

## **COAL ASSESSMENT REPORT ROMAN PROPERTY PEACE RIVER DISTRICT**

**LOCATED AT UTM: 6,083,500 N, 630,000 E**

**LEASE: 417059.**

**Peace River Coal Inc. - Anglo American Coal Pty Ltd  
800 – 700 West Pender Street  
Vancouver, British Columbia  
V6C 1G8**

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September 12, 2014**

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## COAL ASSESSMENT REPORT TITLE PAGE AND SUMMARY

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SIGNATURE(S): *David Lortie*

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NTS / BCGS: *093I 15*

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LONGITUDE: (at centre of work)

UTM Zone: *10* EASTING: *630,000* NORTHING: *6,083,000*

OWNER(S): *Peace River Coal Inc.*

MAILING ADDRESS: *Suite 800 – 700 West Pender Street, Vancouver, BC V6C 1G8*

OPERATOR(S) [who paid for the work]: *Peace River Coal Inc.*

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REPORT KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude. **Do not use abbreviations or codes**)

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- 1. Denison Mines Limited. 1976. Quintette Coal: Limited 1975 Exploration and Development Report, January 1976. Report 607***
- 2. Denison Mines Limited. 1976. Quintette Coal Limited: Information Summary, August 1976. Report 608***
- 3. Denison Mines Limited. 1976. Quintette Coal Limited: 1976 Geological Assessment Report, December 1976. Report 609***

**4. McIntyre, R.F. 2005. 2005 Assessment Report – Roman Mountain Drilling Program, June 2006. Report 905**

SUMMARY OF TYPES OF WORK IN THIS REPORT		EXTENT OF WORK (in metric units)	ON WHICH TENURES
GEOLOGICAL (scale, area)			
	Ground, mapping		
	Photo interpretation		
GEOPHYSICAL (line-kilometres)			
	Ground (Specify types)		
	Airborne (Specify types)		
	Borehole		
	Gamma, Resistivity,		
	Resistivity		
	Caliper		
	Deviation		
	Dip Others (specify)		
	Core		
	Non-core		
SAMPLING AND ANALYSES			
Total # of Samples			
	Proximate		
	Ultimate		
	Petrographic		
	Vitrinite reflectance		
	Coking		
	Wash tests		
PROSPECTING (scale/area)			

Pages 21-23 (Section 4.6 & 4.7), Pages 29-50 (Sections 6, 7, 8), Pages 57-60 (Attachment 4), and analytical laboratory certificates remain confidential under the terms of the Coal Act Regulation, and have been removed from the public version.

<http://www.bclaws.ca/civix/document/id/complete/statreg/25>

[1 2004](#)

# COAL ASSESSMENT REPORT

## ROMAN MOUNTAIN

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- 1 Location Map
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- 4 Sample Analytical Flow Sheets  
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- 5 Geological Map
- 6 Stratigraphic Column
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- 1 2013 Geophysical Logs
- 2 Maps and Sections
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## 1 SUMMARY

The Roman property consists of a coal lease on Roman Mountain in an area that Peace River Coal Inc. acquired in 2006 as part of the formation of the company. Until December 2006, the Trend Mine was owned and operated by NEMI Northern Energy and Mining Inc. (NEMI). In November 2, 2006 NEMI's assets were consolidated with Hillsborough Resources Ltd. and Anglo Canadian Coal Inc. assets to form a new coal mining company, Peace River Coal Limited Partnership (PRCLP). NEMI and Hillsborough Resources Ltd. remained as minority shareholders in PRCLP, and PRC managed the PRCLP assets as general partner.

In October 2011, the NEMI and Hillsborough Resources Ltd. minority interests were sold to PRC. PRC now manages the assets and is a wholly owned subsidiary of Anglo American plc. PRC operates as part of Anglo American's Coal business unit based in Brisbane Australia.

The property is located in the Peace River Regional District of Northeast British Columbia, Canada. The property is in the Inner Foothills of the Canadian Rocky Mountains near the town of Tumbler Ridge, British Columbia and about 725 km northeast of Vancouver, British Columbia. The property is readily accessible by provincial highway and an all-weather forestry service road. See Attachment 1 and Attachment 2.

The coal resources in the Roman Mountain area are part of the Peace River Coalfield. The coal seams are contained in the Lower Cretaceous Gates Formation and were deposited in an alluvial-deltaic environment 145 million years ago. Gates Formation coals have been mined extensively in the region, and the seams at the Roman Mountain area may be correlated with the seams mined previously in the region.

Regional tectonism from post-depositional mountain building has folded the geological structures regionally and locally. In this area, significant reverse and thrust faulting are interpreted in parts of the resource area. The local structures are of moderate geology, as defined by GSC paper 88-21,

In the Roman area, the D2, E1, F, G J, and K1 Seams of the Gates Formation and The Bird , GT1 and GT2 seams of the Gething Formation are considered to have economic potential for development.

Denison carried out drilling exploration on Roman Mountain between 1975 and 1976. The work included a fifteen borehole drilling program in 1975 consisting of twelve rotary percussion boreholes and three HQ diamond core boreholes, further, four trenches were excavated. In 1976, twelve HQ diamond core holes were completed; nine of these boreholes are located within the area of the 2005 to 2006 programs carried out by NEMI and the 2007 to 2009 programs carried out by PRC

NEMI completed an exploration program in 2005 consisting of twenty-four rotary percussion boreholes, nineteen of which were geophysically logged, and the reopening and re-logging of fourteen of the 1975 to 1976 boreholes; spot coring was completed on the D2 Seam in one borehole. Additionally, nineteen trenches were excavated to supplement borehole data. In 2006, twenty-eight rotary percussion boreholes, two HQ core holes, nineteen large diameter core holes and thirty-one trenches were completed by NEMI. In addition, seven existing boreholes were deepened.

Drilling activities carried out on Roman Mountain by PRC from 2007 to 2009 included 143 rotary percussion boreholes, twenty-nine diamond core holes and nineteen large diameter boreholes. These gave an aggregate drilled length of 34,679 m with 28,907 m of rotary percussion drilling, 4,481 m of diamond core drilling and 1,291 m of large diameter core drilling. In addition, ten trenches were excavated during the 2007 to 2009 drilling programs.

In 2011 and 2012 additional work was carried out on Roman Mountain. For 2011, 22 trenches, 6 LDC boreholes and 23 rotary percussion boreholes were completed. In 2012 an additional 14 rotary percussion boreholes and 6 PQ core boreholes were drilled.

In 2013 a drill program was carried out on Roman Mountain. This work included a winter program on the lower area near Babcock Creek. This area had not been extensively drilled due to wet ground conditions. The winter program was designed to access this area when the ground was frozen. The work consisted of 13 rotary percussion boreholes and 19 PQ core boreholes. A summer program targeted area where additional structure and quality data points were required. The program consisted of 12 rotary percussion boreholes and 47 near surface rotary boreholes drilled to test the oxidation depth of the coal. These boreholes were designated as LOX holes.

The structural information from the 2013 drilling was used in the updated resource geological model for Roman Mountain. The quality data will be used as part of a quality update to the resource model in Q2 of 2014.

A series of Geological Resource models have been developed over the past few years and the coal resources of the property have been estimated using the guidelines set forth under GSC paper 88-21.

Trend-Roman is an open cut operation situated in the Rocky Mountain Foothills of northeastern British Columbia, Canada, approximately 20km south of the town of Tumbler Ridge. Mining currently occurs within two blocks (in Trend South since 2005 and Trend Extension since 2012), with future mining planned in the Roman block. The Roman block consists of a syncline that is located directly south of the current Trend South block, on Roman Mountain.

Because the Roman block will be mined with the same equipment fleet and utilise the same facilities (CHPP, Maintenance Shop, etc.) as Trend, the life of mine plan is integrated for both site (and hence, reserves are reported together).

The open cut truck and shovel mining method utilises three hydraulic excavators and one hydraulic shovel, for a nominal capacity of 23.9 Mbcmpa. This capacity increases slightly during the course of the life of the mine as smaller excavators are replaced with larger equipment.

ROM Coal is processed in the CHPP to produce a clean product. Product spec information can be found in the Product Qualities section. Currently, the plant can run at a feed rate of 400 tph, feeding approximately 2.1Mt ROM per year. Planned upgrades and debottlenecking will increase future feed rate maximum to 525tph and annualized feed of over 3.5Mt ROM.

The nearest railhead is the CN Rail Tumbler Subdivision, which terminates 12km south of Tumbler Ridge at the Quintette rail loadout. Peace River Coal (now a wholly owned subsidiary of AAMC) constructed a rail loadout facility in 2005 located approximately 4km north of the Quintette rail loadout which also connects with the CN Rail Tumbler Subdivision railhead. Clean coal is trucked approximately 20 km from the Trend CHPP to the rail loadout. From the rail loadout, coal is carried by CN trains approximately 1,000km to the Ridley Terminal in Prince Rupert, British Columbia. From here, coal is loaded to vessels and shipped to customers worldwide.

The latest Life of Mine plan outlines the next 14 years, terminating in 2028.

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## 2 INTRODUCTION

### 2.1 Purpose of Report

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This report has been prepared to report on the exploration activities undertaken in 2013 on Roman Mountain as part of the requirements for holding coal tenure under the British Columbia Coal Act. The exploration program was undertaken under Notice of Work permit CX-9-8.

### 2.2 Project Description

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Peace River Coal Inc. (PRC) is a producer of high-quality metallurgical coal in Canada. In addition to holding significant coal resources in western Canada, PRC conducts mining operations at the Trend Mine in the Tumbler Ridge area of northeast British Columbia

Until December 2006, the Trend Mine was owned and operated by NEMI Northern Energy and Mining Inc. (NEMI). In November 2006 NEMI's assets were consolidated with Hillsborough Resources Ltd. and Anglo Canadian Coal Inc. assets to form a new coal mining company, Peace River Coal Limited Partnership (PRCLP). NEMI and Hillsborough Resources Ltd. remained as minority shareholders in PRCLP, and PRC managed the PRCLP assets as general partner.

In October 2011, the NEMI and Hillsborough Resources Ltd. minority interests were sold to PRC. PRC now manages the assets and is a wholly owned subsidiary of Anglo American plc. PRC operates as part of Anglo American's Metallurgical Coal business unit based in Brisbane Australia.

### 2.3 Property Description & Location

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The Roman Mountain Project is located on Roman Mountain which is situated in the Rocky Mountain Foothills of north-eastern British Columbia adjacent to the current Trend Mine (see Attachment 1). Access to the project is gained by paved and gravel roads from Tumbler Ridge, located 20 km to the north. The project is located within an area that extends northwest from Gordon Creek to Babcock Creek. It is centered in UTM Zone 10 (NAD 83) at coordinates 6,083,500 N, 630,000 E and is located on NTS Map Sheet 93-I/15

### 2.4 Mineral Rights & Surface Title

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The Roman Project and associated infrastructure occur on several Crown Coal Licences and one Coal Lease (see Attachment 2). Table 1.1 shows the licences and their present status and includes data concerning the coal lease. The Roman Project is located within Coal Lease 417059 which expires on September 14, 2030 and is owned by PRC. The lease covers a total area of 3,201 ha of which approximately 500 ha make up the Roman Project area. The remainder of the lease includes the Trend Mine as well as areas that surround the mine and various infrastructure features. The company advises that the property has not been legally surveyed.

**Table 2.4.1: Summary of Mineral Rights**

Attribute	
Tenure Type	Coal Lease
Tenure Number	417059
Site	Roman
Name	Trend Roman
Holder 1	PRC
Holder 1%	100
Holder2	
Holder2%	
Area	3201
Units	Ha
Application Date	
Grant Date	
Expiry Date	2030.09.14
Renew By	
Renewal Lodged	

## 2.5 Accessibility, Climate, Infrastructure & Physiography

See Attachment 2. The Roman Mountain Project is accessed from Tumbler Ridge via the paved Heritage Highway and an all-weather gravel road named Petroleum Development Road 46 (PDR 46), or the Core Lodge Road. PDR 46 is owned and maintained by Canadian Natural Resources Limited (CNRL) and PRC has entered into a Road Use Agreement for mine access and coal haul. A seasonal trail extends approximately 2 km from Trend Mine and provides primary access to Roman Mountain from June to October. The existing Babcock Creek Road and Roman Mountain South side road provide alternative access to Roman Mountain. The Heritage Highway and PDR 46 road are maintained year-round in good, drivable condition in support of all resource development in the area. Babcock Creek Road and Roman Mountain South side road are not maintained year-round.

All weather data was obtained from the Trend Mine weather station between 2006 and 2009. The station is located in UTM Zone 10, NAD 83 at coordinates 6085666 Northing, 630950 Easting and 1,434 m above mean sea level.

The climate within the project area is characterized by long, cold winters, from November through March, and short, cool summers, from June through August. Summer temperatures generally range between 5°C and 15°C but maximum values of up to 30°C have been recorded. Average winter temperatures range between -10°C and -5°C with minimum temperatures as low as -30°C. Rainfall occurs during the summer months with an annual average of 306 mm. Snow pack at the Trend South Mine normally averages 200 cm per annum but may exceed 275 cm. Wind speeds vary throughout the year averaging approximately 16 km per hour. Maximum wind speeds of up to 111 km per hour have been recorded.

