_0863	2.08	2.08	2.08	*1.56*	31.18	2.84	10,468	5.43	15.10		52.71	14.54	1.44	13,322	2.16	16.92		1.04	Composite
DH_0867	0.83			*1.60*	35.36	4.31	9,701	8.89	14.73		39.10	17.99	1.69	12,730	2.66	16.59			Top Lift
DH_0867	1.92			*1.38*	13.25	2.24	13,453	3.33	17.11		87.53	7.54	0.83	14,436	1.15	17.73			Bottom Lift; lost 3" of core
DH_0867	2.75	2.75	2.75	*1.47*	21.65	3.03	12,028	5.03	16.21		69.13	11.51	1.16	13,788	1.68	17.30		1.70	Composite
DH_0877-D	1.21			*1.63*	37.95	3.05	9,251	6.59	13.89		36.77	15.84	1.19	13,051	1.82	16.21			Top Lift
DH_0877-D	1.96			*1.38*	12.53	2.47	13,556	3.64	16.94		88.69	7.87	0.80	14,381	1.11	17.27			Bottom Lift
DH_0877-D	3.17	3.16	3.16	*1.49*	23.61	2.72	11,680	4.66	15.61		66.06	11.34	0.97	13,801	1.41	16.81		1.89	Composite
			Average	**1.48**	**23.35**	**2.76**	**11,710**	**4.75**	**15.42**		**66.80**	**12.24**	**1.33**	**13,663**	**1.96**	**16.74**		**1.69**	
			Moist Basis (8%)		**21.48**	**2.54**	**10,773**	**4.37**	**14.18**		**66.80**	**11.26**	**1.22**	**12,570**	**1.94**	**15.40**			
			Maximum	1.56	31.18	3.15	12,748	5.86	16.21		79.04	15.00	3.00	14,086	4.55	17.30		2.05	
			Minimum	1.42	16.77	2.26	10,468	3.81	14.74		52.36	9.48	0.82	13,186	1.19	16.21		1.04	
			No. of Samples	8	8	8	8	8	5		8	8	8	8	8	5		8	

Corsa Coal Corporation

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Rhoades Areas

Upper, Middle & Lower Kittanning Seams

Table 2Q

Drill Hole	Thickness (In Feet) PBS Rpt.[4]	Mapped Total Seam	Mapped Total Coal	Raw Quality, Dry Basis Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Washed Quality, Dry Basis (1.55 Float) % Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Clean Tons/ Entry Foot[3]	Comments
Lower Kittanning Seam																			
12-052-KL	5.25			*1.40*	15.42	3.38	12,541	5.39	17.16		82.38	7.11	1.31	13,870	1.89	17.72			Top Split
12-052-KL	na			*1.49*	23.95	5.12	11,638	8.80	16.59		69.07	14.51	2.35	13,222	3.55	17.44			Bottom Split
12-052-KL	na			*1.42*	17.02	3.71	12,372	5.99	17.05		79.88	8.50	1.51	13,749	2.19	17.67		0.00	Composite; hole location only with no data (but quality data).
DH_0863	2.67			*1.47*	21.95	4.18	11,942	7.00	16.25		71.84	9.75	1.81	14,136	2.56	17.15			Top Lift
DH_0863	0.96			*1.48*	23.38	3.57	11,859	6.02	15.45		70.53	13.42	2.08	13,553	3.07	17.04			Bottom Lift
DH_0863	3.63	5.42	5.42	*1.47*	22.38	4.00	11,917	6.71	16.01		71.44	10.86	1.89	13,960	2.71	17.12		3.47	Composite
DH_0864	3.38			*1.39*	13.74	2.84	13,435	4.23	16.67		83.85	7.84	1.55	14,457	2.14	17.22			Top Lift
DH_0864	0.46			*1.67*	42.42	5.70	8,270	13.78	14.08		38.83	9.92	2.22	14,069	3.16	16.91			Middle Lift
DH_0864	1.00			*1.53*	28.29	3.98	10,885	7.31	14.39		65.50	14.52	2.73	13,309	4.10	16.28			Bottom Lift, Lost 5" of core
DH_0864	4.83	5.83	5.83	*1.45*	19.90	3.41	12,337	5.52	15.97		74.87	9.14	1.82	14,229	2.56	17.03		3.85	Composite
DH_0873-D	0.83			*1.56*	30.74	1.57	10,530	2.98	14.47		43.69	13.13	1.15	13,573	1.69	15.96			Top Lift
DH_0873-D	2.83			*1.38*	13.10	4.33	13,515	6.41	17.62		88.49	8.14	1.62	14,348	2.26	17.69			Bottom Lift, lost 5" of core
DH_0873-D	3.67	3.66	3.66	*1.43*	17.70	3.61	12,736	5.67	16.80		76.80	9.44	1.50	14,146	2.12	17.24		2.44	Composite
DH_0879_KL	2.67			*1.43*	17.51	3.33	12,700	5.24	16.65		77.22	7.88	1.60	14,341	2.23	17.39			Top Lift
DH_0879_KL	0.42			*1.48*	23.40	6.86	11,572	11.86	17.18		66.84	10.69	2.59	14,046	3.69	18.09			Middle Lift
DH_0879_KL	1.02			*1.52*	26.54	2.17	11,333	3.83	14.36		59.05	11.43	1.72	13,827	2.49	17.23			Bottom Lift
DH_0879_KL	4.10	4.42	4.42	*1.45*	20.34	3.44	12,245	5.61	16.15		71.68	9.05	1.74	14,184	2.45	17.43		2.80	Composite
DH_0881_KL	3.40			*1.38*	13.11	3.79	13,528	5.60	17.41		85.02	7.87	1.67	14,437	2.31	17.77			Top Lift
DH_0881_KL	0.52			*1.51*	25.56	5.29	11,421	9.26	15.58		57.02	13.81	3.01	13,396	4.49	17.12			Bottom Lift
DH_0881_KL	3.92	4.58	4.58	*1.40*	14.84	4.00	13,235	6.04	17.16		81.12	8.70	1.86	14,292	2.60	17.68		3.16	Composite
			Average	**1.44**	**19.02**	**3.52**	**12,491**	**5.64**	**16.48**		**75.18**	**9.44**	**1.76**	**14,162**	**2.49**	**17.30**		**3.15**	
			Moist Basis (8%)		**17.50**	**3.24**	**11,491**	**5.19**	**15.16**		**75.18**	**8.68**	**1.62**	**13,029**	**2.49**	**15.92**			
			Maximum	1.45	20.34	3.61	12,736	5.67	16.80		81.12	10.86	1.89	14,292	2.71	17.68		3.85	
			Minimum	1.43	17.70	3.44	12,245	5.61	16.15		71.44	8.70	1.50	13,960	2.12	17.03		2.44	
			No. of Samples	2	2	2	2	2	2		5	5	5	5	5	5		5	

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

Gray lines indicate the benches that were composited together to show mineable section.

Corsa Coal Corporation

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Schrock Run Area

Lower Freeport and Upper Kittanning Seam

Table 3Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.55 Float)							Clean	
		Mapped																Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Foot[3]	Comments
Lower Freeport Seam																			
05273-D	0.42			*1.43*	18.42	3.39	12,488	5.43	17.40		75.35	11.51	2.17	13,732	3.16	18.16			Top Lift
05273-D	1.67			*1.36*	10.88	2.56	13,836	3.70	17.68		91.02	7.49	1.11	14,435	1.54	18.00			Bottom Lift
05273-D	2.09	3.50	3.50	*1.37*	12.28	2.71	13,585	4.00	17.63		88.11	8.24	1.31	14,304	1.83	18.03		2.58	Composite
0795-D	2.50	3.42	3.42	*1.32*	7.41	0.69	14,511	0.95	17.62		98.34	6.71	0.67	14,635	0.92	17.70		2.71	Located too far north of property
0891-D	0.81			*1.65*	40.08	1.53	8,539	3.58	13.68		49.70	11.06	0.85	13,816	1.23	17.40			Top Lift
0891-D	2.35			*1.34*	9.20	1.14	14,048	1.62	16.55		93.58	6.85	0.73	14,443	1.01	16.83			Bottom Lift
0891-D	3.16	3.25	3.25	*1.43*	17.63	1.25	12,544	1.99	15.77		81.60	8.00	0.76	14,272	1.07	16.99		2.30	Located too far north of property
0898-D	2.33	4.00	0.00	*1.35*	9.86	1.31	13,822	1.90	18.33		95.24	7.85	0.75	14,168	1.06	18.53		3.13	
09329_WF	3.60	3.67	3.67	*1.32*	7.17	0.53	14,134	0.75	17.81		99.17	6.80	0.53	14,201	0.75	17.50		2.93	
09346_PH	3.15	3.17	3.17	*1.31*	6.39	0.55	14,487	0.76	18.38		97.63	5.06	0.53	14,721	0.72	18.57		2.48	
12043_MM	2.90	2.90	2.90	*1.30*	4.87	0.57	14,697	0.78	18.79		99.04	4.44	0.55	14,771	0.74	18.85		2.27	
			Average	**1.34**	**9.01**	**0.72**	**13,966**	**1.07**	**17.69**		**94.36**	**6.51**	**0.74**	**14,454**	**1.02**	**17.99**		**2.51**	
			Moist Basis (8%)		8.29	0.67	12,848	0.98	16.27		94.36	5.99	0.68	13,298	1.02	16.55			
			Maximum	1.43	17.63	1.25	14,697	1.99	18.79		99.17	8.24	1.31	14,771	1.83	18.85		2.93	
			Minimum	1.30	4.87	0.53	12,544	0.75	15.77		81.60	4.44	0.53	14,201	0.72	16.99		2.27	
			No. of Samples	4	4	4	4	4	4		4	5	5	5	5	5		5	
Upper Kittanning Seam																			
0652-D	1.46			*1.39*	13.82	2.82	13,375	4.22	16.15		87.76	9.80	1.32	1,400	18.86	16.37			Top Lift
0652-D	2.75			*1.37*	11.50	1.52	13,758	2.21	16.83		93.05	8.95	0.83	14,200	1.17	17.08			Bottom Lift
0652-D	4.21	5.67	4.17	*1.37*	12.22	1.93	13,638	2.82	16.62		91.40	9.22	0.98	10,201	1.93	16.86		4.33	Composite; Hole located in Spoerlin area
08108_WF	3.88	3.88	3.88								93.76	8.75	1.18			18.98			Hole falls in Will Farm Area to east
08115_WF	4.58	4.58	4.58								95.86	8.10	0.85			18.04			Hole falls in Will Farm Area to east
08125_WF	3.00										83.45	9.00	1.69			20.21			Hole falls in Will Farm Area to east
08138_WF	2.00	2.00	2.00								85.92	8.81	1.70			21.25			Hole falls in Will Farm Area to east
09314_PH	2.10	2.33	2.33	*1.36*	11.37	3.04	13,797	4.41	20.69		90.17	8.09	1.12	14,361	1.56	21.05		1.74	
09318_PH	1.10			*1.40*	15.26	5.27	13,097	8.05	21.13		79.21	7.27	1.70	14,541	2.34	22.33			Top Lift
09318_PH	2.55			*1.36*	11.38	2.09	13,784	3.03	19.97		92.45	8.89	0.88	14,216	1.24	20.22			Bottom Lift
09318_PH	3.65	3.92	3.92	*1.37*	12.46	2.97	13,593	4.38	20.29		88.77	8.44	1.11	14,306	1.55	20.81		2.91	Composite
09321_PH	2.10	2.17	2.17	*1.37*	12.19	3.44	13,565	5.07	21.09		89.16	9.05	1.27	14,091	1.80	21.45		1.62	
09329_WF	1.90	1.92	1.92	*1.37*	12.38	3.37	13,578	4.96	20.73		89.22	8.15	1.27	14,323	1.77	21.22		1.43	
09342_PH	2.70	2.83	2.83	*1.36*	11.03	2.72	13,854	3.93	20.57		93.79	8.27	0.85	14,315	1.19	20.72		2.20	
09346_PH	2.50	2.67	2.67	*1.38*	12.52	2.02	13,483	3.00	17.22		90.13	9.25	0.68	14,063	0.97	17.51		2.01	
09350_PH	2.40	2.42	2.42	*1.36*	10.90	2.18	13,776	3.16	18.00		93.82	8.76	1.15	14,139	1.63	18.17		1.88	
09355_PH	2.30	2.33	2.33	*1.35*	10.37	1.74	13,822	2.52	17.26		94.54	8.45	0.80	14,162	1.13	17.38		1.82	
09357_PH	1.35			*1.41*	15.70	2.54	12,881	3.94	15.24		86.15	10.10	0.90	13,844	1.30	15.74			Top Lift
09357_PH	0.65			*1.80*	55.05	2.83	6,079	9.31	12.07		37.78	16.02	3.76	12,976	5.80	16.83			Bottom Lift
09357_PH	2.00	3.00	3.00	*1.57*	32.48	2.66	9,980	5.34	13.89		65.52	12.62	2.12	13,474	3.15	16.20		1.88	Composite

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Schrock Run Area

Lower Freeport and Upper Kittanning Seam

Table 3Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.55 Float)							Clean	
		Mapped																Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr. [1] [2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Foot[3]	Comments
09364_PH	2.60	0.60		*1.36*	10.74	1.84	13,802	2.67	17.38		93.82	8.55	0.98	14,179	1.38	17.56			Top Lift
09364_PH	0.65			*1.81*	56.36	3.06	5,812	10.53	11.92		29.48	17.81	4.03	12,679	6.36	17.10			Bottom Lift
09364_PH	3.25	3.17	3.17	*1.48*	22.89	2.16	11,674	3.71	15.93		76.69	11.02	1.79	13,780	2.60	17.44		2.19	Composite
09366_PH	3.80			*1.38*	13.47	2.12	13,344	3.18	16.34		88.92	9.39	1.13	14,095	1.60	16.58			Top Lift
09366_PH	0.30			*1.85*	60.48	1.36	4,891	5.56	10.68		8.63	15.81	2.96	13,012	4.55	16.17			Bottom Lift
09366_PH	4.10	4.08	4.08	*1.44*	18.53	2.04	12,434	3.28	15.73		80.28	10.08	1.33	13,978	1.90	16.54		2.86	Composite
09368_PH	3.10			*1.36*	11.48	2.40	13,696	3.50	16.80		91.99	8.84	1.09	14,155	1.54	16.95			Top Lift
09368_PH	0.50			*1.83*	58.00	2.68	5,507	9.73	11.30		21.81	22.09	4.07	11,947	6.81	16.05			Bottom Lift
09368_PH	3.60	3.58	3.58	*1.46*	21.16	2.46	11,993	4.10	15.66		77.39	11.60	1.71	13,696	2.50	16.76		2.47	Composite
09370_PH	3.20			*1.36*	10.62	1.65	13,874	2.38	16.94		94.80	8.98	0.92	14,150	1.30	17.07			Top Lift
09370_PH	0.70			*1.69*	44.18	4.11	8,080	10.17	13.19		38.06	17.63	4.53	12,763	7.10	17.17			Bottom Lift
09370_PH	3.90	3.92	3.92	*1.44*	18.58	2.23	12,500	3.57	16.05		81.34	11.03	1.78	13,821	2.57	17.09		2.79	Composite
09372_WF	1.80			*1.38*	13.32	1.85	13,384	2.76	16.32		92.65	11.32	1.11	13,722	1.62	16.54			Top Lift
09372_WF	0.90			*1.68*	42.85	3.16	8,324	7.59	13.57		40.17	15.98	3.50	13,024	5.37	17.36			Bottom Lift
09372_WF	2.70	3.92	3.92	*1.51*	25.58	2.39	11,283	4.24	15.18		70.86	13.25	2.10	13,432	3.13	16.88		2.55	Composite
09375_PH	2.75	2.75	2.75	*1.36*	11.13	2.28	13,917	3.28	18.21		92.82	8.77	0.96	14,318	1.34	18.39		2.12	
09378_PH	2.60	2.58	2.58	*1.35*	10.01	2.16	14,015	3.08	17.85		93.31	7.77	0.78	14,415	1.08	17.93		1.98	
10141-D	4.50	4.50	4.50								81.04	9.28	1.53			17.97			
10152-D	3.60	3.60	3.60	*1.47*	22.22	2.95	11,840	4.98	15.44		82.46	13.40	1.74	13,351	2.61	16.09		2.66	Located Pleasant Hill / Yachere Area
10153-D	3.60	3.60	3.60	*1.49*	24.01	2.89	11,459	5.04	15.77		75.47	12.60	1.93	13,519	2.86	17.10		2.46	Located Pleasant Hill / Kimberly Run Area
10154-D	4.30	4.30	4.30	*1.57*	31.90	3.47	10,328	6.72	14.57		61.51	12.23	2.01	13,751	2.92	16.92		2.53	Located Pleasant Hill / Kimberly Run Area
11-133-D	3.40	3.40	3.40								74.39	11.12	1.21			16.63			Hole located Will Farm Area
12043_MM	2.90	2.90	2.90	*1.56*	31.40	2.37	10,306	4.60	14.13		61.63	11.17	1.64	13,758	2.38	16.77		1.70	Hole located Mega Area
			Average	**1.39**	**14.08**	**2.45**	**13,262**	**3.70**	**18.08**		**87.93**	**9.45**	**1.32**	**14,042**	**1.87**	**18.67**		**2.15**	
			Moist Basis (8%)		**12.95**	**2.25**	**12,201**	**3.40**	**16.63**		**87.93**	**8.70**	**1.22**	**12,919**	**1.88**	**17.17**			
			Maximum	1.48	22.89	3.44	14,015	5.07	21.09		95.86	13.25	2.12	14,415	3.15	21.45		2.91	
			Minimum	1.35	10.01	1.74	11,674	2.52	15.66		76.69	7.77	0.68	13,432	0.97	16.20		1.43	
			No. of Samples	13	13	13	13	13	13		18	21	21	16	16	21		16	

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

Gray lines indicate the benches that were composited together to show mineable section.

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Surface-Highwall Mineable Quality (In-Seam Quality, Dry Basis)

Hamer Area

Upper Kittanning and Middle Kittanning Seams

Table 4Q

	Thickness (In Feet)		Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.55 Float)							
Drill Hole	Total Analyzed	Total Seam Coal	Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Comments
Upper Kittanning Seam																	
WCE-ALB-2			*1.48*	22.94						77.50	9.73	1.57	14,137	2.22	21.90		Quallity from Acosta Property
WCE-ALB-7			*1.46*	20.64						78.80	9.50	2.23	14,157	3.15	23.50		Quallity from Acosta Property
DH 26	2.67		*1.43*	17.88	3.14	12,587	4.99			82.20	7.46	1.32	14,526	1.82			
DH 29	2.75		*1.40*	15.40	0.97	12,292	1.58										
Byers 1	3.00		*1.37*	11.63	3.48			22.73		83.50	7.25	1.82			23.59		
		Average	***1.43***	**17.70**	**2.53**	**12,440**	**3.28**	**22.73**		**80.50**	**8.49**	**1.74**	**14,273**	**2.40**	**23.00**		
		Moist Basis (8%)		**16.28**	**2.33**	**11,444**	**3.02**	**20.91**		**80.50**	**7.81**	**1.60**	**13131**	**2.20**	**21.16**		
		Maximum	*1.48*	22.94	3.48	12,587	4.99	22.73		83.50	9.73	2.23	14,526	3.15	23.59		
		Minimum	*1.37*	11.63	0.97	12,292	1.58	22.73		77.50	7.25	1.32	14,137	1.82	21.90		
		No. of Samples	5	5	3	2	2	1		4	4	4	3	3	3		
Middle Kittanning Seam																	
Hamer-Q1-MK	74.0'-76.8'		*1.48*	23.18						59.22	7.68	0.74	14,522	1.02	18.61		Clean Coal Composite
Hamer-Q3-MK	74.0'-76.7'		*1.45*	20.35						**64.47**	7.73	0.70	14,458	0.97	17.37		Clean Coal Composite
Hamer-Q4-MK	79.0'-82.4'		*1.46*	20.89						**62.39**	7.70	0.90	14,401	1.25	17.07		Clean Coal Composite
		Average	***1.46***	**21.47**						**62.03**	**7.70**	**0.78**	**14,460**	**1.08**	**17.68**		
		Moist Basis (8%)		**19.76**						**62.03**	**7.09**	**0.72**	**13304**	**0.99**	**16.27**		
		Maximum	*1.48*	23.18						64.47	7.73	0.90	14,522	1.25	18.61		
		Minimum	*1.45*	20.35						59.22	7.68	0.70	14,401	0.97	17.07		
		No. of Samples	3	3						3	3	3	3	3	3		

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

Washed Quality, Dry Basis (1.45,1.80,1.50 Float) represents a composite of three screen & float analysis - (1) 3/8in x 16M screen data @ 1.55 s.g. (2) 16M x 100 M screen data @ 1.80 s.g. (3) 100M x 0 @ 1.50 s.g.

