NI 43-101

COAL RESOURCE REPORT
RAM RIVER COAL PROPERTY

Alberta, Canada

Prepared For

RAM RIVER COAL CORP.

Vancouver, Canada

By

John T. Boyd Company

Mining and Geological Consultants

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Report No. 5184.000

NOVEMBER 2019

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22 November 2019
File: 5184.000

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Attention: Mr Ken Brophy
President

Subject: NI 43-101
Coal Resource Report
Ram River Coal Property
Alberta Province, Canada

Dear Sirs

This report provides our updated estimate of the coal resources underlying the Ram River coal property located 45 km northeast of the town of Rock Mountain House in west-central Alberta Province, Canada. Our scope of work included two primary tasks: (1) development of an updated geologic model of the deposit using all available exploratory drilling and related information, and (2) using the updated geologic model, estimate the coal resource underlying the Ram River property.

By assignment, this report is prepared in accordance with reporting standards and guidelines of Canadian National Instrument (NI) 43-101.

Report Title
NI 43-101
Coal Resource Report
Ram River Coal Property
Alberta, Canada

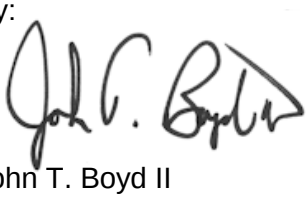
Effective Date
The reported coal resource tonnages are estimated as of 31 October 2019.

Report Author

The principal and responsible author for this report is Adrian Buck, Senior Geologist, BOYD-Australia. Mr. Buck meets or exceed the requisite qualifications for Qualified Peron under NI 43-101 standards. A signed Certificate of Qualification by Mr. Buck is provided in Chapter 28 of this report.

Respectfully submitted,

JOHN T. BOYD COMPANY
By:



John T. Boyd II
President and CEO

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GLOSSARY OF ABBREVIATIONS AND DEFINITIONS

ACARP	:	Australian Coal Association Research Program
AD	:	Air Dried
ASTM	:	American Society for Testing and Materials
BOYD	:	John T. Boyd Company
CIM	:	Canadian Institute of Mining, Metallurgy, and Petroleum
CIM Standards	:	Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards – For Mineral Resources and Mineral Reserves, Prepared by the CIM Standing Committee on Reserve Definitions, Adopted by CIM Council on December 11, 2005.
Coal Resources	:	Coal contained in seams occurring within specified limits of thickness, and depth from surface. A resource tonnage is always calculated on an “in-place” basis; that is, mining or other recovery factors are not applied. Coal Resources are subdivided according to their general “feasibility of exploitation” into resources of immediate and future interest, and according to their “assurance of existence” (i.e., degree of confidence in the quantity estimates), into measured, indicated, inferred, and speculative categories (CIM).
CONSOL	:	CONSOL Energy Inc.
CV	:	Calorific Value
DAF	:	Dry Ash Free
DEM	:	Digital Elevation Model
FS	:	Feasibility Study
Feasibility Study	:	A comprehensive study of a mineral deposit in which all geological, engineering, legal, operating, economic, social, environmental, and other relevant factors are considered in sufficient detail that it could reasonably serve as the basis for a final decision by a financial institution to finance the development of the deposit for mineral production; (NI 43-101).
FSI	:	Free Swelling Index
GSC 88-21	:	A Standardized Coal Resource/Reserve Reporting System for Canada Paper 88-21 by the Geological Survey of Canada, 1989 referenced in NI 43-101.
Indicated Coal Resource	:	That part of a Coal Resource for which quantity or quality, densities, shape and physical characteristics can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and

GLOSSARY OF ABBREVIATIONS AND DEFINITIONS - Continued

		testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes that are spaced closely enough for geological and quality continuity to be reasonably assumed. (CIM Standards/GSC 88-21)
Inferred Coal Resource	:	That part of a Coal Resource for which quantity and quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and quality continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes (CIM Standards/GSC 88-21).
ISO	:	International Organization for Standardization
kPa	:	kilopascals
Loring	:	Loring Laboratories (Alberta) Ltd
LUF	:	Land-use Framework
Measured Coal Resource	:	That part of a coal Resource for which quantity, quality, densities, shape, and physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough to confirm both geological and grade continuity. (CIM Standards/GSC 88-21)
Mt	:	Million tonnes
NI 43-101	:	National Instrument 43-101 Standards of Disclosure for Mineral Projects
NSRP	:	North Saskatchewan Regional Planning.
OSD	:	Out-of-Seam Dilution, rock, impurities recovered from above and below the coal seam with the coal seam during the normal mining process
PE	:	Registered Professional Engineer
PEA	:	Preliminary Economic Assessment
Preliminary Economic Assessment	:	A study, other than a prefeasibility (PFS) or feasibility study (FS), that includes an economic analysis of the potential viability of mineral resources
PFS	:	Pre-feasibility Study

GLOSSARY OF ABBREVIATIONS AND DEFINITIONS - Continued

Preliminary Feasibility Study and Pre-feasibility Study	:	Each mean a comprehensive study of the viability of a mineral project that has advanced to a stage where the mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, has been established and an effective method of mineral processing has been determined, and includes a financial analysis based on reasonable assumptions of technical, engineering, legal, operating, economic, social, and environmental 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 classified as a mineral reserve. (NI 43-101)
QP	:	Qualified Person, Competent Person
Qualified Person or QP	:	An individual who is an engineer or geoscientist with at least five years of experience in mineral exploration, mine development or operation or mineral project assessment, or any combination of these; has experience relevant to the subject matter of the mineral project and the technical report; and is a member or licensee in good standing of a professional association recognized under 43-101 (CIM Standards).
Recoverable Reserves	:	A recoverable reserve refers to that portion of the coal from a mineable coal seam that can be recovered with the mining techniques considered in the feasibility study (GSC 88-21). The portion of in-place seam tonnage recovered during mining but before OSD and coal processing considerations.
RL	:	Reduced Level, in surveying refers to equating elevations of survey points with reference to a common datum.
ROM	:	Run-of-Mine, the as-mined coal material including coal, in-seam rock partings mired with the coal, and OSD (out-of-seam rock contamination).
rpm	:	Rotations per minute
RRCC	:	Ram River Coal Corp.
Saleable Reserves	:	Saleable coal is the quantity of coal that can be delivered to the point of use, and includes all losses in preparation and shipping (GSC 88-21).
VM	:	Volatile Matter

1.0 SUMMARY

1.1 Introduction

John T. Boyd Company (BOYD) was retained to develop a stratigraphic geological model which was then used as the basis for BOYD to complete a coal resource estimate for the Ram River coal property. The subject coal holding was formerly controlled by Consolidation Coal Company (CONSOL) and was acquired by Ram River Coal Corporation (RRCC) in 2012. By assignment, our report is prepared in accordance with NI 43-101 Standards of Disclosure for Mineral Projects.

BOYD has worked extensively throughout the western Canadian coalfields since the 1950s. During the last 60 plus years, we have completed over 100 coal studies in Alberta (58), British Columbia (37), and Saskatchewan (20). Our client base for these studies is diverse and includes major coal producers, investors, and coal consumers. Our work experience includes regional coal resource properties, as well as operating and planned coal mines in western Canada. In 2012, BOYD's Pittsburgh US regional office was retained by RRCC to complete an on-site drill core exploration program and a subsequent Coal Resource Report (issued on 27 February 2013).

We did not conduct a personal inspection on the property as part of this 2019 report, as there are no current exploration activities to inspect. BOYD previously inspected the property in conjunction with our work in 2012.

This chapter provides a brief summary of primary information contained within this resource report and is supported by remaining portions of this report including text, figures, and tables. Weights and measures are expressed in metric units.

1.2 Ownership

Rights to the coal underlying the Ram River property are controlled through leases with the Coal and Mineral Development Unit of the Alberta Department of Energy. The leases grant the exclusive right to work, win, and recover coal in an area encompassing over 13,000 Hectares (Ha). Additional lands are held through Preferential Right Lease Applications, which operate as an exclusive option to enter into a coal lease with Alberta. The current lease terms extend through either 2022 or 2023.

1.3 Geology

The Ram River property is located in the Canadian Rocky Mountains, Central Mountains and Foothills regions of Alberta. The property is associated with a regional thrust block of Mesozoic strata. The block is thrust over Tertiary strata to the east of the property, and in turn, Palaeozoic strata is thrust over to the west of the property. Coal seams of economic interest are found within in the Lower Cretaceous Gates Formation of the Luscar Group.

Within the Ram River property, structures are relatively mild, consisting of northwest-trending folding and thrust faulting. The Ram River anticline is the prominent structure in the property area, dividing the property into two coal-bearing limbs which form synclinal basins. Each limb has a gentle syncline, following with the regional trend. The synclinal axis in the South Block plunges gently to the northwest. The structure of the North Block forms an elongated basin feature within the northwestern portion of the base of the syncline, then in the southeastern portion of the North Block the synclinal axis plunges to the southeast. The synclinal flanks dipping into the basin exhibit dips of 10 degrees to 30 degrees. Erosion has removed the coal measures in the immediate vicinity of the anticlinal axis, resulting in the two separate blocks. Geologic conditions are similar in the two synclinal resource blocks. In the North Block the Seam 3 depth varies from coal seam subcrop to a maximum of between 150 m and 200 m, and averages 103 m. In the South Block, the Seam 3 depth increases to a maximum of 250 m to 550 m, with an average depth of 215 m.

Up to six coal seams and coaly zones are typically recognized, with Seam 2 and Seam 3 typically well developed and the primary focus. Seam 3 thickness ranges from 0.9 m to 7.5 m, with stable thickness typically 3.7 m. Minor partings of inferior coal, claystone, and carbonaceous mudstone are present. In-seam parting thicknesses typically range from 0.05 m to 0.20 m thick, with increased frequency in in the upper portion of the seam. The lower 1.5 m portion of the seam is typically free from parting and displays superior quality.

Seam 2 is present as two plys (S2 and S2R). The upper ply S2R is a thin 0.5 m thick band coal separated from the main seam S2 by a carbonaceous mudstone parting. The parting varies from less than 0.3 m to 3.1 m, with an average thickness of 0.5 m. The main S2 seam has a reported thickness ranging from 1.0 m to 4.9 m, with generally stable thickness typically 2.3 m. The main S2 seam is generally free of major stone parting. Minor partings of inferior coal, claystone, and carbonaceous mudstone typically less than 0.1 m thick are present.

The overall geologic setting (Geology Type) of the coal underlying the Ram River property is judged to range from Low-Type B to Moderate.

1.4 Status of Exploration

Six exploration programs by CONSOL, spanning 1970 to 1981, drilled 488 holes on the Ram River property. Two exploration programs by RRCC, spanning 2012 to 2013, drilled 119 holes on the Ram River property. RRCC is developing plans for the next exploration program. The number of holes drilled in each campaign is shown below.

Company	Year	Drill holes			Approx. Aggregate Meters Drilled
		Chip	Core	Total	
CONSOL	1970-71	43	-	43	5,125
CONSOL	1973	83	-	83	6,289
CONSOL	1974	85	-	85	7,923
CONSOL	1974-75	170	42	212	20,200
CONSOL	1980	17	5	22	3,615
CONSOL	1981	29	15	44	6,531
RRCC	2012	2	11	13	826
RRCC	2013	65	41	106	11,465
Total		494	114	608	61,974

1.5 Coal Resource Tonnage Estimate

Estimated in situ measured and indicated coal resources underlying the Ram River property as at 31 October 2019 total 403 million metric tonnes (Mt), with an additional 285 Mt of inferred resources estimated, as follows:

ASTM Coal Rank	In Situ Resource (Mt)			
	Measured	Indicated	Subtotal (Meas. + Ind.)	Inferred
Med-High Volatile Bituminous	298	105	403	285

Based on available documentation and our regional experience, BOYD is not aware of significant legal, title, taxation, socio-economic, marketing, political, or other relevant modifying factors that could materially affect the resource estimate.

The Ram River area is currently classified Category 2 under the Coal Development Policy for Alberta from 1976, in which underground mining may be considered, but development by surface mining is not normally considered. In 2016, RRCC received a letter from the Alberta Government which reportedly clarified the policy as it relates to RRCC. The letter reports, that as is the case elsewhere across Alberta, the permitting of surface mining activities is subject to regulatory review and approval, and subject to RRCC receiving the necessary approvals. Surface mining of the shallower portions of the Ram River property can be conducted.

1.6 Coal Resource Quality Estimate

Based on the review and work completed by BOYD the in situ coal quality has been estimated for each of the resource categories and areas described above. The following table summarises the quality by seam group and resource confidence category as at 31 October 2019:

Seam - Block	Mass (Mt is)	Relative Density (g/cc is)	Moisture (% ad)	Ash (% ad)	Volatile Matter (% ad)	Fixed Carbon (% ad)	Calorific Value (kcal/kg ad)	Total Sulphur (% ad)	Free Swell Index (FSI)
Measured Resources									
Seam 3 – North	122	1.43	1.0	20.9	26.2	52.2	6,510	0.54	4.6
Seam 3 – South	54	1.42	0.9	19.5	25.0	54.8	6,680	0.54	5.0
Seam 2 – North	86	1.48	1.1	27.1	23.7	48.1	5,930	0.51	3.3
Seam 2 – South	36	1.46	1.1	25.4	23.6	49.9	6,110	0.57	4.0
Subtotal	298	1.44	1.0	23.0	25.0	51.2	6,330	0.54	4.3
Indicated Resources									
Seam 3 – North	5	1.43	1.0	21.8	26.4	51.5	6,410	0.55	4.8
Seam 3 – South	55	1.42	0.9	19.3	25.1	54.8	6,690	0.54	4.9
Seam 2R*	-	1.68	1.5	43.7	17.4	37.4	4,340	0.43	1.0
Seam 2 – North	5	1.50	1.2	28.4	23.8	46.5	5,790	0.55	2.9
Seam 2 – South	40	1.46	1.1	25.1	23.6	50.2	6,140	0.57	4.1
Seam 1*	-	1.50	1.1	25.8	29.2	43.9	6,070	1.77	6.0
Subtotal	105	1.43	1.0	22.1	24.5	52.5	6,430	0.55	4.5
Total	403	1.44	1.0	22.8	24.9	51.5	6,350	0.54	4.3

* Seam 1 and Seam 2R represent inferred resources and shown for completeness. As such, they are excluded in weighted average summaries for indicated and measured resource coal quality.

Coal processing of Ram River property coal is planned to establish final product coal quality.

1.7 Recommendations

BOYD recommends that:

- Additional exploratory core drilling (minimum 85% core recovery) be undertaken to further define raw coal quality of the coal seams throughout both resource block areas.
- Additional study be completed to assess and further define the base of weathering across the drill hole database.
- Further stratigraphic correlation and testing be undertaken of Seams 4, 5 and 6 to assist with determining the economic potential of mining these seams, as part of the overburden removal of the deeper coal seams.
- Review, assess and correct identified issues in the RRCC drill hole database with a focus on unifying geophysical corrections observed in the seam picks, across all database components.
- Undertake mine planning and optimization work to assess the application of strip mining methods.

1.8 Conclusions

Following development of the stratigraphic model, a full assessment of both surface and/or underground mine planning should be undertaken.

- The Ram River property is underlain by a large, Low-Type “Moderate” coal deposit with the following estimated coal resources by confidence category: 298 Mt Measured, 105 Mt Indicated, and 285 Mt Inferred. Total resources are estimated to be 403 million in situ tonnes in the Measured and Indicated categories.
- Additional core drilling exploration is recommended to confirm coal quality on a raw and washed basis and to gain additional coal seam and structural information in areas with lower drill hole densities.
- RRCC is following a logical program to explore, study, and develop the Ram River coal resources.

Following this page is Figure 1.1, General Location Map.

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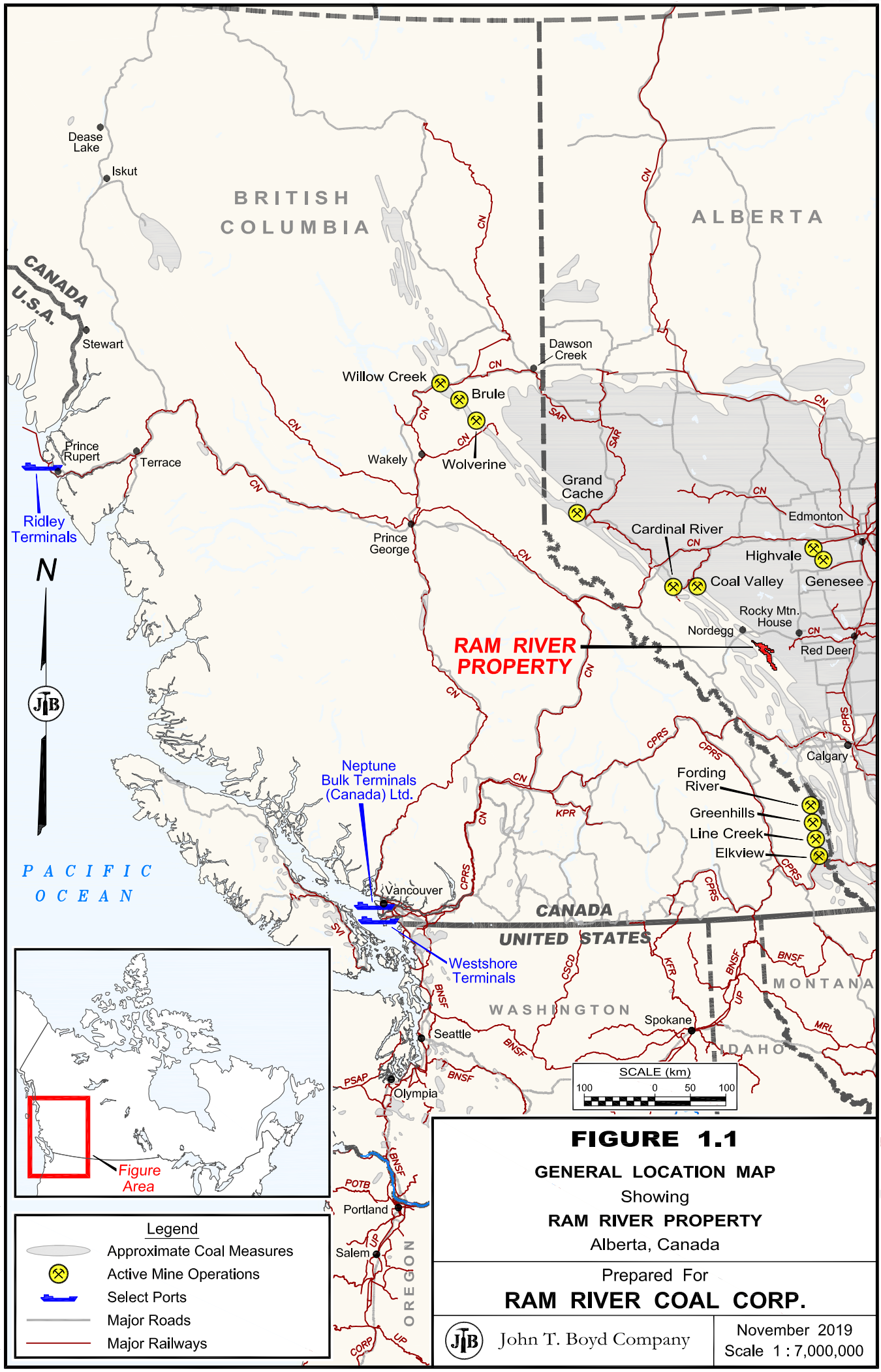

FIGURE 1.1

GENERAL LOCATION MAP

Showing

RAM RIVER PROPERTY

Alberta, Canada

Prepared For

RAM RIVER COAL CORP.

John T. Boyd Company

November 2019

Scale 1 : 7,000,000

Q:\CAD_GROUP\5184.000\FIGURE 1.1.DWG

2.0 INTRODUCTION

2.1 Client Name and Purpose

This report was prepared for RRCC in accordance with NI 43-101 Standards of Disclosure for Mineral Projects.

2.2 Terms of Reference

This report describes the results of new stratigraphic geologic modeling of the Ram River coal deposit performed by BOYD, and the resulting resource estimate. The resource estimate was compared to previous estimates. The work was based on the exploration date compiled for the 2017 Pre-feasibility Study (PFS) geologic database for the Ram River property prepared by Norwest Corporation. Remodelling of the deposit was undertaken to provide RRCC with visual and planning materials required to plan and schedule the Ram River property as a stratigraphic coal deposit.

2.3 Sources of Information

This report is based on property, historic exploration, and prior work results available as of the date of our engagement, 6 August 2019. Primary sources of information were:

- Historical exploration reports and studies completed by CONSOL (the previous owner of the property).
- Exploration drilling, 2014 Preliminary Economic Assessment (PEA), 2017 PFS, and geologic database completed by RRCC.

The geologic database is a collection of the information gathered from 488 exploratory holes drilled by CONSOL between 1970 and 1981, and 119 exploratory holes drilled by RRCC between 2012 and 2013. Information including coal thickness, seam elevation, roof and floor composition, and geophysical characteristics is contained in the database. The 2012 exploration program was conducted under BOYD's direction during November and December of 2012 and comprised three bulk samples collected for comprehensive coal quality and metallurgical (petrographic) coal testing. The 2013 exploration program was supervised by RRCC's consultants, and comprised 106 holes on 54 sites including 41 core holes.