The centre of the Roman Project area is located about 100 km south of Dawson Creek, British Columbia and 175 km south of Fort St. John, British Columbia. Dawson Creek and Fort St. John have populations of approximately 11,000 and 17,400 respectively. In addition, the Roman Project is located approximately 175 km northeast of Prince George, British Columbia and 120 km southwest of Grande Prairie, Alberta both of which have populations greater than 40,000. Each of these cities has regularly scheduled flights to and from major western Canadian cities such as Vancouver, Edmonton and Calgary. Tumbler Ridge is a small town with a population of approximately 2,500 located 20 km to the north of the Roman Project.

The nearest railhead is the CN Rail Tumbler Subdivision, which terminates 12 km south of Tumbler Ridge at the Quintette rail load-out. PRC constructed a rail load-out facility in 2005 located approximately 4 km north of the Quintette rail load-out which also connects with the CN Rail Tumbler Subdivision railhead. Distance from this load-out to the Ridley Terminal Inc., in Prince Rupert, British Columbia is approximately 1,000 km. An airstrip is situated 11 km south of Tumbler Ridge along the Heritage Highway. The unmanned airstrip is primarily used for chartered flights. Primary industrial development activities in the region include oil and natural gas exploration and production, coal exploration and mining, forestry and wind energy generation.

The Roman Project is located in the Rocky Mountain Foothills of British Columbia. The Foothills consist of a series of ridges and valleys that parallel the Rocky Mountains to the west. The topography of the Roman Project area varies from gentle slopes to rugged cliffs and steep valleys. The total elevation change across the project area is approximately 800 m, from 1,400 m above mean sea level at Babcock Creek, to 2,200 m above mean sea level at the peak of Roman Mountain.

Water drainage from the project area is collected into two systems; Gordon Creek to the southeast of Roman Mountain and Babcock Creek to the northwest of Roman Mountain. Johnson Creek is a large tributary draining into Babcock creek and is located northwest of Trend Mine and north-northeast of Roman Northwest portion of the project. Babcock Creek and Gordon Creek drain into the Murray River.

## 2.6 Adjacent Properties

The Roman Project is located within an area that contains a number of both closed and currently producing metallurgical coal properties including Perry Creek, Bullmoose, Wolverine, Quintette and the Trend Mine.

## 2.7 Historical Information

Commercial coal deposits were first discovered north of the Roman Project area beside the Sukunka River in 1965, and this discovery triggered a coal “staking rush” by various companies led mainly by Brameda Resources and Denison Mines Limited.

This activity occurred in response to global expansion of steel production which stimulated worldwide exploration for coking coal. Intensive exploration from the late 1960’s to the 1980’s followed that culminated in the development of the Quintette and Bullmoose Coal Mines.

Infrastructure development included the construction of the town of Tumbler Ridge, 129 km of rail line, 95 km of highway, 127 km of high voltage transmission line, a new port at Ridley Island and the upgrading the 752 km of existing rail line from Prince George to the port at Prince Rupert.

The Quintette Mine made its first coal shipment in December 1983 and operated until August 2000. The mine had a raw coal production capacity in excess of 6 million tonnes per annum, making it one

of Canada's largest mines. Production came from four open pits named Mesa, Wolverine, Shikano and Babcock. Clean coal production capacity was 2.3 million tonnes per annum, although shipments toward the end of the mine's life in 2000 ranged from 1.4 to 1.9 million tonnes per annum.

The Bullmoose Mine produced 34 million tonnes of high quality metallurgical coal from 1983 until its closure in April 2003. Teck, which acquired the property through the purchase of Brameda Resources, operated the mine and owns the majority of the remaining mine assets along with minority partners.

Since 2004 four new open pit coal mines have opened in the region. Two of these which are the Wolverine and Trend Mines, are located in the Tumbler Ridge area and produce metallurgical coal. The others, the Pine Valley Coal Mine and the Brule Mine, are located in the Chetwynd area. The Brule Mine produces Pulverized Coal Injection (PCI) coal while Pine Valley has produced both PCI and metallurgical coal.

In 1970 and subsequent years Denison Mines Limited (Denison) acquired a large number of crown coal licences in the Wolverine Valley, Quintette Mountain and Roman Mountain areas. In April 1971 Denison entered into an agreement with Mitsui Mining Co. Ltd., Alco Standard Corporation and Tokyo Boeki Ltd. to form Quintette Coal Ltd. Several changes in the partnership took place in the 1970's and 1980's leaving Denison as the major shareholder and managing partner. By 1983 Denison had accumulated a 50% stake in the partnership with Mitsui Mining Co. Ltd. holding 12.5%. The remainder of the partnership comprised twelve other companies, mainly representing interests in the Japanese steel industry.

In response to decreasing economic certainty and rulings by federal authorities to reduce coal prices, Teck Corporation took control of Quintette Coal Limited from Denison in 1991 and the Quintette Operating Corporation was created. As a result of diminishing coal prices the Roman licenses reverted to the crown in 1999 to 2000.

Ownership of the Roman Mountain coal license was obtained by NEMI in early 2000. When NEMI joined the PRC partnership in 2006 control of the Roman Mountain coal license was transferred to PRC.

## 2.8 Exploration By Other Parties

Denison Mines Limited carried out extensive exploration work on Roman Mountain between 1975 and 1976. The work included detailed surface geological and topographical mapping, structural interpretation and mechanical exploration including drilling. Activities in the field included rotary percussion and diamond core drilling. In addition trenches were excavated. In 1976 more core drilling was completed.

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## 3 DRILL HOLE DATA

### 3.1 Historical Drilling

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Denison carried out drilling exploration on Roman Mountain between 1975 and 1976. The work included a fifteen borehole drilling program in 1975 consisting of twelve rotary percussion boreholes and three HQ diamond core boreholes, further, four trenches were excavated. In 1976, twelve HQ diamond core holes were completed; nine of these boreholes are located within the area of the 2005 to 2006 programs carried out by NEMI and the 2007 to 2009 programs carried out by PRC.

### 3.2 Drilling 2005 - 2012

---

NEMI completed an exploration program in 2005 consisting of twenty-four rotary percussion boreholes, nineteen of which were geophysically logged, and the reopening and re-logging of fourteen of the 1975 to 1976 boreholes; spot coring was completed on the D2 Seam in one borehole. Additionally, nineteen trenches were excavated to supplement borehole data. In 2006, twenty-eight rotary percussion boreholes, two HQ core holes, nineteen large diameter core holes and thirty-one trenches were completed by NEMI. In addition, seven existing boreholes were deepened.

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In 2011 and 2012 additional work was carried out on Roman Mountain. For 2011, 22 trenches, 6 LDC boreholes and 23 rotary percussion boreholes were completed. In 2012 an additional 14 rotary percussion boreholes and 6 PQ core boreholes were drilled.

### 3.3 2013 Drilling

---

In 2013 a drill program was carried out on Roman Mountain. This work included a winter program on the lower area near Babcock Creek. This area had not been extensively drilled due to wet ground conditions. The winter program was designed to access this area when the ground was frozen. The work consisted of 13 rotary percussion boreholes and 19 PQ core boreholes. A summer program targeted area where additional structure and quality data points were required. The program consisted of 12 rotary percussion boreholes and 47 near surface rotary boreholes drilled to test the oxidation depth of the coal. These boreholes were designated as LOX holes.

The structural information from the 2013 drilling was used in the updated resource geological model for Roman Mountain. The quality data will be used as part of a quality update to the resource model in Q2 of 2014. See Attachment 3 for Borehole Plan and Attachment 7 for Borehole collar information.

### 3.4 Drill Sample Recovery

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Sample analyses were undertaken according to prescribed standard analytical flow sheets. A prerequisite for analyses to be undertaken on any individual sample was that for raw analyses the coal core recovery had to exceed 60% and for wash ability analyses the coal core recovery had to exceed 65%. Samples were evaluated on a case by case basis to determine if the results were to be included in the quality model.



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### 3.5 Geological & Geophysical Logging

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All the NEMI and PRC rotary and core boreholes, including large diameter core boreholes, were logged by borehole geophysical techniques employing the following Century Geophysical Corporation tools:

- gamma / neutron / deviation;
- gamma / density / resistivity / calliper;
- dipmeter / deviation;
- through-rod logs used a gamma-gamma.

Century Geophysical Corporation carried out the geophysical logging. Deliverables included compiled raw geophysical data based on industry standards; digital and paper logs, based on PRC Standard Operating Procedures. In addition to lithological measurements, strata dip and borehole deviation was also measured.

Borehole collar positions and trench locations for the NEMI and PRC exploration programs were initially surveyed using a GPS operated by the field geologist, with follow-up by a professionally registered land surveyor.

All coal seams were picked according to the company's Standard Operating Practice (SOP). The geophysical logs were used as the basis for measuring coal sample recoveries and detecting and recording coal seam lithology variations.

Coal seams intersected in trench excavations were logged and described as per the standards for a borehole.

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### 3.6 Data Density

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The borehole data for Roman Mountain is sufficient to support the current resource statement for both the Canadian 43-101 requirements for structure and the JORC standard for quality. The boreholes were mainly drilled on cross section with an average of 150 m between drilled cross sections. See Attachment 3.

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### 3.7 Data Location / Topographical Data

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The Roman Mountain area was flown for an aerial survey in 2005 using LIDAR technology with the generation of detail contours and DTM data. These data were used as the basis for the topographic surface used in the geological Resource Model.

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### 3.8 Data Orientation Relative to Geological Structure

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Wherever possible, boreholes have been logged with a verticality tool to survey tilt and azimuth down the hole. The data was loaded into MineSight which displays the seam locations based on the downhole survey. Boreholes without downhole surveys were considered as vertical for the purpose of geological modelling. Percussion rotary boreholes tend to deviate more than core holes and trend to turn into the bedding.

### 3.9 Reporting Archives / Database

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The geological data for Roman Mountain is in electronic format with the exception of early historic borehole data from the 1970's and 1980's. New field information is collected digitally and then transferred directly into acQuire.

Before the implementation of the acQuire database, Lithological, thickness and depth information was captured in a standardized code format and entered into the GDB database (a Mincom software product). While the PRC data was acquired and entered during the core logging activity, the NEMI information was validated, standardized and entered into GDB during 2009. This data is now been transferred to acQuire which began to be implemented in 2012.

PRC uses the Mincom MineSight software package for all geological modelling purposes.

An acQuire database for Peace River Coal has been set up and is now the primary geological database for all borehole and trench data. Data is transferred from acQuire into a MineSight model to facilitate interrogation and modelling.

The validation of non-core borehole data includes the following:

- inspection, encoding and loading of lithological logs,
- visual inspection and loading geophysical logs,
- correction of coal seam depths and thicknesses to geophysical picks, and
- checking of seam correlations with surrounding boreholes

The validation of cored borehole data includes the following:

- inspection, encoding and loading of lithological logs,
- visual inspection and loading geophysical logs,
- correction of coal seam depths and thicknesses to geophysical picks,
- apportioning core losses,
- checking of seam correlations with surrounding boreholes, and
- ensuring sample depths and thicknesses correspond to corrected log depths and thicknesses

The current MineSight model was externally audited by Moose Mountain Technical Service and the data used to construct the model was reviewed to confirm completeness and accuracy.

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## 4 COAL ANALYSIS

### 4.1 Sampling

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Coal seams were sampled from HQ and PQ size diamond core and bulk samples which were obtained from large diameter (150 mm) cores (LD). With respect to coal handling, description, and sampling the following industry standards and procedures applied:

- At the drill, HQ core was placed in wooden core boxes with HQ diameter sized partitions that were covered prior to being transported to the logging area for description and sampling. As per industry standards, a plastic sleeve or plastic sheets were used to wrap the coal core sections. Coal seam cores were geologically logged in detail, and core recoveries obtained by comparing the lithology logs to the detailed density / gamma geophysical logs.
- Photos of core were taken ensuring box number and / or borehole number was visible.
- Sample increments were selected on a geological basis, modified, as necessary, for core recovery. Geologists conducted all sampling. For each sample interval the entire core was submitted for analysis. A suite of selected immediate roof and floor lithologies were also sampled. Only samples with a core recovery greater than 65% were submitted for analysis and the analytical results later included in the quality database.
- Typically, samples were placed in thick plastic bags with each bag containing two sample tags that recorded borehole number, seam, and bag number. Samples were double-bagged and placed in plastic buckets for shipping. Duplicate tags were retained by the company.
- Large diameter cores were employed for bulk sampling. Initially this was in order to obtain sufficient sample mass for coking tests, but it soon became evident that core recoveries for large diameter cores were superior to HQ cores and in some instances were used instead of HQ samples. These cores were measured, described and sampled at the drill rig. The approach taken to sample selection, collection and bagging was similar to that described for HQ cores as noted above. Sample recoveries and intervals were finalized by reference to the geophysical logs at the core shed.
- All samples were stored in a cool, dry environment prior to dispatch to the laboratory. Current practice is to ship samples in a timely manner.
- Denison's (i.e. historical) coal core logging and sampling followed prescribed guidelines to ensure a consistent approach by each geologist and to provide consistency from one project to another. Their approach to sample selection met industry standards of the time. Historical approaches to both core logging and sampling are consistent with those employed by PRC in the 2008 to 2011 exploration programs. Only 2 boreholes were used from the work Denison undertook in 1975.