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Blue Lick Area

Table 5Q

Drill Hole	Thickness (In Feet) PBS Rpt.[4]	Mapped Total Seam	Mapped Total Coal	Raw Quality, Dry Basis Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Washed Quality, Dry Basis (1.50 Float) % Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Clean Tons/ Entry Foot[3]	Comments
Sewickley Seam																			
Drill Holes																			
DH_9890	4.80	4.80	4.80	*1.40*	14.78	1.20	13,134	1.83			90.90	10.57	1.15	13,904	1.65			3.71	
DH_9891	5.35	5.35	5.35	*1.44*	19.00	2.01	12,352	3.25											
DH_9892	4.70	4.70	4.70	*1.41*	15.62	1.43	12,982	2.20			84.41	7.88	0.95	14,317	1.33			3.40	
DH_9893	5.30	5.30	5.30	*1.44*	18.66	1.60	12,542	2.55			81.94	8.69	1.16	14,224	1.63			3.80	
DH_9899	1.80	1.80	1.80	*1.40*	14.86	1.16	13,055	1.78											
			Average	**1.42**	**16.58**	**1.48**	**12,813**	**2.32**			**85.75**	**9.05**	**1.09**	**14,148**	**1.54**			**3.64**	
			Moist Basis (8%)		**15.26**	**1.36**	**11,788**	**2.14**			**85.75**	**8.32**	**1.00**	**13,016**	**1.41**				
			Maximum	1.44	19.00	2.01	13,134	3.25			90.90	10.57	1.16	14,317	1.65			3.80	
			Minimum	1.40	14.78	1.16	12,352	1.78			81.94	7.88	0.95	13,904	1.33			3.40	
			No. of Samples	5	5	5	5	5			3	3	3	3	3			3	
Redstone Seam																			
Drill Holes																			
DH_98100	1.40			*1.43*	17.60	2.51	12,703	3.95			92.68	15.60	2.13	13,069	3.26				1.55 Float; CoalQuality.xls
DH_98100	2.60			*1.41*	15.67	1.45	13,024	2.23			89.28	11.80	1.17	13,704	1.71				1.55 Float; CoalQuality.xls
Comp	4.00	4.00	4.00	*1.41*	16.35	1.82	12,912	2.83			90.47	13.13	1.51	13,482	2.25			3.11	
DH_98101	0.90			*1.44*	18.95	3.46	12,408	5.58			86.39	15.63	2.68	13,024	4.12				1.55 Float; CoalQuality.xls
DH_98101	2.80			*1.42*	17.31	2.19	12,741	3.44			85.59	12.16	1.57	13,658	2.30				1.55 Float; CoalQuality.xls
Comp	3.70	3.70	3.70	*1.43*	17.71	2.50	12,660	3.96			85.78	13.00	1.84	13,504	2.74			2.76	
DH_98102	1.20			*1.47*	21.80	3.81	11,929	6.39			78.89	16.79	3.09	12,825	4.82				1.55 Float; CoalQuality.xls
DH_98102	3.10			*1.39*	14.06	1.27	13,285	1.91			91.21	10.73	1.09	13,854	1.57				1.55 Float; CoalQuality.xls
Comp	4.30	4.30	4.30	*1.41*	16.22	1.98	12,907	3.16			87.77	12.42	1.65	13,567	2.48			3.24	
DH_98104	1.00			*1.46*	21.01	3.16	12,084	5.23			81.97	16.03	2.55	12,977	3.93				1.55 Float; CoalQuality.xls
DH_98104	3.40			*1.40*	14.98	1.64	13,205	2.48			89.31	11.69	1.31	13,787	1.90				1.55 Float; CoalQuality.xls
Comp	4.40	4.40	4.40	*1.41*	16.35	1.99	12,950	3.11			87.64	12.68	1.59	13,603	2.36			3.32	
DH_9894	1.20			*1.48*	22.93	3.74	11,741	6.37			74.83	17.12	3.22	12,756	5.05				1.55 Float; CoalQuality.xls
DH_9894	3.00			*1.42*	16.91	1.93	12,831	3.01			85.62	11.05	1.25	13,873	1.80				1.55 Float; CoalQuality.xls
Comp	4.20	4.20	4.20	*1.44*	18.63	2.45	12,520	3.97			82.54	12.78	1.81	13,554	2.73			3.03	
DH_9895	1.20			*1.46*	21.05	4.06	12,075	6.72			85.22	16.76	1.81	12,883	2.81				1.55 Float; CoalQuality.xls
DH_9895	3.20			*1.41*	15.72	2.10	13,014	3.23			86.77	10.86	1.25	13,902	1.80				1.55 Float; CoalQuality.xls
Comp	4.40	4.40	4.40	*1.42*	17.17	2.63	12,758	4.18			86.35	12.47	1.40	13,624	2.07			3.29	
DH_9896	1.00			*1.46*	20.93	3.61	12,085	5.97			84.71	16.93	2.96	12,825	4.62				1.55 Float; CoalQuality.xls
DH_9896	3.15			*1.42*	16.89	1.83	12,783	2.86			86.90	11.82	1.30	13,659	1.90				1.55 Float; CoalQuality.xls
Comp	4.15	4.15	4.15	*1.43*	17.86	2.26	12,615	3.61			86.37	13.05	1.70	13,458	2.56			3.12	

Corsa Coal Corporation

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Blue Lick Area

Table 5Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.50 Float)							Clean	
		Mapped		Sp. Gr. [1]	%	%		S02/mm	%	%	%	%	%		S02/mm	%	%	Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	[2]	Ash	Sulfur	BTU/lb.	BTU	Vol.	FC	Rec.[2]	Ash	Sulfur	BTU/lb.	BTU	Vol.	FC	Foot[3]	Comments
DH_9899	1.20			*1.44*	18.92	2.72	12,481	4.36			87.62	15.51	2.15	13,100	3.28				1.55 Float; CoalQuality.xls
DH_9899	2.90			*1.40*	15.17	1.97	13,091	3.01			89.69	11.38	1.46	13,758	2.12				1.55 Float; CoalQuality.xls
Comp	4.10	4.10	4.10	*1.41*	16.27	2.19	12,912	3.40			89.08	12.59	1.66	13,565	2.46			3.14	
W1	1.30			*1.53*	28.28	9.87	10,913	18.09			61.86	18.50	4.33	12,646	6.85				1.55 Float; CoalQuality.xls
W1	3.25			*1.47*	22.01	3.74	11,938	6.27			77.15	14.20	2.60	13,254	3.92				1.55 Float; CoalQuality.xls
Comp	4.55	5.70	5.70	*1.49*	23.80	5.49	11,645	9.64			72.78	15.43	3.09	13,080	4.76			3.76	
			Average	**1.43**	**17.82**	**2.59**	**12,653**	**4.21**			**85.42**	**13.06**	**1.81**	**13,493**	**2.71**			**3.20**	
			Moist Basis (8%)		**16.39**	**2.38**	**11,641**	**3.87**			**85.42**	**12.02**	**1.66**	**12,414**	**2.50**				
			Maximum	1.49	23.80	5.49	12,950	9.64			90.47	15.43	3.09	13,624	4.76			3.76	
			Minimum	1.41	16.22	1.82	11,645	2.83			72.78	12.42	1.40	13,080	2.07			2.76	
			No. of Samples	9	9	9	9	9			9	9	9	9	9			9	

* Only Locations provided

** Only Quality provided

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

Gray lines indicate the benches that were composited together to show mineable section.

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Downey Area

Upper Freeport, Lower Freeport Rider, Lower Freeport, Upper Kittanning and Middle Kittanning Seams

Table 6Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
		Mapped						SO2/mm								SO2/mm				Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	Foot[3]	Comments
Upper Freeport Seam																					
	1.95			*1.54*	28.93	5.55	10,644	10.43	18.62			60.32	15.31	3.46	13,110	5.28	18.55				Top Lift
	0.40			*1.51*	25.70	11.92	10,925	21.82	21.82			36.55	14.80	6.53	13,207	9.89	19.69				Bottom Lift; used in Glade & Downey - so top not used
DH_10320-DL	2.35	3.30	2.40	*1.53*	28.32	6.76	10,697	12.64	19.23			55.80	15.21	4.04	13,128	6.16	18.77			1.72	Composite from lab sheet
DH_10320-DL	2.35	3.30	2.40	*1.48*	23.31	10.71	10,697	20.02	17.19			57.36	15.25	3.84	13,122	5.85	18.69			1.71	Stonycreek Qual
DH_10321-DL	1.20	1.50	1.50	*1.56*	30.99	5.86	10,422	11.25	17.35			55.06	14.65	3.81	13,145	5.80	19.73			0.78	Stonycreek
DH_10322-DL	1.20	1.50	1.50	*1.59*	33.90	7.17	9,773	14.67	19.33			45.76	14.92	3.56	13,198	5.39	21.49			0.66	Stonycreek
	2.80			*1.45*	19.89	3.40	12,407	5.48	17.83			80.90	11.17	2.50	13,913	3.59	19.21				Top Lift
	0.95			*1.56*	30.62	6.25	10,564	11.83	16.61			56.30	10.46	4.83	13,967	6.92	19.50				Bottom Lift
DH_10323-DL	3.75	5.00	5.00	*1.47*	22.38	4.06	11,979	6.78	17.55			75.19	11.01	3.04	13,926	4.37	19.28			3.37	Composite from lab sheet
DH_10323-DL	5.00	5.00	5.00	*1.53*	28.13	5.59	11,979	9.33	17.55			76.62	11.05	2.91	13,922	4.18	19.26			3.57	Stonycreek
	1.50			*1.47*	21.95	3.36	12,021	5.59	18.39			78.91	12.41	2.29	13,702	3.34	19.89				Top Lift
	0.95			*1.55*	30.44	6.84	10,433	13.11	17.00			58.97	13.83	4.44	13,432	6.61	18.97				Bottom Lift
DH_10325-DL	2.45	4.20	4.20	*1.49*	24.36	4.35	11,570	7.52	17.99			73.24	12.81	2.90	13,625	4.26	19.63			2.80	Composite from lab sheet
DH_10325-DL	4.20	4.20	4.20	*1.53*	28.03	5.35	11,570	9.25	17.99			74.35	12.73	2.78	13,640	4.08				2.91	Stonycreek
DH_10326-DL	1.30	1.50	1.50	*1.56*	30.64	6.50	10,283	12.64	16.10			61.09	14.42	3.29	13,260	4.96	18.01			0.87	Stonycreek; Glade & Downey
	2.85			*1.55*	29.89	5.90	10,450	11.29	15.94			58.64	12.25	2.43	13,652	3.56	18.05				Top Lift; Glade & Downey used this
	0.50			*1.59*	33.63	8.94	9,628	18.57	14.71			23.06	22.39	4.86	11,846	8.21	15.81				Bottom Lift
DH_10325-DL	3.35	4.60	4.60	*1.55*	30.43	6.34	10,330	12.28	15.76			53.46	13.73	2.78	13,389	4.16	17.72			2.33	Composite from lab sheet
DH_10327-DL	4.60	4.60	4.60	*1.58*	33.09	8.50	10,330	16.46	15.76			56.40	12.89	2.58	13,539	3.81	17.91			2.50	Stonycreek
10329_GD-DL	1.60	2.00	2.00	*1.64*	38.72	9.84	8,808	22.34	15.99			39.56	16.89	5.30	12,828	8.26	20.76			0.79	Glade & Downey
			Average	**1.56**	**30.85**	**7.44**	**10,483**	**14.50**	**17.16**			**61.55**	**14.10**	**3.51**	**13,332**	**5.29**	**19.41**			**1.72**	
			Moist Basis (8%)		**28.38**	**6.84**	**9,644**	**13.34**	**15.78**			**61.55**	**12.97**	**3.23**	**12,265**	**5.26**	**17.85**				
			Maximum	1.64	38.72	10.71	11,979	22.34	19.33			76.62	16.89	5.30	13,922	8.26	21.49			3.57	
			Minimum	1.48	23.31	5.35	8,808	9.25	15.76			45.76	11.05	2.58	12,828	3.81	17.91			0.66	
			No. of Samples	8	8	8	8	8	8			6	8	8	8	8	7			8	

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Downey Area

Upper Freeport, Lower Freeport Rider, Lower Freeport, Upper Kittanning and Middle Kittanning Seams

Table 6Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
		Mapped																		Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	SO2/mm BTU	% Vol.	% FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	SO2/mm BTU	% Vol.	% FC	FSI	Foot[3]	Comments
Lower Freeport Rider Seam																					
	0.60			*1.48*	23.14	4.74	11,580	18.62	16.47			75.57	17.44	1.18	12,678	1.86	19.17				Top Lift
	1.20			*1.50*	24.95	3.78	11,465	6.59	18.27			58.29	13.84	1.41	13,461	2.09	19.87				Bottom Lift; used in Glade & Downey - so top not used
DH_10320-DL	1.80	2.20	2.20	*1.49*	24.28	4.13	11,507	7.19	17.61			64.67	15.17	1.33	13,172	2.01	19.61			1.29	Composite from lab sheet
DH_10320-DL	1.80	2.20	2.20	*1.49*	23.81	4.39	11,507	7.63	18.40			65.74	15.39	1.31	13,123	2.00	19.57			1.31	Stonycreek
DH_10321-DL	1.40	1.60	1.60	*1.83*	57.82	2.54	5,514	9.21	11.80			23.92	19.15	1.13	12,385	1.82	18.15			0.43	1.55 Float Glade & Downey & Stonycreek
DH_10322-DL	2.40	2.70	2.70	*1.81*	55.89	4.08	5,850	13.95	12.45			29.29	12.58	1.48	13,402	2.21	19.40			0.87	1.55 Float Glade & Downey & Stonycreek
DH_10324-DL	1.10	1.10	1.10	*1.58*	32.84	3.36	10,062	6.68	17.50			43.35	16.71	1.12	12,866	1.74	20.09			0.46	Stonycreek
	0.60			*1.48*	23.18	2.68	11,629	18.62	17.46			82.06	18.20	1.73	12,522	2.76	17.95				Top Lift
	0.70			*1.50*	24.95	3.78	11,465	6.59	18.27			58.29	13.84	1.41	13,461	2.09	19.87				Bottom Lift
DH_10326-DL	1.30	2.30	2.30	*1.49*	24.02	3.20	11,551	5.54	17.84			70.79	16.13	1.58	12,967	2.43	18.86			1.48	Composite from lab sheet
DH_10326-DL	2.30	2.30	2.30	*1.53*	27.62	5.63	10,440	10.79	18.47			69.95	15.25	1.50	13,055	2.30	18.60			1.49	Stonycreek
			Average	**1.65**	**39.60**	**4.00**	**8,675**	**9.65**	**15.72**			**46.45**	**15.82**	**1.31**	**12,966**	**2.01**	**19.16**			**0.91**	
			Moist Basis (8%)		**36.43**	**3.68**	**7,981**	**8.88**	**14.47**			**46.45**	**14.55**	**1.20**	**11,929**	**2.02**	**17.63**				
			Maximum	1.83	57.82	5.63	11,507	13.95	18.47			69.95	19.15	1.50	13,402	2.30	20.09			1.49	
			Minimum	1.49	23.81	2.54	5,514	6.68	11.80			23.92	12.58	1.12	12,385	1.74	18.15			0.43	
			No. of Samples	5	5	5	5	5	5			5	5	5	5	5	5			5	
Lower Freeport Seam																					
	2.60			*1.33*	8.39	2.84	14,142	18.62	19.99			91.89	5.21	1.02	14,697	1.39	20.29				Top Lift; Glade & Downey used this quality
	0.45			*1.54*	29.11	13.19	10,888	24.23	18.37			32.89	15.88	6.64	13,104	10.13	19.81				Bottom Lift
09462_GD-D	3.05	3.50	3.50	*1.37*	11.86	4.57	13,597	6.73	19.72			82.00	7.00	1.96	14,430	2.72	20.21			2.39	Composite from lab sheet
09462_GD-D	3.50	3.50	3.50	*1.51*	25.64	11.46	13,597	16.86	19.72			87.92	5.93	1.40	14,590	1.92	20.26				Stonycreek
1039_GD-D	2.20	2.25	2.25	*1.38*	12.74	4.51	13,548	6.66	19.27			84.87	7.19	1.50	14,520	2.07	19.90			1.60	Glade & Downey; Stonycreek
DH_10251-DL	1.90	1.90	1.90	*1.37*	11.74	2.37	13,620	3.48	17.44			86.05	5.83	0.93	14,596	1.27	18.09			1.36	Glade & Downey (1.0' Total); Stoney (1.9' Total)
DH_10252-DL	2.20	2.20	2.20	*1.35*	10.41	2.81	13,832	4.06	18.89			88.05	5.65	1.22	14,625	1.67	19.47			1.60	Glade & Downey
DH_10257-DL	4.20	4.20	4.20	*1.71*	46.22	2.58	7,804	6.61	12.79			43.81	8.10	1.84	14,240	2.58	18.04			1.92	Lost 0.4' of core Glade & Downey; Stonycreek
DH_10259-DL	2.70	2.70	2.70	*1.52*	27.14	2.32	10,776	4.31	15.28			66.74	7.14	1.23	14,328	1.72	17.12				Glade & Downey; Stonycreek
DH_10260-DL	2.40	2.40	2.40	*1.34*	9.40	2.64	14,037	3.76	17.31			90.62	5.49	0.89	14,699	1.21	17.47				Lost 0.8' of core; Glade & Downey; Stonycreek
DH_10261	2.50	2.50	2.50	*1.35*	9.95	2.23	13,974	3.19	16.42			89.93	6.06	0.73	14,619	1.00	16.71			1.85	Stonycreek
DH_10264-DL	2.80	2.80	2.80	*1.36*	10.77	2.10	13,802	3.04	16.40			88.21	6.24	0.68	14,587	0.93	16.70			2.04	Stzman-Lowery; Stonycreek
10300_GD-D	1.65	2.00	2.00	*1.39*	14.34	3.74	13,296	5.63	20.42			74.22	6.87	1.80	14,696	2.45	21.49			1.26	Glade & Downey (1.65' Total); Stonycreek (2.00' Total)
10301_GD-D	3.90	3.90	3.90	*1.45*	19.58	4.56	12,372	7.37	20.50			72.42	8.65	2.29	14,333	3.20	22.39			2.49	Lost 0.3' of core; Glade & Downey; Stonycreek
	2.50			*1.39*	13.65	3.86	13,448	18.62	22.09			81.51	7.66	1.87	14,542	2.57	23.20				Top Lift; Glade & Downey used this quality
	1.10			*1.61*	36.11	3.54	9,585	7.39	17.80			59.41	16.37	3.45	12,999	5.31	21.66				Bottom Lift
10302_GD-D	3.60	3.60	3.60	*1.46*	21.21	3.75	12,147	6.18	20.65			74.07	10.59	2.40	14,023	3.43	22.68			2.37	Composite from lab sheet
10302_GD-D	3.60	3.60	3.60	*1.54*	28.55	3.65	12,147	6.01	20.65			75.54	10.01	2.30	14,125	3.26	22.78			2.54	Stonycreek

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Downey Area

Upper Freeport, Lower Freeport Rider, Lower Freeport, Upper Kittanning and Middle Kittanning Seams

Table 6Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
		Mapped						SO2/mm								SO2/mm				Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr. [1] [2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	Foot[3]	Comments
	2.50			*1.38*	12.55	3.73	13,502	18.62	20.97			83.10	7.17	1.85	14,521	2.55	21.74				Top Lift; Glade & Downey used this quality
	1.20			*1.66*	40.82	4.95	8,662	11.43	15.88			41.81	16.57	4.40	12,947	6.80	20.11				Bottom Lift
10302_GD-D	3.70	3.80	3.80	*1.48*	22.61	4.16	11,780	7.07	19.16			68.41	10.51	2.76	13,961	3.95	21.16			2.34	Composite from lab sheet
10304_GD-D	3.80	3.80	3.80	*1.56*	30.73	4.51	11,774	7.66	19.15			74.08	9.22	2.41	14,177	3.40	21.38			2.67	Stonycreek
	1.55			*1.37*	12.37	3.32	13,651	18.62	19.72			87.06	8.01	1.68	14,476	2.32	20.29				Top Lift; Glade & Downey used this quality
	1.05			*1.69*	43.72	5.60	8,244	13.59	15.04			32.30	17.27	5.36	12,793	8.38	19.90				Bottom Lift
10302_GD-D	2.60	3.80	3.80	*1.52*	27.09	4.39	11,113	7.90	17.52			61.35	12.36	3.41	13,686	4.98	20.11			2.16	Composite from lab sheet
10305_GD-D	3.50	3.50	3.50	*1.54*	29.00	4.53	11,113	8.15	17.52			73.53	10.30	2.59	14,060	3.68	20.19			2.41	Stonycreek
DH_10310-DL	2.25	2.40	2.40	*1.36*	10.78	2.74	13,927	3.93	19.06			88.07	6.32	1.23	14,754	1.67	19.51			1.75	1.55 Stuzman-Lowery; Stoney
DH_10311-DL	1.70	3.20	3.20	*1.60*	35.35	6.89	9,486	14.53	15.63			43.66	10.65	2.80	13,964	4.01	18.63			1.36	Lost 1.5' of core; 1.55 Stuzman-Lowery; Stoney
DH_10316-DL	1.90	1.90	1.90	*1.45*	19.66	7.15	12,510	11.43	17.89			65.82	6.53	1.60	14,670	2.18	19.51			1.10	Lost 0.8' of core; Glade & Downey; Stonycreek
DH_10317-DL	2.00	2.30	2.30	*1.37*	11.57	1.52	13,694	2.22	18.13			84.77	5.56	0.82	14,730	1.11	18.99			1.62	Glade & Downey; Stonycreek
	3.90			*1.37*	12.40	4.48	13,603	18.62	18.59			81.16	5.90	1.30	14,711	1.77	19.25				Top Lift; Glade & Downey used this quality
	1.00			*1.66*	40.91	2.98	8,680	6.87	13.40			49.28	20.51	2.67	12,189	4.38	15.87				Bottom Lift
DH_10318-DL	4.90	5.20	5.20	*1.52*	26.94	3.72	11,092	6.70	15.94			64.90	13.35	2.00	13,425	2.98	17.53			3.12	Composite from lab sheet
DH_10318-DL	5.20	5.20	5.20	*1.51*	26.37	3.70	11,092	6.67	15.94			68.82	11.56	1.83	13,734	2.66	17.94			3.30	Stonycreek
DH_10319-DL	2.60	3.50	3.50	*1.36*	10.83	2.20	13,785	3.19	19.11			88.76	5.42	1.22	14,699	1.66	19.85			2.57	Glade & Downey; Stonycreek
DH_10320-DL	3.40	3.40	3.40	*1.37*	12.28	3.62	13,586	5.33	18.55			85.52	7.10	2.14	14,445	2.96	18.99			2.43	Lost 1.5' of core; Glade & Downey; Stonycreek
	1.20			*1.44*	18.95	3.38	12,421	18.62	17.16			73.87	6.49	1.59	14,495	2.19	18.76				Top Lift; Glade & Downey used this quality
	1.70			*1.68*	42.97	5.45	8,254	13.21	14.58			38.50	19.22	3.43	12,436	5.52	16.79				Bottom Lift
DH_10321-DL	2.90	4.70	4.70	*1.60*	35.02	4.76	9,634	9.89	15.43			50.21	15.01	2.82	13,118	4.30	17.44			2.30	Composite from lab sheet
	2.20			*1.36*	10.88	3.14	13,882	18.62	18.83			87.31	6.46	1.76	14,633	2.41	19.54				Top Lift; Glade & Downey used this quality
	2.10			*1.61*	35.92	3.86	9,490	8.13	15.03			43.62	16.10	2.51	12,903	3.89	17.24				Bottom Lift
DH_10323-DL	4.30	4.60	4.60	*1.50*	24.65	3.54	11,467	6.17	16.74			63.28	11.76	2.17	13,682	3.18	18.28			2.65	Composite from lab sheet
DH_10323-DL	4.60	4.60	4.60	*1.47*	22.15	3.46	11,467	6.03	16.74			70.75	10.11	2.04	13,977	2.92	18.67			2.92	Stonycreek
	2.90			*1.36*	10.65	2.83	13,912	18.62	20.16			88.00	5.84	1.49	14,781	2.02	21.11				Top Lift; Glade & Downey used this quality
	1.00			*1.81*	56.01	2.32	6,117	7.59	12.59			21.63	20.60	3.02	12,175	4.96	17.40				Bottom Lift
DH_10324-DL	3.90	4.20	4.20	*1.48*	22.90	2.69	11,806	4.56	18.11			70.07	9.83	1.90	14,077	2.70	20.11			2.65	Composite from lab sheet
DH_10324-DL	4.20	4.20	4.20	*1.69*	43.76	2.46	11,806	4.17	18.11			82.47	7.07	1.62	14,564	2.22	20.80			3.56	Stonycreek
	1.90			*1.36*	11.22	2.69	13,768	18.62	18.06			85.41	6.11	1.42	14,689	1.93	18.74				Top Lift; Glade & Downey used this quality
	0.90			*1.63*	37.98	4.73	9,057	10.44	14.14			35.25	19.83	3.03	12,268	4.94	16.05				Bottom Lift
DH_10325-DL	2.80	3.30	3.30	*1.50*	25.29	3.76	11,292	6.66	16.00			59.05	13.32	2.27	13,417	3.38	17.33			1.78	Composite from lab sheet
DH_10325-DL	3.30	3.30	3.30	*1.49*	23.91	3.66	11,292	6.48	16.00			69.97	10.42	1.93	13,929	2.77	17.90			2.09	Stonycreek
10329_GD-DL	2.00	3.70	3.70	*1.35*	10.23	1.42	14,031	2.02	19.36			89.23	5.73	1.16	14,821	1.57	20.05			2.72	Glade & Downey; Stonycreek; analysis is TOP LIFT only

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Downey Area

Upper Freeport, Lower Freeport Rider, Lower Freeport, Upper Kittanning and Middle Kittanning Seams