A full listing of the reports referenced is included in Chapter 27.

2.4 Personal Inspection

A site inspection of the property was not undertaken as part this report because no inspectable exploration activities have been conducted since the completion of the 2013 drilling program.

BOYD previously inspected the property in 2012 as part of exploration work, with the site personally inspected by Donald D. Sanderson, Project Administrator of BOYD, who visited the property on 9-17 August 2012, and by Mr. Gregory M. Stanish and Mr. Edward C. Mast, BOYD Senior Geologists, who were present during the 2012 Exploration Program.

U:\BOYD_PROJECTS\5184.000 Ram Coal - Stratigraphic Model and Resource Estimation\BOYD Reports\Final\2.0 Introduction.docx

3.0 RELIANCE ON OTHER EXPERTS

3.1 Other Experts

BOYD has relied on the information and data provided by RRCC as the basis for estimating coal resources within the Ram River property. In preparation for this report, BOYD did not conduct field work for resource definition and did not independently drill or complete geophysical logs of drill holes, take samples or conduct coal testing. BOYD has relied on the assessment reports obtained from RRCC.

BOYD reviewed historical exploration, geologic, and feasibility reports prepared previously; we consider that the opinions in those reports are reasonable and appear to have been prepared by experienced and proficient engineers and geologists.[1] BOYD previously completed a resource estimate for the Ram River property in 2013. At that time, BOYD opined that—due to the enactment of the Coal Development Policy for Alberta from 1976 and the associated classification of the Ram River area as Category 2—surface mining was not normally considered for the property. In 2016, RRCC received a letter from the Alberta Government which clarified that policy. The letter reports that, as is the case elsewhere in Alberta, the permitting of surface mining activities is subject to regulatory review and approval.

BOYD accepted land and coal control ownership and leases, exploratory drill hole records and databases, and similar technical source data as provided by RRCC without independent verification. We reviewed data provided for general reasonableness within the context of BOYD's expertise and experience and concluded that the data provided were representative and consistent with our understanding of the subject property.

BOYD relied on previous reports for descriptions, locations, and mapping of the leased areas. BOYD was not provided with the provincial coal leases, and we did not independently verify the boundaries and locations of the leased tracts. The portion of the technical report that relies on this information is in Chapter 4, Property Description, and all maps showing lease locations and boundaries.

[1] See Chapter 27 for a full list of reports referenced.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 Area

The boundary of the Ram River property encompasses two adjacent project areas acquired by RRCC in 2012: (1) the Ram River metallurgical coal properties in the north (the focus of this report), and (2) Scurry Ram metallurgical coal properties in the south (where limited exploration has been undertaken). The Ram River metallurgical coal properties are further divided on the basis of the Ram River Anticline into the North Block (also referred to as the Aries Project) and the South Block.

The combined RRCC coal leases covers an area of 20,107 Ha, plus an additional preferential right lease application area of 2,433 Ha, for a combined total area of 22,540 Ha. The Ram River property covers 13,274 Ha within 18 tracts of Crown leases and 1,424 Ha within 9 tracts of Crown preferential right lease application for a total of 14,698 Ha.

4.2 Location

The Ram River property is located in the Canadian Rocky Mountains, Central Mountains and Foothills regions of Alberta. The nearest residential and service center is the town of Rocky Mountain House, 45 km northeast of Ram River property and the city of Red Deer located 84 km east of Rocky Mountain House. The property covers portions of Ranges 12W5 and 13W5 in Township 39; Ranges 11W5, 12W5, and 13W5 in Township 38; and Range 12W5 in Township 37.[1] Figure 4.1, following this text, shows the location of the Ram River property.

4.3 Mineral Tenure

Coal and mining rights to the Ram River property are controlled through leases with the Coal and Mineral Development Unit of the Alberta Department of Energy. The leases grant the exclusive right to work, win, and recover coal in the described locations. The leaseholder must pay annual rent of CAD$3.50/Ha. Additional lands are held through Preferential Right Lease Applications, which operate as an exclusive option to enter into a coal lease with Alberta Province. The tracts acquired through these options will likely not be subject to any overriding royalties in excess of the Crown assessment.

Coal leases are also subject to the following legislation and policies:

- Mines and Minerals Act: Parts 2 and 3 pertain specifically to coal leasing.

[1] The property is located between latitudes 52 degrees 10’N and 52 degrees 20’N and longitudes 115 degrees 30’W and 115 degrees 50’W.

- Mines and Mineral Administration Regulation.
- Coal Conservation Act: a coal lessee requires a Mine Permit and Mine License to develop a mine in the location of a lease.
- Integrated resource plans, policies and local restrictions set by the Government of Alberta under the Mines and Minerals Act, and any other legislation.

Under Alberta law, coal mining companies are responsible for reclaiming land that is disturbed by mining and the operation of related processing facilities. Standards for the reclamation are set by the provincial government. The underlying principle of the Mine Financial Security Program is that the Environmental Protection and Enhancement Act Approval holder is responsible for completing remediation and reclamation activities to the provincial standards and must maintain care-and-custody of the land until a reclamation certificate has been issued. The approval holder must have the financial resources to complete these obligations.

In 2016, RRCC received a letter from the Alberta Government which clarified the 1976 Alberta Coal Policy as it relates to RRCC. As is the case elsewhere in Alberta, the permitting of surface mining activities is subject to regulatory review and approvals. As such, RRCC will have to receive the necessary approvals before surface mining the shallower portions of the Ram River property.

The Ram River property comprises 18 tracts leased from the Alberta Department of Energy, as shown in the table below (source PFS 2017), and in Figure 4.2.

Legal Description of Coal Leases

Agreement No.	Lease Owner	Issue Date	Expiry Date	TT-RRWM	SS	LSD	Ha
1307030947	Ram River Coal Corp. (100%)	2007-03-18	2022-03-18	36-11W5	4,5,8,9	All	1055.2
1307030948	Ram River Coal Corp. (100%)	2007-03-18	2022-03-18	36-11W5	7,17,18,20	All	1054.8
1307030949	Ram River Coal Corp. (100%)	2007-03-18	2022-03-18	36-11W5 36-12W5	19,30 24,25	All All	1054.3
1307030950	Ram River Coal Corp. (100%)	2007-03-18	2022-03-18	36-12W5 37-12W5	35,36 1,2	All All	1053.2
1307030951	Ram River Coal Corp. (100%)	2007-03-18	2022-03-18	37-12W5	3,10,15	All	791.2
1307030952	Ram River Coal Corp. (100%)	2007-03-18	2022-03-18	37-12W5	11,12,13,14	All	1052.5
1307030953	Ram River Coal Corp. (100%)	2007-03-18	2022-03-18	37-12W5	24,25	All	525.9
1307070574	Ram River Coal Corp. (100%)	2007-07-12	2022-07-12	37-12W5 38-12W5	32,33 4,5	All All	1051.2
1307070575	Ram River Coal Corp. (100%)	2007-07-12	2022-07-12	38-12W5	6,7,8	All	786.5
1307070576	Ram River Coal Corp. (100%)	2007-07-12	2022-07-12	38-13W5	12,13,14	All	789.6
1307100741	Ram River Coal Corp. (100%)	2007-10-07	2022-10-07	38-13W5	25,26,35	All	1052.5
1307100742	Ram River Coal Corp. (100%)	2007-10-07	2022-10-07	38-13W5 39-13W5 39-13W5	33,34 2 3	All 1-11,14-16 1-10,12,13	968.4
1307100743	Ram River Coal Corp. (100%)	2007-10-07	2022-10-07	39-13W5 39-13W5 39-13W5	4 8 9	All 1,2,7-11, 13-16 2-7,12	565.8

Legal Description of Coal Leases

Agreement No.	Lease Owner	Issue Date	Expiry Date	TT-RRWM	SS	LSD	Ha
1307100744	Ram River Coal Corp. (100%)	2007-10-07	2022-10-07	39-13W5 39-13W5	17 18	2-6,12 1-3,5-16	350.3
1308020322	Ram River Coal Corp. (100%)	2008-02-01	2023-02-01	39-12W5 39-13W5	6 1	All All	540.9
1308020323	Ram River Coal Corp. (100%)	2008-02-01	2023-02-01	38-13W5	36	All	263.6
1308020324	Ram River Coal Corp. (100%)	2008-02-01	2023-02-01	38-12W5	14,15	All	528.6
1308020325	Ram River Coal Corp. (100%)	2008-02-01	2023-02-01	38-12W5	17-20	All	1050.2
1308020326	Ram River Coal Corp. (100%)	2008-02-01	2023-02-01	38-12W5	21,22,27,28	All	1050.0
1308020327	Ram River Coal Corp. (100%)	2008-02-01	2023-02-01	38-12W5	29-32	All	1055.6
1308030774	Ram River Coal Corp. (100%)	2008-03-13	2023-03-13	38-11W5 38-11W5 38-11W5 38-12W5	5,6 7 8 1	All 1-9, 12,13,16 1-8,9-14 1,7-10, 15,16	1051.9
1308030775	Ram River Coal Corp. (100%)	2008-03-13	2023-03-13	37-12W5	22,23,26,27	All	1052.0
1308030776	Ram River Coal Corp. (100%)	2008-03-13	2023-03-13	37-12W5 38-12W5	34,35 3	All 1-14	754.7
1308030777	Ram River Coal Corp. (100%)	2008-03-13	2023-03-13	38-12W5	9	3-6,11-13	116.0
1308030778	Ram River Coal Corp. (100%)	2008-03-13	2023-03-13	38-12W5 38-12W5 38-12W5	11 12 13	9-11,13-16 1,2,7-16 1-8,11-13	492.3

Note: Lease areas include township

An additional 1,400 Ha are held under Preferential Right Lease Applications, (applied for lands) as shown in the following table.

Agreement No.	Lease Owner	TT-RRWM	SS	LSD	Ha
A13-7301790-01	Ram River Coal Corp. (100%)	35-11W5 35-11W5 36-11W5 36-11W5	28 33,34 9 10	11-14 All 3-6,11-14 3-6	448.5
A13-7301800-01	Ram River Coal Corp. (100%)	35-11W5 35-11W5	28 33	11-14 All	321.4
A13-7301830-01	Ram River Coal Corp. (100%)	36-12W5	13	1,8-10,15,16	96.7
A13-7301840-01	Ram River Coal Corp. (100%)	36-12W5	26	1,2,7-10,15,16	128.5
A13-7437040-01	Ram River Coal Corp. (100%)	38-12W5 38-12W5	9 16	14,15 All	286.8
A13-7437050-01	Ram River Coal Corp. (100%)	38-12W5	10	15,16	32.2
A13-7440420-01	Ram River Coal Corp. (100%)	38-12W5 38-12W5	10 11	7-10 5,6,12	112.0
A13-7440440-01	Ram River Coal Corp. (100%)	38-13W5	23	1,2,7-16	192.4
A13-7440450-01	Ram River Coal Corp. (100%)	38-13W5	13	All	254.4
A13-7619020-01	Ram River Coal Corp. (100%)	38-13W5 38-13W5	22 28	9-16 1,2,7-16	319.6
A13-7631530-01	Ram River Coal Corp. (100%)	38-12W5	23	1-7,11,12	143.8
A13-130159401	Ram River Coal Corp. (100%)	38-13W5 38-13W5	22 23	7,8 3,4,5,6	96.7

Note: Lease under application areas include township road allowance.

The RRCC lease applications are contiguous with the acquired coal leases and the Alberta Coal Policy application process is non-competitive which provides coal lease holders with reasonable confidence that applications will progress to coal leases. As a

result, for the purposes of estimating resources, BOYD has deemed that both coal leases and coal leases under application are equivalent.

4.4 Royalties

In addition to annual rent, bituminous coal mines in Alberta Province are subject to a two-tiered Crown royalty. The first tier is imposed until a mine pays off its initial capital expenditures for mine development and construction and is assessed at a rate of 1% of mine-mouth revenue. The second tier applies after the initial capital payback is achieved and has a rate of 1% of mine-mouth revenue plus 13% of net revenue. Certain tracts are also subject to overriding royalties[2], which are paid in addition to Crown royalties.

BOYD understands two privately held royalties are in place in relation to the Ram River Project leases. The first, to Imperial Metals relates to the majority of the North Block area (Lease numbers 1308020323 -1308020327) which are subject to an annual payment of CAD$6,000 and production royalty of CAD$0.12/clean tonne. The second, to Fraser Exploration relates to portions of the South Block area (Lease numbers 1307070574 -1307070576) which are subject to an annual payment of CAD$6,000 and production royalty of CAD$0.07/clean tonne.

4.5 Environmental Liabilities

To BOYD's knowledge, no environmental liabilities exist for the project. Previously identified relatively minor costs associated with any remaining reclamation of the 2013 exploration program drilling pads and drilling access roads are understood to be completed, and no further activities have been undertaken.

4.6 Permitting

No mining related permits are currently approved or applied for the Ram River property.

The Ram River property contains some areas in the vicinity of the Ram River that are classified as critical wildlife habitat, in which land use is limited due to the potential to adversely affect animal populations. Coal exploration and development is subject to stricter controls within these areas. Figure 4.3 shows the wildlife sensitive areas across the project area.

[2] Overriding royalty rates based on descriptions found in "Ram River Exploration Report" dated May 1981 by CONSOL.

Following this page are:

Figures

4.1: Project Location Map
4.2: Coal Leases Map
4.3: Wildlife Sensitive Areas Map

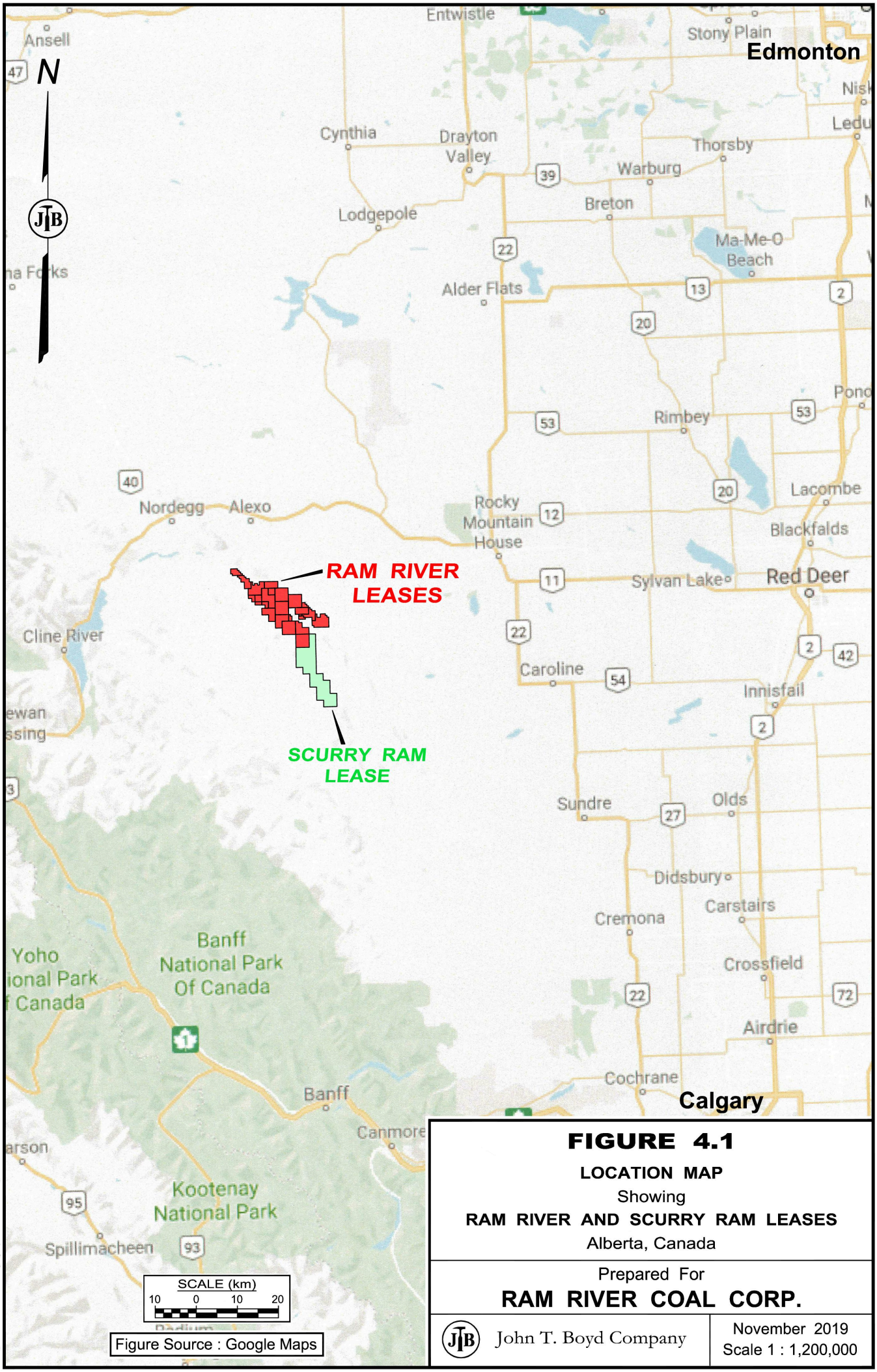

FIGURE 4.1

LOCATION MAP

Showing

RAM RIVER AND SCURRY RAM LEASES

Alberta, Canada

Prepared For

RAM RIVER COAL CORP.

John T. Boyd Company

November 2019

Scale 1 : 1,200,000

Q:\CAD_GROUP–jfg\5184.000\FIGURE 4.1.DWG

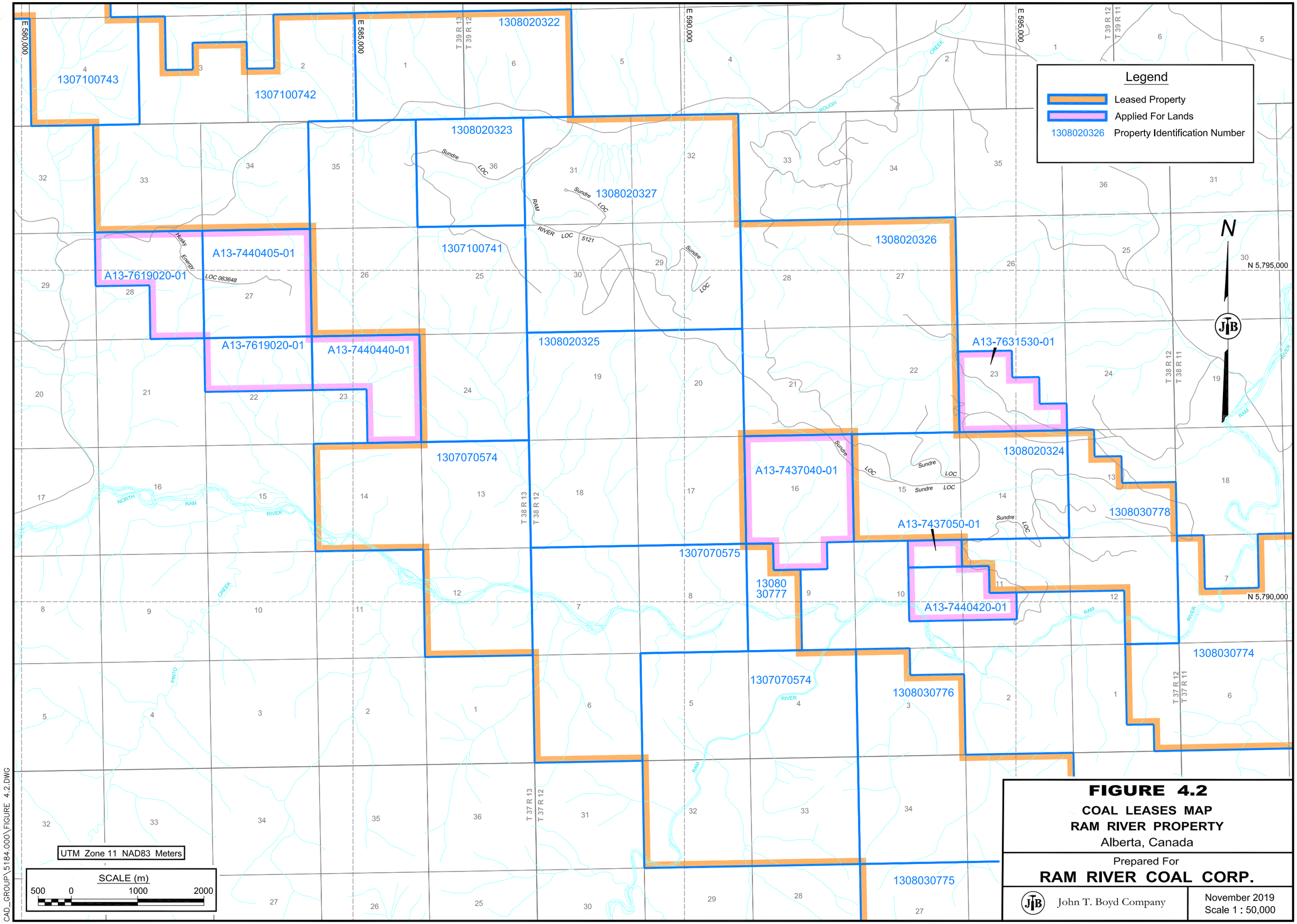

FIGURE 4.2

COAL LEASES MAP

RAM RIVER PROPERTY

Alberta, Canada

Prepared For

RAM RIVER COAL CORP.