### 4.2 Sub-Sampling and Sample Preparation

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At Roman Mountain sample preparation was handled differently depending on when the samples were taken.

Historical samples obtained by Denison during 1975-6 were analysed by Cyclone Engineering Sales Limited in Edmonton, AB and the Department of Energy, Mines and Resources, Clover Bar Lab., AB. The sampling procedures are available for review.

NEMI did not acquire core samples in 2005, but samples analysed for NEMI in 2006 followed similar

standard procedures to PRC's, which are described below.

### 4.3 Assay, Analysis and Laboratory

**Denison:** Denison samples were sent to a coal laboratory and the samples were analysed according to a supplied flow sheet. All core drilled was HQ in size. The core was dried then crushed to ½", the Denison flow sheet is attached at the end of this section.

**NEMI:** NEMI did not acquire core samples in 2005, but samples analysed for NEMI in 2006 followed similar standard procedures to PRC's, which are described in the following section. NEMI samples were crushed to 12.5 mm.

**PRC:** Sample preparation and analyses were undertaken according to the standard analytical flow sheets included in flow sheets at the end of this section.

- Raw coal analyses were limited to samples where core recovery was >60%.
- Washability analyses were limited to samples where core recovery was >65%.
- Only samples with >65% recovery were included in the quality model.

PRC carried out extensive attrition testing on the LDC samples, a seam composite was created from component samples before any attrition testing was undertaken. HQ cores were crushed after being composited. An HQ type sample was split from the LDC samples in order to provide a means of comparing and calibrating the results from the two types of samples. In 2013 a change was made in core size, borehole core size was increased to PQ to provide better core recovery.

Separate flow sheets were used for HQ and PQ size core and 150 mm large diameter core (LDC), as given in Attachment 4.

### 4.4 Size Analysis

Denison created composite from the individual crushed components and screen the composites at 28 mesh and the -28 mesh was split and one split was screen at -100 mesh.

NEMI screened only the following size fractions after crushing:

- HQ core - 12.0 x 0.6 mm; 0.6 x 0.15 mm, 0.15 x 0 mm; and
- LDC core - 19.0 x 3.0 mm; 3.0 x 0.6 mm; 0.6 x 0.15 mm; 0.15 x 0 mm.

With PRC the following size fractions were screened until 2012:

- HQ: 12.5 x 0.25 mm; 0.25 x 0 mm; and
- LDC: 31.5 x 9.5 mm; 9.5 x 1.0 mm; 1.0 x 0.15 mm; 0.15 x 0 mm.

After a review of the size fractions currently used by the Trend Mine CHHP the following size fractions were used for screening starting in 2013.

- PQ: 12.7 x 0.15 mm; 0.15 x 0 mm; and
- LDC: 31.5 x 12.7 mm; 12.7 mm x 1.42 mm; 1.42 x 0.15 mm; 0.15 x 0 mm.

### 4.5 Raw Coal & Non-Coal Analysis

Refer to attached flow sheets for a detail explanation of the pre-treatment and size analysis carried out on NEMI and PRC samples (Attachment 4). In the Roman Mountain area borehole core is sampled by components, which are analysed for ARD, then the components are combined to form seam composites. No compositing was undertaken within the MineSight model.







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## 5 DATA COLLATION

### 5.1 Geology General

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The Roman Project is located in the south-central region of the Peace River Coalfield and lies within the Quintette Trend Fold Zone. It is composed of Mesozoic strata that form part of the Rocky Mountain Foothills of north-eastern British Columbia. The strata have been significantly affected by thrust faulting and folding that occurred during the Cordilleran orogeny. The Murray Syncline is the main structural feature at Roman Mountain and the one that is the host for the surface mineable coal deposits. This structure is a tight, symmetrical fold with an axial trend of 130°. The northeast limb dips fairly uniformly at 50° to 60° to the southwest. The southwest limb dips at up to 80° to the northeast and includes several thrust faults. Refer to Attachment 5 for an overview of the regional geology and Attachment 6 for general stratigraphic columns and representative cross sections. Coal measures are found in the Bullhead and Fort St. John Groups which consist mainly of alternating sequences of marine and non-marine clastic rocks. The oldest strata to crop out in the project area belong to the Minnes Group. These sequences are located on the northeast and southwest limits of the Murray Syncline. The youngest strata belong to the Gates Formation and this subcrop along the axis of the syncline. The coal seams of economic importance occur in the Lower Cretaceous Gates and Gething Formations. These two sequences are separated by marine argillite of the Moosebar Formation.

### 5.2 Coal Seam Geology

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#### 5.2.1 Gates Formation

The Gates Formation is the most significant hard coking coal coal-bearing sequence for surface mining in northeast British Columbia. Coal seams of economic thickness are continuous from the Bullmoose Mountain area to the Alberta provincial border, a distance of almost 140 km.

Coal seams and major lithological units correspond closely to those found at the nearby Trend Mine. Eleven coal seams have been identified in the Roman Project area. These are named A, at the top of the sequence then B, C, D, E, F, G, I, J, K and L Seams. Within these coal seams, individual coal splits are distinguished by a number (e.g., Seams E1, E2 and E3). Of the eleven seams, only the D2, E1, F, G, J, and K2 Seams are considered to have economic potential for development.

Seam thickness data, for Gates and Gething Formations seams, obtained from the geological model, are shown in Table 5.2.1. These values are based on borehole intersections, with true thickness interpolated from seam structure in the geological model. The Roman Project is regarded as consisting of three portions of different degrees of deformation, each of which is considered separately in the model to account for variations in thickness that may be due to structural thickening. These sections are the Northeast Limb, Syncline Hinge and Southwest Limb.

The D Seam Zone, which is the youngest of commercial significance in the project area, includes the D1 and the D2 Seams. Only the D2 Seam is of economic importance. The D2 Seam is persistent throughout the Roman Project area and occurs 3.0 m to 5.0 m below the D1 Seam; the D1 Seam occurs immediately below the Babcock Member Conglomerate. The D2 Seam is from 1.0 to 9.9 m thick and has a sharp roof contact and gradational floor with carbonaceous claystone at the top and bottom of the seam. The D2 Seam has little variation of thickness and quality throughout the Roman Project area. The average ash content (adb), FSI and sulphur content values for the seam are 17.4%, 4.9 and 0.5%, respectively.



**Table 5.2.1: True Thicknesses of Seams of Economic Interest**

Seam	Average (m)	Minimum (m)	Maximum (m)
D2	3.2	1.0	9.9
E1	1.7	1.0	6.7
F	2.2	1.0	7.1
G	3.2	1.0	10.9
J	5.2	1.1	13.8
K1	1.1	1.0	2.3
K2	1.1	1.0	1.4
Total	17.7	-	-

The E Seam Zone occurs approximately 20 m to 25 m below the D Seam. It is composed of as many as three seams but only the E1 Seam is of economic importance. The E1 Seam is persistent throughout the Roman Project area with the main variations occurring in the number and thickness of partings. These partings rarely exceed 0.3 m in thickness and are normally regarded as intra-seam partings or rock bands. Typically E1 Seam ash content (adb), FSI and sulphur values are 23.4%, 5.6 and 0.5% respectively. In general the lower part of the seam has higher ash content.

The F Seam occurs 15 m to 20 m below the E Seam and is persistent throughout the project area. The roof of the F Seam is claystone that gives a high gamma log response. This contrasts with the low gamma response of the seam and consequently facilitates identification and correlation. The lower part of the F Seam sometimes displays a high ash zone and gradational lower contact to the seam floor. Ash content (adb), FSI and sulphur content values for the seam are 12.5%, 7.7 and 0.5% respectively.

The G Seam is located 30 m and 40 m below the F Seam. The G Seam is developed over the entire Roman Project area. The G Seam tends to thicken to the northwest. The roof contact is generally sharp and the upper 1.5 m of the seam contains thin claystone laminae. Normally, the bottom of the seam grades into a carbonaceous siltstone, but there are instances where sharp contacts have been recorded. The seam average ash content (adb), FSI and sulphur content values are 16.1%, 6.1 and 0.3%, respectively.

The G Seam frequently displays anomalous thicknesses due to fault repetition and fold axis structural thickening. The seam is generally thicker in the fold hinge and on the south-western limb of the syncline.

The J Seam is separated from the G Seam by a carbonaceous claystone zone 2.5 to 3.0 m thick. This zone may contain one or more coaly stringers that are referred to as the I Seam. The J Seam has a consistent thickness of about 5.2 m and tends to thicken to the northwest where it reaches a maximum thickness of 13.8 m. The upper half of the seam may contain thin shaley partings, but the lower half is always clean with a low gamma signature and sharp basal contact. The J Seam normally forms the base of the Gates Formation economic coal zone and has an ash content (adb), FSI and sulphur content of 16.0%, 5.3 and 0.2% respectively.

The K Seam Zone comprises up to three seams named K1, K2 and K3, in descending stratigraphic order. Each seam is separated by 1.0 m to 4.0 m of siltstone. The K3 is not economically significant. Ash content (adb), FSI and sulphur for the K1 and K2 Seams are 10.1%, 4.5 and 0.5% for the K1 Seam and 16.0%, 4.9 and 0.6% for the K2 Seam.

The sequence below the K Seam Zone is a 20 m thick siltstone unit overlying a persistent, approximately 1.0 m thick, clay unit. This clay bed is composed of unconsolidated ash fall tuff and has

significant implications with respect to geotechnical design due to its mineralogical properties.

### 5.2.2 Gething Formation

Four coal seams are present in the upper Gething Formation. The uppermost and generally thickest, the Bird Seam, varies from 4.0 m to 5.0 m thick and contains rare thin, shaley partings. The Bird Seam occurs very close to the top of the Gething Formation.

The Bird Seam ash content (adb) and FSI of the seam are 10.8% and 8.5 respectively. The Bird Seam has an average sulphur content of 4.3% over the project area. The sulphur in the Bird Seam occurs as disseminated flecks of pyrite and less frequently as pyrite nodules. Although the sulphur distribution is variable throughout, the top of the seam often displays significantly higher sulphur content than the remainder.

The GT Coal Zone consists of up to three coal seams referred to, from the top, as the GT1, GT2 and GT3 Seams. Each seam may be well-defined but they often coalesce to form one or two primary seams. The zone varies in thickness between 10 m and 15 m with individual seam thicknesses ranging between 1.0 m and 2.0 m. Coal accounts for approximately 65% of the zone. GT1 and GT2 seams are the most laterally persistent ones. Only the GT1 and GT2 seams are considered to be of potential economic interest.

The GT Coal Zone coal seams have ash content (adb), FSI and sulphur content values from 5.9% to 13.7%, 3.5 to 5.0 and 0.4% to 0.6% respectively.

## 5.3 Structural Setting

The Murray Syncline is the predominant structural feature on Roman Mountain and is a tight fold typical of the area. The syncline is roughly symmetrical with the northeast limb dipping fairly uniformly at 50-60° to the southwest. The southwest limb dips generally steeper, up to 80°. The fold axial trend is 130°, with the hinge plunging at an average of 7.5° to the northwest.

Structural complexity varies on the property, with the northeast limb displaying moderate complexity in comparison to the more complex structure of the southwest limb. Overall, stress from the southwest caused the strata to fold and as a mechanism for space accommodation, in-situ thrust faulting led to thickening of the coal seams in the hinge, with general thinning on the limbs. Some of the strata exhibits ductility which allowed folding, while more competent, brittle units have been faulted, leading to seam displacement, repetition and localised truncation. Thrust faulting has also resulted in minor drag folding along the thrust planes. This may explain some of the thickening of the seams in the fault zones.

One change to the previous structural interpretation occurs in the centre of the syncline. A near-vertical thrust fault of length 175m and a 30m throw was modelled where previously the D2, E1 seams were modelled vertically/slightly overturned and the F, G and J seams had significantly less interburden between them. Historical reports confirm that there previously was a fault modelled in that location, however over the years it had been removed. Extra drilling is required to further confirm this structure and its extents.

The second change relating to the structural interpretation is the inclusion of a large-scale thrust fault that appears to post-date the two major thrusts that run parallel to the southwest limb; affecting only the Gates Formation. This structure truncates the two thrust faults and trends north into the anticline in Roman Northwest. The recent 2013 drilling program had multiple drillholes that were barren where previously the model indicated coal should be present. Inspection of the first 50 m of the geophysical

logs of 2013 drillholes, show similar geophysical signatures, to that of the strata around the 'L' seam in the adjacent drillholes that intersected the entire coal sequence exhibit.