Table 6Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
		Mapped						SO2/mm								SO2/mm				Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1][2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	Foot[3]	Comments
	1.80			*1.45*	19.75	2.41	12,369	18.62	16.69			76.14	6.97	1.31	14,595	1.80	18.70				Top Lift; Glade & Downey used this quality
	2.00			*1.68*	42.92	3.69	8,367	8.82	13.45			39.41	17.62	2.89	12,734	4.54	16.69				Bottom Lift
DH_10330-DL	3.80	3.90	3.90	*1.57*	31.66	3.07	10,311	5.95	15.02			57.26	12.45	2.12	13,638	3.11	17.67			2.13	Composite from lab sheet
DH_10330-DL	3.80	3.90	3.90	*1.54*	28.96	2.92	9,957	5.87	14.74			59.99	11.65	2.00	13,776	2.90	17.82			2.19	Stonycreek
DH_10331-DL	2.50	3.50	3.50	*1.38*	12.70	3.55	13,535	5.25	20.66			82.86	6.71	1.55	14,645	2.12	21.62			2.43	Glade & Downey; Stonycreek
	2.00			*1.34*	8.87	1.72	14,296	18.62	19.89			94.92	6.86	1.25	14,655	1.71	20.23				Top Lift; Glade & Downey used this quality
	1.00			*1.64*	38.55	7.50	8,945	16.77	16.19			37.27	18.59	5.91	12,510	9.45	19.12				Bottom Lift
10332_GD-DL	3.00	3.20	3.20	*1.47*	21.61	4.20	12,000	7.00	18.30			70.18	11.89	3.25	13,734	4.73	19.75			2.00	Composite from lab sheet
10332_GD-DL	3.20	3.20	3.20	*1.51*	25.81	5.02	12,000	8.37	18.30			81.78	9.53	2.13	14,166	3.01	19.98			2.40	Stonycreek
10344_GD-DL	2.20	2.90	2.90	*1.63*	38.12	2.86	9,084	6.30	13.65			55.54	12.99	2.46	13,559	3.63	16.44			1.60	Stzman-Lowery; Stonycreek
	1.80			*1.45*	19.96	5.33	12,312	18.62	19.30			71.34	8.32	1.55	14,254	2.17	20.65				Top Lift; Glade & Downey used this quality
	0.45			*1.53*	27.67	7.38	11,013	13.40	18.72			53.11	16.37	3.79	12,861	5.89	20.32				Bottom Lift
10332_GD-DL	2.25	3.20	3.20	*1.47*	21.93	5.86	11,979	9.78	19.15			66.67	10.38	2.12	13,897	3.06	20.57			1.91	Composite from lab sheet
DH_10336-DL	2.80	2.80	2.80	*1.51*	25.70	6.85	11,979	11.44	19.15			67.62	9.96	2.01	13,970	2.88	22.62			1.74	Stonycreek
DH_10337-DL	2.30	2.30	2.30	*1.39*	13.81	2.83	13,292	4.26	19.36			82.58	5.92	1.17	14,636	1.60	20.38			1.61	Glade & Downey; Stonycreek
DH_10339-DL	2.60	3.00	3.00	*1.55*	30.02	3.90	10,492	7.43	17.48			59.19	9.18	2.45	14,074	3.48	20.60			1.68	Glade & Downey (Sulfur=2.45%); Stonycreek (Sulfur 3.90%)
10341_GD-DL	3.20	3.20	3.20	*1.64*	38.65	3.57	9,072	7.87	14.83			49.20	16.46	2.80	12,955	4.32	18.01			1.57	Lost 1.4' of Coal; 1.55 Stuzman-Lowery; Stoney
10342_GD-DL	3.80	3.80	3.80	*1.70*	45.20	2.91	7,677	7.58	12.87			45.26	14.19	2.43	13,376	3.63	16.73			1.78	Lost 1.6' of core; 1.55 Stuzman-Lowery; Stoney
13066	2.83	2.83	2.83	*1.35*	9.69	3.54	14,097	5.02	19.52		7.0	88.26	5.95	1.49	14,745	2.02	19.91		7.0	2.05	1.55 Float
13067	2.33	2.33	2.33	*1.35*	9.68	2.80	14,036	3.99	18.35		7.0	90.66	5.78	1.42	14,690	1.93	18.80		8.0	1.73	1.55 Float
13069	2.92	2.92	2.92	*1.37*	11.84	3.70	13,678	5.41	18.75		7.0	82.46	5.10	1.10	14,802	1.49	19.56		8.0	2.01	1.55 Float
13073	2.83	2.83	2.83	*1.36*	11.38	3.79	13,794	5.50	18.63		7.0	83.93	6.13	1.41	14,685	1.92	18.98		8.0	1.97	1.55 Float
13076	2.75	2.75	2.76	*1.34*	9.30	3.12	14,114	4.42	19.07		7.0	90.13	5.68	1.49	14,710	2.03	19.49		8.0	2.03	1.55 Float
13077	2.50	2.50	2.50	*1.33*	8.27	2.96	14,369	4.12	19.62		8.0	91.95	5.80	1.36	14,782	1.84	19.87		9.0	1.86	1.55 Float
13078	2.92	2.92	2.92	*1.33*	7.95	2.60	14,434	3.60	19.53		7.0	93.27	5.37	1.02	14,868	1.37	19.66		8.0	2.20	1.55 Float
13079	2.92	2.92	2.92	*1.34*	9.39	2.87	14,197	4.04	18.88		8.0	89.36	5.57	1.29	14,842	1.74	19.39		9.0	2.13	1.55 Float
13080	2.08	2.08	2.08	*1.36*	10.79	3.21	13,858	4.63	18.71		8.0	88.75	5.16	1.24	14,808	1.67	19.38		9.0	1.53	1.55 Float
13081	3.17	3.17	3.17	*1.46*	20.81	3.20	12,126	5.28	17.50		6.0	71.64	5.48	1.02	14,813	1.38	19.56		9.0	2.02	1.55 Float
Average	2.73	2.73	2.73	1.36	10.91	3.18	13,870	4.60	18.86		7.20	87.04	5.60	1.28	14,775	1.74	19.46		8.30	1.95	1.55 Float, See Rheological Tables
DH_11210-DL	3.00	3.00	3.00	*1.53*	28.35	3.09	10,889	5.68	15.10			60.87	6.77	1.68	14,515	2.31	17.39			1.70	Stonycreek
DH_11220	2.50	2.50	2.50	*1.46*	20.90	3.92	12,302	6.37	15.70			74.70	6.31	0.84	14,664	1.15	17.15			1.66	Stonycreek
12248_GD	3.30	3.30	3.30	*1.54*	28.91	4.60	10,786	8.53	17.23			59.66	6.12	1.40	14,663	1.91	20.66			1.84	See Rheological Tables
			Average	**1.47**	**22.48**	**3.39**	**11,926**	**5.85**	**17.38**		**7.20**	**72.81**	**8.32**	**1.66**	**14,294**	**2.35**	**19.24**		**8.30**	**1.99**	
			Moist Basis (8%)		**20.68**	**3.12**	**10,972**	**5.38**	**15.99**			**72.81**	**7.66**	**1.53**	**13,150**	**2.33**	**17.70**				
			Maximum	1.71	46.22	6.85	13,974	11.44	20.66		7.20	89.93	16.46	2.80	14,775	4.32	22.78		8.30	3.30	
			Minimum	1.35	9.95	1.52	7,677	2.22	12.79		7.20	43.81	5.42	0.68	12,955	0.93	16.44		8.30	1.26	
			No. of Samples	29	29	29	29	29	29		1	29	29	29	29	29	29		1	28	

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Downey Area

Upper Freeport, Lower Freeport Rider, Lower Freeport, Upper Kittanning and Middle Kittanning Seams

Table 6Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
		Mapped						SO2/mm								SO2/mm				Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1][2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	Foot[3]	Comments
Upper Kittanning Seam																					
09460_GD-D	4.75	4.75	4.75	*1.60*	35.21	4.99	12,779	7.81	17.34			81.73	9.27	1.50	14,064	2.13	17.98			3.79	
09462_GD-D	5.92	5.92	5.92	*1.47*	22.35	5.95	13,500	8.81	17.16			89.87	9.19	1.52	14,139	2.15	17.42			4.77	
10300_GD-D	7.00	7.00	7.00	*1.44*	19.15	2.54	12,489	4.07	16.41			86.55	9.13	1.84	14,234	2.59	17.57			5.32	
10309_GD-D	4.60	4.60	4.60	*1.70*	45.08	3.89	12,160	6.40	15.68			83.15	10.27	1.70	13,963	2.44	16.79			3.96	
10332_GD-DL	7.20	7.20	7.20	*1.48*	22.78	2.82	11,843	4.76	16.26			83.70	11.80	1.91	13,749	2.78	17.69			5.42	
10340_GD-DL	3.50	3.50	3.50	*1.58*	33.48	3.28	9,978	6.57	13.91			57.44	10.40	1.48	13,828	2.14	16.45			1.94	
1039_GD-D	5.00	4.83	4.83	*1.38*	12.81	2.65	13,436	3.94	17.21			88.99	8.87	1.25	14,142	1.77	17.47			3.61	
11207_GD-DL	2.90	2.90	2.90	*1.47*	22.06	2.49	11,927	4.18	14.75			75.93	9.20	0.87	14,115	1.23	16.05			1.97	
12248_GB	5.20	5.20	5.20	*1.53*	28.19	3.26	10,913	5.97	14.40			64.02	10.96	1.82	13,857	2.63	16.22			3.10	See Rheological Tables
DH_10252-DL	4.40	4.40	4.40	*1.41*	16.46	2.87	12,725	4.51	16.02			82.81	9.49	1.57	13,916	2.26	16.58			3.14	
DH_10253-DL	4.50	4.50	4.50	*1.52*	26.63	2.71	11,153	4.86	14.14			68.95	9.64	1.47	13,963	2.11	15.69			2.86	
DH_10254-DL	4.70	4.40	4.40	*1.46*	20.62	2.11	12,066	3.50	15.19			75.73	8.82	1.15	14,086	1.63	16.09			2.95	
DH_10255-DL	5.10	4.50	4.50	*1.50*	24.62	3.41	11,489	5.94	14.74			66.79	8.99	1.71	14,063	2.43	16.45			2.74	
DH_10256-DL	4.60	3.50	3.50	*1.58*	32.55	2.68	9,923	5.40	14.03			60.18	7.73	1.11	14,204	1.56	16.46			2.02	
DH_10257-DL	5.00	4.00	4.00	*1.57*	32.06	3.17	10,159	6.24	13.81			60.16	8.92	1.32	13,993	1.89	16.22			2.30	
DH_10258-DL	4.60	4.60	4.60	*1.44*	18.85	3.23	12,497	5.17	16.68			77.50	10.20	1.48	13,995	2.12	17.56			3.12	
DH_10259-DL	3.20	3.20	3.20	*1.46*	21.00	2.94	12,030	4.89	15.28			73.76	9.96	1.66	13,886	2.39	16.19			2.10	
DH_10260-DL	4.30	4.30	4.30	*1.38*	13.22	2.66	13,283	4.01	16.24			89.89	10.05	1.10	13,789	1.60	16.32			3.25	
DH_10261-DL	5.10	4.70	4.70	*1.46*	21.43	4.55	12,081	7.53	16.18			74.03	10.13	2.06	13,952	2.95	17.49			3.10	
DH_10264-DL	2.30	2.40	2.40	*1.40*	14.53	2.71	13,092	4.14	17.59			86.57	9.96	1.15	13,922	1.65	18.10			1.76	
DH_10265-DL	2.20	2.20	2.20	*1.64*	38.91	2.78	9,008	6.17	13.88			57.49	9.18	0.96	14,241	1.35	18.13			1.26	
DH_10267-DL	3.50	3.50	3.50	*1.47*	21.91	4.76	12,041	7.91	17.10			69.19	11.11	2.00	13,806	2.90	18.53			2.17	
DH_10268-DL	2.10	2.20	2.20	*1.39*	14.18	3.68	13,254	5.55	19.09			85.79	9.20	1.39	14,061	1.98	19.62			1.60	
DH_10310-DL	4.80	4.80	4.80	*1.71*	46.25	4.24	12,484	6.79	16.29			87.32	9.15	1.61	14,156	2.27	17.44			4.37	
DH_10311-DL	4.90	4.90	4.90	*1.46*	21.33	2.98	12,025	4.96	15.58			71.77	9.67	1.70	14,081	2.41	16.56			3.13	
DH_10316-DL	5.00	5.00	5.00	*1.46*	20.92	2.26	12,114	3.73	15.06			74.41	9.24	1.14	14,098	1.62	16.20			3.30	
DH_10328-DL	4.90	4.90	4.90	*1.65*	39.74	3.59	11,113	6.46	15.02			68.59	12.60	1.44	13,580	2.12	16.75			3.37	
DH_10331-DL	4.30	5.70	5.70	*1.42*	17.03	4.01	12,712	6.31	18.98			81.18	9.37	1.78	14,165	2.51	19.97			4.00	
DH_10334-DL	6.90	6.90	6.90	*1.71*	46.19	3.50	11,704	5.98	16.12			76.32	10.03	1.57	13,873	2.26	17.59			5.49	
DH_10335-DL	5.00	5.00	5.00	*1.50*	25.45	2.54	12,356	4.11	16.41			80.94	8.85	1.61	14,057	2.29	17.60			3.71	
DH_10336-DL	3.60	4.70	4.70	*1.40*	14.56	2.54	13,048	3.89	16.74			82.51	8.34	1.46	14,093	2.07	17.36			3.29	
DH_10337-DL	4.20	4.40	4.40	*1.50*	25.03	2.48	11,347	4.37	15.72			65.52	10.01	1.36	13,931	1.95	17.13			2.63	
DH_10338-DL	4.30	4.30	4.30	*1.53*	27.98	3.50	10,859	6.45	14.91			64.28	9.80	1.40	13,939	2.01	16.49			2.57	
DH_10345-DL	4.60	4.60	4.60	*1.49*	23.95	2.99	11,661	5.13	15.62			68.39	9.28	1.33	14,156	1.88	17.32			2.85	
DH_10346-DL	2.80	2.80	2.80	*1.45*	19.65	2.59	12,378	4.18	16.14			81.22	8.92	0.71	14,261	1.00	17.23			2.00	
DH_10347-DL	3.90	3.90	3.90	*1.50*	25.11	7.18	11,510	12.48	17.20			60.54	9.12	2.20	14,232	3.09	19.15			2.16	Lost 1.9' of core (quality note)
DH_10348-DL	3.50	3.30	3.30	*1.42*	16.56	3.36	12,828	5.24	17.35			82.69	9.63	1.66	14,072	2.36	17.96			2.35	Lab sheet different from survcadd output - wrong hole entered for quality (10
DH_11209-DL	3.60	3.60	3.60	*1.44*	19.01	3.64	12,452	5.85	15.10			78.92	10.02	1.50	13,944	2.15	15.72			2.49	
DH_11210-DL	3.70	3.70	3.70	*1.38*	13.10	3.69	13,358	5.52	15.85			86.91	8.79	1.36	14,194	1.92	15.87			2.70	
DH_11215-DL	4.10	4.10	4.10	*1.48*	22.70	5.68	12,011	9.46	17.25			67.33	11.04	2.61	13,879	3.76	18.44			2.48	
DH_11217-DL	2.70	2.70	2.70	*1.41*	15.93	4.86	13,103	7.42	18.64			81.87	8.93	1.63	14,268	2.28	19.45			1.90	
DH_11218-DL	4.90	4.90	4.90	*1.41*	16.47	4.32	12,992	6.65	17.35			79.58	9.73	2.40	14,095	3.41	18.35			3.36	
DH_11219-DL	4.60	4.60	4.60	*1.38*	12.87	2.22	13,558	3.27	15.67			90.18	9.51	1.62	14,163	2.29	15.95			3.48	
DH_11220-DL	5.60	5.60	5.60	*1.43*	17.96	3.81	12,660	6.02	15.14			73.30	9.04	1.70	14,095	2.41	15.77			3.57	

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Downey Area

Upper Freeport, Lower Freeport Rider, Lower Freeport, Upper Kittanning and Middle Kittanning Seams

Table 6Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
		Mapped						SO2/mm								SO2/mm				Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1][2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	Foot[3]	Comments
13066	2.92	2.92	2.92	*1.36*	10.51	1.80	13,868	2.60	16.16		7.0	94.96	8.86	1.32	14,148	1.87	16.33		8.0	2.29	1.55 Float
13067	3.58	3.58	3.58	*1.36*	10.74	1.98	13,780	2.87	15.36		6.0	91.71	8.00	1.42	14,236	1.99	15.61		7.0	2.71	1.55 Float
13069	4.42	4.42	4.42	*1.35*	10.03	2.51	14,062	3.57	16.50		7.0	93.88	7.70	1.32	14,454	1.83	16.68		7.0	3.41	1.55 Float
13070	4.17	4.17	4.17	*1.34*	9.31	2.00	14,048	2.85	16.48		7.0	96.58	8.34	1.46	14,208	2.06	16.52		7.0	3.29	1.55 Float
13071	4.42	4.42	4.42	*1.42*	16.83	2.19	12,832	3.41	15.32		7.0	84.10	8.83	1.62	14,225	2.28	16.28		8.0	3.21	1.55 Float
13074	4.17	4.17	4.17	*1.34*	9.41	1.85	14,026	2.64	16.12		6.0	95.48	7.98	1.40	14,262	1.96	16.24		6.0	3.26	1.55 Float
13075	4.00	4.00	4.00	*1.35*	10.05	1.66	13,942	2.38	16.02		8.0	95.29	8.33	1.33	14,232	1.87	16.20		8.0	3.13	1.55 Float
13076	4.50	4.50	4.50	*1.37*	11.74	2.16	13,649	3.17	15.62		7.0	91.43	8.94	1.54	14,136	2.18	15.89		7.0	3.42	1.55 Float
Average	4.02	4.02	4.023	1.36	11.08	2.02	13,776	2.94	15.95		6.88	92.93	8.37	1.43	14,238	2.00	16.22		7.25	3.09	1.55 Float, See Rheological Tables
			Average	**1.48**	**23.49**	**3.43**	**12,131**	**5.68**	**16.03**		**6.88**	**76.38**	**9.60**	**1.54**	**14,034**	**2.19**	**17.19**		**7.25**	**3.04**	
			Moist Basis (8%)		**21.61**	**3.15**	**11,160**	**5.22**	**14.74**			**76.38**	**8.83**	**1.42**	**12,911**	**2.19**	**15.82**				
			Maximum	1.71	46.25	7.18	13,776	12.48	19.09		6.88	92.93	12.60	2.61	14,268	3.76	19.97		7.25	5.49	
			Minimum	1.36	11.08	2.02	9,008	2.94	13.81		6.88	57.44	7.73	0.71	13,580	1.00	15.69		7.25	1.26	
			No. of Samples	45	45	45	45	45	45		1	45	45	45	45	45	45		1	45	

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Downey Area

Upper Freeport, Lower Freeport Rider, Lower Freeport, Upper Kittanning and Middle Kittanning Seams

Table 6Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
		Mapped																		Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	SO2/mm BTU	% Vol.	% FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	SO2/mm BTU	% Vol.	% FC	FSI	Foot[3]	Comments
Middle Kittanning																					
	2.20			*1.41*	15.90	2.96	12,817	4.62	16.47			85.18	10.71	0.76	13,719	1.11	16.70				Top Lift
	1.60			*1.56*	31.20	3.47	10,267	6.76	15.10			50.45	14.91	1.65	13,137	2.51	16.76				Bottom Lift
1039_GD-D	3.80	3.66	3.66	*1.48*	22.80	3.19	11,668	5.47	15.85			69.53	12.60	1.16	13,457	1.73	16.73			2.29	Composite from lab sheet
1039_GD-D	3.50	3.66	3.66	*1.49*	24.30	3.24	11,668	5.55	15.85			73.82	12.08	1.05	13,529	1.55	16.72			2.46	Stonycreek
DH_10252-DL	3.30	3.30	3.30	*1.46*	21.17	3.24	11,988	5.41	17.11			67.94	11.20	1.23	13,700	1.80	18.34			2.00	Stonycreek
DH_10253-DL	2.60	2.60	2.60	*1.51*	25.60	3.22	11,173	5.76	16.90			63.06	13.38	1.20	13,277	1.81	18.55			1.50	Lab sheet
DH_10254-DL	3.00	3.00	3.00	*1.47*	21.67	3.29	11,936	5.51	17.84			70.32	12.12	1.24	13,535	1.83	18.96			1.88	Glade & Downey
DH_10255-DL	3.40	3.40	3.40	*1.50*	24.78	3.80	11,462	6.63	16.76			66.61	11.77	1.40	13,633	2.05	18.37			2.07	Glade & Downey; Stoney
DH_10256-DL	1.90	1.90	1.90	*1.55*	29.52	4.28	10,535	8.13	16.72			45.27	14.17	1.36	13,232	2.06	18.78			0.81	Lost 0.3' of core; Glade & Downey; Stoney
DH_10258-DL	1.75	1.80	1.80	*1.58*	32.66	4.50	10,021	8.98	16.31			49.57	13.85	0.80	13,270	1.21	18.28			0.86	Glade & Downey; Stoney
10300_GD-D	2.60	3.00	3.00	*1.53*	28.29	3.08	10,866	5.67	16.01			55.61	13.73	1.53	13,422	2.28	17.65			1.56	Lost 0.4' of core
10301_GD-D	3.00	4.20	4.20	*1.50*	24.88	3.90	11,463	6.80	17.23			54.65	12.26	1.39	13,722	2.03	18.65			2.09	Lost 0.5' of core
	1.65			*1.45*	20.45	5.20	12,173	8.54	17.09			71.70	11.21	1.88	13,895	2.71	17.72				Top Lift
	1.65			*1.55*	29.99	3.69	10,506	7.02	16.90			49.53	15.91	1.70	13,074	2.60	18.51				Bottom Lift
10302_GD-D	3.30	3.70	3.70	*1.50*	25.31	4.43	11,324	7.83	16.99			60.41	13.60	1.79	13,477	2.65	18.12			2.05	Composite from lab sheet
10302_GD-D	3.70	3.70	3.70	*1.52*	26.81	3.83	11,060	6.93	16.69			58.09	13.50	1.82	13,477	2.70	18.08			1.99	
	1.80			*1.43*	17.56	4.10	12,631	6.49	17.23			75.80	11.47	1.70	13,789	2.47	17.56				Top Lift
	1.20			*1.55*	30.01	2.91	10,500	5.54	16.04			46.94	14.43	1.87	13,267	2.82	18.15				Bottom Lift
10303_GD-D	3.00	3.70	3.70	*1.49*	23.80	3.50	11,562	6.06	16.63			61.33	12.95	1.79	13,527	2.64	17.86			2.06	Composite from lab sheet
10303_GD-D	3.70	3.70	3.70	*1.42*	17.38	4.00	12,694	6.30	17.19			77.72	11.47	1.50	13,820	2.17	17.53			2.49	
	1.30			*1.47*	21.54	4.48	11,771	7.61	16.32			63.96	11.93	1.03	13,755	1.50	17.21				Top Lift
	1.40			*1.53*	28.11	3.50	10,833	6.46	16.68			54.74	16.04	1.38	13,047	2.12	18.19				Bottom Lift
10304_GD-D	2.70	3.00	3.00	*1.50*	24.87	3.98	11,295	7.05	16.50			59.28	14.01	1.21	13,396	1.80	17.71			1.62	Composite from lab sheet
10304_GD-D	3.00	3.00	3.00	*1.50*	24.78	4.00	11,295	7.08	16.50			59.64	13.86	1.19	13,423	1.77	17.67			1.63	
	1.75			*1.42*	17.19	3.90	12,752	6.12	17.15			79.39	11.47	1.35	13,847	1.95	17.51				Top Lift
	1.30			*1.55*	29.70	3.54	10,537	6.72	16.09			49.71	14.85	1.62	13,224	2.45	17.64				Bottom Lift
10305_GD-D	3.05	3.60	3.60	*1.48*	23.28	3.72	11,674	6.38	16.63			64.95	13.11	1.48	13,544	2.19	17.57			2.11	Composite from lab sheet
10305_GD-D	3.60	3.60	3.60	*1.50*	25.05	4.25	11,302	7.52	14.58			64.13	12.28	1.58	13,653	2.31	15.66			2.11	
10309_GD-D	3.70	3.70	3.70	*1.50*	25.05	4.25	11,302	7.52	14.58			64.12	12.28	1.58	13,653	2.31	15.66			2.17	Glade & Downey; Stoney
	1.90			*1.42*	16.62	3.57	12,819	5.57	15.98			79.24	10.69	1.51	13,934	2.17	16.28				Top Lift; Glade & Downey used this bench
	1.15			*1.46*	20.72	3.18	12,104	5.25	16.02			71.05	14.25	1.52	13,334	2.28	16.98				Bottom Lift
DH_10310-DL	3.05	3.40	3.40	*1.43*	18.26	3.41	12,533	5.45	16.00			75.96	12.11	1.51	13,694	2.21	16.56			2.25	Composite from lab sheet
DH_10310-DL	3.40	3.40	3.40	*1.44*	19.08	3.34	12,533	5.33	16.00			76.18	12.02	1.51	13,710	2.20	16.54			2.27	Stonycreek
	1.80			*1.44*	19.41	3.43	12,332	5.56	16.30			76.59	12.30	1.00	13,673	1.46	16.78				Top Lift; Glade & Downey used this
	0.90			*1.54*	29.09	3.82	10,613	7.20	15.87			49.94	15.74	1.22	13,067	1.87	17.33				Bottom Lift
DH_10315-DL	2.70	3.70	3.70	*1.48*	23.21	3.58	11,657	6.15	16.13			66.13	13.65	1.09	13,435	1.62	17.00			2.21	Composite from lab sheet