John T. Boyd Company

November 2019

Scale 1 : 50,000

CAD_GROUP\5184.000\FIGURE 4.2.DWG

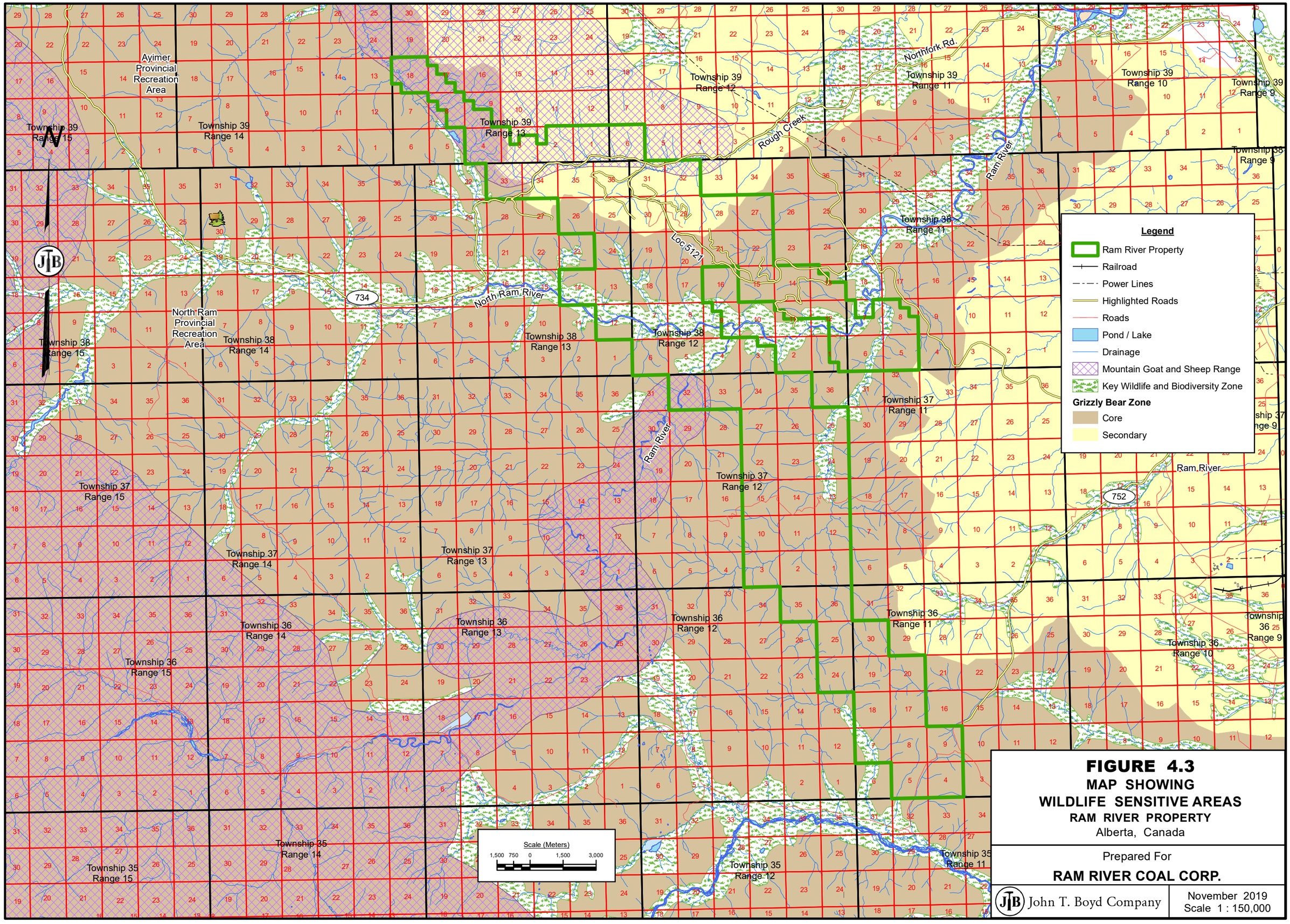

FIGURE 4.3
MAP SHOWING
WILDLIFE SENSITIVE AREAS
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 150,000

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5.0 ACCESSIBILITY, CLIMATE, INFRASTRUCTURE, AND PHYSIOGRAPHY

5.1 Property Access

The property is within a developed region with a history of agriculture, forestry, and oil and gas activity. Primary access roads to the Ram River property are:

- Clearwater County – North Fork road, which is located in the northern portion of the property and meanders west to east. The Northfork road ties into Highway 752 approximately 30 km from the Ram River property boundary.
- Sundre Forest Products logging road (Sunpine Mainline Road) runs north to south along the eastern boundary of the property and provides access from the east.
- Sunpine Mainline Road ties into the secondary paved highway designated as Highway #752 approximately 25 km from the southern boundary of the Ram River property. The junction of the Sunpine and #752 highway is approximately 5 km east of Strachan.
- A series of unimproved secondary roads and jeep trails provide access to the majority of the areas within the Ram River property.

The nearest residential and service center is the town of Rocky Mountain House, 45 km northeast and the city of Red Deer located 84 km to the east of Rocky Mountain House.

The existing railway line (managed by CN rail) runs through the nearby hamlet of Strachan (approximately 30 km from the site) and extends southwest to the Keyera and Husky gas plants. This railway line ties into the CN mainline system in Alberta and provides access to coal terminals on the west coast of British Columbia.

5.2 Climate

The average daily high temperatures are above freezing nine months of the year while low temperatures drop below freezing for seven months of the year. Snowfall averages over 2.5 m per year. Although Canadian mines normally operate in below freezing weather, production could be impacted during winter months, mainly due to mine site accessibility by the mine personnel.

Existing mines construct their surface facilities, including the coal preparation plant, to operate in the lower temperatures experienced during the winter season in western Canada.

The following table shows the annual variation in temperature and precipitation (source PFS 2017):

	Jan	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Avg. High (°C)	-4.1	-2.7	3.2	10.5	16.0	19.4	21.3	20.9	16.1	11.2	1.1	-3.8
Avg. Low (°C)	-18.0	-16.4	-9.9	-3.4	1.7	6.2	8.0	7.0	1.8	-3.2	-11.8	-17.2
Daily Mean (°C)	-11.1	-9.6	-3.4	3.6	8.9	12.8	14.7	14.0	9.0	4.0	-5.3	-10.5
Record Low (°C)	-41.0	-44.1	-37.1	-27.2	-7.5	-2.0	0.2	-4.1	-9.6	-3.0	-38.7	-43.7
Precipitation (mm)	18.4	14.3	17.3	25.1	66.7	88.4	107.1	68.1	20.1	26.5	18.8	18.5

5.3 Infrastructure

The Ram River, North Ram River, and numerous tributaries provide ample sources of water for use in mining and coal preparation (subject to obtaining necessary government water removal approvals). A high-voltage power transmission line runs along the eastern boundary of the property, providing access to electricity.

5.4 Physiography

The surface elevation on the Ram River property ranges from 1,250 m to 1,700 m in the Target area (North Block), and average relief is 120 m. Figure 5.1, following this text, shows the Ram River coal project topography. The North Block displays gentler hills than in the south. Rough Creek forms the northern border of the area. The South Block averages 100 m relief in the southern half and is steeper with 200 m relief in the central and northwest areas.

The primary drainage system for the property is the Ram River and its tributaries. The Ram River runs in a west-east direction along the southern boundary of the Ram River property. The primary tributaries to the Ram River are the North Ram River which crosses the southern portion of the South Block, and Rough Creek located at the northern boundary of the property. The confluence of North Ram River and Ram River is located in the southeast section of the property.

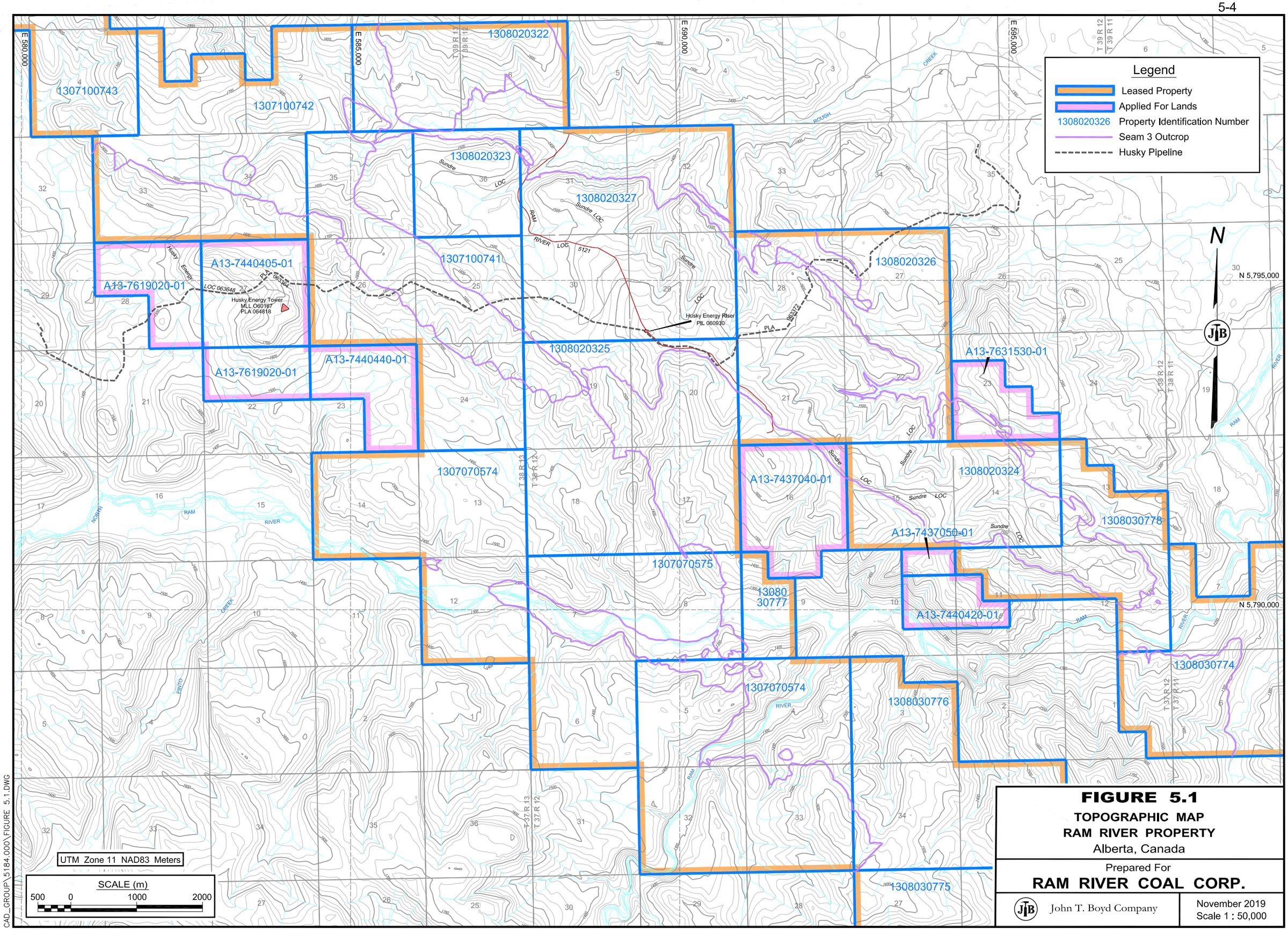
The property is in a transitional region between the Rocky Mountain region of Alberta, Southern Prairie, and the Boreal forests to the north and east. Vegetation is characterized by a mix of deciduous trees such as aspen, poplar, willow, and conifers. Occasional wetlands are encountered in the low-lying areas. Figure 5.2 shows an aerial image of the surface features and vegetation coverage across the property.

Following this page are:

Figures

5.1: Topographic Map

5.2: Aerial Image Map



CAD_GROUP\5184.000\FIGURE 5.1.DWG

FIGURE 5.1

TOPOGRAPHIC MAP
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

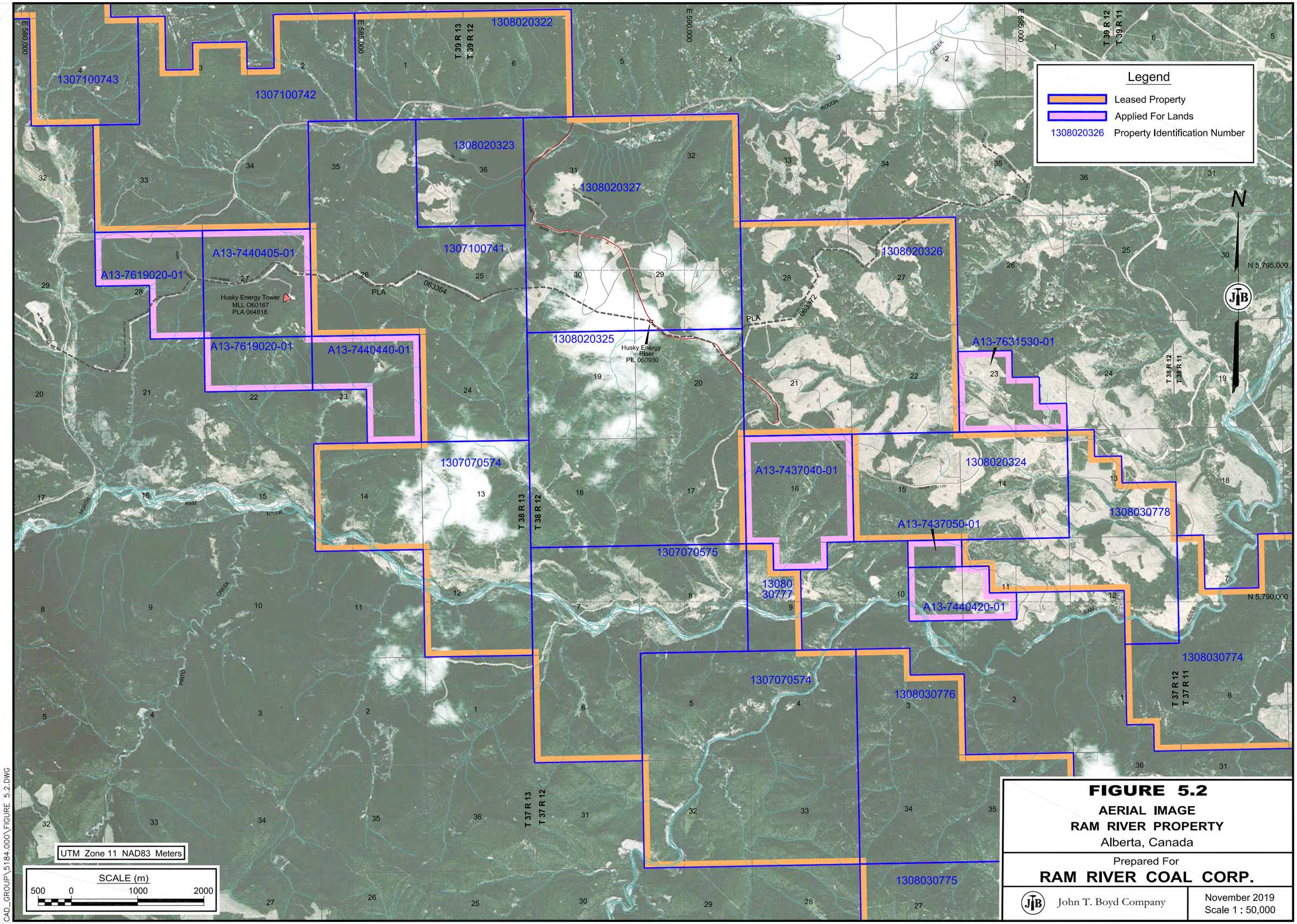


FIGURE 5.2

AERIAL IMAGE

RAM RIVER PROPERTY

Alberta, Canada

Prepared For

RAM RIVER COAL CORP.

John T. Boyd Company

November 2019

Scale 1 : 50,000

CAD_GROUP\5184.000\FIGURE 5.2.DWG

6.0 HISTORY

6.1 Prior Ownership

Coal is owned by the Crown and in the case of the Ram River property, administered by the provincial government of Alberta. The previous lessee was CONSOL through various subsidiaries and affiliates. CONSOL formed the Ram River property by combining four separate adjoining coal holdings.

The first tract was acquired from Fraser Exploration in October 1969. Additional properties were acquired from TIFCO Exploration and TVI Mining & Rio Alto Exploration in early 1970. CONSOL obtained the remaining tracts directly from the Province of Alberta in 1970. All the properties were unexplored prior to acquisition by CONSOL

In 2012, RRCC acquired the Ram River (and Scurry Ram) metallurgical coal properties from CONSOL, forming the current RRCC property.

6.2 Previous Exploration

Initial geological exploration in the region was conducted in the early 1900s by the geological survey of Canada (Dowling, 1906, 1907). Early coal exploration was concentrated around Nordegg, located approximately 30 km northwest of the Ram River property. Nordegg underground coal mine commenced production in 1914 and continued until closure in 1955. During the 1950s and 1960s numerous studies dealing with various aspects of regional or local stratigraphy, developed the understanding of the coal bearing formations of the Ram River property (Erdman, 1950, Douglas, 1955, Mellon, 1967).

In 1970, CONSOL assembled the Ram River leases and commenced exploration to evaluate the coal resources within property. Over several exploration programs from 1970 to 1975, 423 drill holes, detailed surface mapping, and numerous studies were reported (Fishel, 1971; Plachner and Sutton, 1975).

In 1976, the property's exploration focus took an abrupt change, with the Alberta Government's classification of the area in Category 2 under the Coal Development Policy for Alberta. In response, CONSOL applied for and was granted underground test mine permits from the Energy Resources Conservation Board of Alberta (ERCB).

From 1980 to 1981, CONSOL drill programs completed 66 drill holes to assess the underground development and mining approach for the property.

CONSOL slowly proceeded towards conceptual development of a mining approach for the property, completing an internal report on the feasibility of underground mining for the property in 1989. The report suggested that in the absence of exploration commitment, CONSOL “renew and hold the leases while allowing additional time to find opportunities to make Ram River a viable project”. No further exploration was reported by CONSOL on the property.

Prior to RRCC acquiring the Ram River property exploration totalled 488 drill holes. The drilling activities are discussed in Chapter 10. Figure 6.1, following this text, shows drill hole locations across the property. Previous exploration was concentrated throughout the North Block. The South Block areas are explored to a lesser extent. Exploration program drill holes are summarised in the table below:

Year	No. of Drill Holes	Approx. Aggregate Meters Drilled
1970-71	43	5,125
1973	83	6,289
1974	85	7,923
1974-75	212	20,200
1980	22	3,615
1981	44	6,531
2012	13	826
2013	106	11,465
Total	608	61,974

6.3 Historical Resource and Reserve Estimates

6.3.1 CONSOL

A report titled “Ram River Project – Preliminary Feasibility” was prepared in June 1974 by CONSOL and was written by Dave Hughes and Paul Daniells. This report included an estimate of surface-mineable reserves (resources) based on exploration conducted prior to June 1974. The estimates were prepared by a well-known and successful mining company based on information obtained from drilling it conducted itself. Based on information available at that time (i.e., 1974), the mean thickness of the No. 3 Seam was assigned at 3.8 m and the No. 2 Seam at 3.5 m. The estimate was further based on the following assumptions:

- No. 2 Seam is mined past the outcrop line of No. 3 Seam.
- Preparation plant recovery yield of 76%.
- 10% pit loss.
- 45-degree highwall slope.
- A +10% contingency was added to the overburden volume for stripping ratio calculations.
- Drillhole spacing is sufficient for all tonnes to be classified as indicated.

The results of the 1974 reserve estimate (shown in the alternative based on the maximum overburden depth) are below. This estimate did not exclude oxidized coal near the outcrop. BOYD has not done sufficient work to classify these historic estimates as current mineral reserves and does not consider this to be an estimate of current mineral reserves.

1974 Surface-Mineable Reserves at 1.55 Float

Maximum Overburden (m)	Overburden Volume (000-m3)	Raw Coal (000-tonnes)	Clean Coal (000-tonnes)	Raw Ratio	Clean Ratio
61	1,051,899	145,681	100,520	7.22	10.46
58	966,722	137,600	94,944	7.03	10.18
55	881,402	128,162	88,432	6.88	9.97
52	807,061	122,212	84,326	6.60	9.57
49	742,993	116,447	80,349	6.38	9.25
46	680,818	111,060	76,632	6.13	8.88
43	626,742	106,659	73,594	5.88	8.52
40	574,214	99,595	68,721	5.77	8.36

The results of the 1980 reserve estimate follow. BOYD has not done sufficient work to classify these historic estimates as current mineral reserves and does not consider this to be an estimate of current mineral reserves.

1980 Underground Mineable Reserves (000-saleable tonnes)

	No. 3 Seam		No. 2 Seam		Total	
Tract No.	Indicated	Inferred	Indicated	Inferred	Indicated	Inferred
409-019	-	283	-	153	-	436
409-020	1,823	-	1,039	-	2,862	-
409-021	3,918	1,930	2,755	1,181	6,673	3,110
409-022	7,544	-	5,594	-	13,138	-
409-023	205	-	178	-	383	-
409-024	2,939	-	2,366	-	5,306	-
409-006*	-	128	-	89	-	217
409-027	2,754	-	1,402	-	4,156	-
409-028	55	-	44	-	99	-
Total	19,238	2,341	13,378	1,423	32,616	3,764

*Lands held under a Preferential Rights Lease Application

These 1980 estimates were prepared by CONSOL based on its 1980 drilling program. This reserve estimate was calculated manually using coal isopach maps. The estimate is further based on the following assumptions:

- Preparation plant recovery of 72%.
- 30% underground mining recovery.
- Reserves are based only on exploration in the listed tracts.
- Coal density of 1.36 g/cm^3.