## 5.4 Stratigraphy & Structure

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In Roman Mountain the current structure used geological model is derived from borehole information and from surface mapping. A large portion of the resource area is above tree line with an abundance of exposed outcrop. Geological mapping has been carried out since the early 1970's by Dennison Mines, NEMI and PRC.

In 2013 there was a near surface seismic program was carried out on one seismic line that intersected the property. The final evaluation of the results has not been received and the information was not included in this model build.

## 5.5 Geophysical Data

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Geophysical data on the property has been restricted to down-hole geophysics. In 2013 there was a near surface seismic program was carried out on one seismic line that intersected the property. The final evaluation of the results has not been received and the information was not included in this model build.

## 5.6 Geotechnical Data

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Geotechnical information for Roman is taken from a report - Roman Mountain Pit Wall Data Compilation – (Norwest, 2009). Sources of information include the following:

- Outcrop mapping (2008),
- Point load test (PLT) data from exploration borehole core samples (2007/2008),
- Laboratory test data from exploration borehole core samples (2007), and

Geotechnical core logs from select exploration boreholes (2007/2008) which include rock mass characterization using the 1989 version of the Rock Mass Rating classification system (Bieniawski, 1989)

The bedded strata which form the rock mass in this area consist of alternating layers of sandstone, mudstone, siltstone and coal. Given the typical thickness of these layers and frequency of which they alternate, it is not practical to apply strength properties to each rock type for stability analysis. In order to simplify the model, geotechnical domains or zones are selected which are composed of rock units with similar strength characteristics. Although there is some variation in the strength properties, the zones selected and strength parameters applied are deemed representative of the rock mass. The zones created for Roman follow those used at Trend Mine and are as follows:

- J Footwall Zone (rock mass between J and K seams),
- Gates Footwall (rock mass stratigraphically below K seam plies),
- Gates Highwall (rock mass stratigraphically above J seam),
- Gething Footwall (rock mass below the Bird and GT coal package), and
- Gething Highwall (rock mass above Bird seam).

Data from core logs and laboratory testing was sorted into these zones and design values chosen. The criterion for design parameters was the 30th percentile value for RMR89 and the mean value for

the other strength parameters.

This data was used to estimate shear/normal functions within the limit equilibrium software SLOPE/W (Version 7.17). A Mohr-Coulomb strength model was used for the coal seam, clay layer and fault zones. Properties used were based on laboratory testing and back analyses of instabilities at Trend Mine.

## 5.7 Data Aggregation Methods

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Component samples were composited into seam composites for each of the major seams that were identified as minable sections for resource modelling. The seams selected were D1, E1 F, G, J and K2.

## 5.8 Balanced Reporting

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Individual seams were selected for inclusion in the resource evaluation on the basis of its correlation using geophysical logs. In general, all boreholes with geophysical logs have been modelled. Coal seams which had been thickened or thinned due to faulting were used as structural locations and the faulted thickness were not included in creation of hanging wall surfaces.

## 5.9 Other Substantive Exploration

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A ground geophysical program was undertaken during the summer of 2013. This program was an initial trial of different geophysical surveys to understand if ground geophysics can be used successfully in Northeast BC coal fields.

The trials included;

- Ground Penetrating Radar
- OHM Mapper :
- Resistivity
- 2D Seismic

The results of the trial program is still being reviewed and none of the data obtain was used in the current resource determination.

## 5.10 Further Work

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Additional drilling and trenching will continue to be carried out on the property. The drilling will include additional LDC and PQ coring to obtain additional samples to better define the quality of the area. Structural drilling using percussion air rotary drilling will continue to define the structural location of the faults defined in the resource area and better define the location of the Gething seams on the flanks of the syncline. The focus in 2014 will be to drill pre-production rotary boreholes at 50 metre spacing in the Phase 1 area of the Roman Pit. Additional work in 2015 and 2016 will focus on drilling pre-production rotary boreholes at 50 metre spacing in Phase 2 and Phase 3 of the Roman Pit.

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## 9 OTHERS

### 9.1 Discussion of Relative Accuracy / Confidence

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The resource figures given here are estimates only, and subject to variation depending on additional exploration data and revised interpretation. The resources are considered the best estimate given the current level of geological understanding of the coal deposit.

### 9.2 Reliance on Other Experts

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This CP Report has been compiled from reports written by the following experts:

- Ted Hannah, Norwest Corporation, Calgary, Alberta (APEGBC member 22009).
- Sean Ennis, Norwest Corporation, Calgary, Alberta (APEGAB member M52576; APEGBC member 24279).
- Melanie Bolduc, Mintec Inc., Vancouver, British Columbia

### 9.3 Other Relevant Information

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No other relevant information.

### 9.4 Interpretation & Conclusions

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The Peace River Coal Roman Mountain Project encompasses coal seams that demonstrate lateral stratigraphic continuity with thickness variations that are caused mainly by structural disturbance. The structural geology is affected by folding and faulting typical of the Rocky Mountains. As a result, the geology type is Complex according to guidelines set forth in Geological Survey of Canada Paper 88-21.

The verification of the local geology and the calculation of reserves were accomplished through review of current practices and procedures, inspection of a sampling of raw geological and coal analytical data, and verification of volume calculations. The density of drilling on this project is adequate for the delineation of resources amenable to surface mining.

Coal quality results from the 2013 exploration program have not been included in this update. All other quality data that has passed the requirements for inclusion have been used in this update.

All of the coal quality information has now been validated and unified so that just one concise set of data exists. The model also now contains simulated product data and geochemistry where available for the individual seams.

The structural interpretation has been expanded from just the two main thrust to now address a majority of seam repeats with the addition of numerous localised faulting. It has not varied significantly compared to the previous model.

The seam polygons used for coding were built without a minimum mineable thickness and the TTHK was interpolated into the 3DBM and used to remove non-mineable coal. This means that the seam polygons do not require editing/rebuilding to change the minimum mineable thickness.

## 9.5 Recommendations

It is recommended that PRC continue to review coal seam data and update the geological database and model as required.

- Additional drilling in some areas of the deposit would be valuable, especially at depth for better definition of mineralization continuity in the deposit.
- The GT seam in the Gething area is quite thin in places; there are only a few composites to support the thinning of the seam. Additional drilling would be useful.
- carry out a domain analysis of the project area.
- combine all available topography tiles to form a complete topographical surface
- completely rebuild the OVB surface using a standard and consistent dataset
- incorporate the results from LOX program to better define the weathering profile and outcrop location
- confirm the structural interpretation with extra exploration drilling
  - near vertical fault modelled around Section 116
  - further drilling to better delineate the thrust structure along the northwest limb of the Gates seams trending into Roman Northwest
- run scenarios against the inclusion- and/or exclusion- of the GT3 when modelling the GT seams as a package – does the extra parting being mined offset any gain from including the GT3 coal seam
- better correlation of the I seams – inconsistent identification throughout deposit
- spatial studies of the coal quality information currently available and fit for purpose

## 9.6 References

5. Hannah, T, and Ennis S. May 19th 2010. Technical Report: Roman Project Tumbler Ridge, British Columbia. Norwest Corporation, Calgary, Alberta.
6. Bolduc, M. July 2013. Roman Main Project: 3D Modelling and reserve Estimate. Technical Report, Mintec Inc., Vancouver, British Columbia.
7. Canadian Institute of Mining, Metallurgy, and Petroleum (CIM). 2005. CIM Definition of Standards - For Mineral Resources and Mineral Reserves, 10 p.
8. Canadian Securities Administrators. 2005. National Instrument 43-101 - Standards of Disclosure for Mineral Projects, Form 43-101 and Companion Policy 43-101CP. Ontario Securities Commission Bulletin, Volume 28, Issue 51, p 10355-10367 (Rules and Policies) p 10368-10374 (Form 43-101F1 Technical Report, Table of Contents) and p 10375-10383 (Companion Policy 43-101CP to National Instrument 43-101 Standards of Disclosure for Mineral Projects).
9. Hughes, J.D., Klatzel-Maudry, L. and Nikols, D.J. 1989. A Standardized Coal Resource/Reserve Reporting System for Canada. Geological Survey of Canada Paper 88-21, 17 p.
10. Norwest Corporation. 2005. Trend Full Mine Feasibility Study for Northern Energy and Mining Inc.; October 2005.
11. Denison Mines Limited. 1976. Quintette Coal: Limited 1975 Exploration and Development Report, January 1976.

12. Denison Mines Limited. 1976. Quintette Coal Limited: Information Summary, August 1976.
13. Denison Mines Limited. 1976. Quintette Coal Limited: 1976 Geological Assessment Report, December 1976.
14. McIntyre, R.F. 2005. 2005 Assessment Report – Roman Mountain Drilling Program, June 2006.

## 9.7 Competent Person, Date & Signature Page

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Details of the Competent Person, together with signatory pages, are found in Attachment 9

## 9.8 Illustrations & Diagrams

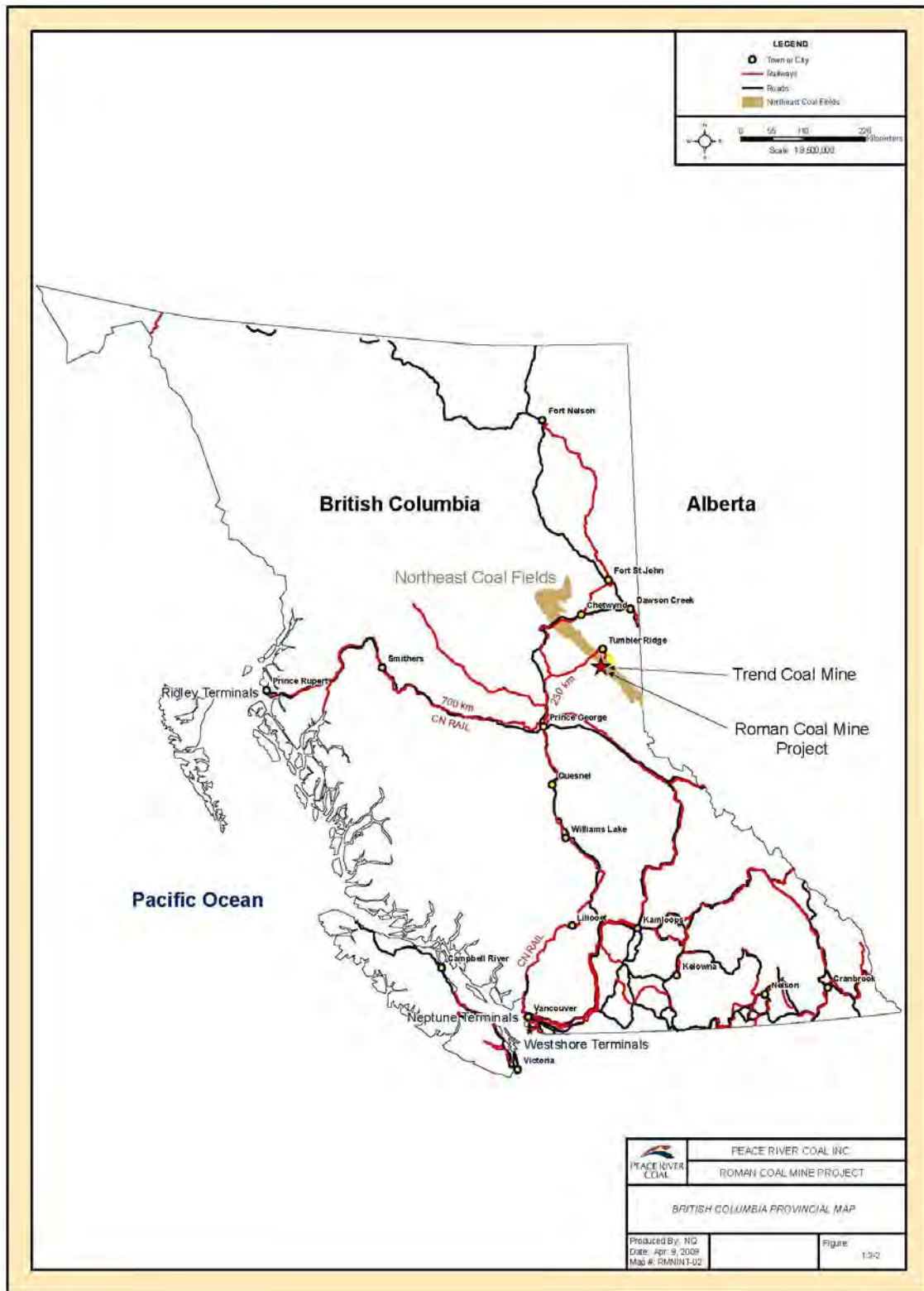
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See Attachments below and text for references.