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Downey Area

Upper Freeport, Lower Freeport Rider, Lower Freeport, Upper Kittanning and Middle Kittanning Seams

Table 6Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean Tons/ Entry	
		Mapped						SO2/mm								SO2/mm					
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1][2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	FSI	Foot[3]	Comments
DH_10316-DL	3.40	3.40	3.40	*1.45*	20.33	3.85	12,229	6.30	15.97			71.40	11.56	1.65	13,720	2.41	16.54			2.15	Glade & Downey; Stoney
DH_10317-DL	4.00	4.10	4.10	*1.48*	22.89	5.28	11,728	9.00	17.40			67.47	11.75	1.03	13,637	1.51	18.53			2.49	Glade & Downey; Stoney
DH_10318-DL	3.70	3.70	3.70	*1.43*	18.31	3.53	12,435	5.68	15.69			78.84	10.97	0.79	13,720	1.15	16.16			2.54	Glade & Downey; Stoney
	3.10			*1.43*	17.58	3.40	12,791	5.32	15.49			78.42	10.67	1.04	13,979	1.49	15.82				Top Lift; Glade & Downey used this bench
	1.00			*1.56*	31.19	2.53	10,366	4.88	14.58			54.29	15.61	1.34	13,036	2.06	16.55				Bottom Lift
DH_10319-DL	4.10	3.10	3.10	*1.48*	23.15	3.04	11,798	5.16	15.12			68.54	12.69	1.16	13,593	1.71	16.12			1.92	Composite from lab sheet
DH_10319-DL	3.10	3.10	3.10	*1.51*	25.62	2.89	11,798	4.90	15.12			70.59	12.27	1.14	13,673	1.67	16.06			2.01	Stonycreek
	1.40			*1.44*	19.47	5.35	12,367	8.65	16.33			78.64	11.41	0.93	13,708	1.36	16.31				Top Lift; Glade & Downey used this bench
	1.30			*1.56*	31.41	3.12	10,162	6.14	14.58			50.92	17.65	0.92	12,613	1.46	16.46				Bottom Lift
DH_10321-DL	2.70	3.80	3.80	*1.50*	25.14	4.29	11,321	7.58	15.50			65.49	14.37	0.93	13,188	1.40	16.38			2.27	Composite from lab sheet
DH_10321-DL	3.80	3.80	3.80	*1.51*	25.74	4.18	11,321	7.38	15.69			68.41	13.71	0.93	13,304	1.40	16.34			2.39	Stonycreek
DH_10322-DL	4.10	4.10	4.10	*1.46*	21.49	3.83	11,927	6.42	15.60			67.63	11.83	0.98	13,594	1.44	16.36			2.47	Lost 1.0' of core; Glade & Downey; Stoney
	1.95			*1.43*	18.36	4.62	12,484	7.40	16.12			77.06	10.69	1.03	13,858	1.49	16.58				Top Lift; Glade & Downey used this bench
	1.05			*1.53*	27.94	2.77	10,915	5.08	15.33			53.45	15.46	0.84	13,027	1.29	16.37				Bottom Lift; Lost 0.2' of core
DH_10323-DL	3.00	3.80	3.80	*1.47*	21.58	4.00	11,957	6.69	15.85			69.12	12.29	0.97	13,579	1.42	16.51			2.34	Composite from lab sheet
DH_10323-DL	3.80	3.80	3.80	*1.50*	24.92	3.39	8,654	7.83				70.92	11.93	0.98	13,642	1.44	16.53			2.46	Stonycreek
	1.85			*1.43*	18.36	4.06	12,528	6.48	17.35			77.08	9.15	1.03	14,255	1.45	18.52				Top Lift; Glade & Downey used this bench
	1.35			*1.51*	26.39	4.00	11,181	7.15	17.05			59.00	14.86	1.51	13,222	2.28	18.62				Bottom Lift
DH_10324-DL	3.20	3.80	3.80	*1.47*	22.02	4.03	11,914	6.77	17.21			68.83	11.75	1.25	13,784	1.81	18.57			2.34	Composite from lab sheet
DH_10324-DL	3.80	3.80	3.80	*1.48*	22.73	4.03	11,914	6.77	17.21			70.01	14.86	1.51	13,222	2.28	18.62			2.39	Stonycreek
DH_10325-DL	4.40	4.90	4.90	*1.50*	24.96	3.12	11,397	5.48	16.14			63.92	13.95	1.15	13,396	1.72	17.12			2.86	Lost 1.40' of core; Glade & Downey; Stoney
	1.50			*1.50*	25.48	4.35	11,309	7.69	19.66			60.27	14.27	1.22	13,328	1.83	22.23				Top Lift; Glade & Downey used this bench
	0.85			*1.69*	44.37	3.88	8,104	9.58	16.47			40.44	13.87	1.17	13,362	1.75	22.35				Bottom Lift
DH_10326-DL	2.35	2.40	2.40	*1.59*	33.71	4.15	9,913	8.36	18.27			51.63	14.10	1.20	13,343	1.80	22.28			1.20	Composite from lab sheet
DH_10326-DL	2.40	2.40	2.40	*1.61*	36.14	4.08	9,913	8.23	18.27			53.51	14.13	1.20	13,340	1.80	22.27			1.26	Stonycreek
DH_10327-DL	3.50	3.60	3.60	*1.46*	20.72	4.13	11,999	6.88	15.73			69.90	11.83	1.22	13,672	1.78	16.62			2.23	Glade & Downey; Stoney
10329_GD-DL	3.10	3.30	3.30	*1.52*	26.89	4.28	11,061	7.74	16.26			55.15	14.23	1.55	13,331	2.33	17.27			1.68	Lost 0.6' of core; Glade & Downey
DH_10330-DL	3.80	3.90	3.90	*1.49*	24.04	4.17	11,487	7.26	15.84			64.54	12.22	1.46	13,643	2.14	17.10			2.28	Glade & Downey; Stoney
DH_10331-DL	3.40	4.00	4.00	*1.50*	25.36	3.17	11,336	5.59	16.41			61.71	12.87	1.38	13,543	2.04	17.79			2.26	Glade & Downey; Stoney

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Downey Area

Upper Freeport, Lower Freeport Rider, Lower Freeport, Upper Kittanning and Middle Kittanning Seams

Table 6Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
		Mapped		Sp. Gr. [1]	%	%		SO2/mm	%	%		%	%	%		SO2/mm	%	%		Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	[2]	Ash	Sulfur	BTU/lb.	BTU	Vol.	FC	FSI	Rec.[2]	Ash	Sulfur	BTU/lb.	BTU	Vol.	FC	FSI	Foot[3]	Comments
DH_10334-DL	4.60	3.60	3.60	*1.46*	20.80	3.97	12,156	6.53	15.63			71.45	11.93	1.01	13,732	1.47	16.26			2.28	1.55 Stuzman-Lowery; Stoney
DH_10334-DL	3.40	3.60	3.60	*1.48*	22.97	3.08	11,723	5.25	15.89			67.19	12.50	1.11	13,517	1.64	16.65			2.18	Glade & Downey; Stoney
DH_10335-DL	3.20	3.30	3.30	*1.51*	25.99	3.79	11,301	6.71	15.85			58.42	13.47	1.43	13,387	2.14	17.17			1.77	Glade & Downey; Stoney
DH_10336-DL	3.40	3.40	3.40	*1.53*	27.70	3.05	10,860	5.62	15.07			60.50	13.94	0.89	13,336	1.33	16.31			1.91	Lost 0.5' of core; Glade & Downey; Stoney
DH_10337-DL	3.60	3.60	3.60	*1.50*	24.53	4.16	11,444	7.27	16.02			61.39	12.53	1.50	13,544	2.22	17.38			2.01	Glade & Downey; Stoney
DH_10339-DL	3.30	3.50	3.50	*1.53*	27.63	3.35	10,956	6.12	14.16			62.44	12.11	1.01	13,624	1.48	15.85			2.03	Lost 0.6' of core; Glade & Downey; Stoney
10341_GD-DL	3.70	3.70	3.70	*1.52*	27.14	3.52	10,981	6.41	14.22			66.68	11.38	1.13	13,790	1.64	15.83			2.29	1.55 Stuzman-Lowery; Stoney
10343_GD-DL	2.20	2.60	2.60	*1.55*	29.67	4.20	10,746	7.82	15.08			53.46	13.74	1.52	13,442	2.26	17.07			1.31	1.55 Stuzman-Lowery; Stoney
10344_DL-DL	3.90	4.60	4.60	*1.46*	20.80	3.97	12,156	6.53	15.63			71.45	11.93	1.01	13,732	1.47	16.26			2.92	Lost 1.3' of core; 1.55 Stuzman-Lowery; Stoney
DH_11209-DL	2.30	2.30	2.30	*1.50*	24.79	5.81	11,552	10.06	15.29			63.42	13.00	1.02	13,528	1.51	15.92			1.33	Stonycreek
DH_11221-DL	2.60	2.60	2.60	*1.74*	48.54	3.42	7,415	9.22	12.86			32.73	14.35	1.14	13,266	1.72	17.52			0.90	Lab sheet
12248_GD	3.60	3.60	3.60	*1.51*	25.91	2.43	11,265	4.31	15.85			66.60	13.66	1.44	13,360	2.16	17.12			2.20	Lab sheet, See Rheological Tables
			Average	**1.51**	**25.91**	**3.78**	**11,176**	**6.82**	**15.97**			**62.80**	**12.81**	**1.27**	**13,518**	**1.88**	**17.35**			**1.92**	
			Moist Basis (8%)		**23.84**	**3.48**	**10,282**	**6.27**	**14.69**			**62.80**	**11.78**	**1.17**	**12,436**	**1.88**	**15.96**				
			Maximum	1.74	48.54	5.81	12,533	10.06	18.27			78.84	14.86	1.82	13,820	2.70	22.27			2.54	
			Minimum	1.43	18.31	2.43	7,415	4.31	12.86			32.73	10.97	0.79	13,222	1.15	15.66			0.81	
			No. of Samples	34	34	34	34	34	33			34	34	34	34	34	34			34	

Quality not included in statistics; may not be representative of mineable section.

Hole # Individual lifts shown along with composite; but not honored - shown for informational purposes only

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Hart Area

Lower Freeport and Upper Kittanning Seams

Table 7Q

Drill Hole	Thickness (In Feet) PBS Rpt.[4]	Mapped Total Seam	Mapped Total Coal	Raw Quality, Dry Basis Sp. Gr. [1 2]	% Ash	% Sulfur	BTU/lb.	SO2/mm BTU	% Vol.	Washed Quality, Dry Basis (1.50 Float) % Rec.[2]	% Ash	% Sulfur	BTU/lb.	SO2/mm BTU	% Vol.	Clean Entry Foot[3]	Comments
Lower Freeport Seam																	
06154-DL	1.83	2.50	2.50	*1.38*	12.56	2.25	13,764	3.27	19.39	89.08	8.32	1.11	14,485	1.53	20.02	1.86	Lost 8" of core
H-1_OP	2.00	2.00	2.00	*1.66*	40.51	0.29											Total coal: 1.9'; Hart core raws March 12
H-5_OP	3.50	3.50	3.50	*1.53*	27.91	0.52	10,886	0.96									PBS Hart Core Raws March 12
H-6_OP	3.00	3.00	3.00	*1.65*	39.67	0.34											PBS Hart Core raws April 12
H-7_OP	3.30	3.30	3.30	*1.58*	32.53	2.13											PBS Hart Core raws April 12 - Oxidized (Raw 71)
H-8_OP	1.50	1.50	1.50	*1.36*	11.20	2.08											Hart core raws May 12 - Oxidized (Raw 50)
H-12_OP	2.10	2.10	2.10	*1.40*	14.76	2.62				80.49	6.83	0.97				1.44	
H-14_OP	2.00	2.00	2.00	*1.32*	6.54	0.50				95.11	4.73	0.50					
H-17_OP	0.70	0.70	0.70	*1.36*	10.52	1.09											Raw head only; no wash
H-18_OP	2.60	2.60	2.60	*1.38*	13.11	0.60											Hart core raws May 12 - Oxidized (Raw 0)
H-21_OP	NA	2.50	2.50	*1.44*	19.34	6.56											Loss 1.8'; Hart core raws May 12
H-22_OP	2.50	2.30	2.30	*1.53*	28.41	4.64											Total coal: 1.8'; Hart core raws May 12 - Oxidized (Raw 76)
H-27_OP	3.00	3.00	3.00	*1.40*	15.04	1.03											Total coal: 2.0'; Hart core raws May 12 - Oxidized (Raw 40)
H-30_OP	2.60	2.10	2.10	*1.46*	20.57	0.38											Hart core raws May 12 - Oxidized (Raw 0)
JOB#206-D	6/1-30/12			*1.40*	15.29	1.93				72.43	5.45	0.88	14,773	1.19			3/8" x 0 Only
JOB#206-D	7/1-31/12			*1.39*	14.08	1.75				71.93	6.50	0.86	14,309	1.20			3/8" x 0 Only
JOB#206-D (Non-Ox)	9/1-30/12			*1.41*	15.99	3.15				74.61	6.02	1.05	14,605	1.44			3/8" x 0 Only
JOB#206-D (Ox)	9/1-30/12			*1.39*	13.58	2.96				76.63	5.76	1.05	14,759	1.42			3/8" x 0 Only - Oxidized
JOB#206-D (Ox)	10/1-31/12			*1.54*	28.54	2.94				55.68	7.42	1.25	14,375	1.74			3/8" x 0 Only - Oxidized
JOB#206-D (Non-Ox)	10/1-31/12			*1.47*	22.29	3.59				64.34	6.44	1.06	14,689	1.44			3/8" x 0 Only
JOB#206-D (Ox)	11/1-30/12			*1.53*	28.42	2.52				64.09	7.05	1.09	14,517	1.50			3/8" x 0 Only - Oxidized
JOB#206-D (Non-Ox)	11/1-30/12			*1.37*	12.19	3.07				82.80	6.07	1.04	14,708	1.41			3/8" x 0 Only
JOB#206-D	12/1-31/12			*1.49*	23.89	2.31				65.88	7.14	0.96	14,470	1.33			3/8" x 0 Only
			Average	**1.46**	**20.72**	**1.93**	**10,886**	**0.96**		**73.09**	**6.31**	**0.97**	**14,578**	**1.41**		**1.44**	
			Moist Basis (8%)		**19.06**	**1.77**	**10,015**	**0.88**		**73.09**	**5.81**	**0.90**	**13,412**	**1.34**			
			Maximum	1.66	40.51	4.64	10,886	0.96		95.11	7.42	1.25	14,773	1.74		1.44	
			Minimum	1.32	6.54	0.29	10,886	0.96		55.68	4.73	0.50	14,309	1.19		1.44	
			No. of Samples	21	21	21	1	1		11	11	11	9	9		1	
			Average Non-Ox:	**1.45**	**20.25**	**1.78**				**75.95**	**6.15**	**0.92**	**14,592**	**1.34**			
Oxidized Samples																	
H-7_OP	3.30	3.30	3.30	*1.58*	32.53	2.13											PBS Hart Core raws April 12 - Oxidized (Raw 71)
H-8_OP	1.50	1.50	1.50	*1.36*	11.20	2.08											Hart core raws May 12 - Oxidized (Raw 50)
H-18_OP	2.60	2.60	2.60	*1.38*	13.11	0.60											Hart core raws May 12 - Oxidized (Raw 0)
H-22_OP	2.50	2.30	2.30	*1.53*	28.41	4.64											Total coal: 1.8'; Hart core raws May 12 - Oxidized (Raw 76)
H-27_OP	3.00	3.00	3.00	*1.40*	15.04	1.03											Total coal: 2.0'; Hart core raws May 12 - Oxidized (Raw 40)
H-30_OP	2.60	2.10	2.10	*1.46*	20.57	0.38											Hart core raws May 12 - Oxidized (Raw 0)
JOB#206-D (Ox)	9/1-30/12			*1.39*	13.58	2.96				76.63	5.76	1.05	14,759	1.42			3/8" x 0 Only
JOB#206-D (Ox)	10/1-31/12			*1.54*	28.54	2.94				55.68	7.42	1.25	14,375	1.74			3/8" x 0 Only
JOB#206-D (Ox)	11/1-30/12			*1.53*	28.42	2.52				64.09	7.05	1.09	14,517	1.50			3/8" x 0 Only
			Average	**1.46**	**21.27**	**2.14**				**65.47**	**6.74**	**1.13**	**14,550**	**1.55**			

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Hart Area

Lower Freeport and Upper Kittanning Seams

Table 7Q

Drill Hole	Thickness (In Feet) PBS Rpt.[4]	Mapped Total Seam	Mapped Total Coal	Raw Quality, Dry Basis Sp. Gr. [1 2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	Washed Quality, Dry Basis (1.50 Float) % Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	Clean Entry Foot[3]	Comments
Upper Kittanning Seam																	
H-1_OP	2.50			*1.53*	27.83	2.42											Hart core raws March 12
H-1_OP	0.20			*1.95*	70.33	4.30											Hart core raws March 12
H-1_OP	2.70	2.70	2.70	*1.56*	30.98	2.56											Composite
H-3_OP	3.70	3.70	3.70	*1.60*	34.57	0.44											PBS Hart Core Raws March 12
H-4_OP	2.20	2.20	2.20	*1.64*	39.10	5.33											PBS Hart Core Raws March 12
H-5_OP	3.50	3.50	3.50	*1.52*	27.24	2.94	11,201	5.25									PBS Hart Core Raws March 12
H-6_OP	4.80	4.80	4.80	*1.73*	47.95	2.76											PBS Hart Core raws April 12
H-7_OP	2.00	2.00	2.00	*1.37*	12.32	2.24											PBS Hart Core raws April 12
H-8_OP	5.00	5.00	5.00	*1.39*	13.67	2.54				83.56	6.59	1.01				3.53	
H-9_OP	2.00	5.00	5.00	*1.37*	11.73	2.45				87.30	7.63	0.92				3.63	
H-10_OP	0.90	0.90	0.90	*1.69*	44.15	5.21											Total coal: 0.85'; Hart core raws May 12
H-11_OP	1.60	1.60	1.60	*1.35*	9.89	0.72				90.34	6.23	0.64				1.19	
H-12_OP	3.30			*1.38*	13.33	1.70				83.83	7.65	0.77				0.00	Lab sheet
H-12_OP	1.70			*1.69*	43.74	7.21											Hart core raws May 12
H-12_OP	5.00	5.00	5.00	*1.49*	23.67	3.57										0.00	
H-13_OP	1.30			*1.44*	18.80	1.37				73.07	10.98	0.77				0.00	Lab sheet, Hart #13 (67.8-69.1 feet)
H-13_OP	2.90			*1.41*	15.65	1.60				77.28	8.38	0.74					Lab sheet, Hart #13-2 (68.9-71.8 feet)
H-13_OP	4.20	3.80	3.80	*1.42*	16.63	1.53				75.98	9.18	0.75				2.49	
H-13_OP	1.30			*1.71*	46.05	6.39											Hart core raws May 12
H-13_OP	0.40			*1.91*	66.49	4.02											Hart core raws May 12
H-13_OP	0.70			*1.51*	25.72	5.03											Hart core raws May 12
H-13_OP	2.40	3.80	3.80	*1.69*	43.53	5.60											Different from lab sheets (above)
H-14_OP	3.10			*1.39*	13.50	1.37				81.92	7.92	0.72				0.00	Lab sheet
H-14_OP	1.10			*1.73*	47.82	1.08											Hart core raws May 12 - Oxidized (Raw 0)
H-14_OP	4.20	4.20	4.20	*1.47*	22.49	1.29										0.00	
H-15_OP	2.55			*1.37*	12.48	1.70				86.33	8.07	0.81				0.00	
H-15_OP	0.30			*1.85*	60.00	3.85											Hart core raws May 12 - Oxidized (Raw 55)
H-15_OP	0.75			*1.47*	21.92	6.40											Hart core raws May 12
H-15_OP	0.50			*1.82*	57.10	9.99											Hart core raws May 12
H-15_OP	4.10	3.81	3.81	*1.48*	23.13	3.73										0.00	
H-17_OP	3.90	3.90	3.90	*1.49*	23.76	1.90				69.25	9.25	0.69				2.45	
H-18_OP	5.00	5.00	5.00	*1.52*	27.18	0.72				29.76	12.30	0.96				1.38	
H-19_OP	1.70	3.70	3.70	*1.62*	36.78	4.21				47.14	12.06	2.83				1.72	
H-22_OP	3.30	3.30	3.30	*1.41*	16.39	3.42				76.40	7.07	0.95				2.17	

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Hart Area

Lower Freeport and Upper Kittanning Seams

Table 7Q

	Thickness (In Feet)			Raw Quality, Dry Basis						Washed Quality, Dry Basis (1.50 Float)						Clean	
		Mapped														Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr. [1 2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	Foot[3]	Comments
H-23_OP	3.10			*1.41*	15.88	1.60				77.16	7.26	0.74				0.00	Lab sheet
H-23_OP	1.40			*1.80*	54.80	6.09											Hart core raws May 12
H-23_OP	4.50	4.50	4.50	*1.53*	27.99	3.00										0.00	
H-25_OP	3.60	5.40	5.40	*1.60*	34.53	2.82				59.06	12.27	1.11				3.10	
H-26_OP	3.70	3.70	3.70	*1.62*	37.37	1.30											Hart core raws May 12 - Oxidized (Raw 30)
H-27_OP	3.20			*1.39*	14.36	1.80				81.55	7.98	0.81				0.00	Lab sheet
H-27_OP	1.70			*1.78*	52.51	5.96											Hart core raws May 12
H-27_OP	4.90	4.90	4.90	*1.53*	27.60	3.24										0.00	
H-28_OP	4.00	4.00	4.00	*1.56*	30.80	0.57											
H-29_OP	4.50	4.50	4.50	*1.42*	17.43	0.70				72.24	12.50	0.64				2.82	
H-30_OP	3.50			*1.38*	12.99	1.74				83.29	7.71	0.80					Lab sheet
H-30_OP	1.30			*1.64*	38.74	5.11											Hart core raws May 12 - Oxidized (Raw 48)
H-30_OP	4.80	4.80	4.80	*1.45*	19.96	2.65										0.00	
H-31_OP	5.20	5.20	5.20	*1.49*	24.42	0.61				88.84	20.32	0.61					
H-32_OP	4.00	4.00	4.00	*1.65*	40.24	0.32				68.50	27.85	0.38					
H-33_OP	4.10	4.10	4.10	*1.47*	21.80	3.51					8.77	1.21					60m Samples from GEO (PBS Hart Core Raws May 12)
H-34_OP	3.10			*1.34*	9.22	0.97					8.22	0.80					60m Samples from GEO (PBS Hart Core Raws May 12) - Oxidized (Raw 55, Washed 71)
H-34_OP	1.30			*1.78*	52.92	5.68					15.64	2.64					60m Samples from GEO (PBS Hart Core Raws May 12)
H-34_OP	4.40	4.40	4.40	*1.47*	22.13	2.36					10.41	1.34					Composite
H-35_OP	4.50	4.49	4.49	*1.49*	24.08	2.06					11.19	1.05					60m Samples from GEO (PBS Hart Core Raws May 12) - Oxidized (Raw 66, Washed 62)
H-36_OP	2.00			*1.36*	10.85	0.55					9.54	0.56					60m Samples from GEO (PBS Hart Core Raws May 12) - Oxidized (Raw 0, Washed 1)
H-36_OP	2.20			*1.53*	28.46	3.06					10.05	1.39					60m Samples from GEO (PBS Hart Core Raws May 12) - Oxidized (Raw 75)
H-36_OP	4.20	4.40	4.40	*1.45*	20.46	1.92					9.82	1.01					Composite
H-37_OP	4.50	4.50	4.50	*1.51*	26.43	0.86				82.77	19.30	0.78					
H-38_OP	5.80	4.30	4.30	*1.60*	34.78	0.37				72.02	25.87	0.43					
H-39_OP	4.10	4.10	4.10	*1.43*	18.49	0.46				99.34	18.37	0.46					
H-40_OP	4.00	3.90	3.90	*1.41*	16.40	0.42											Total coal: 2.5'; Hart core raws May 12 - Oxidized (Raw 0)
H-42_OP	2.00	3.90	3.90	*1.43*	18.13	0.36											Hart core raws May 12 - Oxidized (Raw 0)
H-42_OP	1.90			*1.41*	16.28	0.41											Hart core raws May 12 - Oxidized (Raw 0)
H-42_OP	3.90	3.90	3.90	*1.42*	17.23	0.38											Composite