By 1982, the property was more extensively explored, and the estimated reserves greatly increased. A summary of the 1982 estimate follows and was based on the following assumptions:

- 55% reserve recovery due to a combination of longwall and hydraulic mining.
- Minimum coal thickness of 1.52 m.
- Coal density of 1.40 g/cm^3 for No. 3 Seam and 1.43 g/cm^3 for No. 2 Seam.
- No adjustment was proposed for preparation plant losses (the reserve estimate shown below does not represent saleable product).

1982 Underground Mineable Reserves (000-tonnes)

	No. 3 Seam		No. 2 Seam		Total	
Tract No.	Measured	Inferred	Measured	Inferred	Measured	Inferred
409-019	-	12,053	-	6,260	-	18,313
409-020	5,187	1,900	3,562	4,298	8,749	6,198
409-021	19,950	-	11,897	-	31,847	-
409-022	20,976	-	19,652	-	40,628	-
409-023	729	-	462	-	1,191	-
409-024	7,823	-	5,918	-	13,741	-
409-015	-	4,874	-	3,417	-	8,291
409-016	-	10,785	-	7,030	-	17,815
409-017	-	10,220	-	7,760	-	17,980
409-027	5,736	10,282	6,266	4,426	12,002	14,708
409-028	198	1,862	156	1,353	354	3,215
409-005	-	3,715	-	2,767	-	6,482
409-004	-	81	-	-	-	81
409-006*	-	333	-	475	-	808
409-009*	-	1,026	-	582	-	1,608
Total	60,599	57,131	47,913	38,368	108,512	95,499

*Lands held under a Preferential Rights Lease Application

BOYD has not done sufficient work to classify the 1982 historic estimates as current mineral reserves and does not consider this to be an estimate of current mineral reserves.

6.3.2 Ram River

Resource estimates for the Ram River property have been completed on a number of occasions since RRCC acquired the property in 2012.

In 2013, BOYD completed a resource estimate for the Ram River property, in accordance with NI 43-101. The 2013 estimate was based on historical data and coal quality results from the 2012 bulk sample. An underground mineable resource (Measured and Indicated) of 359 Mt of medium-high volatile bituminous coal was reported. A separately reported estimate of 53 Mt of open cut resources was made.

In 2017, Norwest completed a PFS on part of the Ram River property (the Aries Project). The technical report included resources estimates across the whole Ram River property, and was reported in accordance with NI 43-101. The resource estimate was based on 2013-2014 exploration results. An underground and surface mineable resource (Measured and Indicated) of 414 Mt was reported.

6.4 Production History

There has been no coal produced on this property as at the effective date of this report.

Following this page is Figure 6.1, Drill Hole Location Map.

U:\BOYD_PROJECTS\5184.000 Ram Coal - Stratigraphic Model and Resource Estimation\BOYD Reports\Final\6.0 History.docx

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000

N

JTB

Legend

- Leased Property
- Applied For Lands
- 74-RR-291 — Drill Hole Locations
- 81-RR-DDH4 — Core Hole Locations
- Bulk Sample Locations
- Seam 3 Outcrop

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 6.1

DRILL HOLE LOCATION MAP
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

CAD_GROUP\5184.000\FIGURE 6.1.DWG

7.0 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The Ram River property is located in the eastern foothills of the Canadian Rocky Mountains, Central Mountains and Foothills regions of Alberta. The property is associated with a regional thrust block of Mesozoic strata. The block is thrust over Tertiary strata to the east of the property, and in turn, Palaeozoic strata is thrust over to the west of the property. Figure 7.1, following this text, illustrates the regional geology.

7.2 Stratigraphy

Coal seams of economic interest are found within in the Lower Cretaceous Gates Formation of the Luscar Group. Figure 7.2 shows the coal formation in relation to the Alberta Table of Formations. The regional stratigraphic sequence associated with the property is summarized below:

- Till and unconsolidated sediments.
- Brazeau Formation.
- Alberta Group.
- Luscar Group (including Ram River coal seams).
- Nikanassin Formation.
- Fernie formations.

The nomenclature of the units presented is consistent with the Alberta Table of Formations, which was released by the Alberta Geological Survey in May 2019. Each of the above-mentioned units are described in the following subsections in decreasing stratigraphic order.

7.2.1 Till and Unconsolidated Sediments (Quaternary)

The property area is covered with a thin layer of unconsolidated quaternary till, alluvial sediments, and soil. The unconsolidated quaternary sediments range in thickness from 0 m to 30 m, with a typical thickness of 3.7 m. The unit typically thins to less than 1 m across topographic ridges and thickens to greater than 7 m in streams and valleys.

7.2.2 Brazeau Formation (Upper Cretaceous)

Brazeau Formation is the youngest and uppermost Cretaceous formation associated with the Ram River stratigraphic sequence. The formation outcrops to the east of the property area and overlies the Alberta Group formations.

The Brazeau Formation is composed of sandstone, laminated siltstone, and olive-green mudstone. The lower part of the Brazeau Formation is characterized by chert-and quartzite-bearing, granular to pebble conglomerate intervals. This interval is overlain by greenish-grey to dark grey mudstone, siltstone, and greenish-grey sandstone, thin coal to coaly shale beds. There are numerous thin bentonite layers in the upper part of the sequence (Prior, 2013).

7.2.3 Alberta Group (Upper Cretaceous)

The Alberta Group unconformably overlies the Luscar Group and underlies the Brazeau Formation. The Alberta Group contains three formations:

- Wapiabi Formation: The Wapiabi Formation is the uppermost formation of the Alberta Group. The marine Wapiabi Formation is dominantly composed of shale, mudstone, silty shale, argillaceous siltstone, and siltstone that at times is calcareous, platy. Sandstones of the Chungo and Marshybank Members are present in the upper and lower parts, respectively (Prior, 2013).
- Cardium Formation: The marine Cardium Formation is the mid formation of the Alberta Group. The Cardium Formation is composed of thickly bedded to massive quartz sandstone, silty sandstone, siltstone, shale and pebble conglomerate (Prior, 2013).
- Blackstone Formation: The Blackstone Formation is the lowermost formation of the Alberta Group. The Blackstone Formation is up to 530 m thick (Stott, 1963), however, is typically recessive, with the only complete exposure being observed along the South Ram River (Dawson, 1989). The formation is characterized by shale that ranges from silty to calcareous, siltstone intervals that contain bentonite, and thin lenticular sideritic beds. The shale is commonly fissile to platy and contains locally prominent bedding. The uppermost sequence commonly contains sideritic nodules (Prior, 2013). The lower portion of the Blackstone Formation contains a sandstone interval; commonly a pebble layer at the base of the sequence.

7.2.4 Luscar Group (Lower Cretaceous)

The Luscar Group contains marginal marine to non-marine units that were derived from the Columbian Orogen during the Lower Cretaceous (Dawson, 1989). The Luscar Group is a lateral equivalent to the Blairmore Formation. The Luscar Group in west-central Alberta is approximately 400 m thick and comprises four formations, Gates, Moosebar, Gladstone and Cadomin formations (Langenberg and McMechan, 1985). Figure 7.3 shows a representative stratigraphic column of the Ram River property:

- Gates Formation: The Gates Formation is the uppermost formation of the Luscar Group, and includes the coal seams of economic interest to the Ram River coal property. Three members are recognised; Mountain Park, Grande Cache, and Torrens Members.
  - *Mountain Park Member* is a thick sequence of fluvial interbedded, fine grained sandstone and mudstone, with minor carbonaceous beds. Commonly the rocks

have a greenish colouration that is attributed to the abundance of feldspar in the unit (Dawson, 1989). Typically, thin coal beds only occur at the top of the unit, with the rest of the interval being barren. The Mountain Park Member is approximately 150 m to 200 m thick. The base of the unit is typically represented by a thick, massive, greenish grey, cliff forming sandstone (Dawson, 1989). The upper contact is unconformable and commonly distinguished by a pebble conglomerate that varies in thickness from 10 cm to 6 m (Dawson, 1989).

- *Grande Cache Member* is composed of mudstone, carbonaceous siltstone, fine-grained sandstone and thick coal seams. The rocks contain a high felspathic component, which assists with differentiating the unit during outcrop mapping (Dawson, 1989). The Grande Cache Member in the property area is approximately 110 m thick and contains up to six coal zones, of which Zone 2 and Zone 3 are the thickest.
- *Torrens Member* is the lowermost interval of the Gates Formation and contains fine-grained sandstone with minor intervals of pebble conglomerate. The depositional environment of the Torrens Member is interpreted as marine shoreface to beach.

- Moosebar Formation: The Moosebar Formation is generally a dark grey shale that contains sideritic concretions. Platey, siltstone layers occur thought out the unit, with the highest abundance occurring in the upper portion of the sequence (Prior, 2013). The top of the Moosebar Formation is represented by a thin mudstone unit that lies immediately above a 15 m to 20 m thick conglomeratic sequence. Commonly a pebble lag bed is present at the base of the unit. Within the region, the Moosebar Member is less than 65 m thick and represents a marginal marine depositional environment (Dawson, 1989).

- Gladstone Formation: The Gladstone Formation conformably overlies the Cadomin Formation. The lower portion of the Gladstone Formation is composed of a fine-grained sandstone, siltstone, and mottled green and maroon shale that contains sideritic concretionary layers. The sandstone beds are resistant in outcrop and are distinctive by the weathered quartz sheen (Dawson, 1989). The depositional environment of the lower sequence is interpreted to be non-marine. The upper part of the sequence contains green-grey, fossiliferous, calcareous, fine-grained sandstone, shale and coquina. The Gladstone Formation is approximately 75 m thick. The depositional environment of this upper sequence is interpreted as marginal marine (Prior, 2013). The top of the Gladstone Formation is gradational with the base of the Moosebar Formation.

- Cadomin Formation: The base of the Luscar Group is the Cadomin Formation, which has a sharp unconformable lower contact with the Nikanassin Formation (Dawson, 1985). The Cadomin Formation is characterized as an erosion-resistant chert- and quartzite-pebble conglomerate that is interbedded with fine- to coarse-grained quartz sandstone, siltstone, and commonly carbonaceous mudstone (Prior, 2013). The Cadomin Formation is interpreted as an alluvial and pediment deposit. The Cadomin Formation varies from 5 m to 15 m in thickness in the region, and forms distinct resistant units in outcrop (Dawson, 1989).

7.2.5 Nikanassin Formation (Upper Jurassic to Lower Cretaceous)

The Nikanassin Formation overlies the Fernie Formation. The Nikanassin Formation is composed of dark grey mudstone, fine-grained sandstone, and intermittent carbonaceous shale. Minor, thin, impure coal layers occur in the upper part of the sequence (Prior, 2013). The formation is interpreted as marine in the lower portion of the sequence, which grades to a marginal marine to coastal plain sequence in the upper portion of the sequence.

7.2.6 Fernie Formation (Jurassic)

The Fernie Formation is composed of shale, limestone, siltstone, sandstone, and intermittent chert conglomerate at the base (Prior, 2013). The shale grades from grey to black and is weakly to strongly fissile. The limestone contains phosphatic, cherty, and oolitic varieties. Some of the sandstone is phosphatic. The Fernie Formation is interpreted as a marine sequence.

7.3 Structural Geology

The Ram River property is regionally dominated by the northwest-trending thrust faulting and folding associated with the Alberta Rocky Mountains, Central Mountains and Foothills region. Mesozoic strata of the property are thrust over Tertiary strata to the east of the property along the Brazeau Thrust and associated faults. In turn, Palaeozoic strata is thrust over the Mesozoic strata along the McConnell Thrust and associated regional faults to the west of the property.

Within the Ram River property structures are relatively mild consisting of northwest-trending folding and thrust faulting. Figure 7.4 shows a representative cross section of the Ram River property. Local faulting and folding contributes to the major seams being fragmented, soft, and friable due to in-seam deformation. Figure 7.5, Structural Features Plan, shows folds and faults for the property area. Figure 7.6 shows the Seam 3 structure roof contours in elevation.

7.3.1 Folding

The Ram River anticline is the prominent structure in the property area. The Ram River anticline divides the property into two coal-bearing limbs which form synclinal basins. Each limb has a gentle syncline, following with the regional trend. The synclinal axis in the South Block plunges gently to the northwest. The North Block forms an elongated basin feature within the northwestern portion of the base of the syncline, then in the southeastern portion of the North Block the synclinal axis plunges to the southeast. The synclinal flanks dipping into the basin exhibit dips of 10 degrees to 30 degrees.

Erosion has removed the coal measures in the immediate vicinity of the anticlinal axis, resulting in the two separate blocks. Geologic conditions are similar in the two synclinal resource blocks. In the North Block, Seam 3 depth varies from the seam

subcrop to a maximum of between 150 m and 200 m, and averages 103 m. In the South Block, Seam 3 depth increases to a maximum of 250 m to 550 m, with an average depth of 215 m.

7.3.2 Faulting

Ten thrust faults have been identified across the property in previous studies. The faults have a northwest-trending strike, southwest dip direction and are typically associated with the anticlinal axes. A series of parallel thrusts (F1, F2, F2B, F3) separated by approximately 400 m encroach on the eastern limb of the North Block syncline. Vertical displacement of the thrusts is estimated as typically 20 m to 30 m, but may exceed 100 m in places along Fault F1.

7.4 Coal Seam Stratigraphy

Coal seams of economic interests within the Ram River property are from the Luscar Group - Gates Formation - Grande Cache Member. Up to six coal seams and coaly zones are typically recognized, with Seam 2 and Seam 3 typically well developed, and the primary focus. Figure 7.3, Representative Stratigraphic Column, and Figure 7.4, Representative Cross Section, show the coal seam stratigraphy for the Ram River property. The character of each seam and level of drill hole control is summarised in the following table:

Seam	Code	Intersections	Description
6	S6	23	Only recognized in limited number of holes, Typically 0.4 m thick. Currently considered as inferior coal marker band. Possible trend to 0.7 m thick in the east North Block. Often not picked on logs and has not been a focus of correlation work.
5	S5	92	Thin coal seam, typically 0.4 m thick, localised thickening to 0.6 m. Widely distributed but often not picked on logs and has not been a focus of correlation work. Mid-burden thickness is typically 15 - 20 m between seam 5 and 6.
4	S4	136	Inferior coal marker band, typically 0.5m. Mid-burden thickness is typically 20 – 25 m between seam 4 and 5.
3	S3	258	Thick stable well-developed coal seam. Typically 3.7 m thick, minor thin stone parting and inferior coal toward top. Mid-burden thickness is typically 40 - 50 m between seam 3 and 4.
2	S2R	204	Thin stable coal seam rider associated to the roof of Seam 2. Typically, 0.5 m thick, moderate to high ash character. Mid-burden thickness is typically 25 - 30 m between seam 2R and 3.
	S2	243	Thick stable well-developed coal seam. Typically, 2.3 m thick. Mid-burden thickness is typically 0.5m between seam 2 and 2R.
1	S1	147	Thin coal seam, typically 0.6 m thick, localised thickening to 1.0 m. Mid-burden thickness is typically 8 m between seam 1 and 2, thinning to less than 1 m northwest of North Block.

7.4.1 Seam 6

Seam 6 is the uppermost seam identified at Ram River. Limited information has been established for Seam 6, which has a reported seam thickness ranging from 0.1 m to 1.9 m, with unstable thickness typically 0.4 m. The seam has 23 interpreted drill holes intersections in the Ram River database, widely distributed across the property. Interburden approximately 15 m to 20 m thick separates Seam 6 from the underlying Seam 5.

Lithologically, Seam 6 development varies from a single coal band to inferior coal band however limited details were available to establish the character. Seam 6 has not been a focus of previous work, and correlation work is at an early stage. The seam is considered to have low economic potential, primarily due to thickness.

7.4.2 Seam 5

Seam 5 is present as thin coal seam. The reported thickness ranged from 0.1 m to 1.5 m, with moderately stable thickness typically 0.4 m. Localised thickening trends to 0.6 m are present. The seam has 92 interpreted drill holes intersections in the Ram River database, widely distributed across the property. Interburden approximately 20 m to 25 m thick separates Seam 5 from the underlying Seam 4.

Lithologically, the seam is developed as a single thin coal band though limited details were available to establish the presence of partings. No testing of the seam is reported, however based on geophysical responses, the seam is likely to display similar properties to the other coal seams in the sequence, with average ash content of approximately 20% to 40% (ad). Seam 5 has not been a focus of previous work, and correlation work is required to reliably consider the coal seam character further.

As an independent target Seam 5 is considered to have low economic potential primarily due to thickness. Some limited economic potential may exist, if considered as part of overburden removal of deeper coal seams.

7.4.3 Seam 4

Seam 4 is present as a thin inferior coal seam to carbonaceous mudstone marker band. The reported thickness ranges from 0.1 m to 2.1 m, with an unstable thickness typically 0.5 m. The seam has 136 interpreted drill holes intersections in the Ram River database, widely distributed across the property. Interburden approximately 40 m to 50 m thick separates Seam 4 from the underlying Seam 3. The seam is considered to have low economic potential primarily due to both thickness and poor coal development.

7.4.4 Seam 3

Seam 3 is a primary seam target at the Ram River property. The reported thickness ranges from 0.9 m to 7.5 m, with stable thickness typically 3.7 m. Localised seam thickening and thinning associated with structure and subcrop is present. The seam has 258 interpreted drill holes intersections in the Ram River database, widely distributed across the property. The seam is notably absent from several drilling intersections in a small area in the southeast of the North Block. Seam 3 subcrop fully encloses the North Block syncline. Figures 7.7 to 7.9 show Seam 3 typical profile, thickness isopach and depth across the property area.

Lithologically, the seam is generally free of major stone partings. Minor partings of inferior coal, claystone and carbonaceous mudstone are present. In-seam parting thicknesses typically range from 0.05 m to 0.20 m thick, with increased frequency in in the upper portion of the seam. The lower 1.5 m portion of the seam is typically free from parting and displays superior quality. The seam coal lithotypes are reported as principally vitrain, with very minor durain bands irregularly spaced over the seam interval. No attempts to correlate plys within Seam 3 have previously been attempted.

The immediate roof overlying Seam 3 is massive bedded sandstone greater than 10 m thick, with distinct contact. In the far southeast of the North Block, a small area where Seam 3 is absent has been interpreted as a possible scour by the roof sandstone. Localised sections of gradational and finer grained and carbonaceous roof are present. The floor of Seam 3 is comprised of mudstone and siltstone. Seam 2 underlies Seam 3, separated by approximately 25 m to 30 m of interburden. Figure 7.10 shows Seam 3 to Seam 2 mid-burden thickness isopach across the property area.

7.4.5 Seam 2

Seam 2 is a primary seam targeted at the Ram River property. The seam is present as two plys: S2 and S2R. The upper S2R ply is a thin 0.5 m thick band of coal separated from the main S2 seam by a carbonaceous mudstone parting. The parting varies from less than 0.3 m to 3.1 m, with an average thickness of 0.5 m. The main S2 seam has a reported thickness ranges from 1.0 m to 4.9 m, with generally stable thickness typically 2.3 m. Localised seam thickening and thinning associated with structure and subcrop is present. The seam has 243 interpreted drill holes intersections in the Ram River database, widely distributed across the property. Figures 7.11 to 7.13 shows Seam 2 typical profile, thickness isopach and depth across the property area.

Lithologically, the upper S2R ply generally consists of vitreous to dull coal, inferior coal with thin mudstone partings. The main S2 seam is generally free of major stone parting. Minor parting of inferior coal, claystone and carbonaceous mudstone typically less than 0.1 m thick are present. The seam coal lithotypes are reported as principally vitrain, with very minor durain bands becoming increasingly common towards southern areas.

The immediate roof strata overlying Seam 2 is generally siltstone, sandstone or interbedded silty claystone and mudstone. Seam 2 roof strata is typically fractured with gradational contact with the seam. The floor of Seam 2 is comprised of silty-mudstone and silty-claystone, becoming more carbonaceous as Seam 1 coalesces. Seam 1 underlies Seam 2, separated by typically 7 m to 9 m of interburden. In the northwest of the North Block interburden to Seam 1 thins to less than 1 m. Figure 7.14 shows Seam 2 to Seam 1 mid-burden thickness isopach across the property area.

7.4.6 Seam 1

Seam 1 reported in the Ram River database is present as a thin coal seam. The reported thickness ranges from 0.2 m to 1.4 m, with moderately stable thickness typically 0.6 m. Seam 1 displays localised thickening to 1.0 m and is potentially discontinuous in areas. The seam has 147 interpreted drill holes intersections in the Ram River database, widely distributed across the property. Figure 7.11 shows the typical profile and Figure 7.15 shows the thickness isopach of Seam 1.

Lithologically, the seam is typically developed as a single banded, typically inferior coal seam. In places, associated coal bands each 0.5 m thick, interbedded with carbonaceous mudstone over an interval approximately 5 m thick are noted (refer drill hole 80-RR-DDH1). The seam coal primary lithotypes are reported as vitrain, clarain and durain, with durain predominate.