# Attachment 1

## Location Map

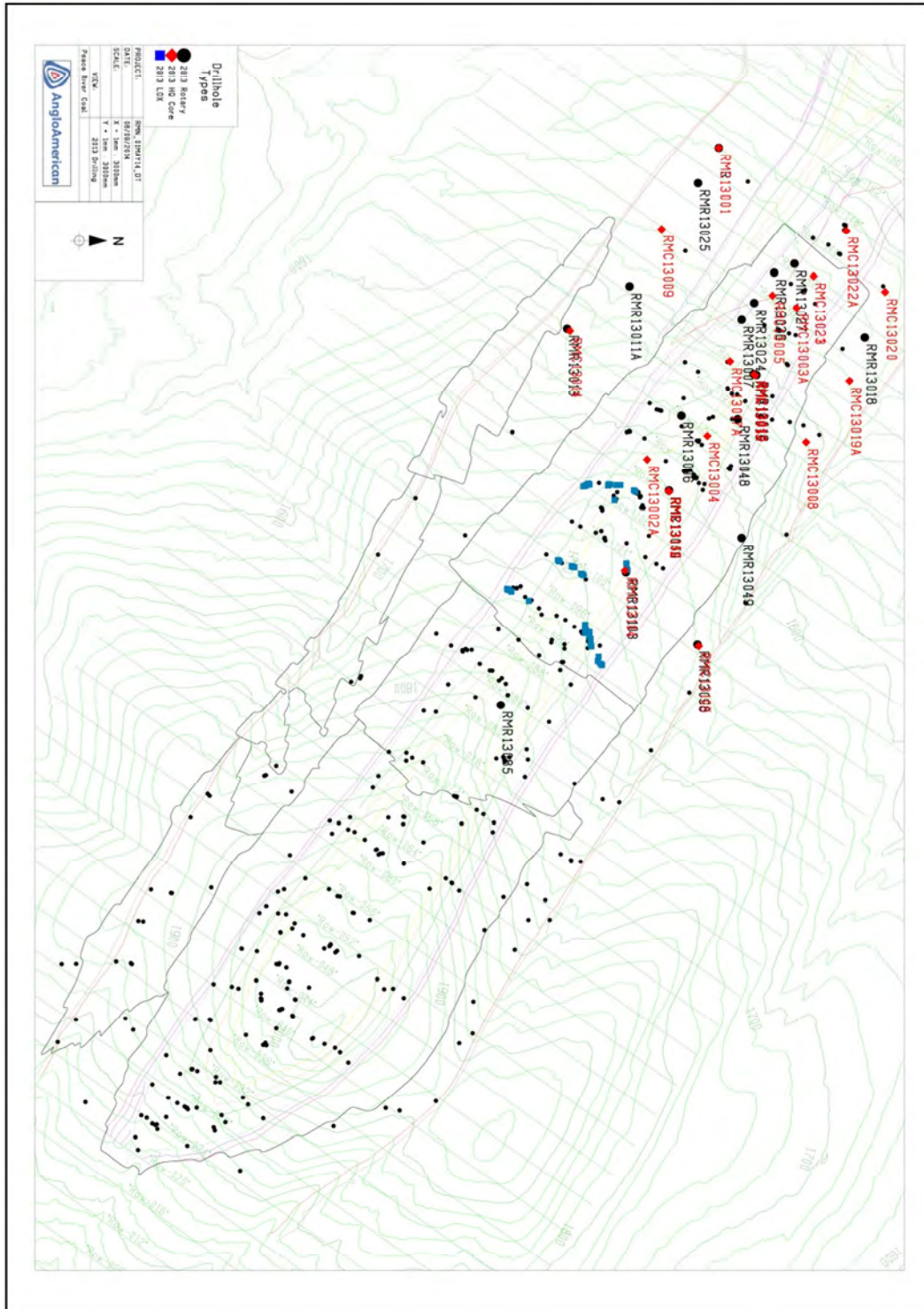






# Attachment 3

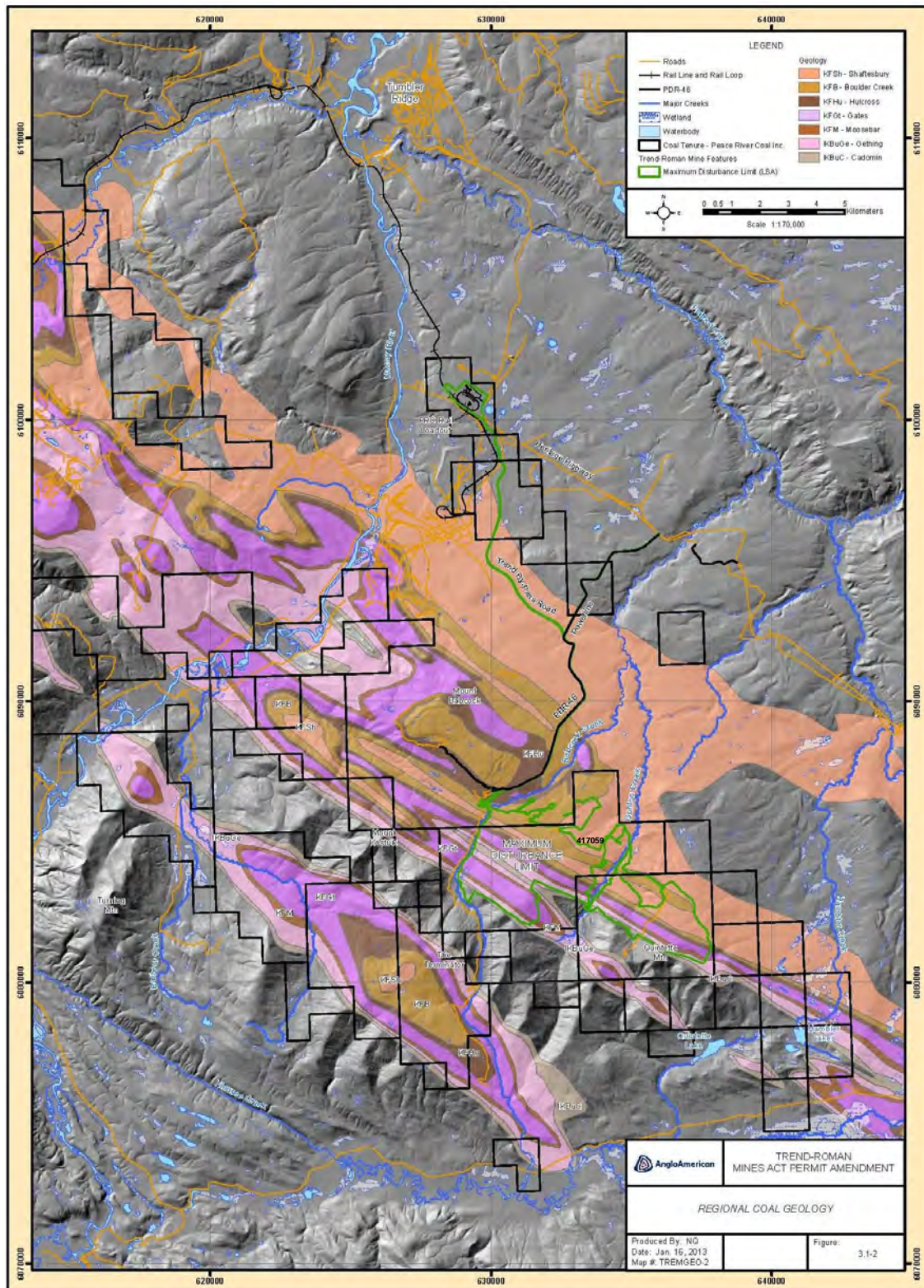
## 2013 Borehole Plan





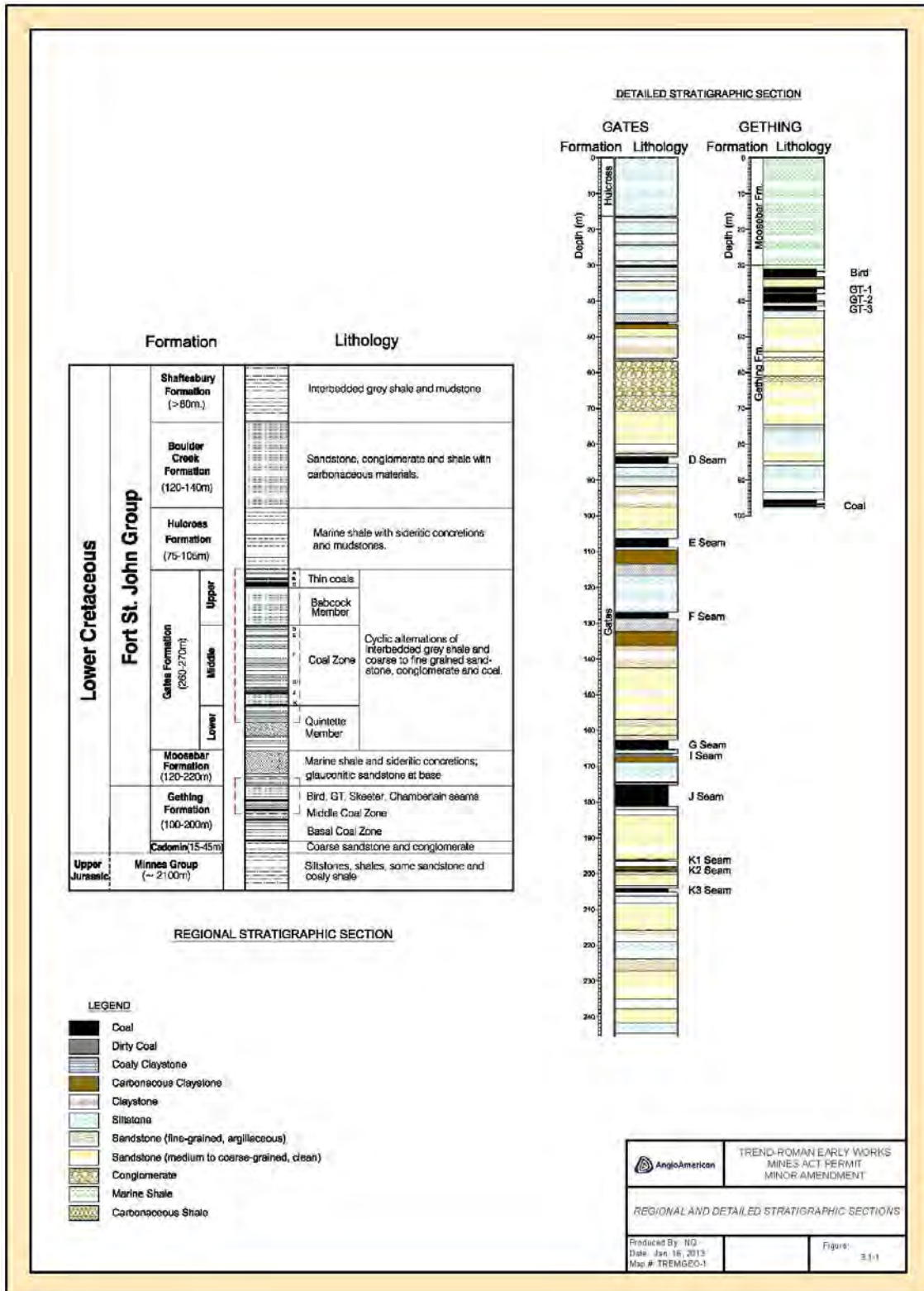
# Attachment 5

## General Geological Map



# Attachment 6

## Stratigraphic Column





# Attachment 7

## 2013 Borehole Collar Information

Hole_ID	Easting	Northing	Elevation	Depth	Year	Type	Azimuth	Dip
RMC13001	628878.9	6083937	1439.94	192.1	2013	PQ Core	215	-55
RMC13002A	629732.2	6083741	1627.47	282.31	2013	PQ Core	215	-70
RMC13003	629314.7	6084146	1446.92	90.66	2013	PQ Core	0	-90
RMC13003A	629317.4	6084149	1446.7	140.77	2013	PQ Core	0	-90
RMC13004	629667.2	6083906	1586.15	199	2013	PQ Core	35	-75
RMC13005	629283.9	6084083	1451.68	96.86	2013	PQ Core	215	-60
RMC13008	629684.1	6084175	1520.46	140.52	2013	PQ Core	35	-55
RMC13009	629102.9	6083781	1458.24	185.13	2013	PQ Core	215	-60
RMC13010	629500.6	6084036	1513.44	155.48	2013	PQ Core	0	-90
RMC13012	629498.3	6084033	1512.87	59.59	2013	PQ Core	0	-90
RMC13014	629381.3	6083531	1538.09	107.01	2013	PQ Core	215	-60
RMC13017	629464	6083960	1511	81	2013	PQ Core	215	-60
RMC13017A	629462.5	6083967	1512.858	251.89	2013	PQ Core	215	-60
RMC13019	629514.7	6084296	1461.163	119.41	2013	PQ Core	35	-60
RMC13019A	629515.9	6084293	1461.106	115.61	2013	PQ Core	35	-60
RMC13020	629274	6084390	1433.041	185.19	2013	PQ Core	35	-55
RMC13021	629231.2	6084195	1441.297	128.76	2013	PQ Core	215	-60
RMC13022	629105.2	6084278	1435.157	173	2013	PQ Core	0	-90
RMC13022A	629107.4	6084284	1435.273	131.87	2013	PQ Core	0	-90
RMC13023	629231.4	6084195	1441.291	128	2013	PQ Core	35	-65
RMC13102	629819.5	6083800	1638.906	170.8	2013	PQ Core	215	-60
RMC13104	630036.1	6083681	1671.81	138	2013	PQ Core	35	-60
RMC13105	630242.5	6083882	1638.646	77.44	2013	PQ Core	35	-60
RMC13110	629820.8	6083801	1638.847	209.4	2013	PQ Core	35	-60
RMR13001	628878.9	6083937	1439.94	33	2013	Rotary	215	-55
RMR13006	629612.8	6083835	1580.8	137.66	2013	Rotary	215	-55
RMR13007	629350.5	6083999	1465.35	58.38	2013	Rotary	215	-60
RMR13011	629255.3	6083696	1493.37	307.59	2013	Rotary	215	-55
RMR13011A	629258.5	6083693	1493.42	189.15	2013	Rotary	215	-55
RMR13013	629375.3	6083523	1540.55	79.39	2013	Rotary	215	-55
RMR13015	629497.1	6084031	1513.18	139.15	2013	Rotary	215	-60
RMR13016	629499.5	6084039	1513.55	123.8	2013	Rotary	35	-60
RMR13018	629399	6084335	1443.88	150.83	2013	Rotary	35	-55
RMR13024	629303.9	6084033	1458	198	2013	Rotary	215	-55
RMR13025	628976.8	6083880	1447.094	199	2013	Rotary	215	-60
RMR13026	629221.6	6084088	1447.391	198	2013	Rotary	215	-60
RMR13027	629197.3	6084143	1442.227	211.2	2013	Rotary	215	-60
RMR13048	629622.3	6083988	1554.285	120.53	2013	Rotary	35	-60
RMR13049	629945.8	6083999	1603.444	156.53	2013	Rotary	35	-60
RMR13050	629817.7	6083801	1638.846	341.32	2013	Rotary	0	-90
RMR13085	630403.7	6083342	1784.955	298.96	2013	Rotary	0	-90
RMR13098	630238.1	6083879	1638.962	96.15	2013	Rotary	35	-60
RMR13103	630040.8	6083684	1671.173	140.84	2013	Rotary	35	-60
RMX13052	629821.3	6083710	1654.637	31.8	2013	LOX	0	-90
RMX13053	629817.6	6083706	1654.6	29.06	2013	LOX	0	-90
RMX13054	629844.1	6083652	1658.095	20.08	2013	LOX	0	-90

Hole_ID	Easting	Northing	Elevation	Depth	Year	Type	Azimuth	Dip
RMX13055	629802.1	6083642	1647.051	25	2013	LOX	0	-90
RMX13056	629801	6083636	1646.827	16	2013	LOX	0	-90
RMX13057	629804.3	6083635	1646.254	13.68	2013	LOX	0	-90
RMX13058	629803.2	6083669	1647.164	19.6	2013	LOX	0	-90
RMX13059	629803.2	6083662	1647.154	16.92	2013	LOX	0	-90
RMX13060	629803.6	6083659	1647.014	10.82	2013	LOX	0	-90
RMX13061	629803.6	6083575	1647.284	31.8	2013	LOX	0	-90
RMX13062	629801	6083580	1647.119	34.94	2013	LOX	0	-90
RMX13064	629805.6	6083573	1647.366	31.38	2013	LOX	0	-90
RMX13065	629799.5	6083582	1647.104	32.12	2013	LOX	0	-90
RMX13066	629806.5	6083567	1647.416	31.78	2013	LOX	0	-90
RMX13067	629802.1	6083584	1647.292	23.66	2013	LOX	0	-90
RMX13068	630048.5	6083568	1697.743	38.12	2013	LOX	0	-90
RMX13069	630046.3	6083565	1698.568	35.28	2013	LOX	0	-90
RMX13070	630045.1	6083561	1697.337	28.48	2013	LOX	0	-90
RMX13071	630009.7	6083500	1695.642	16.28	2013	LOX	0	-90
RMX13072	630007.7	6083498	1695.701	13.9	2013	LOX	0	-90
RMX13073	630011.2	6083503	1695.819	20	2013	LOX	0	-90
RMX13074	630025.6	6083539	1694.131	31.36	2013	LOX	0	-90
RMX13075	630024.2	6083536	1694.245	35.36	2013	LOX	0	-90
RMX13076	630027.1	6083543	1694.175	42.3	2013	LOX	0	-90
RMX13078	630088.5	6083365	1714.875	38.42	2013	LOX	0	-90
RMX13079	630092	6083371	1715.373	38.48	2013	LOX	0	-90
RMX13080	630117.3	6083419	1717.934	43.54	2013	LOX	0	-90
RMX13081	630182.9	6083572	1701.369	38.24	2013	LOX	0	-90
RMX13082	630193.1	6083572	1701.362	35.42	2013	LOX	0	-90
RMX13083	630190.2	6083572	1701.347	26.28	2013	LOX	0	-90
RMX13084	630271.4	6083609	1691.191	56.92	2013	LOX	0	-90
RMX13087	630085.6	6083360	1712.909	19.98	2013	LOX	0	-90
RMX13088	630232.4	6083587	1696.28	44.58	2013	LOX	0	-90
RMX13089	630214.6	6083584	1696.782	29.1	2013	LOX	0	-90
RMX13090	630222	6083587	1696.586	46.8	2013	LOX	0	-90
RMX13091	630290.5	6083613	1690.846	31.4	2013	LOX	0	-90
RMX13092	630283.5	6083607	1691.315	43.52	2013	LOX	0	-90
RMX13093	630293.3	6083618	1690.509	29.24	2013	LOX	0	-90
RMX13094	630238.2	6083588	1696.253	23.12	2013	LOX	0	-90
RMX13095	630243.2	6083590	1696.129	16.78	2013	LOX	0	-90