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Hart Area

Lower Freeport and Upper Kittanning Seams

Table 7Q

	Thickness (In Feet)			Raw Quality, Dry Basis						Washed Quality, Dry Basis (1.50 Float)						Clean	
		Mapped															
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr. [1 2]	% Ash	% Sulfur	BTU/lb.	SO2/mm BTU	% Vol.	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	SO2/mm BTU	% Vol.	Entry Foot[3]	Comments
H-43_OP	3.00	3.00	3.00	*1.46*	21.45	2.72				83.17	16.01	1.64					
H-44_OP	2.80	2.90	2.90	*1.59*	34.49	0.47				59.13	18.42	0.51					
H-45_OP	3.50	3.50	3.50	*1.52*	27.43	3.92											Hart core raws May 12 - Oxidized (Raw 12)
H-46_OP	3.00	3.60	3.60	*1.35*	10.02	0.86				94.13	8.25	0.65					
H-47_OP	3.00	3.00	3.00	*1.57*	32.27	1.71				51.97	10.87	1.01					
H-49_OP	2.10	2.10	2.10	*1.35*	10.48	0.56											Total Coal 1.8'; Hart core raws May 12 - Oxidized (Raw 34)
H-50_OP	3.30	3.30	3.30	*1.53*	27.54	0.87											Hart core raws May 12 - Oxidized (Raw 27)
H-51_OP	4.00	4.00	4.00	*1.52*	27.31	2.92											Hart core raws May 12
H-52_OP	4.00	4.30	4.30	*1.53*	27.97	2.19											Hart core raws May 12 - Oxidized (Raw 52)
H-53_OP	4.20	4.20	4.20	*1.57*	31.79	2.22											Hart core raws May 12 - Oxidized (Raw 9)
H-54_OP	5.00	5.00	5.00	*1.77*	51.78	2.95											Hart core raws May 12
H-55_OP	4.00	4.00	4.00	*1.62*	36.71	0.62											Hart core raws May 12 - Oxidized (Raw 0)
H-57_OP	1.30	3.10	3.10	*1.36*	11.19	1.11					8.76	0.89					60m Samples from GEO (PBS Hart Core Raws May 12) - Oxidized (Raw 14, Washed 12)
H-57_OP	1.30			*1.66*	41.23	5.08					12.12	2.65					60m Samples from GEO (PBS Hart Core Raws May 12)
H-57_OP	2.60	3.10	3.10	*1.51*	26.21	3.10					10.44	1.77					Composite
H-58_OP	3.50	3.50	3.50	*1.40*	15.38	0.61											Hart core raws May 12 - Oxidized (Raw 0)
H-59_OP	1.90			*1.86*	61.35	2.37											Hart core raws May 12 - Oxidized (Raw 70)
H-59_OP	1.90			*1.71*	45.81	1.26											Hart core raws May 12 - Oxidized (Raw 27)
H-59_OP	3.80	3.80	3.80	*1.79*	53.58	1.82											Composite
H-60_OP	4.20	4.20	4.20	*1.55*	29.77	0.50											Hart core raws May 12 - Oxidized (Raw 0)
H-61_OP	3.00			*1.39*	14.10	2.09											Hart core raws May 12
H-61_OP	2.40			*1.67*	42.49	4.30											Hart core raws May 12
H-61_OP	5.40	5.40	5.40	*1.52*	26.72	3.07											Composite
H-62_OP	1.40	1.40	1.40	*1.34*	9.29	0.62											Hart core raws May 12 - Oxidized (Raw 0)
H-63_OP	4.00	4.00	4.00	*1.57*	31.87	0.37											Total coal 3.3'; Hart core raws May 12 - Oxidized (Raw 0)
H-64_OP	3.80	3.80	3.80	*1.52*	26.85	0.42											Total coal 2.4'; Hart core raws May 12 - Oxidized (Raw 10)
H-65_OP	2.30	2.30	2.30	*1.37*	11.99	0.71											Hart core raws May 12 - Oxidized (Raw 2)
H-66_OP	4.30	4.30	4.30	*1.43*	18.40	0.42											Total coal: 1.5'; Hart core raws May 12 - Oxidized (Raw 0)
H-68_OP	2.50	2.50	2.50	*1.40*	14.65	2.81											PBS Hart core raws June 12
H-69_OP	3.50	3.50	3.50	*1.45*	20.10	2.86											Labeled as Hole #69C (depth and thickness matches SCAD; PBS Hart core raws May 12
H-70_OP	3.00	3.00	3.00	*1.42*	17.43	0.52											PBS Hart core raws May 12 - Oxidized (Raw 7)
H-71_OP	2.60	2.60	2.60	*1.42*	16.51	2.94											PBS Hart core raws May 12
H-77_OP	3.00	3.00	3.00	*1.58*	33.19	3.08											Total coal: 2.8'; PBS Hart core raws June 12
H-78_OP	2.10	2.10	2.10	*1.36*	10.70	3.00											PBS Hart core raws June 12
H-78A_OP	4.20	NA	NA	*1.46*	20.74	4.07											Data was entered as H-78; No data for H-78A but thickness is different; PBS Hart core raws June 12
H-79_OP	2.10	2.10	2.10	*1.50*	25.12	4.23											Data matches Hole #79C; PBS Hart core raws June 12

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Hart Area

Lower Freeport and Upper Kittanning Seams

Table 7Q

Drill Hole	Thickness (In Feet) PBS Rpt.[4]	Mapped Total Seam	Mapped Total Coal	Raw Quality, Dry Basis Sp. Gr. [1 2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	Washed Quality, Dry Basis (1.50 Float) % Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	Clean Entry Foot[3]	Comments
Job #206 "C"-Prime		1/1-31/12		*1.53*	28.03	2.16				50.76	7.69	1.12	14,344	1.56			3/8" x 0 Only
Job #206 "C"-Prime		2/1-29/12		*1.54*	29.01	2.26				45.76	8.18	1.01	13,971	1.45			3/8" x 0 Only
Job #206 Top "C"-Prime	OX	3/1-31/12		*1.41*	16.25	1.68				60.21	7.63	0.86	14,156	1.22			3/8" x 0 Only
Job #206 "C"-Prime	OX	3/1-31/12		*1.49*	24.42	1.96				48.94	8.14	0.99	14,217	1.39			3/8" x 0 Only
Job #206 Top "C"-Prime	OX	4/1-30/12		*1.41*	16.49	1.63				60.74	7.62	0.83	14,089	1.18			3/8" x 0 Only
Job #206 Bot "C"-Prime		4/1-30/12		*1.53*	27.76	2.22				56.14	10.96	1.13	13,829	1.63			3/8" x 0 Only
Job #206 Top "C"-Prime	Non-Ox	4/1-30/12		*1.36*	10.63	2.13				69.01	7.10	1.10	14,444	1.52			3/8" x 0 Only
Job #206 Bot "C"-Prime	OX	5/1-31/12		*1.47*	22.24	1.86				50.83	8.22	0.92	14,145	1.30			3/8" x 0 Only
Job #206 Top "C"-Prime	OX	5/1-31/12		*1.36*	10.52	2.06				55.74	6.47	1.01	14,437	1.40			3/8" x 0 Only
Job #206 Bot "C"-Prime		6/1-30/12		*1.45*	20.32	1.92				57.57	7.05	0.87	14,412	1.21			3/8" x 0 Only
Job #206 "C"-Prime		6/1-30/12		*1.39*	14.09	1.45				62.96	7.48	0.74	14,312	1.03			3/8" x 0 Only
Job #206 "C"-Prime		7/1-31/12		*1.49*	24.27	2.92				47.30	8.25	1.25	14,248	1.75			3/8" x 0 Only
Job #206 "C"-Prime		8/1-31/12		*1.46*	20.96	2.73				55.84	7.95	1.16	14,349	1.62			3/8" x 0 Only
Job #206 Bot "C"-Prime		9/1-30/12		*1.69*	44.48	4.35				21.66	10.46	1.93	13,965	2.76			3/8" x 0 Only
Job #206 Top "C"-Prime		9/1-30/12		*1.40*	14.60	2.52				65.48	6.83	0.87	14,555	1.20			3/8" x 0 Only
Job #206 Bot "C"-Prime		10/1-31/12		*1.71*	46.30	4.34				27.61	10.42	1.94	14,021	2.77			3/8" x 0 Only
Job #206 Top "C"-Prime		10/1-31/12		*1.47*	22.41	3.14				56.72	8.18	1.19	14,347	1.66			3/8" x 0 Only
Job #206 Bot "C"-Prime		11/1-30/12		*1.77*	51.69	5.36				17.93	10.35	2.32	14,040	3.30			3/8" x 0 Only
Job #206 Top "C"-Prime		11/1-30/12		*1.41*	16.27	2.84				62.04	9.80	1.90	14,078	2.70			3/8" x 0 Only
		Average		**1.50**	**24.84**	**1.94**	**11,201**	**5.25**		**65.44**	**11.19**	**0.93**	**14,216**	**1.41**		**2.25**	
		Moist Basis (8%)			**22.85**	**1.79**	**10,305**	**4.83**		**65.44**	**10.29**	**0.85**	**13,078**	**1.30**			
		Maximum		1.79	53.58	5.33	11,201	5.25		99.34	27.85	1.64	14,444	1.75		3.53	
		Minimum		1.34	9.29	0.32	11,201	5.25		29.76	6.23	0.38	13,829	1.03		1.19	
		No. of Samples		68	68	68	1	1		30	34	34	17	17		6	
		Average Non-Ox:		**1.51**	**25.61**	**2.34**				**66.70**	**11.75**	**0.90**	**14,239**	**1.47**			
Oxidized Samples																	
H-14_OP	1.10			*1.73*	47.82	1.08											Hart core raws May 12 - Oxidized (Raw 0)
H-15_OP	0.30			*1.85*	60.00	3.85											Hart core raws May 12 - Oxidized (Raw 55)
H-26_OP	3.70	3.70	3.70	*1.62*	37.37	1.30											Hart core raws May 12 - Oxidized (Raw 30)
H-30_OP	1.30			*1.64*	38.74	5.11											Hart core raws May 12 - Oxidized (Raw 48)
H-34_OP	3.10			*1.34*	9.22	0.97					8.22	0.80					60m Samples from GEO (PBS Hart Core Raws May 12) - Oxidized (Raw 55, Washed 71)
H-35_OP	4.50	4.49	4.49	*1.49*	24.08	2.06					11.19	1.05					60m Samples from GEO (PBS Hart Core Raws May 12) - Oxidized (Raw 66, Washed 62)
H-36_OP	2.00			*1.36*	10.85	0.55					9.54	0.56					60m Samples from GEO (PBS Hart Core Raws May 12) - Oxidized (Raw 0, Washed 1)
H-36_OP	2.20			*1.53*	28.46	3.06					10.05	1.39					60m Samples from GEO (PBS Hart Core Raws May 12) - Oxidized (Raw 75)
H-36_OP	4.20	4.40	4.40	*1.45*	20.46	1.92					9.82	1.01					Composite
H-40_OP	4.00	3.90	3.90	*1.41*	16.40	0.42											Total coal: 2.5'; Hart core raws May 12 - Oxidized (Raw 0)
H-42_OP	2.00	3.90	3.90	*1.43*	18.13	0.36											Hart core raws May 12 - Oxidized (Raw 0)
H-42_OP	1.90			*1.41*	16.28	0.41											Hart core raws May 12 - Oxidized (Raw 0)
H-42_OP	3.90	3.90	3.90	*1.42*	17.23	0.38											Composite

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Hart Area

Lower Freeport and Upper Kittanning Seams

Table 7Q

	Thickness (In Feet)			Raw Quality, Dry Basis						Washed Quality, Dry Basis (1.50 Float)						Clean	
	PBS	Mapped Total	Mapped Total	Sp. Gr. [1,2]	%	%		SO2/mm	%	%	%	%		SO2/mm	%	Entry	
Drill Hole	Rpt.[4]	Seam	Coal		Ash	Sulfur	BTU/lb.	BTU	Vol.	Rec.[2]	Ash	Sulfur	BTU/lb.	BTU	Vol.	Foot[3]	Comments
H-45_OP	3.50	3.50	3.50	*1.52*	27.43	3.92											Hart core raws May 12 - Oxidized (Raw 12)
H-49_OP	2.10	2.10	2.10	*1.35*	10.48	0.56											Total Coal 1.8'; Hart core raws May 12 - Oxidized (Raw 34)
H-50_OP	3.30	3.30	3.30	*1.53*	27.54	0.87											Hart core raws May 12 - Oxidized (Raw 27)
H-52_OP	4.00	4.30	4.30	*1.53*	27.97	2.19											Hart core raws May 12 - Oxidized (Raw 52)
H-53_OP	4.20	4.20	4.20	*1.57*	31.79	2.22											Hart core raws May 12 - Oxidized (Raw 9)
H-55_OP	4.00	4.00	4.00	*1.62*	36.71	0.62											Hart core raws May 12 - Oxidized (Raw 0)
H-57_OP	1.30	3.10	3.10	*1.36*	11.19	1.11					8.76	0.89					60m Samples from GEO (PBS Hart Core Raws May 12) - Oxidized (Raw 14, Washed 12)
H-58_OP	3.50	3.50	3.50	*1.40*	15.38	0.61											Hart core raws May 12 - Oxidized (Raw 0)
H-59_OP	1.90			*1.86*	61.35	2.37											Hart core raws May 12 - Oxidized (Raw 70)
H-59_OP	1.90			*1.71*	45.81	1.26											Hart core raws May 12 - Oxidized (Raw 27)
H-59_OP	3.80	3.80	3.80	*1.79*	53.58	1.82											Composite
H-60_OP	4.20	4.20	4.20	*1.55*	29.77	0.50											Hart core raws May 12 - Oxidized (Raw 0)
H-62_OP	1.40	1.40	1.40	*1.34*	9.29	0.62											Hart core raws May 12 - Oxidized (Raw 0)
H-63_OP	4.00	4.00	4.00	*1.57*	31.87	0.37											Total coal 3.3'; Hart core raws May 12 - Oxidized (Raw 0)
H-64_OP	3.80	3.80	3.80	*1.52*	26.85	0.42											Total coal 2.4'; Hart core raws May 12 - Oxidized (Raw 10)
H-65_OP	2.30	2.30	2.30	*1.37*	11.99	0.71											Hart core raws May 12 - Oxidized (Raw 2)
H-66_OP	4.30	4.30	4.30	*1.43*	18.40	0.42											Total coal: 1.5'; Hart core raws May 12 - Oxidized (Raw 0)
H-70_OP	3.00	3.00	3.00	*1.42*	17.43	0.52											PBS Hart core raws May 12 - Oxidized (Raw 7)
Job #206 Top "C"-Prime	OX	3/1-31/12		*1.41*	16.25	1.68				60.21	7.63	0.86	14,156	1.22			3/8" x 0 Only
Job #206 "C"-Prime	OX	3/1-31/12		*1.49*	24.42	1.96				48.94	8.14	0.99	14,217	1.39			3/8" x 0 Only
Job #206 Top "C"-Prime	OX	4/1-30/12		*1.41*	16.49	1.63				60.74	7.62	0.83	14,089	1.18			3/8" x 0 Only
Job #206 Bot "C"-Prime	OX	5/1-31/12		*1.47*	22.24	1.86				50.83	8.22	0.92	14,145	1.30			3/8" x 0 Only
Job #206 Top "C"-Prime	OX	5/1-31/12		*1.36*	10.52	2.06				55.74	6.47	1.01	14,437	1.40			3/8" x 0 Only
			Average	**1.49**	**23.88**	**1.21**				**56.63**	**8.88**	**0.95**	**14,154**	**1.26**			

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash,100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Bassett Area

Upper Freeport Seam

Table 8Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.50 Float)							Clean	
		Mapped						SO2/mm							SO2/mm			Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	% Vol.	% FC	Foot[3]	Comments
Upper Freeport																			
0904-D	6.30	6.33		*1.50*	24.63	3.19	11,461	5.57	15.27		66.42	9.94	1.84	14,001	2.63	16.82		3.83	
09384-D	2.60	2.67		*1.56*	30.89	5.64	10,314	10.93	15.17		58.85	14.70	3.36	13,171	5.11	16.66		1.49	
09386-D	2.81	2.83		*1.57*	32.08	6.22	10,143	12.26	16.33		57.01	12.49	2.78	13,597	4.10	18.64		1.54	
09388-D	5.90	5.25		*1.52*	27.22	4.88	10,863	8.99	14.99		60.00	11.73	2.57	13,565	3.79	16.55		2.92	
09389-D	3.80	4.00		*1.42*	16.61	2.93	12,794	4.58	16.08		83.80	9.88	2.11	13,971	3.03	16.50		2.89	
09390-D	3.80	5.41		*1.49*	24.44	2.39	11,107	4.30	15.28		69.13	11.36	1.43	13,353	2.14	16.99			
09392-D	3.20	3.25		*1.53*	27.86	5.72	10,778	10.62	16.32		57.16	12.43	2.96	13,530	4.38	17.13		1.73	
			Average	**1.51**	**26.42**	**4.74**	**11,098**	**8.79**	**15.83**		**64.65**	**11.89**	**2.61**	**13,654**	**3.85**	**17.15**		**2.30**	
			Moist Basis (8%)		**24.30**	**4.36**	**10,210**	**8.09**	**14.57**		**64.65**	**10.94**	**2.40**	**12,562**	**3.83**	**15.78**			
			Maximum	1.57	32.08	6.22	12,794	12.26	16.33		83.80	14.70	3.36	14,001	5.11	18.64		3.83	
			Minimum	1.42	16.61	2.93	10,143	4.58	15.17		57.01	9.88	1.84	13,171	2.63	16.50		1.49	
			No. of Samples	5	5	5	5	5	5		5	5	5	5	5	5		5	

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

Corsa Coal Corporation

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Surface and Deep Mineable Quality (In-Seam Quality, Dry Basis)

Shaffer Area

Upper Kittanning (C') Seam

Table 9Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.50 Float)							Clean	
		Mapped						SO2/mm	%	%					SO2/mm	%	%	Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1][2]	% Ash	% Sulfur	BTU/lb.	BTU	Vol.	FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	Vol.	FC	Foot[3]	Comments
Upper Kittanning Seam																			
0901-D	3.92	3.92	3.92	*1.45*	19.85	3.22	12,389	5.20	14.13		80.52	10.57	1.62	14,051	2.31	14.86		2.78	
0905-D	3.80	NA	NA	*1.41*	16.01	1.80	12,699	2.83	14.64		86.72	10.55	1.32	13,625	1.94	15.16			Data not availabe for mapping
0908-D	3.67	3.66	3.66	*1.48*	22.50	2.64	11,874	4.45	14.41		76.25	10.20	1.30	14,013	1.86	15.46		2.51	
12107-D	2.80	2.80	2.80	*1.52*	26.63	2.97	11,090	5.36	15.28		72.03	11.91	1.53	13,662	2.24	16.87		1.86	
12110-D	3.20	3.20	3.20	*1.48*	22.93	2.02	11,818	3.42	14.55		76.53	10.37	0.95	13,926	1.36	15.55		2.21	
12111-D	3.70	3.70	3.70	*1.49*	24.01	2.75	11,628	4.73	15.12		76.51	10.21	1.54	13,989	2.20	16.37		2.57	
12113-D	3.70	3.70	3.70	*1.43*	18.23	3.05	12,635	4.83	15.68		81.76	9.20	1.50	14,156	2.12	16.57		2.64	
12114-D	NA	3.50	3.50	*1.43*	17.90	2.74	12,673	4.32	15.46		85.00	10.64	1.42	13,943	2.04	16.06		2.59	
12115-D	3.50	3.50	3.50	*1.48*	22.73	2.20	11,779	3.74	14.68		77.95	10.26	1.25	13,935	1.79	15.94		2.45	
12237-D	3.20	3.40	3.40	*1.54*	28.79	3.08	10,661	5.78	13.27		61.09	10.27	1.74	13,862	2.51	14.69		1.94	
DDH_1	2.00	2.00	2.00	*1.41*	16.49	4.72	12,948	7.29	19.00		77.64	9.95	1.49	14,052	2.12	19.75		1.34	
DDH_2	3.60	3.60	3.60	*1.45*	19.73	4.59	12,370	7.42	18.57		71.37	9.73	1.42	14,174	2.00	19.14		2.26	
DH_3-D	2.50	3.25	3.25	*1.40*	14.64	4.24	13,095	6.48	17.80		86.92	10.24	1.51	13,902	2.17	17.70			
DH_4-D	3.48	3.48	3.48	*1.46*	20.62	4.62	12,093	7.64	17.05		79.01	11.81	2.18	13,707	3.18	17.77		2.44	
DH_5-D	2.42	3.00	3.00	*1.46*	21.24	3.85	12,063	6.38	17.02		78.12	11.43	1.97	13,774	2.86	18.05		2.09	Thickness from analysis may be total coal; unable to confirm from lab sheet
DH_6-D	3.25	3.42	3.42	*1.44*	19.03	4.20	12,293	6.83	17.28		80.80	10.04	1.69	13,941	2.42	17.99		2.42	Thickness from analysis may be total coal; unable to confirm from lab sheet
DH_7-D	3.46	3.25	3.25	*1.46*	21.13	3.58	11,829	6.05	17.31		76.02	9.68	1.31	13,845	1.89	18.36		2.20	Thickness from analysis may be total coal; unable to confirm from lab sheet
DH_8-D	2.83	3.17	3.17	*1.46*	21.01	3.44	11,800	5.83	17.31		74.82	9.36	1.18	13,878	1.70	18.25		2.11	Thickness from analysis may be total coal; unable to confirm from lab sheet
PBS_15	3.00	3.00	3.00	*1.45*	19.54	3.64	12,354	5.89	16.80		71.69	9.34	1.27	14,166	1.79	17.87		1.89	
			Average	**1.46**	**21.32**	**3.37**	**12,017**	**5.60**	**16.05**		**76.30**	**10.29**	**1.49**	**13,946**	**2.14**	**17.03**		**2.25**	
			Moist Basis (8%)		**19.61**	**3.10**	**11,056**	**5.15**	**14.77**		**76.30**	**9.47**	**1.37**	**12,830**	**2.14**	**15.67**			
			Maximum	1.54	28.79	4.72	12,948	7.64	19.00		85.00	11.91	2.18	14,174	3.18	19.75		2.78	
			Minimum	1.41	16.49	2.02	10,661	3.42	13.27		61.09	9.20	0.95	13,662	1.36	14.69		1.34	
			No. of Samples	17	17	17	17	17	17		17	17	17	17	17	17		17	

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

Corsa Coal Corporation

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Deep Mineable Quality (In-Seam Quality, Dry Basis)