The immediate roof overlying Seam 1 is reported as extremely variable, from sandstone to claystone. The floor generally comprised medium grained, well cemented sandstone or silty mudstone.

As an independent target Seam 1 is considered to have moderate to low economic potential primarily due to thickness. Some economic potential may exist, if considered as part of extraction of overlying coal Seam 2.

Following this page are:

Figures

7.1: Alberta Geologic Map
7.2: Alberta Table of Formations
7.3: Representative Stratigraphic Column
7.4: Representative Cross Section
7.5: Structural Features Plan
7.6: Structure Roof Contours - Seam 3
7.7: Seam 3 Typical Profile
7.8: Seam 3 Isopachs
7.9: Seam 3 Depth Contours
7.10: Seam 3 to Seam 2 Midburden Isopachs
7.11: Seam 2 and 1 Typical Profiles
7.12: Seam 2 Isopachs
7.13: Seam 2 Depth Contours
7.14: Seam 2 to Seam 1 Midburden Isopachs
7.15: Seam 1 Isopachs

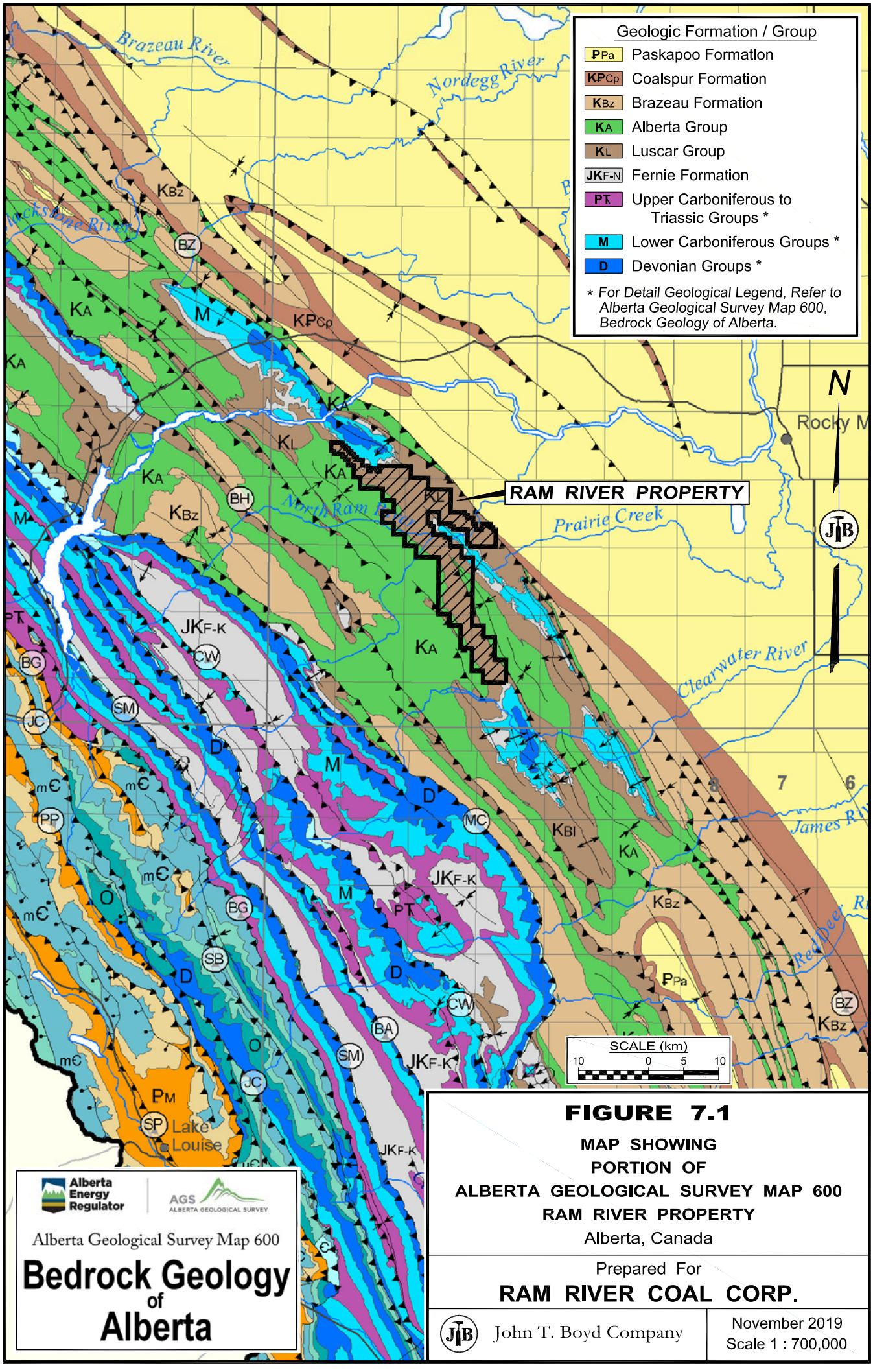


FIGURE 7.1

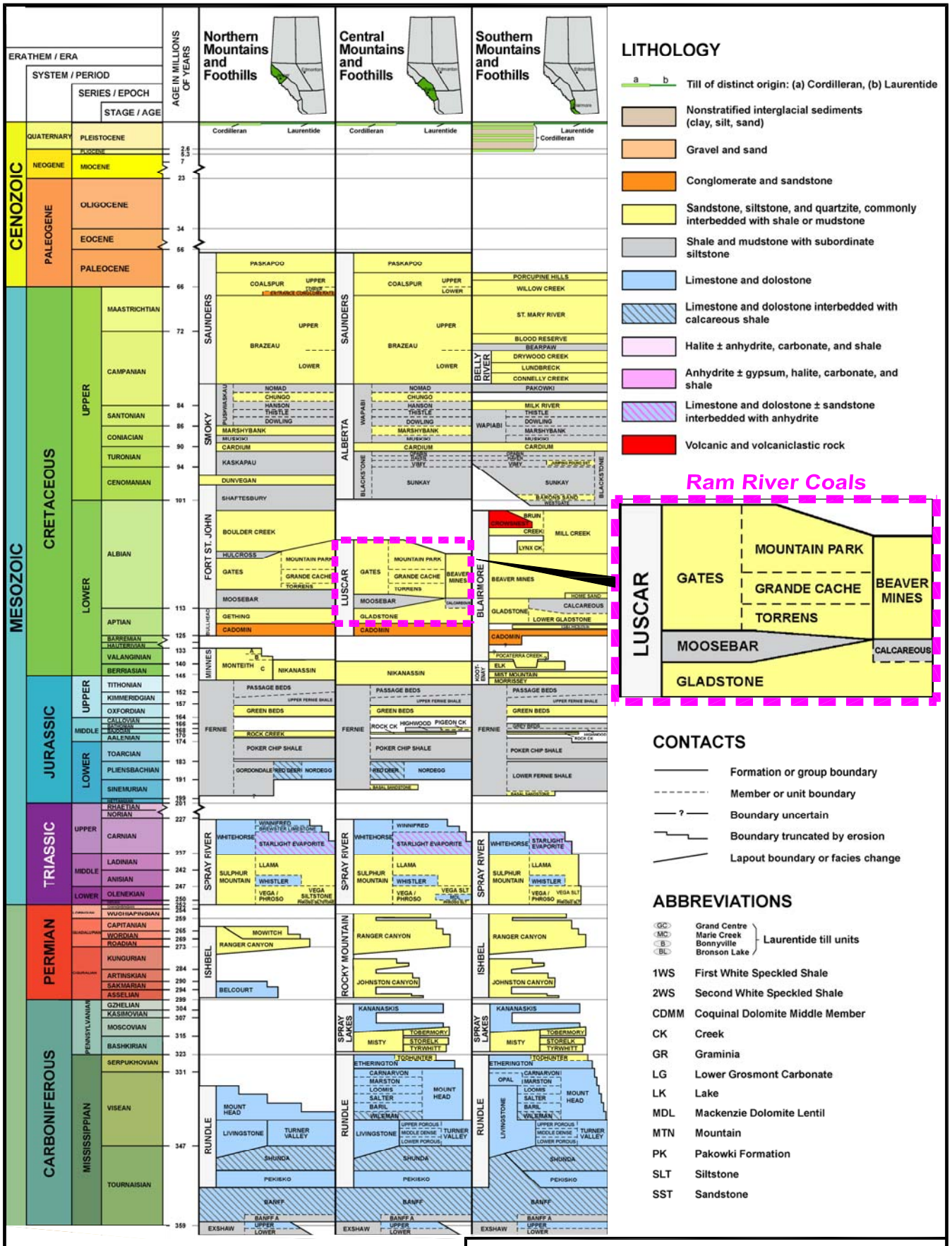
MAP SHOWING
PORTION OF
ALBERTA GEOLOGICAL SURVEY MAP 600
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 700,000

Q:\CAD_GROUP—jfg\5184.000\FIGURE 7.1.DWG



Alberta Energy Regulator

AGS ALBERTA GEOLOGICAL SURVEY

FIGURE 7.2

ALBERTA TABLE OF FORMATIONS (MAY 2019)
RAM RIVER PROPERTY
Alberta, Canada

Prepared For

RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
No Scale

Q:\CAD_GROUP-jfg\5184.000\FIGURE 7.2.DWG

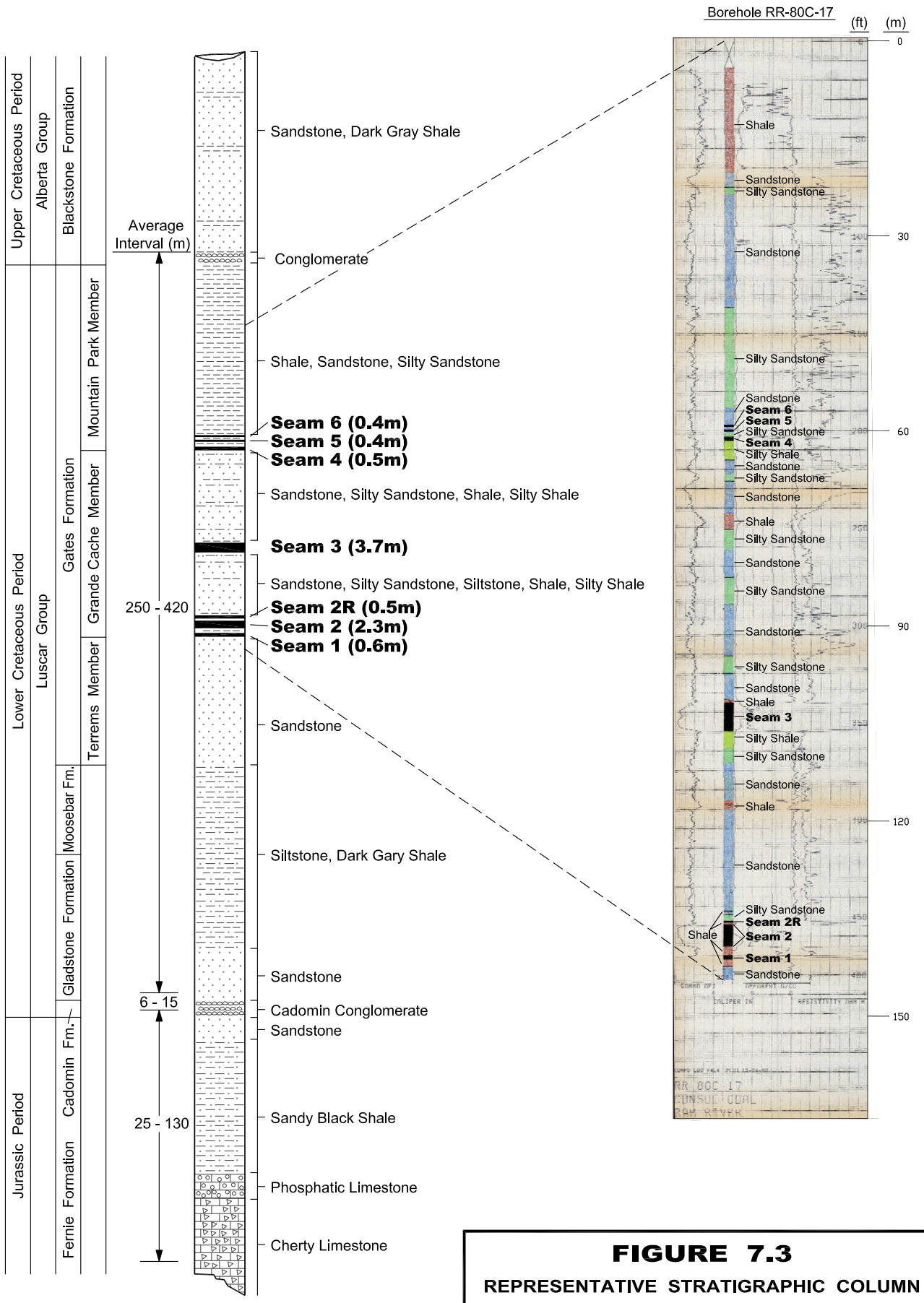


FIGURE 7.3

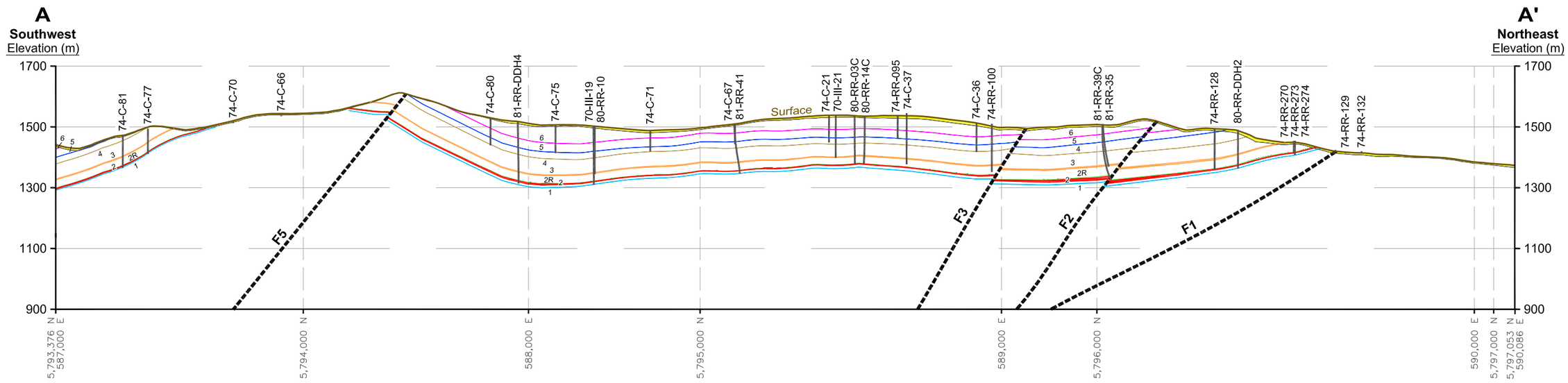
REPRESENTATIVE STRATIGRAPHIC COLUMN
RAM RIVER PROPERTY
Alberta, Canada

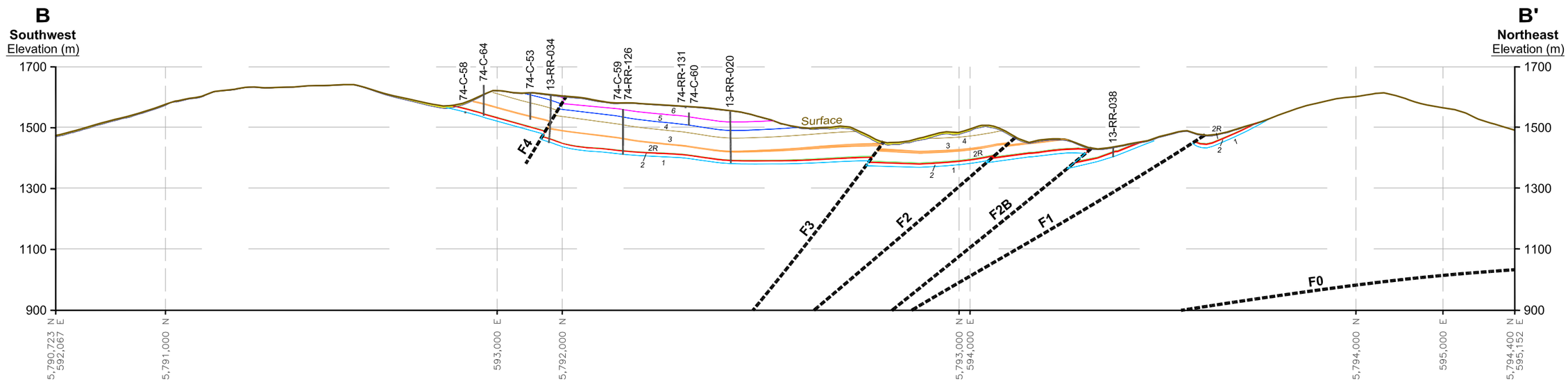
Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Not to Scale

Q:\CAD_GROUP\5184.000\FIGURE 7.3.DWG





Legend

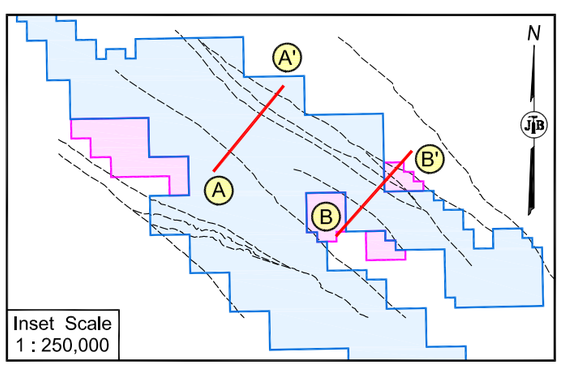
COAL SEAMS

6 2R
5 2
4 1
3

74-C-60 Drill Hole

Quaternary, Tertiary, and Weathered Zones

Fault



SCALE (m)
100 0 140 280

FIGURE 7.4

REPRESENTATIVE CROSS SECTIONS
A- A' AND B - B'
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 14,000

Q:\CAD_GROUP-jfg\5184.000\FIGURE 7-4.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

DOMAIN 1
DOMAIN 2
DOMAIN 3
DOMAIN 4
DOMAIN 5

Fault F0 - Regional - Brazeau Thrust
Fault - F1
Fault - F2
Fault - F2B
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
ANTICLINE
SYNCLINE
D U 100
D U 30
D U 20
D U 15

Legend

- Leased Property
- Applied For Lands
- Seam 3 Outcrop
- Drill Hole Location
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 7.5

STRUCTURAL FEATURES MAP
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

CAD_GROUP\5184.000\FIGURE 7.5.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault-F1
Fault-F2
Fault-F3
Fault-F4
Fault-F5
Fault-F6
Fault-F7
Fault-F8
Fault-F9
Fault F0 - Regional - Brazeau Thrust
Fault-F2B

Legend

- Leased Property
- Applied For Lands
- 1300 — Seam 3 Structure Roof Coutour (m)
- Seam 3 Outcrop
- 74-RR-275 1525.8 — Drill Hole Location with Top of Roof Elevation (m)
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 7.6
STRUCTURE ROOF CONTOURS
SEAM 3
RAM RIVER PROPERTY
Alberta, Canada

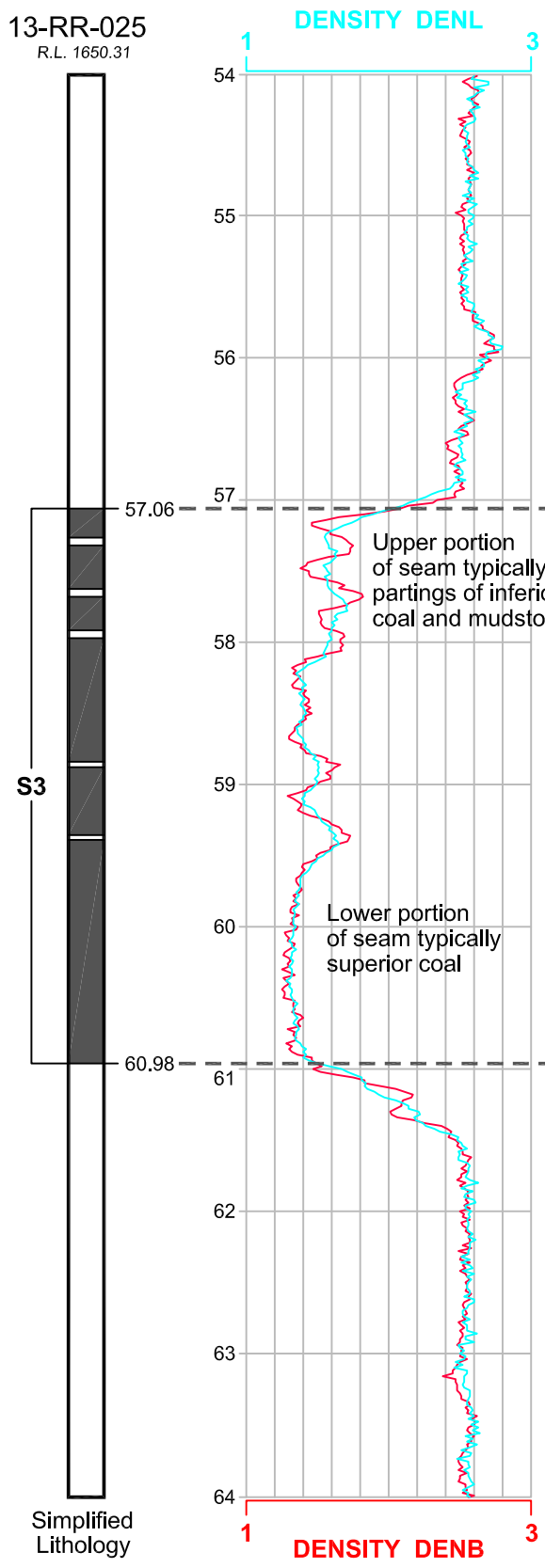
Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 7.6.DWG

Typical Seam 3 Profile



Roof conact typically distinct, massive bedded Sandstone

Upper portion of seam typically partings of inferior coal and mudstone

Description:
Thick stable well-developed coal seam. Typically 3.7 m thick, minor thin stone parting and inferior coal toward top. Mid-burden thickness is typically 40 - 50 m between Seam 3 and 4.