RMX13096	630202.9	6083584	1696.952	47.7	2013	LOX	0	-90
RMX13099	630198.3	6083575	1701.17	17.08	2013	LOX	0	-90
RMX13100	630203.7	6083574	1701.337	13.96	2013	LOX	0	-90
RMX13101	630206.6	6083573	1701.468	11.24	2013	LOX	0	-90
RMX13106	630021.6	6083686	1670.894	28.96	2013	LOX	0	-90
RMX13107	630034.5	6083688	1671.483	32.26	2013	LOX	0	-90
RMX13108	630016.6	6083685	1670.602	53.78	2013	LOX	0	-90



# Attachment 8

## Historical Borehole Collar Information

Hole_ID	Easting	Northing	Elevation	Depth	Year	Type
QBD7513	631253.8	6082776	1996.2	220	1975	HQ Core
QBD7514	630376	6083361	1779.26	204.1	1975	HQ Core
QBR7580	631013.6	6082774	1981.02	260.75	1975	Rotary
QBR7581	631023.4	6082742	1977.02	115	1975	Rotary
QBR7582	630972.1	6082685	1943.12	23.52	1975	Rotary
QBR7586	630308.2	6083319	1776.28	36	1975	Rotary
QBR7587	630250.3	6083247	1760.57	36.58	1975	Rotary
QBR7588	630253.5	6083238	1760.99	29.87	1975	Rotary
QBR7589	630240.9	6083207	1754	27	1975	Rotary
QBR7590	630598.6	6083408	1744.86	43.28	1975	Rotary
QBR7591	630545.1	6083366	1754.27	29.87	1975	Rotary
QBR7593	630548.4	6083330	1766.3	55.16	1975	Rotary
QBR7594	629931.4	6083602	1679.27	173.8	1975	Rotary
QBD7651	630188.3	6083543	1710.49	128	1976	HQ Core
QBD7652	630154.4	6083454	1721	38	1976	HQ Core
QBD7653	630106.6	6083409	1718.39	91.44	1976	HQ Core
QBD7654	629901	6083537	1673.8	76	1976	HQ Core
QBD7655	629832.1	6083650	1656.35	58	1976	HQ Core
QBD7656	629939.8	6083747	1651.93	113	1976	HQ Core
QBD7657	630018	6083767	1652.26	83	1976	HQ Core
QBD7658	629679.3	6083883	1592.41	195.07	1976	HQ Core
QBD7659	629759.7	6083967	1594.6	137.16	1976	HQ Core
QBD7660	630248	6083579	1700	124	1976	HQ Core
QBD7661	630710.7	6082932	1899.08	106.48	1976	HQ Core
QBD7662	631262.3	6082550	1913.3	162	1976	HQ Core
RTR20051	630307.9	6083313	1776.34	100.6	2005	Rotary
RTR200510	629960	6083686	1666.75	174	2005	Rotary
RTR200511	630030.1	6083785	1651.67	52.42	2005	Rotary
RTR200512	629999.7	6083737	1656.35	57	2005	Rotary
RTR200513C	629764.7	6083842	1627.59	249	2005	Rotary
RTR200514	629537.7	6083961	1538.91	120	2005	Rotary
RTR200515	629554	6083987	1538.39	178.31	2005	Rotary
RTR200516	629365.7	6084061	1459.71	59.32	2005	Rotary
RTR200518	629392.5	6084146	1454.63	42.67	2005	Rotary
RTR20052	630169.1	6083519	1714.96	237.5	2005	Rotary
RTR200523	629654.3	6083693	1604.44	27.43	2005	Rotary
RTR200524	629736.2	6083793	1631.26	156.3	2005	Rotary
RTR20053	630157.7	6083495	1718.62	198	2005	Rotary
RTR20054	630082.5	6083376	1713.04	92	2005	Rotary
RTR20055	630202.6	6083562	1705.25	67.06	2005	Rotary
RTR20056	630241.1	6083613	1691.59	55.47	2005	Rotary
RTR20057	630412.2	6083416	1745.31	147.83	2005	Rotary
RTR20058	630450.3	6083474	1726.91	67.3	2005	Rotary
BSTR20061	630556.9	6083355	1758.63	33.63	2006	LDC
BSTR200610	629842.6	6083654	1658.28	34.7	2006	LDC
BSTR200611	629866.1	6083618	1662.03	45.31	2006	LDC

Hole_ID	Easting	Northing	Elevation	Depth	Year	Type
BSTR200612	629864.4	6083616	1661.93	42.53	2006	LDC
BSTR200613	630229.6	6083581	1696.94	37.25	2006	LDC
BSTR200614	630523.4	6083413	1743.36	72.5	2006	LDC
BSTR200615	630083.2	6083386	1713.4	45.39	2006	LDC
BSTR200616	630078.9	6083396	1713.22	55.8	2006	LDC
BSTR200617	630551.3	6083416	1744.43	43.9	2006	LDC
BSTR200618	629755.5	6083966	1594.62	42.98	2006	LDC
BSTR200619	629757.1	6083963	1594.62	47.9	2006	LDC
BSTR20062	630553.4	6083354	1758.54	36.4	2006	LDC
BSTR20063	630286.1	6083509	1718.27	51.68	2006	LDC
BSTR20064	630286.1	6083513	1717.98	45.87	2006	LDC
BSTR20065	630237.5	6083516	1717.04	58	2006	LDC
BSTR20066	630249.2	6083516	1717.19	49.24	2006	LDC
BSTR20067	629826.5	6083714	1654.84	32.96	2006	LDC
BSTR20068	629837	6083722	1654.54	39.48	2006	LDC
BSTR20069	629840.9	6083658	1658.11	36.74	2006	LDC
DTR20061	630656.4	6083222	1832.87	270.33	2006	HQ Core
DTR20062	631314.3	6082831	2018.81	121	2006	HQ Core
RTR200610	630799.4	6083002	1926.29	258	2006	Rotary
RTR200611	631235.9	6082739	1995.1	333.13	2006	Rotary
RTR200612	631205.4	6082690	1984.35	298.6	2006	Rotary
RTR200613	630554.4	6083085	1852.98	107.7	2006	Rotary
RTR200614	630993.4	6082355	1863.99	58.3	2006	Rotary
RTR200615	630994.9	6082368	1867.1	115.7	2006	Rotary
RTR200616	630344.8	6083356	1778.94	276.65	2006	Rotary
RTR200617	630726.6	6082901	1904.32	75.4	2006	Rotary
RTR200618	630047.2	6083564	1697.89	216.97	2006	Rotary
RTR200619	629822.5	6083660	1653.73	170.03	2006	Rotary
RTR20062	631058.8	6082879	1982.87	362.3	2006	Rotary
RTR200620	631548.7	6082393	1786.37	125.6	2006	Rotary
RTR200621	631532.8	6082378	1786.94	93.03	2006	Rotary
RTR200622	631563.6	6082407	1785.65	73.53	2006	Rotary
RTR200623	630015.8	6083509	1696.15	158.58	2006	Rotary
RTR200624	630811.7	6083506	1744.57	91.68	2006	Rotary
RTR200625	631397.9	6082500	1865.31	144.6	2006	Rotary
RTR20063	630652.9	6083216	1833.22	238.16	2006	Rotary
RTR20064	630654.1	6083223	1832.9	171	2006	Rotary
RTR20065	630838.6	6083078	1901.36	205	2006	Rotary
RTR20066	631090.7	6082956	1980.97	205.13	2006	Rotary
RTR20067	631076.6	6082897	1983.42	281.46	2006	Rotary
RTR20068	630655.6	6083221	1833.11	238.3	2006	Rotary
RTR20069	630808.9	6083021	1924.58	312	2006	Rotary
TRB07001	630652.1	6082549	1866.87	68.78	2007	LDC
TRB07002	630652.1	6082549	1866.87	70.15	2007	LDC
TRB07003	631262.1	6082510	1897.44	92.9	2007	LDC
TRB07004	630755.4	6082883	1916	76.69	2007	LDC