Berwind Lohr Area

Upper Freeport and Lower Freeport Seams

Table 10Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.50 Float)								Clean	
		Mapped						SO2/mm	%	%						SO2/mm	%	%		Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1][2]	% Ash	% Sulfur	BTU/lb.	BTU	Vol.	FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	BTU	Vol.	FC	FSI	Foot[3]	Comments
Upper Freeport (E) Seam																					
13090-DL	2.79	2.67	2.67	*1.44*	18.52	3.54	12,522	5.65	15.52		6.0	80.97	12.59	1.85	13,617	2.72	16.01		7.0		1.55 Float
13091-DL	4.58	6.42	6.42	*1.43*	18.46	3.78	12,505	6.05	15.61		6.0	81.67	12.71	2.37	13,579	3.49	16.23		7.0		1.55 Float, lab sheet suggests 1.84' parting removed from sample
13092-DL	3.92	3.92	3.92	*1.44*	18.51	4.11	12,515	6.57	16.42		7.0	83.84	13.46	2.18	13,483	3.23	16.76		8.0		1.55 Float
TH-6C	2.00	2.00	2.00	*1.68*	43.23	0.43	6,534	1.32												0.00	
TH-7B	2.00	2.00	2.00	*1.73*	48.06	0.29	5,622	1.03												0.00	
Actual 7/1-31/12	3.00	3.00	3.00	*1.43*	17.90	1.76						76.60	9.40	1.38	13,805	2.00				2.00	Top E only
Actual 6/1-30/12				*1.50*	24.57	1.93						64.62	12.64	1.54	13,321	2.31				0.00	Top E
Actual 6/1-30/12				*1.46*	21.48	1.97						73.67	13.90	1.22	13,111	1.86				0.00	Bottom E
Actual 5/1-31/12				*1.50*	25.15	1.58						64.17	11.99	1.24	13,372	1.85				0.00	Top E
Actual 5/1-31/12				*1.49*	23.89	2.54						69.03	13.21	1.46	13,233	2.21				0.00	Bottom E
L-6-07	1.17			*1.39*	13.82	2.96	13,235	4.48				92.59	11.98	2.34	13,559	3.45				0.00	
L-6-07	1.67			*1.41*	16.14	4.02	12,207	6.58				90.69	14.20	2.43	13,332	3.64					
Composite	2.83	NA	NA	*1.40*	15.19	3.58	12,630	5.72				91.47	13.29	2.39	13,425	3.56					Not in lithologic database
LR-90-09	1.25	2.92	2.92	*1.39*	14.42	2.44	13,085	3.73												0.00	
LR-90-09	1.67			*1.38*	12.99	2.01	13,471	2.99													
LR-90-09	0.25			*1.59*	34.41	8.21	9,659	16.99				91.46	11.10	1.53	13,729	2.23					
Composite	2.92	2.92	2.92	*1.39*	13.61	2.20	13,305	3.31													
LR-96-09	1.25			*1.50*	24.97	1.15	11,143	2.07												0.00	
LR-96-09	0.17			*1.51*	25.91	2.55	11,275	4.53				69.60	13.44	1.83	13,244	2.77					
LR-96-09	1.67			*1.42*	17.27	2.64	12,702	4.16				84.41	13.43	1.65	13,451	2.46					
Composite	3.08	3.08	3.08	*1.46*	20.85	2.03	11,993	3.33													
LR-17-08	1.58	2.42	2.42	*1.44*	18.89	4.35	12,672	6.87				81.52	11.60	1.41	13,862	2.04				1.73	
LR-52-09	2.75	1.92	1.92	*1.47*	21.73	4.11	11,909	6.91				65.04	11.43	1.70	13,900	2.45				1.12	
LR-56-09	2.42	NA	NA	*1.71*	46.10	0.36	6,765	1.05													
L-1-04	1.50			*1.37*	12.46	3.49	13,403	5.20				89.98	10.11	2.85	13,898	4.11				0.00	
L-1-04	1.67			*1.40*	14.51	1.91	12,799	2.99				91.90	12.62	1.21	13,131	1.84					
Composite	3.17	NA	NA	*1.39*	13.54	2.66	13,085	4.04				90.99	11.43	1.99	13,494	2.95					Not in lithologic database
LR-9-08	1.00			*1.38*	12.75	4.74	13,552	7.00				84.90	9.10	2.97	14,332	4.15				0.00	
LR-9-08	1.67			*1.41*	15.89	3.71	13,069	5.67				82.13	11.51	1.43	13,956	2.05					
Composite	2.67	2.58	2.58	*1.40*	14.71	4.09	13,250	6.17				83.17	10.61	2.01	14,097	2.85				1.83	

Corsa Coal Corporation

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Deep Mineable Quality (In-Seam Quality, Dry Basis)

Berwind Lohr Area

Upper Freeport and Lower Freeport Seams

Table 10Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.50 Float)								Clean	
		Mapped		Sp. Gr. [1]	%	%		SO2/mm	%	%		%	%	%		SO2/mm	%	%		Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	[2]	Ash	Sulfur	BTU/lb.	BTU	Vol.	FC	FSI	Rec.[2]	Ash	Sulfur	BTU/lb.	BTU	Vol.	FC	FSI	Foot[3]	Comments
LR-50-09	1.75			*1.45*	20.32	6.70	12,215	10.97				67.79	9.65	1.50	14,111	2.13				0.00	
LR-50-09	1.50			*1.36*	10.89	1.82	13,944	2.61				91.57	7.98	1.36	14,405	1.89					
LR-50-09	1.67			*1.40*	15.49	2.41	13,162	3.66				83.55	12.08	1.08	13,835	1.57					
Composite	4.92	4.96	4.96	*1.41*	15.80	3.76	13,064	5.94				80.39	9.97	1.32	14,107	1.87				3.42	
			Average	**1.42**	**17.26**	**3.47**	**12,677**	**5.50**	**15.85**		**6.3**	**82.17**	**11.90**	**1.91**	**13,729**	**2.80**	**16.33**		**7.3**	**2.02**	
			Moist Basis (8%)		**15.88**	**3.20**	**11,663**	**5.06**	**14.58**			**82.17**	**10.95**	**1.76**	**12,631**	**2.57**	**15.03**				
			Maximum	1.47	21.73	4.35	13,305	6.91	16.42		7.0	91.47	13.46	2.39	14,107	3.56	16.76		8.0	3.42	
			Minimum	1.39	13.54	2.03	11,909	3.31	15.52		6.0	65.04	9.97	1.32	13,425	1.87	16.01		7.0	1.12	
			No. of Samples	10	11	11	11	11	3		3.0	8	9	9	9	9	3		3.0	4	
Lower Freeport (D) Seam																					
TH-6B	3.00	3.00	3.00	*1.69*	43.62	2.30	8,487	5.42													
TH-6D	3.00	3.00	3.00	*1.66*	40.61	0.39	7,644	1.02													
TH-7B	2.00	2.00	2.00	*1.83*	57.54	1.62	5,937	5.46													
TH-7D	2.00	2.00	2.00	*1.57*	32.16	3.18	10,364	6.14													
TH-8B	2.00	2.00	2.00	*1.48*	22.73	3.99	11,964	6.67													
TH-9A	3.00	3.00	3.00	*1.49*	23.95	0.65	11,029	1.18													
TH-9B	3.00	3.00	3.00	*1.54*	29.09	6.55	10,818	12.11													
TH-9C	3.00	3.00	3.00	*1.41*	16.45	1.86	12,936	2.88													
TH-9D	3.00	3.00	3.00	*1.51*	25.75	2.48	11,253	4.41													
Actual 7/1-31/12				*1.47*	21.66	2.35						71.46	8.05	1.25	13,970	1.79					Identified as "D"
Actual 6/1-30/12				*1.44*	19.33	2.53						76.01	8.00	1.28	14,282	1.79					Identified as "D"
Actual 5/1-31/12				*1.44*	18.71	2.33						75.10	7.61	1.14	14,261	1.60					Identified as "D"
L-2-04	1.67	NA	NA	*1.39*	13.88	2.59	13,352	3.89				87.61	9.81	1.88	14,107	2.67					Not in lithologic database
13088-DL	2.33	2.67	2.67	*1.38*	13.08	3.42	13,500	5.07	17.39		7.0	85.52	8.01	1.68	14,476	2.32	17.84		8.0		1.55 Float
13089-DL	2.67	2.67	2.67	*1.48*	22.65	3.01	11,794	5.10	15.56		7.0	73.95	8.74	1.75	14,331	2.44	17.12		9.0		1.55 Float
LR-21-09	1.50	NA	NA	*1.43*	18.29	1.91	12,744	3.00													Not in lithologic database
LR-70-09	0.83	1.67	1.67	*1.47*	22.17	4.20	11,814	7.10													
L-1-04	0.67			*1.35*	9.51	2.11	14,149	2.98				93.99	7.69	1.40	14,488	1.93					
L-1-04	1.00			*1.40*	15.03	2.33	13,185	3.53				86.36	9.23	1.32	14,227	1.85					
Composite	1.67	NA	NA	*1.38*	12.82	2.24	13,570	3.31				89.41	8.61	1.35	14,331	1.88					Not in lithologic database
L-5-04	0.75			*1.39*	14.39	3.05	13,213	4.61				84.32	9.39	1.81	14,116	2.56					
L-5-04	1.50			*1.39*	13.52	2.93	13,337	4.39				87.63	8.12	1.34	14,338	1.87					
L-5-04	0.42			*1.39*	14.26	5.77	13,268	8.70				84.66	9.50	3.08	14,175	4.35					
Composite	2.67	NA	NA	*1.39*	13.88	3.41	13,291	5.13				86.24	8.69	1.74	14,250	2.45					Not in lithologic database

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Deep Mineable Quality (In-Seam Quality, Dry Basis)

Berwind Lohr Area

Upper Freeport and Lower Freeport Seams

Table 10Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.50 Float)								Clean	
		Mapped		Sp. Gr. [1]	%	%		SO2/mm	%	%		%	%	%		SO2/mm	%	%		Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	[2]	Ash	Sulfur	BTU/lb.	BTU	Vol.	FC	FSI	Rec.[2]	Ash	Sulfur	BTU/lb.	BTU	Vol.	FC	FSI	Foot[3]	Comments
LR-61-09	0.58			*1.41*	15.72	1.35	12,868	2.10													
LR-61-09	1.17			*1.39*	13.59	1.76	13,279	2.64				89.66	8.72	0.91	14,213	1.29					
LR-61-09	0.25			*1.42*	17.28	5.25	12,756	8.22													
Composite	2.00	2.92	2.92	*1.40*	14.67	2.07	13,093	3.18				52.30	5.09	0.53	8,291	1.29				1.30	
			Average	**1.41**	**16.43**	**2.86**	**12,895**	**4.47**	**16.48**		**7.0**	**79.17**	**8.16**	**1.49**	**13,298**	**2.17**	**17.48**		**8.5**	**1.30**	
			Moist Basis (8%)		**15.12**	**2.63**	**11,863**	**4.11**	**15.16**		**6.4**	**79.17**	**7.51**	**1.37**	**12,234**	**2.00**	**16.08**		**7.8**		
			Maximum	1.48	22.65	4.20	13,570	7.10	17.39		7.0	89.41	9.81	1.88	14,476	2.67	17.84		9.0	1.30	
			Minimum	1.38	12.82	1.91	11,794	3.00	15.56		7.0	52.30	5.09	0.53	8,291	1.29	17.12		8.0	1.30	
			No. of Samples	0	8	8	8	8	2		2.0	6	6	6	6	6	2		2.0	1	
Actual 6/1-30/12				*1.65*	39.81	3.34						49.51	9.34	1.97	14,118	2.79				0.00	Bottom "D"
Actual 5/1-31/12				*1.54*	28.71	2.86						64.18	8.45	1.51	14,092	2.14				0.00	Bottom "D"

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash,100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

Gray lines indicate the benches that were composited together to show mineable section.

Corsa Coal Corporation

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Deep Mineable Quality (In-Seam Quality, Dry Basis)

Quecreek Area

Upper Kittanning (C') Seam

Table 11Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
		Mapped																		Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	FC	FSI	Foot[3]	Comments
Upper Kittanning Seam																					
0511-D	3.50	4.33	4.33	*1.42*	17.17	3.17	12,725	4.98	18.50		7	81.86	8.96	1.80	14,182	2.54	19.68		8	3.07	An additional 0.83' was sampled
0845-D	3.27	3.70	3.70	*1.48*	22.90	4.10	11,875	6.91	15.68		5	76.72	12.20	2.39	13,666	3.50	16.77		7	2.56	
09153-D	3.33	3.40	3.40	*1.38*	12.64	2.76	13,574	4.07	17.29		6	90.11	8.70	1.48	14,247	2.08	17.65		7	2.57	
09154-D	3.83	3.80	3.80	*1.41*	16.13	2.78	12,969	4.28	18.57		6	83.80	8.75	1.78	14,239	2.50	19.53		7	2.74	
09155-D	3.83	3.90	3.90	*1.45*	19.54	3.08	12,442	4.95	18.32		6	77.86	9.08	1.46	14,257	2.05	19.75		7	2.67	
09156-D	4.08	3.80	3.80	*1.44*	19.23	2.92	12,382	4.71	17.17		5	77.85	9.37	1.70	14,114	2.42	18.52		7	2.60	
10104-D	4.10	4.10	4.10	*1.57*	32.12	3.67	10,242	7.17	17.45		4	56.50	10.63	1.59	13,899	2.29	21.64		7	2.22	
10109-D	2.80	2.80	2.80	*1.36*	10.75	0.97	13,733	1.41	17.21		6	95.97	9.18	0.76	14,003	1.09	17.41		6	2.22	lost 0.5' of core
10111-D	4.20	4.80	4.50	*1.64*	39.42	2.36	9,019	5.23	13.52		4	55.49	11.29	1.86	13,834	2.69	17.18		8	2.67	
10112-D	4.30	4.30	4.30	*1.53*	27.55	3.58	10,971	6.53	16.81		6	65.38	11.50	1.73	13,825	2.50	18.92		8	2.61	
10114-D	4.00	4.10	4.10	*1.51*	25.86	1.16	11,361	2.04	16.25		6	71.82	10.63	0.98	14,002	1.40	17.79		9	2.70	lost 1.1' of core
10115-D	2.20	2.30	2.30	*1.41*	15.64	3.24	13,041	4.97	18.58		7	88.26	12.44	1.69	13,670	2.47	18.58		8	1.74	near Zimmerman area but not on controlled property
12151-E	4.88	6.00	4.39	*1.42*	17.35	3.44	12,823	5.37	14.87		6	83.77	10.89	1.54	13,925	2.21	15.39		7	4.36	Sample excludes 1.12' shale ?
9513	3.30	3.30	3.30	*1.36*	10.77	0.80	13,942	1.15				91.69	7.88	0.76	14,442	1.05	18.94			2.50	
DH-9515	3.20	3.20	3.20	*1.48*	23.35	4.91	11,847	8.29				63.00	11.08				20.26			1.82	Mined area
DH-9516	3.10	3.10	3.10	*1.47*	21.84	3.72	12,069	6.16				67.57	7.91				22.51			1.87	Mined area
JF_4	4.31	4.35	4.35	*1.42*	17.48	3.44	12,679	5.43	20.93			76.40	10.57	1.71	13,943	2.45	22.21			2.88	
JF_77-12	3.70	3.70	3.70	*1.41*	16.31	0.93	12,876	1.44				87.07	10.68	0.94	13,922	1.35				2.77	
JF_77-28	3.15	3.62	3.62	*1.39*	14.24	3.25	13,407	4.85				89.33	11.74	1.80	13,933	1.35				2.74	
JF-1-D	4.52	4.52	4.52	*1.45*	20.14	3.79	12,119	6.25	20.06			71.30	10.29	2.11	13,847	3.05	21.81			2.85	
JF-49-D	3.10	3.05	3.05	*1.48*	23.00	2.33	11,740	4.85	16.60		5	68.60	9.00	1.09						1.89	1.50 Float
JN_12-D	5.00	5.50	5.00	*1.36*	11.28	3.16						**80.98**								3.70	with 1.14% moisture
JN-86-D	3.75	4.09	3.88	*1.43*	17.51	3.50						**86.86**								3.08	An additional 0.34' was sampled
			Average	**1.45**	**20.01**	**2.85**	**12,226**	**4.77**	**17.46**		**6**	**77.27**	**10.13**	**1.54**	**13,997**	**2.17**	**19.14**		**7**	**2.64**	
			Moist Basis (8%)		**18.41**	**2.62**	**11,248**	**4.39**	**16.06**		**5**	**77.27**	**9.32**	**1.41**	**12,877**	**2.19**	**17.61**		**7**		
			Maximum	1.64	39.42	4.91	13,942	8.29	20.93		7	95.97	12.44	2.39	14,442	3.50	22.51		9	4.36	
			Minimum	1.36	10.75	0.80	9,019	1.15	13.52		4	55.49	7.88	0.76	13,666	1.05	15.39		6	1.74	
			No. of Samples	20	20	20	19	19	14		13	21	21	19	18	18	18		13	23	

Corsa Coal Corporation

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Deep Mineable Quality (In-Seam Quality, Dry Basis)

Quecreek Area

Upper Kittanning (C') Seam

Table 11Q

Drill Hole	PBS Rpt.[4]	Thickness (In Feet) Mapped Total Seam	Thickness (In Feet) Mapped Total Coal	Raw Quality, Dry Basis Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	FSI	Washed Quality, Dry Basis (1.55 Float) % Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	FC	FSI	Clean Tons/ Entry Foot[3]	Comments
Shipped Quality Data																					
CTL#164674 - 4/29-5/3/14 CPA# 84545													8.69	1.24							
CTL#164951 - 5/6-10/13 CPA# 84569													8.78	1.24							
CTL#165657 - 5/27-31/13 CPA# 84872													8.75	1.08							
CTL#166380 - 6/17-21/13 CPA# 85176													9.03	1.19							
CTL#165453 - 5/20-24/13 CPA# 84806													9.06	1.04							
CTL#166593 -6/24-28/13 CPA# 85188													8.92	1.11							
Clean Coal - 10/2/13 CPA# 86310													8.85	1.32							
Quecreek Raw Coal Lab# 12-137557				*1.54*	29.06	2.34															
Quecreek Brand Metallurgical Coal													9.25	1.20							
PBS Coals - Quecreek Clean Coal CPA# 77936													8.93	1.45							
Quecreek Clean Coal CPA#81324													10.14	1.55							
	Average			**1.54**	**29.06**	**2.34**							**9.04**	**1.24**							
	Moist Basis (8%)				**26.74**	**2.15**							**8.32**	**1.14**							
	Maximum			1.54	29.06	2.34							10.14	1.55							
	Minimum			1.54	29.06	2.34							8.69	1.04							
	No. of Samples			1	1	1							10	10							

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

Corsa Coal Corporation

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Deep Mineable Quality (In-Seam Quality, Dry Basis)

Casselman Area

Upper Freeport Seam

Table 12Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Composite float Washed Quality, Dry Basis (1.45,1.60,1.65 Float)							Composite float Washed Quality, Dry Basis (1.55,1.60,1.65 Float)							Composite float Washed Quality, Dry Basis (1.45,1.80,1.50 Float)							Washed Quality, Dry Basis (1.45 Float)							
Drill Hole	Analyzed	Total Seam	Total Coal	Sp. Gr. [1] [2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	Comments
Upper Freeport																																			
2-OB				*1.34*	8.90	1.30	14260	1.82	19.10	72.00																									
4-OB				*1.34*	9.00	1.90	14210	2.67	20.40	70.60																									
6-OB				*1.40*	15.10	2.60	13110	3.97	21.70	63.20																									
8-OB				*1.34*	8.70	0.90	14290	1.26	20.20	71.10																									
9-OB				*1.38*	12.90	4.50	13450	6.69	20.30	66.80																									
10-OB				*1.36*	11.00	2.10	13860	3.03	20.80	68.20																									
12-OB				*1.37*	12.00	3.70	13650	5.42	21.70	66.30																									
13-OB				*1.33*	8.20	1.60	14320	2.23	19.90	71.90																									
15-OB				*1.33*	8.20	1.70	14380	2.36	19.80	71.10																									
16-OB				*1.36*	10.60	1.60	13940	2.30	20.40	69.00																									
17-OB				*1.34*	8.70	1.30	14280	1.82	18.30	73.00																									
19-OB				*1.35*	10.20	2.20	14040	3.13	19.50	70.30																									
21-OB				*1.36*	10.50	1.60	13930	2.30	20.20	69.30																									
22-OB				*1.36*	10.70	1.90	13960	2.72	19.40	69.90																									
24-OB				*1.34*	8.70	0.80	14270	1.12	19.50	71.80																									
25-OB				*1.35*	9.60	2.60	14050	3.70	20.80	69.60																									
26-OB				*1.34*	8.90	1.60	14160	2.26	19.60	70.50																									
27-OB				*1.33*	7.70	1.60	14450	2.21	19.00	73.30																									
29-OB				*1.33*	8.30	1.20	14310	1.68	19.90	71.80																									
31-OB				*1.34*	9.30	1.80	14150	2.54	19.20	71.50																									
32-OB				*1.38*	13.40	1.30	13480	1.93	21.80	64.80																									
33-OB				*1.33*	8.00	0.80	14370	1.11	20.90	71.10																									
34-OB				*1.37*	12.10	1.10	13680	1.61	19.10	12.10																									
35-OB				*1.38*	13.00	1.70	13560	2.51	20.40	13.00																									
36-OB				*1.32*	7.10	0.70	14580	0.96	20.70	7.10																									
37-OB				*1.34*	8.70	1.00	14290	1.40	19.30	72.00																									
38-OB				*1.37*	11.80	0.80	13760	1.16	19.70	68.50																									
39-OB				*1.33*	8.10	1.40	14390	1.95	20.00	71.90																									
40-OB				*1.36*	10.90	1.60	13950	2.29	18.50	70.60																									
WCE-CAS-02-11				*1.36*	11.14						90.97	7.46	0.98	14,547	1.35	20.90	92.51	7.73	1.01	14,499	1.39	20.85													
WCE-CAS-03-11				*1.45*	19.58						79.98	9.09	0.88	14,295	1.23	20.43	82.21	9.50	0.91	14,222	1.28	20.33													
WCE-CAS-04-11-E				*1.44*	18.66						81.26	8.53	1.54	14,367	2.14	22.10	81.26	8.53	1.54	14,367	2.14	22.10													
WCE-CAS-05-11				*1.53*	27.86						69.07	6.79	1.14	14,650	1.56	22.64	70.87	7.17	1.19	14,580	1.63	22.56													
WCE-CAS-06-11				*1.39*	13.74						88.62	7.37	0.90	14,527	1.24	21.46	89.89	7.60	0.90	14,485	1.24	21.41													
WCE-CAS-09-12				*1.47*	22.38																		72.51	8.24	1.04	14346	1.45	21.15							
WCE-CAS-10-12				*1.44*	19.01																								77.11	6.99	1.00	14620	1.37	19.9	
WCE-CAS-11-12				*1.43*	17.90																		80.40	7.42	1.13	14430	1.57	20.26							
WCE-CAS-017-16	1.33	2.70		*1.55*	30.04	1.79			18.05																				57.02	7.78	1.03			22.49	Recovered 1.33' out of 2.70', not honored
WCE-CAS-018-16	2.80	4.30		*1.35*	10.16	1.55			19.78																				92.62	8.52	1.29			20.01	Recovered 2.8' out of 4.30', not honored
WCE-CAS-028-17	2.80	3.17		*1.44*	18.70	1.08			19.70																				81.98	7.78	1.16			21.6	Recovered 2.8' out of 3.17'
WCE-CAS-029-17	3.60	3.95		*1.42*	16.86	1.41			20.06																				83.57	7.89	0.99			21.6	Recovered 3.6' out of 3.95'
WCE-CAS-030-17	3.60	3.40		*1.42*	17.15	1.61			21.66																				81.89	7.42	1.18			20.73	
WCE-CAS-031-17	2.75	3.51		*1.42*	16.51	2.51			18.87																				76.28	8.22	1.2			20.08	Recovered 2.75' out of 3.51', not honored
WCE-CAS-032-17	3.80	3.43		*1.41*	16.19	1.70			18.46																				82.83	7.67	1.17			19.75	
WCE-CAS-033-17	3.00	2.85		*1.42*	17.15	1.71			19.08																				79.63	7.79	1.08			20.5	
Average				***1.43***	**17.51**	**1.66**	**14039**	**2.42**	**19.97**	**63.87**	**81.98**	**7.85**	**1.09**	**14,477**	**1.50**	**21.51**	**83.35**	**8.11**	**1.11**	**14,431**	**1.54**	**21.45**	**76.46**	**7.83**	**1.09**	**15,388**	**1.51**	**20.71**	**81.17**	**7.59**	**1.10**	**14,620**	**1.37**	**20.68**	
Moist Basis (8%)					**16.11**	**1.53**	**12916**	**2.23**	**18.37**	**58.76**	**81.98**	**7.22**	**1.00**	**13319**	**1.38**	**19.79**	**83.35**	**7.46**	**1.02**	**13276**	**1.42**	**19.73**	**76.46**	**7.20**	**1.00**	**13237**	**1.39**	**19.05**	**81.17**	**6.98**	**1.01**	**13450**	**1.26**	**19.03**	
Maximum				1.44	19.01	4.50	14580	6.69	21.80	73.30	90.97	9.09	1.54	14,650	2.14	22.64	92.51	9.50	1.54	14,580	2.14	22.56	80.40	8.24	1.13	14,430	1.57	21.15	83.57	7.89	1.18	14,620	1.37	21.60	
Minimum				1.41	16.19	0.70	13110	0.96	18.30	7.10	69.07	6.79	0.88	14,295	1.23	20.43	70.87	7.17	0.90	14,222	1.24	20.33	72.51	7.42	1.04	14,346	1.45	20.26	77.11	6.99	0.99	14,620	1.37	19.75	
No. of Samples				6	6	34	29	29	34	29	5	5	5	5	5	5	5	5	5	5	5	5	2	2	2	2	2	2	6	6	6	1	1	6	

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash,100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

Washed Quality, Dry Basis (1.45,1.60,1.65 Float) represents a composite of three screen & float analysis - (1) 38in x 1MM screen data @ 1.45 s.g. (2) 1MM x 100 M screen data @ 1.60 s.g. (3) 100M x 0 @ 1.65 s.g.