Lower portion of seam typically superior coal

Raw Coal Quality:
Moisture - 1.0 % (ad)
Ash Content- 20.9 % (ad)
Volatile Matter - 26.2 %(ad)
Fixed Carbon - 52.2% (ad)
Calorific Value - 6,510 kcal/kg (ad)
Total Sulphur - 0.54 % (ad)
FSI - 4.7 (Index)

Floor typically mudstone, siltstone.
25 - 30 m mid-burden to Seam 2.

SCALE (m)
0 0.5 1

FIGURE 7.7

REPRESENTATIVE PROFILE - SEAM 3
DRILL HOLE 13-RR-025
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50

Q:\CAD_GROUP~jfg\5184.000\FIGURE 7.7.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault F0 - Regional - Brazeau Thrust
Fault - F2B

Legend

- Leased Property
- Applied For Lands
- 4.0 — Seam 3 Isopach (m)
- Seam 3 Outcrop
- 74-RR-235 3.72 — Drill Hole Location with Seam 3 Thickness (m)
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 7.8

THICKNESS CONTOURS
SEAM 3
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 7.8.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2A
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

Legend

- Leased Property
- Applied For Lands
- 200 — Seam 3 Depth to Roof Contour (m)
- Seam 3 Outcrop
- 81-RR-28 145.6 — Drill Hole Location with Depth to Roof (m)
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 7.9
DEPTH TO ROOF CONTOURS
SEAM 3
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 7.9.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

Legend

- Leased Property
- Applied For Lands
- 25 — Midburden Contour - Seam 3 to Seam 2 (m)
- Seam 3 Outcrop
- 74-RR-202 25.2 — Drill Hole Location with Midburden Thickness (m)
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 7.10

MIDBURDEN CONTOURS
SEAM 3 TO SEAM 2
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 7.10.DWG

Typical Seam 2, 2R, and 1 Profiles

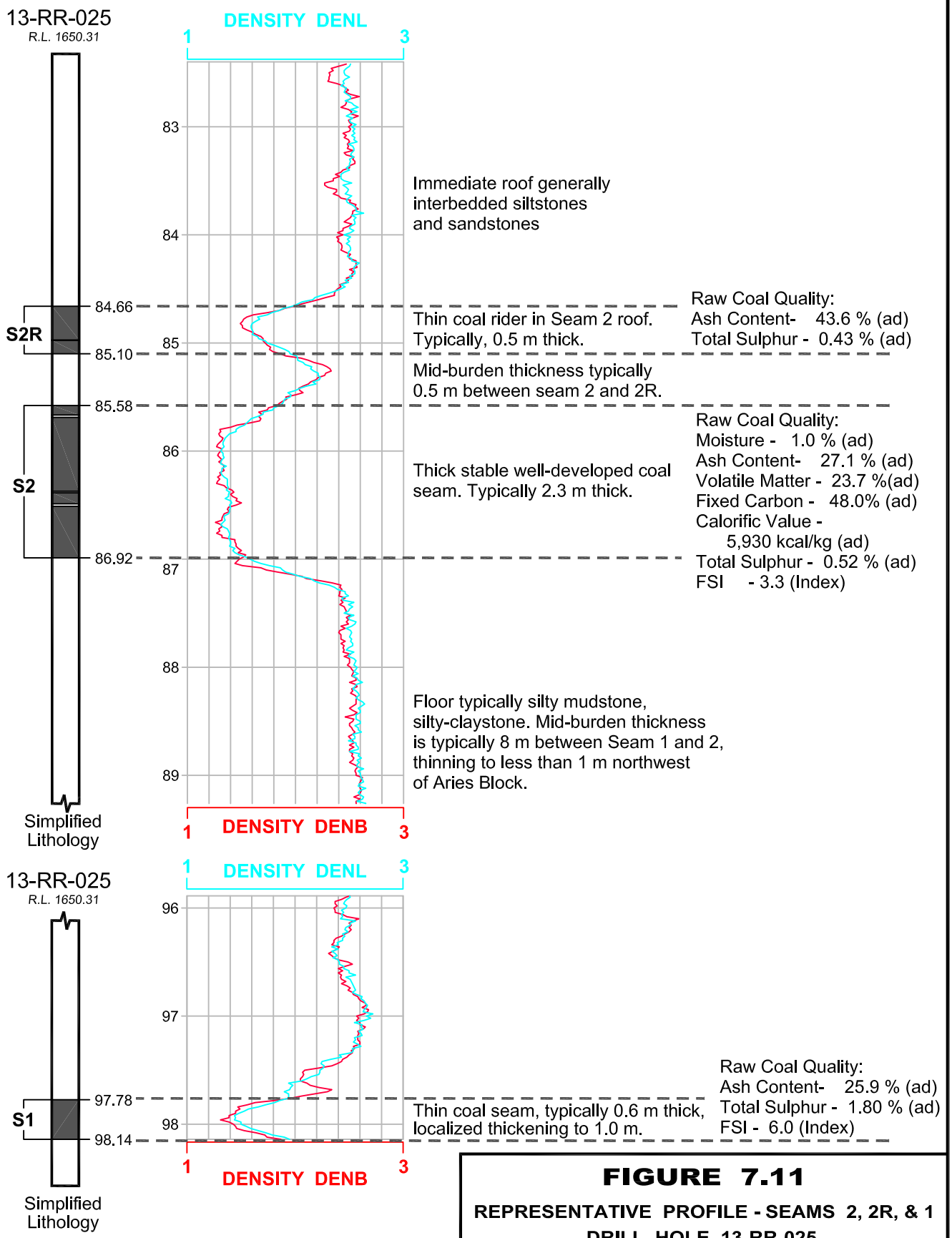


FIGURE 7.11

REPRESENTATIVE PROFILE - SEAMS 2, 2R, & 1
DRILL HOLE 13-RR-025
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50

Q:\CAD_GROUP–jfg\5184.000\FIGURE 7.11.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

Legend

- Leased Property
- Applied For Lands
- Seam 2 Outcrop
- 5.0 — Seam 2 Isopach (m)
- Fault
- 74-RR-113 2.59 — Drill Hole Location with Seam 2 Thickness (m)

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 7.12

THICKNESS CONTOURS
SEAM 2
RAM RIVER PROPERTY
Alberta, Canada

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John T. Boyd Company

November 2019
Scale 1 : 50,000

CAD_GROUP\5184.000\FIGURE 7.12.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault F0 - Regional - Brazeau Thrust
Fault - F2A
Fault - F2B

Legend

- Leased Property
- Applied For Lands
- 200 — Seam 2 Depth to Roof Contour (m)
- Seam 2 Outcrop
- 81-RR-28 178.4 — Drill Hole Location with Depth to Roof (m)
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 7.13

SEAM 2 - DEPTH TO ROOF CONTOURS
RAM RIVER PROPERTY
Alberta, Canada

Prepared For

RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 7.13.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault F0 - Regional - Brazeau Thrust
Fault - F2B

Legend

- Leased Property
- Applied For Lands
- 10 — Midburden Contour - Seam 2 to Seam 1 (m)
- Seam 2 Outcrop
- 74-RR-087 7.9 — Drill Hole Location with Midburden Thickness (m)
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 7.14
MIDBURDEN CONTOURS SEAM 2 TO SEAM 1 RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 7.14.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

Legend

- Leased Property
- Applied For Lands
- Seam 1 Outcrop
- 1.0 — Seam 1 Isopach (m)
- Fault
- 74-RR-147 1.37 — Drill Hole Location with Seam 1 Thickness (m)

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 7.15

THICKNESS CONTOURS
SEAM 1
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 7.15.DWG

8.0 DEPOSIT TYPE

8.1 Mineral Deposit Type

The mineral of interest in the Ram River property is bituminous rank coal. Our geologic modelling covers the entire coal area, beginning at the seam outcrop. In 2013 BOYD opined that—due to enactment of the Coal Development Policy from 1976 and the associated classification of the Ram River area as Category 2—development by surface mining would not be considered. In 2016, RRCC received a letter from the Alberta Government which reportedly clarified the matter. The letter clarifies that, as is the case elsewhere across Alberta, the permitting of surface mining activities is subject to regulatory review and approvals.

BOYD has included open cut and underground resources in our estimate.

8.2 Geologic Methods

BOYD independently checked RRCC's database against drill hole records. We then used the resultant database to create a stratigraphic geologic model using Maptek Vulcan computer software. Our Qualified Person assessment, as previous, concludes that the Geologic Type of the Ram River deposit is moderate overall, but Low-Type B within the resource area. Vulcan is an industry accepted geologic software and is considered to be an appropriate geologic modelling system for use at the Ram River property.

8.3 Exploration Planning

The Geological Survey of Canada published standardized guidelines for classifying Canadian coal deposits in publication GSC 88-21. This paper divided coal deposits into four categories based on the level of tectonic deformation and structural complexity:

- Low – Plains areas, generally unaffected by tectonic deformation and are flat-lying and unfaulted.
- Moderate – Outer Foothills area, some tectonic deformation and occasional faulting, generally less than 30-degree dip.
- Complex – Inner Foothills and Front Range areas, high level of deformation with steeply-dipping and overturned beds and major faults.
- Severe – Rocky Mountain area, with extreme level of deformation that requires modelling as an orebody rather than tabular deposit.

The Ram River property falls into the moderate category which is characterized by broad folds with a wavelength of 1.5 km or more and bedding inclination of less than 30 degrees. However, in BOYD's coal resource assessment, we consider the steeper coal located adjacent to the coal seam outcrops (+12-degree dip) are suitable for open cut extraction, and the more flat lying central portion of the synclinal basins (nominal flat to 12-degree dip and free of any material faulting) designated as the primary area for future underground mining. In BOYD's opinion, the deeper potential underground resource areas are judged to be Low (Low-Type B) in Geology Type.

The recommended GSC 88-21 criteria for Assurance-of-Existence reliability classification) by Geology Type category follows:

	Distance from nearest data point (m) by Assurance-of-Existence Category		
Geology Type	Measured	Indicated	Inferred
Low-Type B	0-600	600-1,200	1,200-3,600
Moderate	0-450	450-900	900-2,400

It is important to recognize that the preceding criteria are expressed as a radius distance (not a spacing between seam data points).

BOYD used the following criteria in this report to classify the estimated coal resource tonnages:

	Criteria (m)			
	Seam Structural Data		Seam Quality Data	
Reliability Category	Points Radial Influence Distance	Point Spacing Distance	Points Radial Influence Distance	Point Spacing Distance
Measured	450	900	1,000	2,000
Indicated	900	1,800	2,000	4,000
Inferred	2,000	4,000	4,000	8,000

As shown, the criteria selected by BOYD (when compared on the same basis, spacing, or radius), are within the guidelines contained in GSC 88-21.

9.0 EXPLORATION

The majority of the exploration that has been conducted in the Ram River property is in the form of drilling. The drilling techniques used are of different types including diamond coring and conventional air rotary drilling. The drilling activities are discussed in greater detail in Section 10 of this Technical Report.

Other than exploration drilling, several programs of geological mapping have been completed across the property. A preliminary surface reconnaissance mapping program, prior to exploration drilling was recorded by CONSOL in 1970. In 1974 CONSOL went on to complete a detailed surface mapping program of the entire Ram River area. A geology map was prepared, on scale of 1 in.:2,000 ft, to serve as the base designing of future drilling programs.

In 2013, RRCC completed a geological mapping program prior to the 2013 drilling program. Two teams consisting of two geologists mapped outcrops and sub-crops within the Ram River property boundaries. A total of 429 points were recorded throughout the mapping program. This mapping helped to confirm the surface mapping done in 1974, and provided new geological information based on recent outcrop exposure (from trails/roads). The 2013 RRCC geological mapping was incorporated in the geological model to refine and check projected seam outcrop locations.

No surface samples or trench coal samples are known or recorded in the RRCC database.

In 2013, RRCC flew a LiDAR (light detection and ranging survey) which was used to develop a detailed topographic digital elevation model (DEM) for the property. The LiDAR survey was incorporated in the geological model to establish an accurate and reliable DEM.

No airborne or ground geophysical surveys (such as magnetics, gravity, or seismic) are known or reported for the property area.

10.0 DRILLING

10.1 Drilling Programs

Six exploration programs by CONSOL, spanning from 1970 to 1981, drilled 488 holes on the Ram River property. Two exploration programs by RRCC, spanning from 2012 to 2013, drilled 119 holes. The number of holes drilled in each campaign is shown below. Distribution of CONSOL and RRCC drill holes are shown on Figure 6.1.

Company	Year	Drill holes			Approx. Aggregate Meters Drilled
		Chip	Core	Total	
CONSOL	1970-71	43	-	43	5,125
CONSOL	1973	83	-	83	6,289
CONSOL	1974	85	-	85	7,923
CONSOL	1974-75	170	42	212	20,200
CONSOL	1980	17	5	22	3,615
CONSOL	1981	29	15	44	6,531
RRCC	2012	2	11	13	826
RRCC	2013	65	41	106	11,465
Total		494	114	608	61,974

CONSOL's initial 1970 exploration program comprised 43 conventional rotary exploration holes, logged with natural gamma and resistivity tools.

In 1973, CONSOL conducted a second phase of exploration drilling with an additional 83 holes drilled. The majority of these holes were drilled within TVI-Ram River and Fraser-Ram River portions of the Ram River properties. The holes were drilled using conventional rotary method and were geophysically logged with natural gamma, resistivity or density tools, or a combination of the three.

In 1974-1975, CONSOL conducted two exploration programs. A total of 297 drill holes were drilled in 1974 and early 1975. The majority of these drill holes were rotary exploration holes. Some of the drill holes were rotary drilled with predetermined core intervals to obtain coal samples from Seam 3 and Seam 2. Coal samples were obtained from 42 drill holes.

In 1980, CONSOL's exploration drilling program included 22 drill holes: 2 diamond drill holes, 3 rotary core holes and 17 rotary exploration holes. Core recovery was excellent in adjacent strata, and poor in coal zones. Coal recovery is discussed further in the next section.

In 1981, CONSOL completed a final drilling program: 44 holes were drilled, including 14 core holes and 1 diamond drill hole. As was the case the previous year, core recovery was excellent in adjacent strata, and often poor in coal zones.

In 2012, RRCC completed a large-diameter drilling program. Multiple large diameter (150 mm) core holes were drilled in two North Block locations to obtain large quantity bulk samples for washability and metallurgical testing. On site A1, a pilot rotary drill hole was drilled to determine coal intervals, followed by three large diameter core holes targeting Seam 3. On the site A4, a pilot rotary drill hole was drilled followed by six large diameter core holes targeting Seam 3 and Seam 2. Two additional core holes (HQ-size) were drilled in 2012. The recovery in the large-diameter holes was excellent, but the recovery in the smaller diameter holes was similar to that in previous years—good through the rock zones but poor through the friable coal zones.

In 2013, RRCC's exploration program was designed to gather geological, structural, coal quality, geotechnical, geochemical, hydrological, and environmental information. A total of 11,465 m in 106 holes, on 54 sites were drilled between July 2013 and January 2014. This included 8 x PQ (85 mm) and 33 x LD (152 mm) core holes.

10.2 Procedures

10.2.1 CONSOL 1970-1981 Programs

Generally, the initial exploration performed by CONSOL consisted of each core hole being geophysically logged with natural gamma, hole caliper, density, and resistivity tools. Holes were cemented from top to bottom upon completion.

Diamond core holes were drilled with an HQ-size core bit by a skid-mounted Longyear Super 38 drill rig. Extensive excavation was needed on hillsides to accommodate the drill components and service equipment. The diamond cores were cut by rapid rotation (between 2,000 revolutions per minute [rpm] and 2,500 rpm), feed pressure between 690 kilopascals (kPa) and 1,000 kPa, and pump pressure between 690 kPa and 860 kPa. Overall core recovery was 99% in strata outside of the coal seams. However, core recovery within the coal seams was below 40% due to the softness of the coal.

Rotary cores were advanced by conventional rotary drilling to a depth of 3 m to 4.5 m above the coal seams. At this depth, the rotary drill pipe was replaced with a wireline coring pipe and a Christiansen double-core barrel. Core runs in roof and floor were between 1.5 m and 3 m, and 0.3 m to 0.6 m in coal. After the coring run was cut, a retrieval device was lowered into the wireline pipe to remove the barrel. The barrel was laid into a pipe rack and was disassembled in order to remove the core. Following removal, the attending geologist would take preliminary notes on lithology, core recovery, and fracturing; the core was then boxed. Recovery of roof and floor cores varied between 60% and 100%; coal seam core recovery was between 20%

and 40%. Numerous variations of feed pressure, rotation speed, pump pressure, and drill fluid pressure were attempted to improve core recovery with minimal success.

The remaining holes were drilled with rotary drilling using reverse-circulation air sampling. Chip samples were bagged, labelled, and sent for laboratory analysis. Several samples from the 1980 program were contaminated by fine sediments along the drill hole; previous reports attribute this to the high hydraulic head at the depth of the coal seams that required high pressure to push samples to the surface, and long transport times.

10.2.2 RRCC 2012 Program

The 2012 drilling was done by a track mounted, self-propelled rig, capable of drilling with compressed air with variable drill hole diameter sizes from HQ and larger. In the interest of expediting the program, it utilized air rotary hammer drilling in non-coal intervals and switched to coring in the coal seam sections. In this way, coal samples of suitable size for the desired analyses could be obtained. The drill cuttings from the rotary drilling were not used for analyses.

Each site consisted of a full-length air rotary hammer drilled pilot hole that was used to establish coal seam and thickness. Cuttings from this pilot hole were collected at 0.3 m (1 ft) intervals and the top and bottom depths of the desired seams were determined. Following this determination, the rig was moved to a nearby location on the same drill pad where multiple 150 mm diameter core holes could be drilled in order to recover enough material for bulk sample analysis. 240 kg of material was required for the Seam 3 and 180 kg for Seam 2.

Bulk sample drilling consisted of first air rotary hammer drilling the 150 mm diameter drill holes down to depth of 1 m to 2 m above where the top of the target coal seam was encountered in the pilot hole. At this point, drill rods were pulled, the air rotary hammer bits are replaced with a 150 mm diameter coring bit, and a double walled core barrel with a split inner barrel. Remaining roof rock was then cored along with the entire coal seam. Coring was stopped once an approximate depth of 0.5 m to 1 m below the coal seam was reached. All the large diameter core holes achieved good to excellent recovery percentages.

Recovered coal samples were geologically described, measured, photographed, and packed in plastic lined wooden boxes. The core boxes were then sealed and stored in heated garage. Once the minimum required sample weight was achieved for each seam, the samples were taken to Loring Laboratories, in Calgary Alberta, Canada, for analysis.

10.2.3 RRCC 2013 Program

Multiple drilling methods were used throughout the 2013 program. These included: rotary, rotary with coring of select coal seams, and roof and floor strata, as well as continuous coring of selected holes from the collar to the total depth of the hole. A rotary open hole “pilot hole” was complete on each site prior to commencing the core holes. A total of 11,465 m in 106 holes, on 54 sites were drilled between July 2013 and January 2014. Included in the program were 8 PQ (85 mm) and 33 LD (152 mm) core holes.

11.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

11.1 CONSOL Sampling and Exploration

Various exploration programs and coal quality testing for the RRCC property were conducted by CONSOL through 1981. It is our understanding that work conducted by CONSOL was performed both by company employees and third-party vendors.

BOYD reviewed the sampling and testing procedures used by CONSOL and makes the following observations regarding the sampling and testing procedures:

- Copies of the 1974, 1980, and 1981 Loring Laboratory coal quality analytical reports were observed.
- These reports include a certificate of testing, document control identification, are dated and signed by a “Licensed Assayer of British Columbia”.
- Details of sample identification, depth intervals, testing completed, moisture basis, units of analysis and in places testing issues are recorded on the reports.
- No reference testing procedure standards were observed.

Based on reputation and BOYD’s knowledge of and experience with CONSOL, the company appears to be diligent in their coal exploration and sampling programs and was consistent with North American coal industry practice. The issue of core recovery is discussed in Chapter 10.

11.2 RRCC 2012 Exploration Program

BOYD provided direct oversight of all drill and related field activities during the 2012 program. BOYD was responsible for coal seam core description, handling, storage, and delivery to Loring Laboratories (Alberta) Ltd (Loring). The analytical work was done in accordance with American Society for Testing and Materials (ASTM) or International Organization for Standardization (ISO) standards.