Hole_ID	Easting	Northing	Elevation	Depth	Year	Type
TRB07005	630596.2	6083009	1865.64	70.68	2007	LDC
TRB07006	630253.2	6083251	1762.02	60.26	2007	LDC
TRB07007	630829	6083534	1744.18	50.91	2007	LDC
TRB07008	630828.7	6083534	1744.03	55	2007	LDC
TRC07001	630908.2	6082874	1962.96	290.8	2007	HQ Core
TRC07002	630971.6	6082942	1954.14	377	2007	HQ Core
TRC07003	630990.8	6082986	1954.33	224	2007	HQ Core
TRC07004	630709	6083077	1904.23	278	2007	HQ Core
TRC07005	630618	6083544	1728.75	201.5	2007	HQ Core
TRC07006	629992.3	6083467	1697.84	88.87	2007	HQ Core
TRC07007	630048.6	6083571	1698.69	251.22	2007	HQ Core
TRC07008	629639.5	6084167	1510.28	184.36	2007	HQ Core
TRC07009	630050.9	6083567	1698.82	243	2007	HQ Core
TRC07010	629558.9	6084083	1517.57	168.2	2007	HQ Core
TRC07011	629679.8	6083877	1594.15	163.82	2007	HQ Core
TRC07012	629683	6083882	1593.82	169.75	2007	HQ Core
TRR07001	631175	6082820	1995.98	244.9	2007	Rotary
TRR07002	631112.2	6082731	1990.44	263.9	2007	Rotary
TRR07003	631203.8	6082689	1986.19	213.3	2007	Rotary
TRR07004	631024.7	6082742	1978.06	140.88	2007	Rotary
TRR07005	631077.3	6082678	1963.19	123.2	2007	Rotary
TRR07006	631399.3	6082501	1867.01	187.89	2007	Rotary
TRR07007	631505.3	6082485	1831.25	122.68	2007	Rotary
TRR07008	631112.9	6082732	1990.56	314.3	2007	Rotary
TRR07009	631477.9	6082436	1820.55	118.64	2007	Rotary
TRR07010	631567.6	6082563	1833.23	68	2007	Rotary
TRR07011	631435	6082578	1881.03	157	2007	Rotary
TRR07012	631111.8	6082738	1988.31	380.95	2007	Rotary
TRR07013	631420.2	6082567	1882.03	201.4	2007	Rotary
TRR07015	631330.4	6082700	1975.04	325.6	2007	Rotary
TRR07017	631333.4	6082703	1971.64	254.36	2007	Rotary
TRR07020	630903.4	6082554	1906.21	219.74	2007	Rotary
TRR07021	630710	6083080	1904.12	222	2007	Rotary
TRR07022	630629	6082994	1874.18	101	2007	Rotary
TRR07023	630422.5	6083166	1817.1	245.7	2007	Rotary
TRR07024	630779	6083132	1890	214.25	2007	Rotary
TRR07025	630419.6	6083133	1813.61	83.86	2007	Rotary
TRR07026	630346.3	6083199	1794.22	95.82	2007	Rotary
TRR07027	630195.8	6083336	1743.99	108	2007	Rotary
TRR07028	630798.5	6083005	1927.12	238.34	2007	Rotary
TRR07029	630225	6083391	1744	178.4	2007	Rotary
TRR07030	630268.1	6083447	1745.06	275.9	2007	Rotary
TRR07031	630544.4	6083349	1759.76	278.42	2007	Rotary
TRR07032	631334.3	6082704	1974.95	216.6	2007	Rotary
TRR07033	631160	6082765	1998.19	329.06	2007	Rotary
TRR07034	631235.7	6082742	1997.24	295.3	2007	Rotary



Hole_ID	Easting	Northing	Elevation	Depth	Year	Type
TRR07035	630306.7	6083504	1722.26	161.1	2007	Rotary
TRR07036	630346.6	6083533	1716.4	99.28	2007	Rotary
TRR07037	630661.4	6083620	1716.43	111.88	2007	Rotary
TRR07038	629797.6	6083610	1649.88	77.81	2007	Rotary
TRR07039	631305.4	6082648	1963.18	246.44	2007	Rotary
TRR07040	630060.1	6083574	1698.29	276	2007	Rotary
TRR07041	629946.9	6083625	1684.86	205	2007	Rotary
TRR07042	631113.2	6082738	1992.56	255.12	2007	Rotary
TRR07043	629944.8	6083626	1684.61	283.1	2007	Rotary
TRR07044	630927.3	6082898	1962.89	268	2007	Rotary
TRR07045	629864.6	6083725	1653.84	214.8	2007	Rotary
TRR07046	631110.2	6082739	1990.72	265.1	2007	Rotary
TRR07047	629865.2	6083732	1653.18	251.62	2007	Rotary
TRR07048	631121.6	6082758	1993.41	298	2007	Rotary
TRR07049	629764.9	6083850	1627.12	276.96	2007	Rotary
TRR07050	631233.8	6082743	1997.42	353.38	2007	Rotary
TRR07051	631316.4	6082828	2020.71	189.5	2007	Rotary
TRR07052	631251.8	6082775	1997.91	219.8	2007	Rotary
TRR07053	631080.8	6082892	1986.05	238.52	2007	Rotary
TRR07055	631264.8	6082552	1914.28	127.34	2007	Rotary
TRR07056	631209.9	6082690	1985.8	254.64	2007	Rotary
TRR07057	631060	6082879	1984.75	322.84	2007	Rotary
TRR07059	631159.6	6082766	1996.1	338	2007	Rotary
TRR07061	631064	6082876	1985.25	376.3	2007	Rotary
TRR07062	630970.9	6082939	1957.88	321.92	2007	Rotary
TRR07063	630652.2	6082549	1866.06	64.44	2007	Rotary
TRR07064	630640.5	6082772	1871.46	204.64	2007	Rotary
TRR07065	631261	6082511	1897.67	87.12	2007	Rotary
TRR07066	631070.3	6082636	1947.22	50.69	2007	Rotary
TRR07067	631490.3	6082211	1772.32	192.9	2007	Rotary
TRR07068	630908.4	6082752	1945.31	69.02	2007	Rotary
TRR07069	630915	6082735	1940	59.68	2007	Rotary
TRR07070	630252.4	6083264	1749.24	59.84	2007	Rotary
TRR07071	629776.7	6083870	1623.67	180	2007	Rotary
TRR07072	630596.3	6083009	1864.78	75	2007	Rotary
TRR07073	630755.4	6082883	1916	69.04	2007	Rotary
TRR07074	629595.6	6083768	1587.2	107.94	2007	Rotary
TRR07075	629655.4	6083694	1604.89	65.94	2007	Rotary
TRR07076	629749.9	6083969	1595.84	231.94	2007	Rotary
TRR07077	629775.6	6083869	1625.61	181.08	2007	Rotary
TRR07078	629858.5	6083729	1654.96	197.44	2007	Rotary
TRR07079	630831.7	6083535	1744.35	50.49	2007	Rotary
TRR07114	630878.7	6082810	1943.81	127.08	2007	Rotary
TRB08002	629597.2	6083775	1586.48	58	2008	LDC
TRB08003	629598.9	6083780	1588.25	68	2008	LDC
TRB08004	629782.9	6083876	1622.85	90	2008	LDC



Hole_ID	Easting	Northing	Elevation	Depth	Year	Type
TRB08005	629784.9	6083876	1623.09	81	2008	LDC
TRB08006	629778.2	6083870	1623.64	93.23	2008	LDC
TRB08007	629784.4	6083870	1623.25	86.86	2008	LDC
TRB08008	629784.4	6083870	1623.25	145.64	2008	LDC
TRC08001	631558.9	6082560	1832.85	80.11	2008	HQ Core
TRC08002	631559.1	6082561	1833.01	76.18	2008	HQ Core
TRC08003	631676.3	6082632	1816.32	176.5	2008	HQ Core
TRC08005	631411.4	6082469	1852.81	98.92	2008	HQ Core
TRC08006	629663.9	6084211	1503.05	100	2008	HQ Core
TRC08009	629833.7	6083724	1655.17	189.77	2008	HQ Core
TRC08012	631290.9	6082341	1839.5	207.8	2008	HQ Core
TRC08013	631525.8	6082582	1844.76	88.4	2008	HQ Core
TRC08014	629831.8	6083721	1655.34	279.65	2008	HQ Core
TRR08005	629258.2	6084385	1433.35	171	2008	Rotary
TRR08006	629379.2	6084102	1457.36	150.54	2008	Rotary
TRR08007	629268	6084172	1443.14	150.54	2008	Rotary
TRR08008	629380.8	6084103	1457.25	151.22	2008	Rotary
TRR08009	629251.7	6084133	1445.37	122	2008	Rotary
TRR08010	629379.8	6084098	1457.32	148	2008	Rotary
TRR08011	629305.9	6084199	1443.08	90	2008	Rotary
TRR08012	629127.7	6084193	1437.81	136	2008	Rotary
TRR08013	629430.1	6084274	1452.04	210.56	2008	Rotary
TRR08014	629172.2	6084267	1436.066	96.44	2008	Rotary
TRR08015	629162.7	6083846	1456.65	248.58	2008	Rotary
TRR08016	629270.6	6084167	1443.63	152	2008	Rotary
TRR08017	629146	6084235	1437.45	150	2008	Rotary
TRR08018	628972.8	6084016	1442.62	186	2008	Rotary
TRR08022	631492.7	6082461	1827.42	168	2008	Rotary
TRR08023	631434.6	6082565	1874.68	192	2008	Rotary
TRR08024	631510.1	6082490	1829.88	120	2008	Rotary
TRR08025	631502.8	6082481	1829.81	181.5	2008	Rotary
TRR08026	631398.2	6082502	1866.34	224	2008	Rotary
TRR08027	631112.6	6082337	1846.39	180.27	2008	Rotary
TRR08028	631506	6082487	1830.39	135.21	2008	Rotary
TRR08029	631109.9	6082334	1846.55	104.8	2008	Rotary
TRR08030	631031.8	6082804	1986.1	314	2008	Rotary
TRR08031	631070.1	6082861	1985.48	393.9	2008	Rotary
TRR08032	631191.5	6082689	1986.18	282.06	2008	Rotary
TRR08033	631287.3	6082731	1988	316	2008	Rotary
TRR08034	630812.2	6083010	1927.14	375.74	2008	Rotary
TRR08035	631327.2	6082701	1974.69	356.82	2008	Rotary
TRR08036	630809.4	6083015	1927.06	384	2008	Rotary
TRR08037	631233.1	6082747	1996.22	370.08	2008	Rotary
TRR08038	629490.6	6083881	1544.75	149.66	2008	Rotary
TRR08039	630329	6083345	1775	72.6	2008	Rotary
TRR08040	629778.4	6083869	1623.52	91	2008	Rotary