Washed Quality, Dry Basis (1.55,1.60,1.65 Float) represents a composite of three screen & float analysis - (1) 38in x 1MM screen data @ 1.55 s.g. (2) 1MM x 100 M screen data @ 1.60 s.g. (3) 100M x 0 @ 1.65 s.g.

Washed Quality, Dry Basis (1.55,1.80,1.50 Float) represents a composite of three screen & float analysis - (1) 38in x 1MM screen data @ 1.55 s.g. (2) 1MM x 100 M screen data @ 1.80 s.g. (3) 100M x 0 @ 1.50 s.g.

Corsa Coal Corporation

43-101 Technical Report - Wilson Creek

Surface Mineable Quality (In-Seam Quality, Dry Basis)

Acosta Area

Upper, Middle, Lower Kittanning Seams

Table 13Q

		Thickness (In Feet)		Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.55 Float)							
		Mapped																
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] 2(Raw ash)	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Comments
Upper Kittanning Coal Quality																		
JF-77-33				*1.46*	20.63	2.40	12187	3.94										
ALB-2				*1.37*	12.40	2.80	13650	4.10	20.10	67.50								
ALB-4				*1.48*	22.90	2.66	11880	4.48	19.10	58.00								
ALB-9				*1.48*	22.60	3.09	11950	5.17	19.20	58.20								
ALB-10				*1.44*	18.60	2.64	12590	4.19	16.40	65.00								
ALB-11				*1.45*	20.29	3.91	12081	6.47	20.80	58.91								
ALB-13				*1.45*	20.31	3.02	12167	4.96	19.98	59.71								
ALB-14				*1.45*	19.98	2.88	12188	4.73	18.53	61.49								
ALB-15				*1.44*	19.28	2.42	12573	3.85	19.63	61.10								
ALB-16				*1.45*	19.61	2.78	12436	4.47	21.04	59.35								
ALB-18				*1.40*	15.08	1.23	13076	1.88	15.91	69.01								
ALB-19				*1.38*	13.05	2.61	13381	3.90	16.82	70.13								
ALB-21				*1.41*	15.59	2.59	13070	3.96	20.57	63.85								
ALB-22				*1.41*	16.43	2.35	12863	3.65	20.54	63.03								
WCE-ALB-2				*1.48*	22.94						77.50	9.73	1.57	14137.00	2.22	21.90		
WCE-ALB-3				*1.44*	19.13						79.50	10.90	2.23	13983.00	3.19	22.00		
WCE-ALB-4				*1.45*	20.44						79.60	10.31	2.07	14045.00	2.95	19.84		
WCE-ALB-7				*1.46*	20.64						78.80	9.50	2.23	14157.00	3.15	23.50		
WCE-ALB-8				*1.44*	19.48						80.60	9.48	1.66	14205.00	2.34	21.37		
WCE-ALB-10				*1.39*	13.66						86.60	9.06	1.05	14275.00	1.47	20.94		
WCE-ALB-11				*1.50*	24.52						67.80	9.69	1.47	14128.00	2.08	20.53		
			Average	***1.44***	**18.93**	**2.67**	**12578**	**4.27**	**19.12**	**62.71**	**78.63**	**9.81**	**1.75**	**14,133**	**2.49**	**21.44**		
			Moist Basis (8%)		**17.42**	**2.46**	**11572**	**3.93**	**17.59**	**57.70**	**78.63**	**9.03**	**1.61**	**13002**	**2.29**	**19.72**		
			Maximum	1.50	24.52	3.91	13650	6.47	21.04	70.13	86.60	10.90	2.23	14,275	3.19	23.50		
			Minimum	1.37	12.40	1.23	11880	1.88	15.91	58.00	67.80	9.06	1.05	13,983	1.47	19.84		
			No. of Samples	21	21	14	14	14	13	13	7	7	7	7	7	7		

Notes: Consol cores - 1" top size

Corsa Coal Corporation

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Surface Mineable Quality (In-Seam Quality, Dry Basis)

Acosta Area

Upper, Middle, Lower Kittanning Seams

Table 13Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.55 Float)							
		Mapped																
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] 2(Raw ash)	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Comments
Middle Kittanning Coal Quality																		
JF-77-33				*1.45*	20.48	3.26	11624	5.61										
ALB-4				*1.46*	21.30	3.65	12100	6.03	16.30	62.40								
ALB-7				*1.55*	30.40	4.09	10440	7.84	115.20	54.40								
ALB-9				*1.50*	24.70	3.62	11520	6.28	15.90	59.40								
ALB-10				*1.51*	25.80	5.19	11220	9.25	15.80	58.40								
ALB-11	2.39			*1.51*	26.32	3.21	11222	5.72										
ALB-13				*1.49*	23.54	2.33	11793	3.95	16.08	59.96								
ALB-14				*1.48*	23.16	3.34	11547	5.79	15.24	61.60								
ALB-16				*1.48*	23.09	3.29	11749	5.60	17.22	59.69								
ALB-18				*1.60*	34.86	2.89	9480	6.10	14.32	50.82								
ALB-19				*1.50*	25.19	2.76	11269	4.90	16.03	58.78								
ETI-OB1											67.10	10.82	1.30	13,949	1.86	17.46		
ETI-OB3											60.90	14.19	1.49	13,348	2.23	16.56		
ETI-OB4											73.00	13.42	1.49	13,513	2.21	17.23		
ETI-OB5											70.00	10.62	1.10	13,882	1.58	16.78		
WCE-ALB-2	2.39			*1.50*	24.98						59.40	14.59	1.03	13,349	1.54	14.48		
WCE-ALB-7				*1.47*	21.65						69.00	11.75	1.15	13,839	1.66	17.86		
WCE-ALB-8				*1.64*	38.98						51.80	11.35	1.28	13,875	1.85	16.85		
WCE-ALB-11				*1.60*	34.89						54.40	11.36	1.33	13,818	1.93	16.95		
			Average	***1.52***	***26.62***	***3.42***	***11269***	***6.10***	***26.90***	***58.38***	**63.20**	**12.26**	**1.27**	**13,697**	**1.86**	**16.77**		
			Moist Basis (8%)		**24.49**	**3.15**	**10368**	**5.61**	**24.75**	**53.71**	**63.20**	**11.28**	**1.17**	**12601**	**1.71**	**15.43**		
			Maximum	1.64	38.98	5.19	12100	9.25	115.20	62.40	73.00	14.59	1.49	13,949	2.23	17.86		
			Minimum	1.45	20.48	2.33	9480	3.95	14.32	50.82	51.80	10.62	1.03	13,348	1.54	14.48		
			No. of Samples	15	15	11	11	11	9	9	8	8	8	8	8	8		

Corsa Coal Corporation

43-101 Technical Report - Wilson Creek

Surface Mineable Quality (In-Seam Quality, Dry Basis)

Acosta Area

Upper, Middle, Lower Kittanning Seams

Table 13Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.55 Float)							
		Mapped																
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] 2(Raw ash)	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Comments
Lower Kittanning Coal Quality																		
ALB-2				*1.63*	37.50	3.61	9270	7.79	15.80	46.70								
ALB-4				*1.69*	44.30	2.91	8160	7.13	14.60	41.10								
ALB-7				*1.49*	24.10	3.73	11570	6.45	15.60	60.30								
ALB-8	6.20			*1.79*	53.90	2.88	6650	8.66	13.50	32.60								
ALB-9				*1.79*	54.40	2.05	6580	6.23	11.70	33.90								
ALB-10				*1.46*	21.30	4.13	12040	6.86	16.60	62.10								
ALB-11	3.99			*1.55*	30.27	2.33	9122	5.11										
ALB-13				*1.48*	23.31	2.41	11628	4.15	17.02	59.67								
ALB-14				*1.64*	39.16	2.33	8831	5.28	14.78	46.06								
ALB-18				*1.49*	24.44	4.00	11347	7.05	16.79	58.76								
ALB-19				*1.54*	28.64	2.64	10529	5.01	15.21	56.15								
ETI-OB-1											73.70	11.11	2.04	13902.00	2.93	18.58		
ETI-OB-2											72.40	10.75	1.96	13977.00	2.80	19.12		
ETI-OB-3											81.50	10.92	1.95	13900.00	2.81	17.04		
ETI-OB-4											51.30	11.66	2.29	13806.00	3.32	19.27		
ETI-OB-5											66.80	9.70	2.20	14175.00	3.10	18.49		
WCE-ALB-7				*1.57*	32.24						63.20	12.38	1.55	13748.00	2.25	22.72		
WCE-ALB-8				*1.42*	16.73						50.80	10.92	1.61	13977.00	2.30	17.31		
			Average	***1.58***	**33.10**	**3.00**	**9612**	**6.34**	**15.16**	**49.73**	**65.67**	**11.06**	**1.94**	**13,926**	**2.79**	**18.93**		
			Moist Basis (8%)		**30.45**	**2.76**	**8843**	**5.83**	**13.95**	**45.76**	**65.67**	**10.18**	**1.79**	**12812**	**2.57**	**17.42**		
			Maximum	1.79	54.40	4.13	12040	8.66	17.02	62.10	81.50	12.38	2.29	14,175	3.32	22.72		
			Minimum	1.42	16.73	2.05	6580	4.15	11.70	32.60	50.80	9.70	1.55	13,748	2.25	17.04		
			No. of Samples	13	13	11	11	11	10	10	7	7	7	7	7	7		

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

Corsa Coal Corporation

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Deep Mineable Quality (In-Seam Quality, Dry Basis)

Horning Area

Lower Freeport (D) Seam

Table 14Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
	PBS	Mapped Total	Mapped Total	Sp.	%	%		S02/mm	%	%		%	%	%		S02/m	%	%		Entry	
Drill Hole	Rpt.[4]	Seam	Coal	Gr.[1 2]	Ash	Sulfur	BTU/lb.	BTU	Vol.	FC	FSI	Rec.[2]	Ash	Sulfur	BTU/lb.	m BTU	Vol.	FC	FSI	Foot[3]	Comments
Quality for Horning Area																					
0610-DL	3.33	3.33	3.33	*1.33*	8.08	1.82	14,485	2.51	17.96		7	93.22	5.52	0.77	14,919	1.03	18.14		8	2.51	
0611-DL	3.00	3.00	3.00	*1.33*	8.34	1.86	14,333	2.60	17.00			92.26	5.30	1.04	14,861	1.40	17.24			2.25	
0613-DL	2.30	2.33	2.33	*1.36*	11.34	2.94	13,804	4.26	17.28			86.92	6.54	1.02	14,552	1.40	17.59			1.68	
0615-DL	2.20	2.17	2.17	*1.33*	8.37	2.46	14,332	3.43	18.04			93.06	5.50	0.74	14,827	1.00	18.08			1.64	Less than 2.5' cutoff limit
0614-DL	3.70	3.67	3.67	*1.33*	7.99	2.45	14,483	3.38	18.42			92.25	5.36	1.10	14,931	1.47	18.58			2.74	
0617-DL	1.80	3.20	3.20	*1.35*	9.90	2.77	14,129	3.92	18.03		7	90.42	6.18	1.37	14,758	1.86	18.41		7	2.38	Loss of 0.70'
0624-DL	2.33	2.80	2.80	*1.36*	10.73	0.94	13,945	1.35	17.30		7	89.67	7.22	0.75	14,554	1.03	17.69		8	2.07	
0625-DL	2.17	2.60	2.60	*1.34*	9.38	2.20	14,192	3.10	17.06		7	92.66	6.61	1.18	14,661	1.61	17.26		8	1.97	
11121-DL	2.80	2.00	2.00	*1.43*	17.75	2.28	12,785	3.56	15.87		6	82.32	6.14	0.78	14,632	1.06	16.96		8	1.43	
11122-DL	1.10	2.50	2.50	*1.32*	6.71	1.15	14,492	1.59	17.40		7	94.15	4.55	0.69	14,865	0.93	17.58		7	1.89	
11125-DL	2.90	2.91	2.91	*1.37*	12.15	3.31	13,621	4.85	17.19		7	89.58	7.51	1.92	14,428	2.67	17.57		7	2.18	
11126-DL	2.90	2.90	2.90	*1.33*	8.42	2.40	14,095	3.40	17.35		7	91.90	5.17	0.87	14,700	1.19	17.56		7	2.16	
BH-1	3.10			*1.44*	18.87	3.03			16.94			78.92	6.31	1.22			17.94				
BH-2	2.80			*1.38*	12.55	3.07			17.55			85.95	7.00	1.23			18.06				
BH-3	3.00			*1.34*	9.49	2.78			17.40			93.08	9.49	2.78			17.40				
BH-4	3.00			*1.39*	13.78	2.50			17.13			86.96	6.17	1.28			17.84				
BH-6	?			*1.40*	14.81	2.02			16.76			86.23	6.50	0.76			17.70				
BH-7	2.90			*1.45*	19.74	3.31			17.96			80.25	6.85	1.52			19.61				
			Average	**1.37**	**10.09**	**2.13**	**14,023**	**3.06**	**17.28**		**7**	**90.49**	**5.99**	**1.01**	**14,710**	**1.38**	**17.62**		**8**	**2.09**	
			Moist Basis (8%)		**9.28**	**1.96**	**12,902**	**2.82**	**15.90**		**6**	**90.49**	**5.51**	**0.93**	**13,533**	**1.38**	**16.21**		**7**		
			Maximum	1.43	17.75	3.31	14,492	4.85	18.42		7	94.15	7.51	1.92	14,931	2.67	18.58		8	2.74	
			Minimum	1.32	6.71	0.94	12,785	1.35	15.87		6	82.32	4.55	0.69	14,428	0.93	16.96		7	1.43	
			No. of Samples	10	10	10	10	10	10		7	10	10	10	10	10	10		7	10	
Shipped Quality Data																					
Horning Clean Coal CPA# 78305													10.15	1.16							See Rheological Tables
Quality Outside of Area																					
0620-DL	2.17	2.20	2.20	*1.33*	8.18	2.84	14,278	3.98	16.64		6	93.11	5.70	1.38	14,695	1.88	16.65		7	1.66	
0622-DL	2.29	2.40	2.40	*1.36*	10.90	2.82	13,927	4.05	17.13		7	89.21	6.51	1.06	14,676	1.44	17.50		8	1.77	
11115-DL	3.80	3.00	3.00	*1.33*	7.99	1.40	14,335	1.95	17.18		8	94.23	5.44	0.68	14,787	0.92	17.41		8	2.29	Mined out area
11129-DL	2.30	2.30	2.30	*1.35*	9.97	1.98	14,052	2.82	18.01		7	89.19	5.44	0.72	14,776	0.98	18.62		8	1.69	

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.
b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.
c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.
d. "NA" indicates that a thickness was not reported.
e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

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Deep Mineable Quality (In-Seam Quality, Dry Basis)

A-Seam Underground and Job 27A Areas

Brookville (A) Seam

Table 15Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.50 Float)								Clean	
		Mapped																	Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1][2]	% Ash	% Sulfur	BTU/lb.	SO2/mm BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	SO2/mm BTU	% Vol.	% FC	FSI	Foot[3]	Comments
Block A (A Seam) and Blocks E and F (Job 27A Area)																				
10212_DP	7.20	7.20	7.20	*1.57*	31.76	0.98	10,213	1.92	15.69		57.13	10.79	0.68	13,886	0.98	18.45			3.93	
10216_DP	5.60	5.60	5.60	*1.59*	34.04	1.42	9,769	2.91	16.28		47.80	11.39	1.00	13,766	1.45	19.61			2.59	
10217_DP	8.40	8.40	8.40	*1.54*	29.4	1.56	10,562	2.95	17.39			9.70	0.80	14,089	1.14	20.07				
10221_DP	5.80	5.80	5.80	*1.62*	36.73	1.94	9,325	4.16	17.82		46.79	12.21	1.37	13,642	2.01	21.69			2.67	
10231_DP	6.10	6.10	6.10	*1.54*	29.12	1.43	10,632	2.69	17.30		62.78	11.00	0.93	13,853	1.34	19.73			3.59	
10232_DP	9.10	9.10	9.10	*1.61*	35.64	0.84	9,537	1.76	15.45		54.89	11.21	0.64	13,814	0.93	18.05			4.88	
10233_DP	9.30	9.30	9.30	*1.54*	28.83	0.95	10,715	1.77	17.96		60.05	10.07	0.85	14,001	1.21	20.60			5.23	
10234_DP	5.60	5.60	5.60	*1.61*	36.22	1.71	9,219	3.71	17.81		43.20	11.38	1.19	13,637	1.75	21.87			2.37	
10235_DP	6.20	6.20	6.20	*1.62*	36.82	1.04	9,203	2.26	14.37		45.47	12.24	0.75	13,512	1.11	16.82			2.78	
9190_DP	7.90	7.90	7.90	*1.52*	26.65	1.07	10,955	1.95	16.92		63.16	10.10	0.82	13,885	1.18	19.06			4.61	
9191_DP	6.70	6.70	6.70	*1.51*	26.45	0.88	11,085	1.59	16.98		60.63	9.81	0.69	14,003	0.99	19.19			3.75	
9192_DP	7.50	8.10	8.10	*1.54*	29.11	0.78	10,527	1.48	16.65		64.10	10.46	0.62	13,849	0.90	18.88			4.87	
9194_DP	8.60	8.70	8.70	*1.49*	24.13	0.90	11,319	1.59	18.01		69.34	10.22	0.75	13,826	1.08	19.91			5.48	
9195_DP	8.60	9.00	9.00	*1.55*	30.15	1.51	10,429	2.90	17.01		55.95	11.11	1.10	13,787	1.60	19.83			4.76	
9196_DP	7.80	8.10	8.10	*1.63*	37.90	1.18	9,082	2.60	16.09		47.47	8.87	0.78	14,124	1.10	20.64			3.81	
9197_DP	8.30	8.10	8.10	*1.59*	33.60	1.55	9,868	3.14	15.99		48.34	11.73	0.83	13,708	1.21	18.77			3.78	
9198_DP	6.60	6.60	6.60	*1.56*	30.61	1.76	10,218	3.44	16.30		55.00	10.65	0.97	13,855	1.40	18.84			3.44	
9199_DP	8.00	8.50	8.50	*1.50*	25.23	1.10	11,243	1.96	16.58		66.97	9.71	0.81	13,967	1.16	18.61			5.21	
9218_DP	7.80	8.40	8.40	*1.54*	28.73	1.06	10,625	2.00	16.60		62.40	10.79	0.72	13,841	1.04	18.96			4.91	
9219_DP	7.90	7.90	7.90	*1.51*	26.38	1.73	10,995	3.15	17.86		64.71	12.09	1.19	13,544	1.76	19.99			4.71	
9220_DP	8.90	8.90	8.90	*1.61*	36.19	0.84	9,279	1.81	16.33		49.21	9.60	0.78	13,987	1.12	19.81			4.30	
A-Seam Core Holes DH-12-111, 12-112, 13-001, 13-002 1/17/13 CPA# 83310												9.99	0.79	14,071	1.12	18.01		7.5		
12111	6.98	10.75	10.25	*1.53*	27.54	1.03	10,409	1.98	13.99		66.04	10.00	0.74	13,975	1.06	17.37				Composite, Sample excludes 3.77' of mapped seam
Holes 13-005,13-006,13-007 2/9/13 Sample# 117716				*1.45*	20.37	1.13	12,120	1.86		18.25	71.05	9.42	0.78	14,096	1.20	19.64	70.94	8.00		1.55 Float
Holes 13-010,13-011,13-012,13-013 2/15/13 Sample #117717												9.36	0.85	14,125	1.20	20.05	70.59	7.50		1.55 Float, Unknown Recovery
			Average	**1.56**	**30.64**	**1.24**	**10,315**	**2.44**	**16.73**		**56.97**	**10.58**	**0.86**	**13,870**	**1.25**	**19.46**	**70.77**	**7.67**	**4.08**	
			Moist Basis (8%)		**28.19**	**1.14**	**9,489**	**2.24**	**15.39**		**56.97**	**9.73**	**0.79**	**12,760**	**1.24**	**17.90**	**65.10**	**7.05**		
			Maximum	1.63	37.90	1.94	12,120	4.16	18.01		71.05	12.24	1.37	14,125	2.01	21.87	70.94	8.00	5.48	
			Minimum	1.45	20.37	0.78	9,082	1.48	14.37		43.20	8.87	0.62	13,512	0.90	16.82	70.59	7.50	2.37	
			No. of Samples	22	22	22	22	22	21		21	24	24	24	24	24	2	3	20	
Block B																				
10214_DP	5.50	5.50	5.50	*1.70*	44.53	1.91	8,087	4.72	16.61		44.06	9.99	1.27	14,050	1.81	23.39			2.50	
10224_DP	6.00	6.00	6.00	*1.53*	27.51	1.12	10,880	2.06	19.26		65.37	12.24	0.90	13,586	1.32	21.62			3.64	
10226_DP	8.50	8.50	8.50	*1.63*	37.73	1.48	9,142	3.24	16.80		49.31	12.29	0.84	13,608	1.23	20.97			4.15	
10228_DP	7.00	7.00	7.00	*1.54*	29.26	1.47	10,539	2.79	18.69		58.46	9.93	0.92	14,004	1.31	21.04			3.84	
10229_DP	11.40	11.40	11.40	*1.65*	40.06	1.48	8,419	3.52	17.44		41.09	11.51	0.83	13,767	1.21	19.38			4.71	
10242_DP	4.30	4.30	4.30	*1.60*	35.49	0.78	9,514	1.64	15.24		51.03	12.07	0.77	13,641	1.13	17.56			2.14	
10246_DP	3.50	3.50	3.50	*1.55*	30.07	0.96	10,550	1.82	17.78		59.12	12.55	0.77	13,599	1.13	20.02			1.95	
			Average	**1.60**	**34.95**	**1.31**	**9,590**	**2.83**	**17.40**		**52.63**	**11.51**	**0.90**	**13,751**	**1.31**	**20.57**			**3.28**	
			Moist Basis (8%)		**32.15**	**1.21**	**8,823**	**2.60**	**16.01**		**52.63**	**10.59**	**0.83**	**12,651**	**1.31**	**18.92**				
			Maximum	1.70	44.53	1.91	10,880	4.72	19.26		65.37	12.55	1.27	14,050	1.81	23.39			4.71	
			Minimum	1.53	27.51	0.78	8,087	1.64	15.24		41.09	9.93	0.77	13,586	1.13	17.56			1.95	
			No. of Samples	7	7	7	7	7	7		7	7	7	7	7	7			7	

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Deep Mineable Quality (In-Seam Quality, Dry Basis)