11.3 RRCC 2013 Exploration Program

BOYD did not participate in any of the exploration or coal sampling during the 2013 program. RRCC’s consultants supervised the program including, core handling, descriptions, storage, and delivery to Loring, in Calgary Alberta. The analytical work is reported to have been done in accordance with ASTM or ISO standards. BOYD reviewed certificates of analysis and observed report statements that testing had been completed to ASTM standards. Lab analysis is reported from GWIL Industries, ALS, SGS, Canmet and Pearson Coal Petrography Laboratories.

Based on the stated standards and laboratory used, BOYD considers the sample preparation and analytical procedures were adequate for the coal quality results for inclusion in geological modelling and resource estimation.

12.0 DATA VERIFICATION AND MODELLING

12.1 Data Verification

BOYD relied on historical source data as provided by RRCC, which was assumed to have been developed by qualified professionals in their respective fields. The process of verifying the RRCC data included independently re-building the geological models. As part of BOYD's approach to re-building the geological models, a series of steps were undertaken by the QP (Qualified Person) to verify the RRCC geological database. Details of the verifications undertaken, procedures applied, limitations and shortcomings of the database are discussed in the following subsections. The QPs opinion of the data adequacy including detail of corrections made are also included.

12.1.1 Topographic Survey

BOYD reviewed the surface topography DEM. It was observed to have been derived from LiDAR and generated on a 25 m block size. The DEM was generated from high quality data and was well-constructed. Discussion within the PFS indicated that 6% of drill hole collar surveys varied more than ± 3 m from the DEM, due to the property's topographic relief. BOYD's QP considered this discrepancy required further investigation and verification.

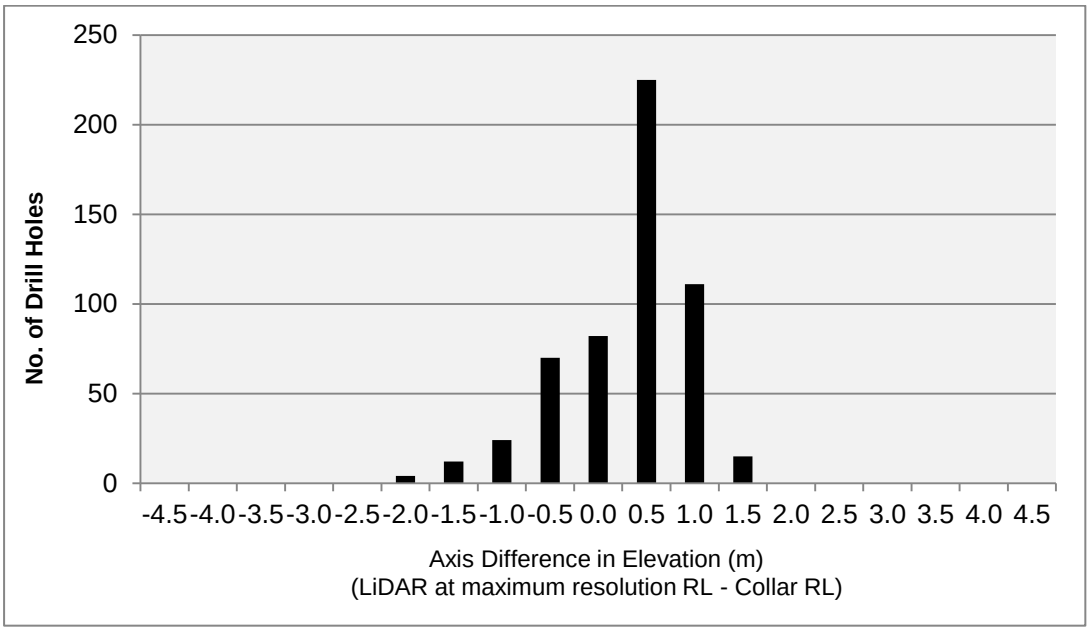
The original LiDAR survey raw XYZ data files were used to rebuild the DEM. Maptek Vulcan software was used to resample the raw points at a uniform 5 m grid cell size, generating 25 million points. The points were then triangulated to generate the highest achievable DEM accuracy for the geological model.

12.1.2 Drill Hole Collar Survey

The RRCC drill hole collar locations database contained 599 holes. Surveys in the database were completed by both RRCC and CONSOL. Collar locations of the holes drilled by RRCC were surveyed using high precision Differential Global Positioning System. The CONSOL drill holes locations were reported as surveyed but no specific detail on surveyor company, method and accuracy were provided.

To verify the accuracy of the recorded elevations of collar locations in the RRCC database, these were compared against BOYD's DEM of the site's topography. Collar elevations were generally in agreement with the DEM, although skewed to a lower elevation than the DEM. Drill hole collars with a difference between DEM and collar RL (reduced level) of more than one standard deviation were flagged as being unreliable and substituted with the DEM collar RL elevations. A total of 48 drill hole collar RLs were adjusted: these were predominantly from 1970 to 1975 drilling. Following adjustment, the average difference between the DEM and collar RL is 0.55

m. The histogram below shows the distribution of the differences in collar elevation compared to the DEM.



As part of verifying the RRCC database drill hole collar location, both grid projection translations, and imperial to metric conversions of original CONSOL data were reviewed. Spot checks were undertaken to verify hole positions corresponded with original exploration plans and global coordinate variations validated to highlight anomalous translations. The process established that 14 collar coordinates and 15 collar elevations were adjusted anomalously. In each case, reasonable explanations were located in the database comments field, and the corrections were considered to be acceptable. An additional six CONSOL drill holes with no identified location co-ordinates were noted: a review of the original exploration reports provided no additional information and the holes were discarded.

12.1.3 Downhole Survey and Geophysics

BOYD reviewed the downhole geophysical and downhole survey database. It was observed to contain downhole survey data for the 2013 exploration holes and approximately 10% of the CONSOL drill holes. BOYD considered the data compilation to be reliable. No independent checks were made to confirm the completeness of the compilation. BOYD recognizes that additional hardcopy downhole survey logs exist, however, considered they would be unlikely to make a material difference to the geological model. Where available, downhole survey was applied to drill holes in the geological model. Holes without downhole survey were assumed to be vertical.

The down hole geophysical data comprised LAS data for RRCC holes, and PDF logs for approximately 10% of the CONSOL drill holes. BOYD recognizes the downhole geophysics data provided for the property is incomplete and is aware more hardcopy geophysical logs for the property exist. Verification of the accuracy and reliability of the RRCC geological and seam interpretations relied primarily on the 2013 series digital geophysical logs, and to a lesser extent, the CONSOL pdf logs.

12.1.4 Drill Hole Database

BOYD built a stratigraphic geological model using the drill hole lithological and seam pick database presented in the 2017 PFS Appendix B, RRCC Access database. The lithological database contained lithological log information for 410 holes, of which 111 contained identified coal seams. The associated seam pick database contained seam interpretations for 451 holes.

Validation steps were run on the 7,680 lithological records of the RRCC dataset and established: rare instances of intersection depth discrepancies and unrecognized lithological codes present. However, significant discrepancy between the lithology and seam picks in the database were observed. Data verification in the 2017 PFS noted, “In an effort to refine the drill hole coal interpretation and coal correlation, RAM’s [RRCCs] internal geological consultants adjusted some of the seam picks of the roof and the floor of the coal plies. These adjustments have been made only in the dataset storing the seam interval. The lithology description table was not updated.” Due to this discrepancy, BOYD constructed the stratigraphic geological model from seam picks which had no direct connection to the RRCC lithological database.

The stratigraphic geological model was constructed from the RRCC seam picks database. Verification steps were run on 1,426 seam pick records contained in the RRCC database, which established 37 records with undefined seam codes (e.g. code 6 and code 99), six records of poorly defined Seam 3 splits (3R and 3L), and rare coding errors were present. BOYD completed spot checks to verify geophysical seam re-picks made by RRCC’s consultants. The geophysical seam corrections were reviewed and observed in places to vary by more than a meter, and routinely increased the reported seam thickness, often by as much as 0.4 m thick. BOYD’s QP considered that the process of re-picking coal seams to geophysical logs as standard industry practice, however in the RRCC database case, issues with not completing corrections across all database components, larger than typical depth adjustments, and tendency to thicker seams were considered to be issues of concern. Following consideration of the issues BOYD accepted the drill hole seam picks database as being adequate for preparing a coal resource.

12.1.5 Quaternary Sediment and Weathering

BOYD used the RRCC drill hole quaternary sediment interpretations presented as "Till" in the database contained in the 2017 PFS Appendix B, RRCC Access database. The 315 records included in the database were based on a previous study which assessed drill hole lithology logs. In many locations where surface lithologies were not recorded, till depth was assumed to be equivalent to the base of casing. BOYD's QP considered the assumption, although not technically correct, to be a practical and sensible method to extend the number of quaternary sediment interpretation points. The drill hole quaternary thickness points were observed to display considerable variation, with trends associated with the topography. To account for the observed trends in the isopach, default till values one standard deviation below the average and one standard deviation above the average, were assigned to drainage and ridge locations respectively. Figure 12.1, following this text, shows the Thickness Isopach of Quaternary sediments developed for the property.

Verification of the RRCC base of weathering information established, previous studies had applied a default base of weathering of 10 m below quaternary sediments. BOYD's QP considered the use of a default base of weathering to require further investigation. Review of the lithology database identified 20 RRCC holes containing weathering interpretations, of which 7 holes provided suitable information to interpret the base of weathering at unique locations. A basic assessment of original CONSOL exploration reports was used to interpret the base of weathering at an additional six drill hole locations. The assessment established the average depth of weathering as being 13.3 m below quaternary sediments, with depths greater than 20 m common. BOYD therefore replaced the previous default base of weathering, with a modelled base of weathering surface.

BOYD opines that the stratigraphic geological model would be improved with additional analysis to assess the base of weathering.

12.1.6 Structural Interpretation

BOYD reviewed the 2017 PFS structural interpretation. It was observed to contain 11 thrust fault surfaces dipping approximately 60 degrees to the southwest, separating a series of fault blocks. The structural interpretation was reportedly generated based on 660 parallel, vertical cross-sections through the Ram River property. The provided structural interpretation was loaded into Vulcan for verification. Fault planes and drill holes (corrected for down hole survey) were overlain in 3D. Drill hole stratigraphy was checked at location holes intersected fault plane and were considered to support the fault interpretations. Based on the verification undertaken, BOYD considered the structural interpretation as provided to be reliable and used it to prepare the stratigraphic geological model.

12.1.7 Seam Correlation

BOYD completed checks of the geophysical profiles to test seam correlations provided in the RRCC database. LAS downhole geophysical logs were loaded into a Vulcan Isis database to compare seam profiles. Typically, 30 seam profiles of long and short spaced density were plotted together aligned with the seam roof. The character of each seam profile was compared to establish the seam correlation confidence. Based on the 2013 drill holes reviewed, each seam displays a reasonably stable character, with the exception of localized structural disruptions. Review of Seam 2 and 2R noted sparse locations where 2R has not been interpreted. BOYD considers it likely that 2R is laterally continuous, with localized coalescence with Seam 2 (e.g. 13-RR-023). A review of upper marker seams also identified some minor correlation issues.

BOYD observed that the RRCC seam correlations were undertaken to a reasonable level. Our review noted minor weakness in the observed 2R, and 4 to 6 Seam correlations. In each case the weakness was considered to have limited impact on the geological model and was adequately reflected in confidence classification criteria.

Based on our review, BOYD considers that the seam correlations provided were acceptable for use in the preparation of the stratigraphic geological model.

12.1.8 Seam Isopach and Outlier Analysis

Geostatistical methods were applied to identify and review potentially anomalous drill hole seam intersections, prior to generation of seam isopachs. Seam intersections were identified as outliers as being more than three standard deviations from the mean thickness. Outliers were typically observed to represented localized structural thickening and thinning associated with faults or subcrops. Across all seams a total of 63 outlier thickness were nullified. At each location, either the roof or floor was honored, based on BOYD's consideration of the most reliable surface.

12.1.9 Coal Quality Database

BOYD reviewed the raw coal quality database presented in the 2017 PFS Appendix B, RRCC Access database. The coal quality database was observed to include 100 sample records, from 23 drill holes, including 17 Seam 3 intersections and 16 Seam 2 intersections. BOYD's QP considered the coal quality database of less than 5% of drill holes to be a weakness requiring further investigation.

The 2018 optimization study, by Millcreek Mining Group noted the following:

- "on the basis of various extensive exploration programs between 1970 and 2013, the Aries deposit structure is represented by over 600 drill holes. Of these, there have been 154 holes drilled to collect core for coal quality testing from 82 locations."

- “Based on conservative criteria, the 2017 PFS (and PFS optimization) work omitted the majority of these holes and used only 23 holes for quality modelling of the entire North Block”.

The 2017 PFS study criteria for reliable coal quality data included: core recovery more than 85%, lithology log, geophysical log, and clear record of the sample interval. BOYD considers the 2017 PFS study criteria to be in line with accepted industry standards. However, the 2018 optimization study found that the “conservative criteria used”, a high proportion of quality data and that, “Using reasonable criteria and assumptions”, additional holes should be included.

Following review of the coal quality information, BOYD’s QP opined the 2017 PFS study quality criteria—although reasonable in most instances—limited the dataset to the extent that it adversely effected the reliability of the quality model. As such, BOYD considered the coal quality model conclusions of the 2018 Millcreek optimization study to be reasonable.

BOYD extended the coal quality database to include additional holes, as recommended by the 2018 optimization study. When including points with reduced core recovery (e.g. 13-RR-007FC), the loss zone was established from geological and geophysical logs and a comparable adjacent or associated sample “default analysis” was applied over the loss interval. On this basis, the core recovery limit was lowered to a minimum of 73%, on a case by case basis. In addition, quality data previously excluded due to the absence of lithology or geophysical logs were also reviewed. Where samples were considered to be reliably depth controlled on the basis of core logging measurements, they were re-included. A total of 17 coal quality points from 11 drill holes identified by the 2018 optimization study and 4 coal quality points from 3 drill holes identified by BOYD were added the coal quality model.

As part of extending the coal quality database BOYD reviewed original laboratory reports and replaced composited seam results in the RRCC database with original individual sampling results, where possible. An additional 222 samples, including 180 samples from the 1981 core holes were added.

BOYD completed database validation on the 316 sample records from 47 drill holes included in the updated raw coal quality compilation and established discrepancies between the sample intervals and seam picks depths in the database. The cause was established to be seam re-picking completed by RRCC’s geological consultants (as discussed in Section 12.1.4, Drill hole database). BOYD used our understanding of geophysical correction techniques to manually re-connect sample depths with the RRCC seam picks. In the process, several instances where the “revised RRCC seam pick” increased the seam thickness, that did not appear to have been accounted for in the full seam raw coal quality composite of the previous study. BOYD recognized

that the data revisions made may introduce errors, but considered the revisions to be necessary to adequately model the coal quality.

In the development of the BOYD 2019 stratigraphic geological model, verification of RRCC's original coal quality data was completed. Additional drill holes and samples were included, sample depth corrections applied and quality in sample loss zone substituted. Seam 3 coal quality is represented by a total of 31 coal quality points comprising 18 used in the PFS, 11 added by Milcreek, and 2 added by BOYD. Seam 2 coal quality is represented by a total of 23 coal quality points comprising 15 used in the PFS, 6 added by Milcreek, and 1 added by BOYD. BOYD considers the updated raw coal quality database used has been extended based on reasonable criteria and assumptions, and increases the reliability of the coal quality model

12.2 Geological Modelling

The stratigraphic geological model used as the basis of this resource estimate was developed by BOYD as part of this resource estimate. The geological model was generated from borehole and coal quality data from 488 holes that were completed by previous explorers and an additional 119 holes completed since RRCC acquired the Ram River property.

12.2.1 Stratigraphic Structure Model

The geological model for the project was developed using Maptek Pty Ltd Vulcan 3D software version 11.0.4. The geological model was developed as a stratigraphic grid model. The sequence of seams were modelled, as well as the base of quaternary sediments and base of weathering.

The seam/horizon naming convention used at Ram River coal project is presented in the following table:

Name	Code	Intersections	Description
Quaternary Sediments	BHQA	315	Unconsolidated Quaternary sediments, till
Weathering Base	BHWE	13	Base of weathering
Seam 6	S6	23	Considered as inferior coal marker band
Seam 5	S5	92	Thin coal seam, typically 0.4 m thick
Seam 4	S4	136	Inferior coal marker band, typically 0.5 m
Seam 3	S3	258	Thick (3.7 m) stable well-developed coal seam
Seam 2	S2R	204	Thin (0.5 m) coal seam rider, parting 0.5 m
	S2	243	Thick (2.3 m) stable well-developed coal seam
Seam 1	S1	147	Thin coal seam, typically 0.6 m thick

The following steps were used to generate the model:

- Drill hole database creation.
- Validation – mapfile generation.
- Stratigraphic sequence – interpolation mapfiles.
- Stratigraphic sequence – isopachs grid models.

- Stratigraphic sequence – reference horizon structural grid model.
- Stratigraphic sequence – horizon roof and floor grids, isopach stacking.
- Overburden sequence – isopach grid models.
- Overburden sequence – floor grids, stacked relative topography.
- Overburden sequence – truncation of stratigraphic sequence.

Structural variable used during modelling are presented in the following table.

Structural Parameter	Mapfile Variable	Grid Variable	Description
Structure Roof	SR	SR	Horizon roof elevation m MSL
Structure Floor	SF	SF	Horizon floor elevation m MSL
Structure Thickness	ST	ST	Thickness from roof to floor m
Parting Thickness	PT	PT	Thickness of absent horizon between roof and floor
Net Thickness	TK	TK	Structural Thickness less partings m
Mid-burden Thickness	MD	MD	Thickness of inter-burden to above horizon m
Depth to Roof	DR	DR	Horizon depth to roof below topographic surface m
Depth to Floor	DF	DF	Horizon depth to floor below topographic surface m

The geological stratigraphic model comprises three dimensional gridded surfaces of each of the seam roof and floor horizons specified in the stratigraphic sequence. The elevation of each of the gridded surfaces was based on the elevation of the relevant drill hole intercept. Where a seam was not intersected in the drill hole, it was interpolated to exist. If the seam was expected to be above or below the drill hole, the thickness of the interpolated seam was estimated from the surrounding drill holes. If the missing seam was within the stratigraphic sequence intersected by the drill hole, the location of the seam was interpolated based on surrounding interburden and a zero thickness was applied. Stratigraphy near some of the fold axes and faults design data were necessary to control the seam roof and floor locations so that the model represented the geological interpretation.

Fault block domains were established between thrust faults. BOYD assessed domain drill hole populations and determined that a single domain of the Aries Block contained approximately 80% of the drill holes, followed by 10% of holes present across an erosional divide. An additional eight fault block domains were poorly represented by drill hole control. BOYD considered that independent domain-based modelling of the fault blocks was not supported by the drill hole population. BOYD adapted a structural modelling technique to suit the RRCC drill hole controls. A combination of faults was defined by design strings with fault throw specified at each of the strings' nodes with crest and toe controls. The modelled seam roof and floor surfaces were truncated by the base of weathering horizon that was modelled concurrently as a non-conformable gridded surface.

The following table summarises the model parameters used in the generation of the geological stratigraphic structure model:

Model Element	Description
Shema and project	RAM 184
Thickness Interpolator	Triangulation, Delaunay algorithm
Trend Interpolator Order	0
Smoothing Passes	9
Triangle Side Length	Maximum 10,000 m
Stratigraphic Elements	2 overburden units, 7 coal intervals
Overburden Sequence	Conformable BHQA, BHWE
Overburden Reference Hz.	Topography
Seam Sequence	7 conformable horizons, S6 to S1
Stratigraphic Interpolator	FixDHD, 1 sequence passes
Seam Reference Hz.	S3.sr, Seam 3 roof
Parting Spilt	S2R.md, conformable and continuous
Faults Control	Layer GEO_S3_SR_faults
Faults Throws	W-tag throws and crest and toes to Sequence
Grid Spec	Ram184.gdc_spec
Grid Cell Size	25 m x 25 m
Topography Grid	Ramtopo_184.tp
Grid Datum and Projection	UTM Zone 11, NAD83 meters
Grid Origin	580,000 m East, 5,786,000 m North
Grid Dimensions	20,000 m East-West x 18,000 m North-South

BOYD's checks on the geological model included:

- Visual assessment of cross sections, to compare drill holes and modelled surfaces to ensure the model was consistent with the drilling data.
- Comparison between postings of seam thickness and modelled thickness contours.
- Comparison between postings of composited raw ash values and contours to ensure the coal quality model honoured the base data.

12.2.2 Stratigraphic Coal Quality Model

The estimator used for the coal quality model was inverse distance. It is a commonly used technique for modelling analytical results for coal deposits. The results are a unique interpolated surface that honours all the raw data values. Inverse distance to the second power, minimum of 10 points, 9 smoothing passes, and maximum search radius of 10 km was used for a smooth grid and improved contours. A grid was created over the triangulated surface, with a grid side length of 20 m x 20 m.

The following steps were used to generate the coal quality model:

- Drill hole database creation.
- Seam Quality - Compositing and mapfile generation (mass-weighted averages).
- Seam Quality – Quality parameter grid models.
- Seam Quality – Truncation of quality grid models to subcrops.

Coal quality variables used during modelling are presented in the following table.