Hole_ID	Easting	Northing	Elevation	Depth	Year	Type
TRR08041	629620.3	6083910	1569.72	264	2008	Rotary
TRR08042	629800.4	6083898	1617.83	46	2008	Rotary
TRR08043	629535.6	6083961	1539.09	208	2008	Rotary
TRR08044	630928.3	6082904	1960.6	353	2008	Rotary
TRR08045	629952.1	6083628	1684.88	242	2008	Rotary
TRR08046	630375.6	6083362	1780.025	264.15	2008	Rotary
TRR08047	630552.6	6083352	1759.59	218.16	2008	Rotary
TRR08048	630729.5	6083077	1907.33	318.48	2008	Rotary
TRR08051	630060.2	6083574	1698.72	278.77	2008	Rotary
TRR08052	631555.7	6082887	1906.46	157.52	2008	Rotary
TRR08053	629951.9	6083628	1685.08	281.76	2008	Rotary
TRR08054	629564.1	6083841	1569.15	189.21	2008	Rotary
TRR08055	630339.1	6082935	1767.25	219	2008	Rotary
TRR08056	630990.9	6083418	1788.48	71.8	2008	Rotary
TRR08057	629938.4	6083246	1686.77	272	2008	Rotary
TRR08058	629657.1	6083374	1609.09	224	2008	Rotary
TRR08059	631071	6082637	1947	75.18	2008	Rotary
TRR08060	631545	6082592	1843.24	69.29	2008	Rotary
TRB09281	629823	6083718	1654.84	30.05	2009	LDC
TRB09282	629842	6083654	1658	31.48	2009	LDC
TRB09283	629866	6083618	1662	44.44	2009	LDC
TRB09284	629598	6083779	1588	62.75	2009	LDC
TRC09079	629170.6	6084265	1437.46	133.65	2009	HQ Core
TRC10080	629388	6084128	1458	79.69	2010	HQ Core
TRR10174	629094	6084282	1435	155.4	2010	Rotary
TRR10184	629091	6084282	1437	145	2010	Rotary
TRR10185	629090	6084278	1437	203.45	2010	Rotary
TRR11408	631506.3	6083029	1909.75	118.56	2011	Rotary
TRR11413	631301.4	6083266	1876.21	48.52	2011	Rotary
TRR11416	631018	6083298	1846.84	152.35	2011	Rotary
TRR11418	630937.6	6083464	1767.58	60.13	2011	Rotary
TRR11482	630929.3	6083350	1811.49	151.12	2011	Rotary
TRR11484	630894.5	6083414	1782.35	109.92	2011	Rotary
TRR11490	631073.7	6083380	1803.96	59.2	2011	Rotary
TRR11493	631213.3	6083268	1868.98	76.17	2011	Rotary
TRR11495	631328.4	6083230	1894.04	54.58	2011	Rotary
TRR11501	631513.5	6083067	1907.89	66.8	2011	Rotary
TRC12372A	631208	6082783	1998.55	108.2	2012	HQ Core
TRC12372B	631207.2	6082782	1998.61	125.33	2012	HQ Core
TRC12372C	631177.3	6082760	1997.54	132	2012	HQ Core
TRC12386	630381.5	6083274	1801.33	235.88	2012	HQ Core
TRC12398	631552.8	6082401	1788.33	107	2012	HQ Core
TRC12399	631551.1	6082405	1788.54	1	2012	HQ Core
TRR12415	630593.6	6082703	1855.03	221	2012	Rotary
TRR12420	630329.3	6082959	1767.84	207	2012	Rotary
TRR12440	630323	6082962	1764.82	216	2012	Rotary

Hole_ID	Easting	Northing	Elevation	Depth	Year	Type
TRR12473	630232.4	6083480	1728.47	200	2012	Rotary
TRR12474	630225.2	6083482	1728.25	206	2012	Rotary
TRR12486	630568.6	6082730	1848.02	237	2012	Rotary
TRR12488	630711.4	6083036	1915.34	191	2012	Rotary
TRR12489	630595.6	6082698	1855.34	157	2012	Rotary
TRR12497	630919.1	6082446	1876.87	85	2012	Rotary
TRR12498	630918.5	6082444	1876.73	137	2012	Rotary
TRR12505	631332.8	6082697	1973.19	280	2012	Rotary
TRR12506	631333.3	6082695	1973.13	218	2012	Rotary
TRR12509	631259.7	6082319	1834.78	173	2012	Rotary
TRR12512	631530.7	6082431	1805.95	91	2012	Rotary

# Attachment 9

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## Signature Page

I, David Phillippe Lortie, P. Geo., do hereby certify that:

- a) I am currently employed as Coal Resource Manager by Peace River Coal Inc., Suite 800 - 700 West Pender Street, Vancouver, British Columbia, Canada V6C 1G8. Peace River Coal Inc. is a subsidiary of Anglo American Plc.
- b) This certificate applies to the Coal Assessment Report entitled "Coal Assessment Report Roman Property Peace River Coal District", dated September 12, 2014.
- c) I graduated with a Bachelor of Science in Geology degree from Acadia University in 1976. I have worked as a Geologist for more than 21 years since my graduation from university. I am a member of the Association of Professional Engineers and Geoscientists of British Columbia (License #31067) I am a "qualified person" for purposes of National Instrument 43-101 ("NI 43-101").
- d) I am responsible for the preparation of this Coal Assessment Report.
- e) I have previously been involved with the Northeast British Columbia coal fields since 2004 as the Chief Geologist with Western Coal Corp. (previously Western Canadian Coal Corp.) and now with Peace River Coal Inc. planning and supervising the exploration work.

Dated this 12 day of September, 2014

  
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D.P. Lortie P. Geo.

# Attachment 10

## Exploration Cost 2013

Exploration Cost	
Type of Work	2013
Total for Geophysics	\$ 308,996
Total for Sample Analysis	\$ 502,454
Total for Site/Pit Preparation	\$ 681,711
Total for FIRE SAFETY FIRST AID	\$ 35,700
Total for Drilling (including Fuel)	\$ 2,650,313
Total for Project Roman Exploration	\$ 4,179,174
Coal Lease	\$ 32,010
Staffing	\$ 968,321
<b>Total Roman Exploration cost</b>	<b>\$ 5,179,505</b>

# Appendix 1









































## 2013 Geophysical Logs (Attached as separate folder on DVD)

Name	Date modified	Type
RMC13001	05/09/2014 8:08 AM	File folder
RMC13002A	04/09/2014 11:20 AM	File folder
RMC13003	04/09/2014 11:19 AM	File folder
RMC13003A	04/09/2014 11:26 AM	File folder
RMC13004	04/09/2014 11:30 AM	File folder
RMC13005	04/09/2014 11:36 AM	File folder
RMC13008	04/09/2014 11:42 AM	File folder
RMC13009	04/09/2014 11:45 AM	File folder
RMC13010	04/09/2014 11:49 AM	File folder
RMC13012	04/09/2014 11:53 AM	File folder
RMC13014	04/09/2014 11:55 AM	File folder
RMC13017A	04/09/2014 11:56 AM	File folder
RMC13019	04/09/2014 12:32 PM	File folder
RMC13019A	04/09/2014 12:36 PM	File folder
RMC13020	04/09/2014 12:42 PM	File folder
RMC13021	04/09/2014 12:45 PM	File folder
RMC13022A	04/09/2014 12:52 PM	File folder
RMC13102	04/09/2014 12:57 PM	File folder
RMC13104	04/09/2014 1:03 PM	File folder
RMC13105	04/09/2014 1:08 PM	File folder
RMC13110	04/09/2014 1:16 PM	File folder
RMR13006	04/09/2014 9:14 AM	File folder
RMR13007	04/09/2014 9:18 AM	File folder
RMR13011	04/09/2014 9:28 AM	File folder
RMR13011A	04/09/2014 9:38 AM	File folder
RMR13013	04/09/2014 9:41 AM	File folder
RMR13015	04/09/2014 9:53 AM	File folder
RMR13016	04/09/2014 10:00 AM	File folder
RMR13018	04/09/2014 10:05 AM	File folder
RMR13024	04/09/2014 10:08 AM	File folder
RMR13025	04/09/2014 10:11 AM	File folder
RMR13026	04/09/2014 10:12 AM	File folder
RMR13027	04/09/2014 10:19 AM	File folder
RMR13048	04/09/2014 10:23 AM	File folder
RMR13049	04/09/2014 10:27 AM	File folder
RMR13050	04/09/2014 10:44 AM	File folder
RMR13085	04/09/2014 10:54 AM	File folder
RMR13098	04/09/2014 10:58 AM	File folder
RMR13103	04/09/2014 11:03 AM	File folder



## Appendix 2

### Maps and Sections (Attached as separate folder on DVD)

Name	Date modified	Type	Size
 Roman 2013 Borehole Plan.pdf	08/09/2014 11:18 ...	Adobe Acrobat D...	1,868 KB
 Roman Property Location Map.pdf	05/09/2014 9:59 AM	Adobe Acrobat D...	2,248 KB
 Sect_Row-020.pdf	29/04/2014 8:26 AM	Adobe Acrobat D...	304 KB
 Sect_Row-024.pdf	29/04/2014 8:29 AM	Adobe Acrobat D...	351 KB
 Sect_Row-028.pdf	29/04/2014 8:33 AM	Adobe Acrobat D...	355 KB
 Sect_Row-032.pdf	29/04/2014 8:34 AM	Adobe Acrobat D...	365 KB
 Sect_Row-036.pdf	29/04/2014 8:36 AM	Adobe Acrobat D...	372 KB
 Sect_Row-040.pdf	29/04/2014 8:59 AM	Adobe Acrobat D...	402 KB
 Sect_Row-044.pdf	29/04/2014 9:00 AM	Adobe Acrobat D...	410 KB
 Sect_Row-048.pdf	29/04/2014 9:01 AM	Adobe Acrobat D...	381 KB
 Sect_Row-052.pdf	29/04/2014 9:02 AM	Adobe Acrobat D...	390 KB
 Sect_Row-056.pdf	29/04/2014 9:05 AM	Adobe Acrobat D...	381 KB
 Sect_Row-060.pdf	29/04/2014 9:06 AM	Adobe Acrobat D...	360 KB
 Sect_Row-064.pdf	29/04/2014 9:08 AM	Adobe Acrobat D...	393 KB
 Sect_Row-068.pdf	29/04/2014 9:09 AM	Adobe Acrobat D...	359 KB
 Sect_Row-072.pdf	29/04/2014 7:47 AM	Adobe Acrobat D...	382 KB
 Sect_Row-076.pdf	29/04/2014 7:50 AM	Adobe Acrobat D...	347 KB
 Sect_Row-080.pdf	29/04/2014 7:51 AM	Adobe Acrobat D...	359 KB
 Sect_Row-084.pdf	29/04/2014 7:53 AM	Adobe Acrobat D...	371 KB
 Sect_Row-088.pdf	29/04/2014 7:54 AM	Adobe Acrobat D...	347 KB
 Sect_Row-092.pdf	29/04/2014 7:56 AM	Adobe Acrobat D...	364 KB
 Sect_Row-096.pdf	29/04/2014 7:57 AM	Adobe Acrobat D...	372 KB
 Sect_Row-100.pdf	29/04/2014 7:58 AM	Adobe Acrobat D...	393 KB
 Sect_Row-104.pdf	29/04/2014 7:58 AM	Adobe Acrobat D...	387 KB
 Sect_Row-108.pdf	29/04/2014 7:59 AM	Adobe Acrobat D...	389 KB
 Sect_Row-112.pdf	29/04/2014 7:59 AM	Adobe Acrobat D...	351 KB
 Sect_Row-116.pdf	29/04/2014 8:00 AM	Adobe Acrobat D...	409 KB
 Sect_Row-120.pdf	29/04/2014 8:01 AM	Adobe Acrobat D...	377 KB
 Sect_Row-124.pdf	29/04/2014 8:02 AM	Adobe Acrobat D...	351 KB
 Sect_Row-128.pdf	29/04/2014 8:03 AM	Adobe Acrobat D...	358 KB
 Sect_Row-132.pdf	29/04/2014 8:04 AM	Adobe Acrobat D...	335 KB
 Sect_Row-136.pdf	29/04/2014 8:04 AM	Adobe Acrobat D...	346 KB
 Sect_Row-140.pdf	29/04/2014 8:04 AM	Adobe Acrobat D...	330 KB
 Sect_Row-144.pdf	29/04/2014 8:19 AM	Adobe Acrobat D...	327 KB
 Sect_Row-148.pdf	29/04/2014 8:18 AM	Adobe Acrobat D...	321 KB
 Sect_Row-152.pdf	29/04/2014 8:17 AM	Adobe Acrobat D...	317 KB
 Sect_Row-156.pdf	29/04/2014 8:15 AM	Adobe Acrobat D...	377 KB
 Sect_Row-160.pdf	29/04/2014 8:13 AM	Adobe Acrobat D...	350 KB
 Sect_Row-164.pdf	29/04/2014 8:12 AM	Adobe Acrobat D...	387 KB
 Sect_Row-168.pdf	29/04/2014 8:10 AM	Adobe Acrobat D...	369 KB

## Appendix 3

### 2013 Coal Quality

(Attached as separate folder on DVD)

Name	Date modified	Type
RMC13001	05/09/2014 1:49 PM	File folder
RMC13002A	05/09/2014 1:49 PM	File folder
RMC13003	05/09/2014 1:49 PM	File folder
RMC13003A	05/09/2014 1:49 PM	File folder
RMC13004	05/09/2014 1:49 PM	File folder
RMC13008	05/09/2014 1:49 PM	File folder
RMC13009	05/09/2014 1:49 PM	File folder
RMC13010	05/09/2014 1:49 PM	File folder
RMC13012	05/09/2014 1:49 PM	File folder
RMC13014	05/09/2014 1:49 PM	File folder
RMC13017A	05/09/2014 1:49 PM	File folder
RMC13019	05/09/2014 1:50 PM	File folder
RMC13019A	05/09/2014 1:50 PM	File folder
RMC13020	05/09/2014 1:50 PM	File folder
RMC13021	05/09/2014 1:50 PM	File folder
RMC13022	05/09/2014 1:50 PM	File folder
RMC13022A	05/09/2014 1:50 PM	File folder
RMC13023	05/09/2014 1:50 PM	File folder
RMC13102	05/09/2014 1:50 PM	File folder
RMC13104	05/09/2014 1:50 PM	File folder
RMC13105	05/09/2014 1:50 PM	File folder
RMC13110	05/09/2014 1:50 PM	File folder

## Appendix 4

### Borehole Seam Intervals (Attached as separate folder on DVD)

Name	Date modified	Type
 Roman Borehole Lithology.pdf	08/09/2014 1:51 PM	Adobe Acrobat D...