A-Seam Underground and Job 27A Areas

Brookville (A) Seam

Table 15Q

	Thickness (In Feet)			Raw Quality, Dry Basis							Washed Quality, Dry Basis (1.50 Float)								Clean	
		Mapped																	Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	FSI	Foot[3]	Comments
Block C																				
10241_DP	5.70	5.70	5.70	*1.54*	29.41	1.37	10,339	2.65	14.83		60.99	10.68	0.76	13,678	1.11	16.53			3.27	
10250_DP	8.70	8.70	8.70	*1.62*	36.90	0.97	9,405	2.06	17.99		43.61	14.49	0.74	13,080	1.13	18.56			3.74	
DH_10238_DP	6.05	6.05	6.05	*1.52*	26.75	1.34	11,018	2.43	15.31		64.69	11.02	0.92	13,797	1.33	17.09			3.62	
			Average	**1.56**	**31.02**	**1.23**	**10,254**	**2.38**	**16.04**		**56.43**	**12.06**	**0.81**	**13,518**	**1.19**	**17.39**			**3.54**	
			Moist Basis (8%)		**28.54**	**1.13**	**9,434**	**2.19**	**14.76**		**56.43**	**11.10**	**0.74**	**12,437**	**1.19**	**16.00**				
			Maximum	1.62	36.90	1.37	11,018	2.65	17.99		64.69	14.49	0.92	13,797	1.33	18.56			3.74	
			Minimum	1.52	26.75	0.97	9,405	2.06	14.83		43.61	10.68	0.74	13,080	1.11	16.53			3.27	
			No. of Samples	3	3	3	3	3	3		3	3	3	3	3	3			3	
Block D																				
DH_10118_DP	6.70	6.70	6.70	*1.53*	27.76	0.85	10,814	1.57	14.57		58.75	11.40	0.68	13,682	0.99	16.09			3.66	
			Average	**1.53**	**27.76**	**0.85**	**10,814**	**1.57**	**14.57**		**58.75**	**11.40**	**0.68**	**13,682**	**0.99**	**16.09**			**3.66**	
			Moist Basis (8%)		**25.54**	**0.78**	**9,949**	**1.45**	**13.40**		**58.75**	**10.49**	**0.63**	**12,587**	**0.99**	**14.80**				
			Maximum	1.53	27.76	0.85	10,814	1.57	14.57		58.75	11.40	0.68	13,682	0.99	16.09			3.66	
			Minimum	1.53	27.76	0.85	10,814	1.57	14.57		58.75	11.40	0.68	13,682	0.99	16.09			3.66	
			No. of Samples	1	1	1	1	1	1		1	1	1	1	1	1			1	
Overall average of all holes:			**Average**	**1.57**	**31.50**	**1.25**	**10,171**	**2.49**	**16.75**	**18.25**	**56.03**	**10.94**	**0.86**	**13,803**	**1.25**	**19.45**	**70.77**	**7.75**	**3.83**	
			Moist Basis (8%)		**28.98**	**1.15**	**9,357**	**2.29**	**15.41**	**16.79**	**56.03**	**10.07**	**0.79**	**12,698**	**1.25**	**17.89**	**65.10**	**7.13**		
			Maximum	1.70	44.53	1.94	12,120	4.72	19.26	18.25	71.05	14.49	1.37	14,125	2.01	23.39	70.94	8.00	5.48	
			Minimum	1.45	20.37	0.78	8,087	1.48	14.37	18.25	41.09	8.87	0.62	13,080	0.90	16.09	70.59	7.50	1.95	
			No. of Samples	33	33	33	33	33	32	1	32	34	34	34	34	34	2	2	31	

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

_D, -D or -DL on drill hole number indicates source of Data (driller's log)

-DP detail data provided in text file from PBS

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Deep Mineable Quality (In-Seam Quality, Dry Basis)

Laurel Area

Upper Kittanning (C') Seam

Table 16Q

	Thickness (In Feet)			Raw Quality, Dry Basis								Washed Quality, Dry Basis (1.55 Float)								Clean	
		Mapped																		Tons/ Entry	
Drill Hole	PBS Rpt.[4]	Total Seam	Total Coal	Sp. Gr.[1] [2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	FSI	% Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	FSI	Foot[3]	Comments
Upper Kittanning																					
12-246-DL	4.80	4.80	4.80	*1.49*	23.80	4.11	11,586	7.09	15.72		6	69.63	8.70	1.25	14,162	1.77	17.10		8	3.03	
12-247-DL	3.20	3.20	3.20	*1.41*	16.22	3.07	12,977	4.73	16.98		6	82.68	8.29	1.08	14,324	1.51	17.82		7	2.27	
DH 950	3.50	3.50	3.50	*1.36*	11.27	2.10	13,758	3.05	18.53			88.40	7.65	0.83	14,419	1.15	19.03			2.57	¼" x 0 size fraction
DH 955	3.70	3.70	3.70	*1.36*	10.60	2.70	13,979	3.86	18.40			89.20	7.50	1.01	14,566	1.39	18.80			2.72	
DH 956	3.50	3.50	3.50	*1.37*	12.42	2.53	13,607	3.72	18.45			86.81	7.69	1.13	14,521	1.56	18.97			2.54	
DH 957	3.70	3.70	3.70	*1.37*	12.17	4.10	13,695	5.99	18.98			86.06	6.70	0.93	14,758	1.26	19.49			2.66	
DH 953	3.00	3.00		*1.37*	11.90	18.20	13,730	26.51	18.20			87.20	8.50	1.22	14,371	1.70	18.50			2.18	
DH 958	3.35	3.40		*1.38*	13.18	3.21	13,502	4.75	19.97			84.17	6.84	0.94	14,691	1.28	20.74			2.41	
DH 962	NA	3.50		*1.49*	23.90	2.42	11,518	4.20	18.10			72.80	7.80	0.99	14,461	1.37	20.70			2.31	3/8" x 0 size fraction
DH 966	3.50	3.50		*1.41*	15.50	2.68	13,106	4.09	18.20			82.00	8.30	1.14	14,442	1.58	19.10			2.45	3/8" x 0 size fraction
09-158	4.10	4.10	4.10	*1.47*	22.28	2.45	11,815	4.15	16.24			72.96	9.55	0.92	14,064	1.31	17.73			2.68	
09-166	3.00	3.00	3.00	*1.38*	13.23	2.36	13,346	3.54	16.36			89.98	8.69	0.82	14,135	1.16	16.71			2.27	
111000-DL	3.30	3.30	3.30	*1.42*	16.89	2.55	12,882	3.96	18.06		6	84.84	8.36	1.24	14,347	1.73	19.14		7	2.42	
111002-DL	3.40	3.40	3.40	*1.41*	16.11	4.24	12,816	6.62	17.84		6	78.91	7.95	1.32	14,253	1.85	18.22		7	2.30	
111003-DL	3.30	2.70	2.70	*1.37*	11.94	0.99	13,652	1.45	16.47		6	92.85	9.14	0.81	14,126	1.15	16.82		6	2.09	
111005-DL	3.20	3.20	3.20	*1.39*	13.96	5.06	13,338	7.59	17.61		7	85.70	8.48	1.15	14,249	1.61	17.85		8	2.32	
			Average	**1.40**	**15.34**	**3.92**	**13082**	**5.96**	**17.76**		**6.17**	**83.39**	**8.13**	**1.05**	**14368**	**1.46**	**18.55**		**7.17**	**2.45**	
			Moist Basis (8%)		**15.34**	**3.61**	**12035**	**5.48**	**16.34**		**5.67**	**83.39**	**7.48**	**0.96**	**13219**	**1.34**	**17.06**		**6.59**		
			Maximum	1.49	23.90	18.20	13979	26.51	19.97		7.00	92.85	9.55	1.32	14758	1.85	20.74		8.00	3.03	
			Minimum	1.36	10.60	0.99	11518	1.45	15.72		6.00	69.63	6.70	0.81	14064	1.15	16.71		6.00	2.09	
			No. of Samples	16	16	16	16	16	16		6	16	16	16	16	16	16		6	16	

Quality not included in statistics; may not be representative of mineable section.

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

[4] PBS reported thickness.

a. Where thickness was recorded on a laboratory sheet, thickness matched database and quality was verified.

b. In some cases, lost core thickness was recorded on a laboratory sheet, however, true seam thickness is unclear.

c. In some cases, thickness may only reflect total coal (excluding partings); raw quality was subjectively honored and washed quality (excluding recovery) was honored.

d. "NA" indicates that a thickness was not reported.

e. The majority of quality data was extracted from Carlson digital survcadd files and supplemented with data from various excel files.

Corsa Coal Corporation

43-101 Technical Report

Deep Mineable Quality (In-Seam Quality, Dry Basis)

Keyser Area

Middle and Lower Kittanning Seams

Table 17Q

Drill Hole	Thickness (In Feet) Analyzed	Total Seam	Total Coal	Raw Quality, Dry Basis Sp. Gr. [1 2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Composite float Washed Quality, Dry Basis (1.45,1.80,1.50 Float) % Rec.[2]	% Ash	% Sulfur	BTU/lb.	S02/mm BTU	% Vol.	% FC	Comments
Middle Kittanning																		
WCE-KYZ-13-1-C				*1.47*	22.13													
			Average	*1.47*	**22.13**													
			Moist Basis (8%)		**20.36**													
			Maximum	1.47	22.13													
			Minimum	1.47	22.13													
			No. of Samples	1	1													
Lower Kittanning																		
WCE-FET-002-11				*1.34*	8.51													
WCE-FET-03B-11				*1.40*	14.95													
WCE-FET-004A-11				*1.40*	15.02													
WCE-FET-06B-11				*1.40*	14.85													
WCE-FET-008-11				*1.43*	17.99													
WCE-FET-009-11				*1.45*	20.23													
WCE-FET-013-11				*1.51*	25.81													
WCE-FET-014B-11				*1.47*	21.89													
WCE-FET-016B-11				*1.44*	18.69													
WCE-FET-017-11				*1.42*	17.16													
WCE-FET-018-11				*1.67*	41.88													
WCE-FET-019-11				*1.37*	11.88													
WCE-FET-023B-11				*1.57*	31.87													
WCE-KYZ-13-1-B				*1.48*	23.26						68.40	8.29	1.56	14,325	2.18	17.20		
			Average	*1.45*	**20.29**						**68.40**	**8.29**	**1.56**	**14,325**	**2.18**	**17.20**		
			Moist Basis (8%)		**18.66**						**68.40**	**7.63**	**1.44**	**13,179**	**2.00**	**15.82**		
			Maximum	1.67	41.88						68.40	8.29	1.56	14,325	2.18	17.20		
			Minimum	1.34	8.51						68.40	8.29	1.56	14,325	2.18	17.20		
			No. of Samples	14	14						1	1	1	1	1	1		

[1] *Italics* denote specific gravity values which have been estimated based on raw coal ash content where specific gravity = 1.25+(raw ash¸100)

[2] **Bold** denotes specific gravity and/or wash recovery values which have been estimated based on Estimated Visual Recovery calculations.

[3] Entry Width = 19.5

Washed Quality, Dry Basis (1.55,1.80,1.50 Float) represents a composite of three screen & float analysis - (1) 38in x 1MM screen data @ 1.55 s.g. (2) 1MM x 100 M screen data @ 1.80 s.g. (3) 100M x 0 @ 1.50 s.g.

APPENDIX

5

RÉSUMÉS OF QUALIFIED PERSONS

Justin S. Douthat

Current Position
Vice President, Manager of Engineering Services

Profession
Engineer

Years' Experience
22+

Education
MBA - The Pennsylvania State University, University Park, PA

BS - Mining & Minerals Engineering, Virginia Tech, Blacksburg, VA

AA&S - Engineering, SVCC, Richlands, VA

Professional Registrations
PE - AR, CO, IL, KS, KY, LA, MS, NC, VA, WV

SME - Registered Member (4028345)

OSHA 40-Hour Health and Safety Training

OSHA 8-Hour Supervisory Health and Safety Training

MSHA Qualified Impoundment Inspector

40-Hour Radiation Safety Officer Training

www.mma1.com

Summary of Experience

Mr. Douthat coordinates engineering services for the company's energy and mineral resources clients, including those in the aggregates and industrial mineral industries. His experience includes geologic modeling, reserve calculations, mineral valuations, mine planning and production timing using Carlson Mining® computer software. In addition, he performs end-of-mine reclamation and closure cost assessments that meets the requirements of Accounting Standard Codification Topic 410 (*ASC 410*) Accounting for Asset Retirement Obligations. He administers training for the use of Carlson Mining® computer software for geologic modeling and mine planning both in the United States and abroad. Mr. Douthat also coordinates and supervises a company-wide radiation safety program that includes the safety training of geophysical logging personnel in order to maintain compliance with federal and state nuclear regulatory authorities.

Specific Projects

> Prepared and/or served as a Qualified Person (QP) on multiple technical reports for the public filing of coal resources and coal reserves including those for the U.S. Securities and Exchange Commission, Canadian National Instrument 43-101 Standards for Disclosure of Mineral Projects (NI 43-101) and the Joint Ore Reserves Committee (JORC) code

> Conducted reserve estimations for both aggregates and industrial minerals clientele that included reviews of potential acquisition properties or expansion areas as well as definition of maximum reserve potential for as-configured operating properties

> Designed pits for quarries that maximized reserves with a focus on erosion and sediment control

> Completed amendments to mining permits for submittal to state agencies

> Worked closely with quarry operations personnel to produce overburden removal and disposal plans along with the associated cut and fill volume estimates for future quarry expansion areas

> Prepared multiple construction bid packages to include overburden removal and disposal area designs, haul road design and relocation, and all associated erosion and sediment control design construction details

> Coordinated aerial surveys for topographic mapping and stockpile inventory purposes, and prepared stockpile inventory volume calculations

> Provided detailed mine planning that included reserve/resource assessment and mine production timing for surface and underground operations utilizing Carlson Mining® computer software

Michael G. McClure

Current Position
Principal Geologist

Profession
Geology

Years' Experience
40

Education
MS - Geology, University of Kentucky, Lexington, KY (1990)

BS - Geology, Brigham Young University, Provo, UT (1977)

Professional Registrations
CPG – AIPG (No. 8196)

PG - KY, VA

MSHA Annual Retraining (surface & underground coal mining)

Affiliations
American Association of Petroleum Geologists (AAPG)

American Institute of Professional Geologists (AIPG)

Summary of Experience

Mr. McClure conducts geologic evaluations for the mining and coalbed methane (CBM) industries where he incorporates borehole and rock mechanics data, underground mapping, and geophysical data into the reporting process. He also directs the company's CBM laboratory for mining-related and exploration projects conducted in Alabama, Tennessee, Virginia, West Virginia, Kentucky, Ohio, Oklahoma, Pennsylvania, Illinois, and Wyoming.

Significant Projects

> Analyzed surface and underground mining and coalbed methane resources in major basins of the USA, and internationally within selected areas of Mexico, Venezuela, Canada, Chile, Czech Republic, China, and Turkey.

> Provided geologic support for mining safety and accident investigations in Kentucky and West Virginia

Specific Projects

> **Virginia, USA:** Coordination of geological operations for 100 coalbed methane wells that included quality control, geophysical log interpretation, coalbed methane desorption testing, mapping, and analysis of coalbed methane potential for coal beds in the Central Appalachian Basin of Virginia.

> **Tennessee and Virginia, USA**: Coordination of geologic component of small-scale pilot program for injection of CO_2 into Shale and CBM wells in order to enhance gas recovery and sequester CO_2.

> **Pennsylvania, USA:** Coordination of drilling, geologic mapping, coal quality testing, and reserve report preparation for several geologically complex properties in the Anthracite coal fields.

> **Shanxi Province, China:** Coordination of geologic evaluation of deep-mineable coal reserves and development of coalbed methane resources within a coal mining leasehold which has since been opened as a large longwall mining operation.

> **Southern Chile:** Conduct evaluation of geologic conditions for a financial institution on an undeveloped coal reserve property, which has since been opened as a surface mining operation.

> **West Virginia, USA:** Participation in research to collect, identify and quantify rare earth elements (REE) from an active underground coal mine.

> **Turkey:** Conduct audit of geologic conditions for limestone and metallic ore deposits

Recognitions

> Graduate Fellowship Award, Federal Office of Surface Mining and the University of Kentucky, 1985–1986.

> Sigma Gamma Epsilon, while pursuing undergraduate studies at Brigham Young University.

Memberships

> Tazewell County Virginia Economic Development Commission, Member of ad hoc committee to study feasibility of making natural gas available for industrial usage, 1992.

> West Virginia Coalbed Methane Group – Member of ad hoc committee representing Coal and Oil & Gas Industry to draft legislation governing the development of coalbed methane within the state, 1993.

> Energy and Mineral Law Foundation, Lexington, Kentucky.

Kirt W. Suehs

Current Position
Senior Geologist

Profession
Geology

Years' Experience
39+

Joined MM&A
1999

Education
BS – Geology, Old Dominion University, Norfolk, Virginia

AS – Mining Engineering, Bluefield State College, Bluefield, West Virginia

Professional Registrations
CPG – VA

AIPG

Continuing Education
Contemporary Supervision– Personnel Management, Houston, Texas, October 1989.

Elements of Coal Preparation, Penn State University, February 1985.

Summary of Experience

Mr. Suehs manages coal resource, reserve, and mineability evaluations for public filing documents, regional coal studies, and property management programs that include collection and interpretation of geophysical data, computer mapping applications, market valuation of coal resources, and project reporting and presentation.

Significant Projects

> **Central Appalachian Basin:** Managed multiple due diligence evaluations associated with merger and acquisition activities. Project parameters included reserve evaluations, Phase I environmental site assessments, and mine planning and hazards mapping for major energy and land-holding companies

> **Securities and Exchange Commission (SEC) reports and Canadian National Instrument 43-101 technical reports:** Supervised multiple projects associated with SEC filings for Peabody Energy, Penn Virginia Resource Partners, Patriot Coal Company, and others

> **Central West Virginia:** Conducted regional investigation and exploration of deep and surface minable coal resources followed by detailed evaluation

> **Eastern and Western Kentucky:** Evaluated coal resources to define potential multiple seam stripping applications

> **Illinois:** Evaluated deep and surface mineable reserves for multiple million-ton-per-year operations

> **Southwestern Virginia:** Investigated extensive reserves for geological factors that influenced seam mineability

> **Tennessee:** Evaluated seam mineability and reserve characteristics and implemented an exploration program to confirm seam mapping

> **Western Maryland:** Evaluated substantial underground mineable reserves

> **International:** Managed coal resource, reserve and mineability evaluations for public filings in Canada and Australia, and has worked in all the domestic coal fields in the United States and on international projects in China, Turkey and Colombia.

Gerard J. Enigk

Current Position
Principal Engineer

Profession
Mining Engineering

Years' Experience
40+

Joined MM&A
1994

Education
MS - Environmental Science

BS - Mining Engineering

Professional Registrations
PE - West Virginia

West Virginia Mine Foreman Certification

OSHA 40-Hour Health & Safety Training Certificate

MSHA Qualified Impoundment Inspector

West Virginia Dept. of Environmental Protection (WVDEP) Approved Person for Permit Submittals

Summary of Experience

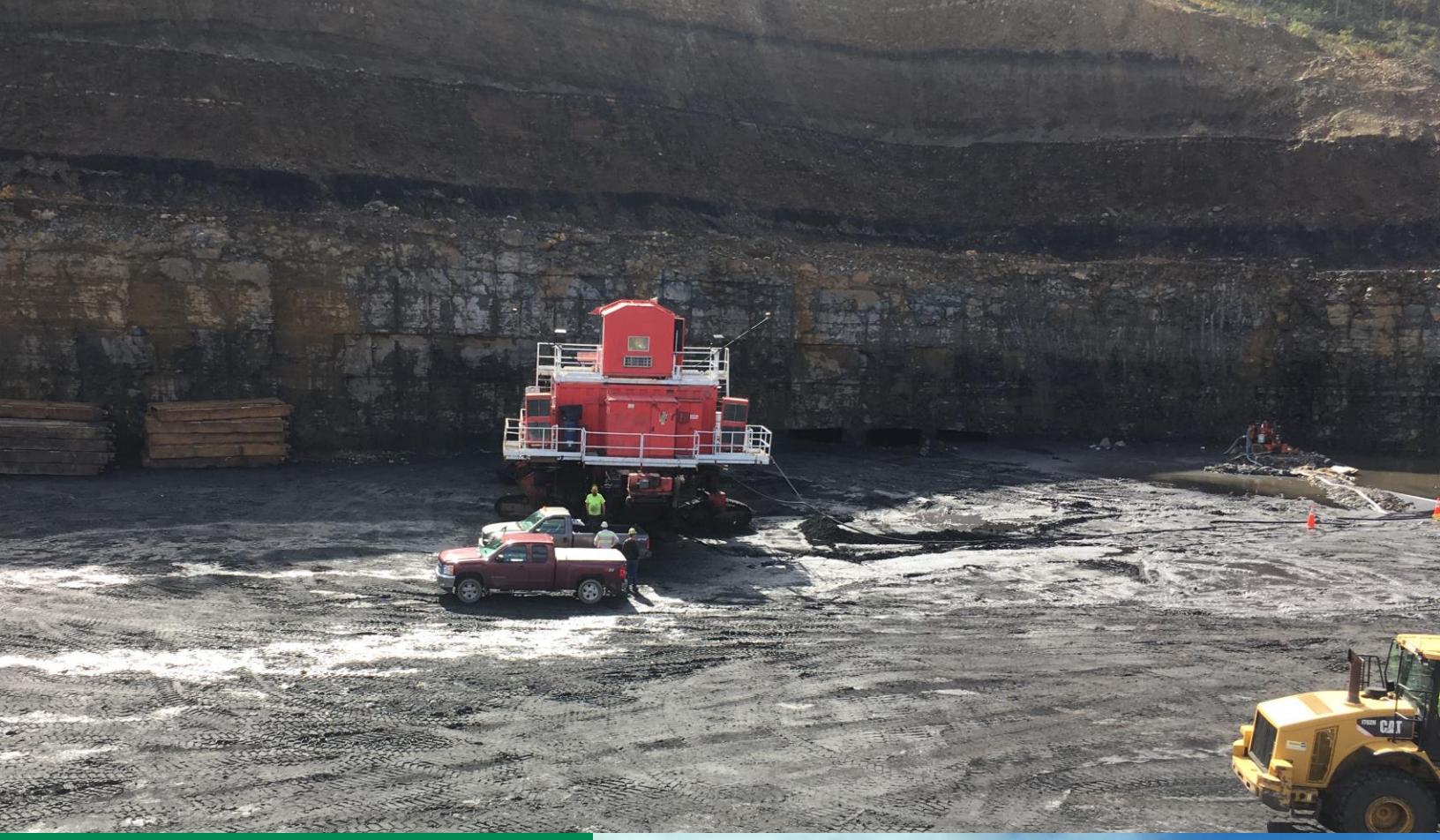
Mr. Enigk is responsible for mine planning, design engineering, and feasibility studies of mine properties both domestically and abroad. He conducts geotechnical evaluations of mining conditions and evaluates mine subsidence associated with mine sites. In addition, he conducts environmental site assessments and evaluates post-closure obligations for mining properties.

He has:

> Completed feasibility studies for coal and non-coal mining ventures, including equipment selection and financial modelling
> Performed operational and environmental due diligence for mining property ownership changes
> Evaluated and conducted computer simulation of mine ventilation systems
> Investigated hundreds of underground coal mine roof failures
> Managed industrial demolition and site reclamation of coal preparation and base metals processing plants
> Designed, prepared permits, and conducted feasibility studies for reprocessing and reclamation of coarse coal refuse, fine coal slurry, and other mineral tailings areas
> Conducted weekly impoundment monitoring and prepared annual impoundment reports as required by Mine Safety and Health Administration (MSHA)
> Provided expert witness and technical support services for litigation and adjustment of industrial insurance claims

Specific Projects

> **Zulia State, Venezuela**: Designed open-cut mine and surface facilities for coal concession
> **Shanxi Province, China**: Designed facilities and ventilation system for operating longwall coal mine and managed engineering staff
> **Maras Province, Turkey**: Designed open-cut lignite mine and surface facilities for 260 megawatt (MW) mine-mouth power generation station
> **Norte de Santander Department, Columbia**: Designed multiple underground coal mines and surface facilities for conversion from traditional mining methods to mechanized mining methods
> **La Libertad Department, Peru**: Completed site reconnaissance and prepared preliminary mine design for near-vertical underground coal mine resource in remote region
> **Western Australia**: Designed open-cut, highwall, and underground mine and production systems, and prepared financial evaluations for coal resources



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