Quality Parameter	Mapfile Variable	Grid Variable
In Situ Moisture (%is)	M0	M0
Total Moisture (%ar)	M1	M1
Inherent Moisture (%ad)	M2	M2
In Situ Density (g/cc)	D0	D0
Relative Density (g/cc ad)	D2	D2
Ash (%ad)	A2	A2
Volatile Matter (%ad)	V2	V2
Fixed Carbon (%ad)	C2	C2
Total Sulphur (%ad)	S2	S2
Calorific Value (%ad)	E2	E2
FSI (index)	MS	MS

12.2.2.1 Moisture Basis

Particular attention was given to the basis for the estimation of moisture. The analytical moisture basis is significant in assessing in situ moisture and in situ density, required for resource tonnage estimates, as well as reporting resource coal quality on a uniform air-dried basis.

The RRCC raw coal quality proximate data was reported on a range of moisture bases including; air-dried (ad), dry basis (db) and as received (ar). Moisture analyses included, total moisture, equilibrium moisture, air-dried moisture. BOYD applied a geostatistical approach to correct for a missing moisture basis. A moisture relationship was established using multiple variable regression, based on 39 samples containing air-dried moisture and ash (db), volatile matter (db) and specific gravity. A relatively low R^2 correlation value was observed, but greatly improved on seam default values applied in previous studies. The derived relationship was used to estimate air-dried proximate analyses and calorific values, for CONSOL data originally reported on a dry basis. In addition, fixed-carbon was estimated (by normalized subtraction), where not previously reported in historical reports.

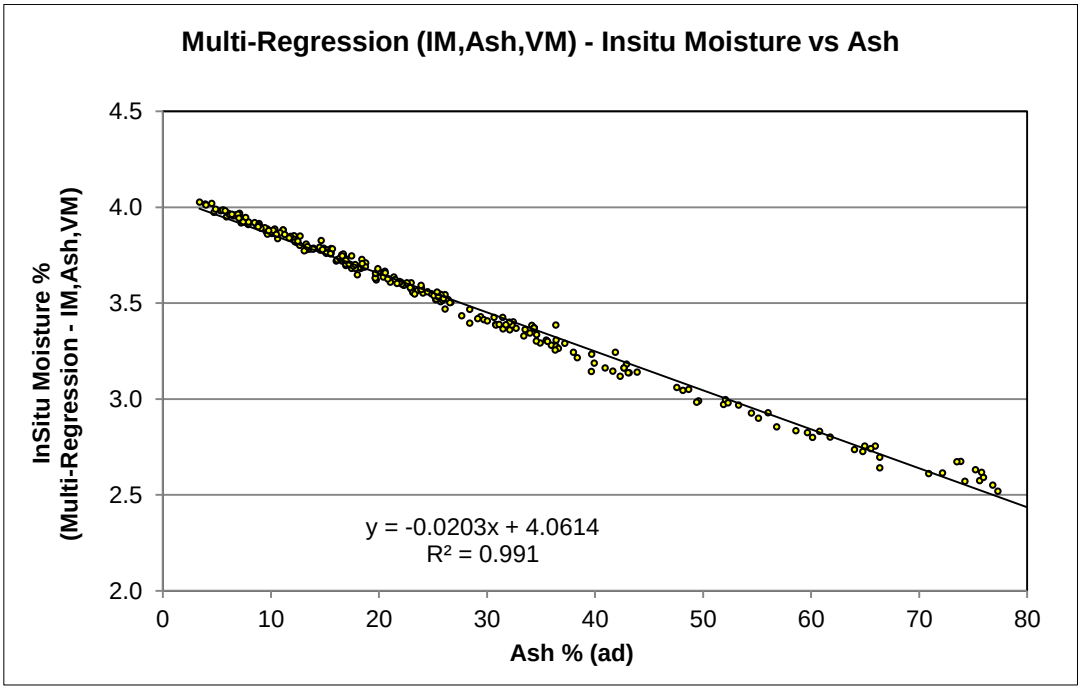
In situ moisture estimates were made using total moisture, equilibrium moisture, inherent moisture and proximate analysis results, following methods outlined in ACARP Projects C10041[1] and C10042[2]. A summary of the methods used to derive

[1] Estimation of In situ and Product Total Moisture, ACARP C10041, 2003
[2] Estimation of In situ Density from Apparent Relative Density and Relative Density Analyses, ACARP C10042, 2004

in situ moisture are shown in the following table:

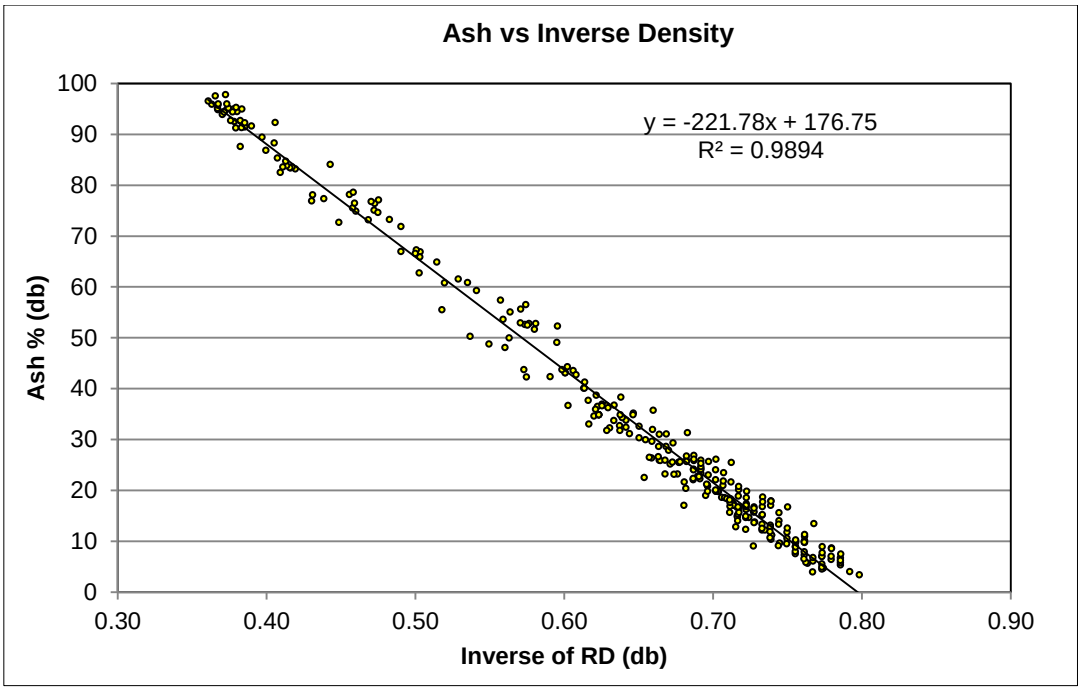
	In Situ Moisture		Equilibrium Moisture
	ACARP C10041 (eq 5.1 & 5.3)	Multi Regression (M_{ad},Ash_{db},VM_{daf})	(ASTM)
No. of Samples	316	275	27
Minimum	2.24	2.43	1.90
Maximum	5.66	4.03	4.30
Average	3.54	3.47	2.99
Median	3.43	3.58	2.80

The results of the in situ moisture estimate analysis show good correlation between the ACARP C10041 method and multi variable regression method, typically 0.5% higher than equilibrium moisture analyses. Based on limited equilibrium moisture data set and good correlation observed in the multi-regression (shown in figure below), BOYD considered it appropriate to apply and model the multi-regression in situ moisture estimate for estimating Ram River coal resources.



12.2.2.2 Density

Of the 316 samples in the RRCC geological database, 265 of them were analysed for specific gravity (RD). Where RD values are missing, RD was calculated using a regression between ash (db) and the inverse of RD (ad). Points were determined as outliers if they were more than three standard deviations from the line of best fit. The following figure shows the data used to develop the relationship.



Where samples in the database had not been analysed for RD, the regression shown in the chart above was applied to derive a substituted density to compliment the resource model and to ensure the relationship between ash and density remained consistent for the estimation process.

Density data are recorded on an air-dried basis in the RRCC database. Consequently, relative density was modelled and estimated on an air-dried basis. To convert the air-dried density to in situ density, the formula developed by Preston and Sanders (1993)[3] was applied after the resource estimation was developed from the geological model.

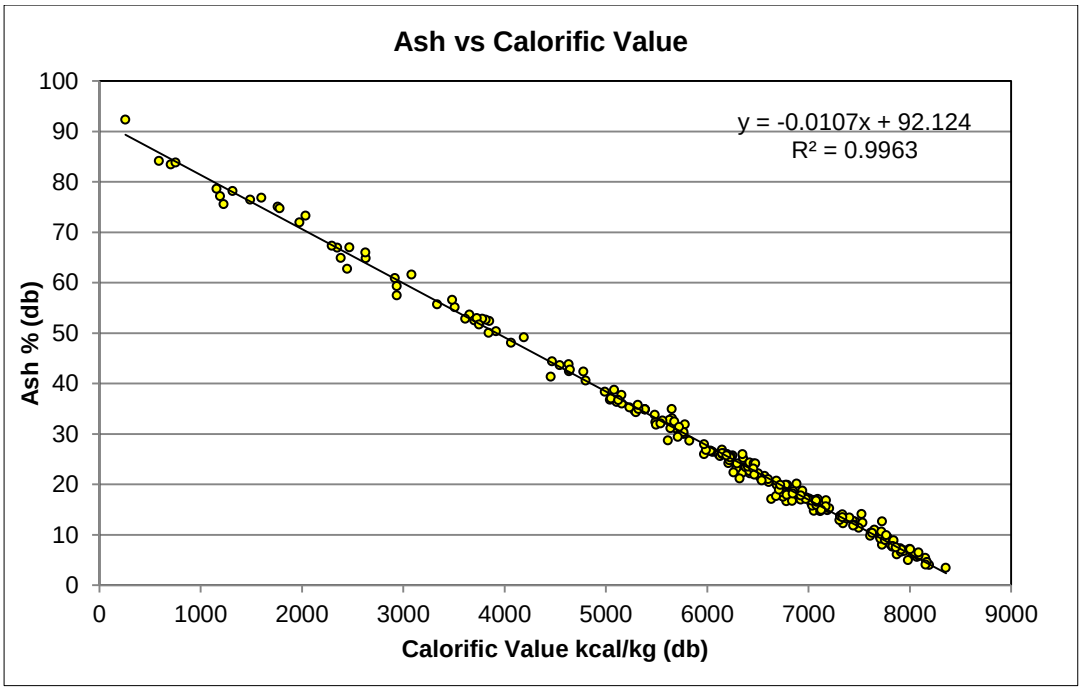
The in situ moisture applied to the Preston & Sanders (1993) equation was estimated for each sample by multiple regressions, typically 3% to 4% for coal with 10% (ad) ash content.

12.2.2.3 Ash-Calorific Value Relationship

Of the 316 samples in the RRCC geological database, 244 of them have been analysed for calorific value (or energy). Where CV values are missing, CV was calculated using regression between ash (db) and CV (db). Points were determined as outliers if they were more than three standard deviations from the line of best fit.

The following figure shows the Ash-CV relationship and regression. The regression method was used to derive CV values, where samples had not been analysed for CV.

[3] Preston, K and Sanders, R, 1993, Estimating the In Situ Relative Density of Coal, Australian Coal Geology, Volume 9.



12.3 Data Not Verified

BOYD accepted the following information without independent verification.

- Coal and surface control of lease areas and related mapping (copies of the provincial leases were not provided and are not available on Alberta Department of Energy websites).
- Historical drill hole measurements and resulting coal quality analyses.

For purposes of this report, BOYD did not verify historic drill hole data by conducting independent drilling in areas already explored. It is customary in preparing coal resource and reserve estimates to accept basic drilling and coal quality data as provided by the client subject to the reported results being judged representative and reasonable. The data used in this report are adequate for preparing coal resource estimates. The management and staff of RRCC, who conducted the exploration between 2012 and 2019, fully cooperated during this study, and BOYD has no reason to believe any material information was not disclosed.

Following this page is Figure 12.1, Quaternary Sediment Isopachs.

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault - F0 - Regional - Brazeau Thrust
Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault - F7

RAM RIVER
NORTH RAM RIVER

Legend

- Leased Property
- Applied For Lands
- Seam 3 Outcrop
- 5.0 — Quarternary Sediment Isopachs (m)
- Fault
- 74-C-70 5.5 — Drill Hole Location with Quarternary Sediment Thickness (m)
- Base of Weathering Observation Point (Thickness Not Shown)

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 12.1

QUARTERNARY SEDIMENT ISOPACHS
RAM RIVER PROPERTY
Alberta, Canada

Prepared For

RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 12.1.DWG

13.0 COAL PROCESSING

13.1 Raw Seam Coal Quality Characterization

Rank of the coal within the Ram River property ranges from high-medium volatile (mid-vol) to high volatile (high-vol) bituminous according to the ASTM classification. Mean max vitrinite reflectance ($R_{v,max}$) typically ranges from 0.93% to 0.97%.

Average ash content of the seams is generally less than 25.0% (ad). Seam 3 has the lowest average ash content at 20.9% (ad) in the Aries Block and Seam 2R is the highest at 43.6% (ad). Average ash content for all seams of interest modelled across the deposits is 22.7% (ad). Raw coal quality ash (%ad) contours for seams 3, 2, 2R, and 1 are shown in Figures 13.1 to 13.4, following this text.

Volatile matter is consistent with coal of this rank with typical values ranging between 23.6% and 26.2% (ad). Average total Sulphur content for each seam ranges from 0.43% to 0.62% (ad), with the exception of Seam 1 which displays high values averaging 1.80% (ad). Phosphorous values show some variability throughout the deposit, with contents typically less than 0.05% (ad). Raw coal quality total Sulphur contours for seams 3 and 2 are shown in Figures 13.5 and 13.6.

Raw Free Swelling Index (FSI) for Seam 3 across the Aries Block averages 4.7, and raw FSI for Seam 2 averages 3.3. Raw coal quality FSI contours for Seam 3 and 2 are shown in Figures 13.7 and 13.8, respectively. Seams 3 and 2 have a reported fluidity of 385 ddpm and 66 ddpm, respectively. Ram River coals are mechanically soft and friable, with reported Hardgrove Grindability Index typically 80 to 100.

13.2 Washability Characterization

Detailed information of washability characteristics for the property are contained in the previously filed technical report: Norwest PFS 2017. The previous information remains current, and the following is an abbreviated summary.

BOYD, as part of the 2013 Ram River resource estimate completed a detailed assessment of all CONSOL coal washability work, results of the 2012 washability bulk sample testing work and coking coal assessment.

Based on the washability results from the 2012 to 2014 exploration and testing program, Norwest input the washability data into the Limn® process simulation platform. Using a selected process design flowsheet that typifies current industry designs for the recovery of high value coking coals, a plausible simulated product for each seam was developed.

RRCC engaged in comprehensive exploration and testing programs during 2012 and 2013. As part of those programs, several large diameter (LD) cores (150 mm) were extracted from the key seams in the planned Aries North Block mining areas. The purposes of the LD cores were to enable improved core recovery and to provide sufficient coal mass to perform bulk washability tests. The LD cores were also of sufficient mass to provide bulk samples for coke pilot oven testing as well as performing a pilot washing test. Two separate Norwest documents, Ram River Prefeasibility Coal Preparation Evaluation (Norwest, 9-9-2014) and Ram Coal Bulk Samples Test Work Report (Norwest, 10-14-2014) detail the characterization of the Aries property coals and the pilot wash testing performed in Australia.

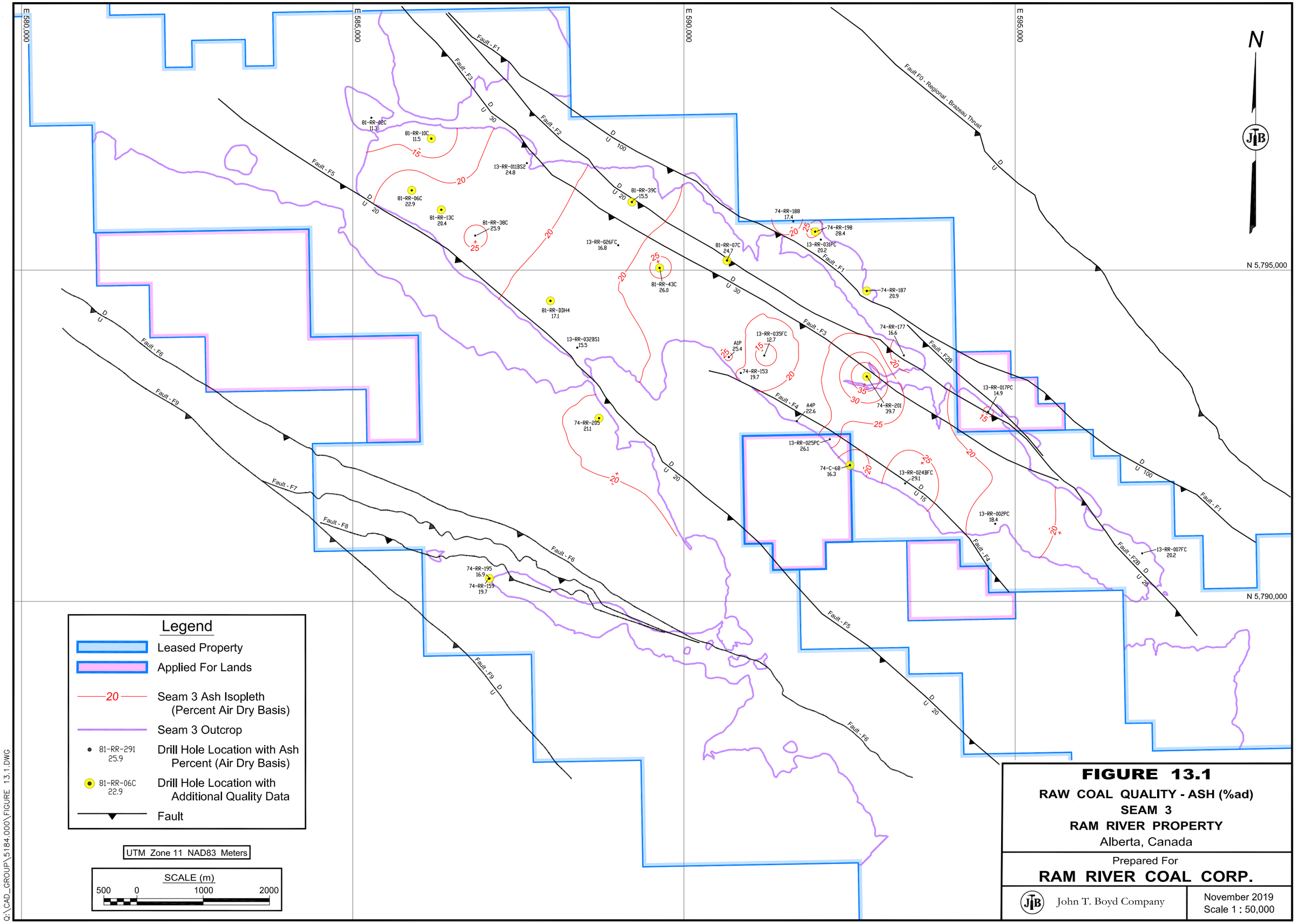
RRCC and Norwest jointly developed a bulk washability testing program for the LD cores for the purpose of designing a coal process plant. The program included core treatment procedures accepted internationally, especially for use in coking coal assessment. This included a series of low-energy liberation procedures, including dry and wet tumbling tests. The latter two tests tend to replicate the effects of screening and pumping operations in a preparation plant allowing a more accurate modelling and simulation for the determination of an optimal process. This is especially important given the typically friable nature of western Canadian metallurgical coals.

As part of the 2019 development of the stratigraphic geological model, no new coal process testing has been completed. Summary of the coal processing testing including product yield and ash relationships are included in the *Technical Report Aries Coal Project*, prepared as a companion report to the 2017 PFS by Norwest Corporation, March 2017.

Following this page are:

Figures

13.1: Raw Coal Quality - Ash (%ad) - Seam 3
13.2: Raw Coal Quality - Ash (%ad) - Seam 2
13.3: Raw Coal Quality - Ash (%ad) - Seam 2R
13.4: Raw Coal Quality - Ash (%ad) - Seam 1
13.5: Raw Coal Quality - Total Sulphur (%ad) - Seam 3
13.6: Raw Coal Quality - Total Sulphur (%ad) - Seam 2
13.7: Raw Coal Quality - FSI (Index) - Seam 3
13.8: Raw Coal Quality - FSI (Index) - Seam 2



Legend

- Leased Property
- Applied For Lands
- 20 — Seam 3 Ash Isopleth (Percent Air Dry Basis)
- Seam 3 Outcrop
- 81-RR-291 25.9 — Drill Hole Location with Ash Percent (Air Dry Basis)
- 81-RR-06C 22.9 — Drill Hole Location with Additional Quality Data
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)

500 0 1000 2000

FIGURE 13.1

RAW COAL QUALITY - ASH (%ad)
SEAM 3
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 13.1.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000

N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

81-RR-05C 32.6
81-RR-13C 29.6
81-RR-38C 25.1
81-RR-09C 27.9
81-RR-DDH4 24.9
81-RR-39C 35.2
74-C-55 13.7
74-C-56 25.3
81-RR-07C 16.4
13-RR-031PC 21.4
74-RR-156 18.3
74-RR-142 14.6
74-RR-177 17.5
13-RR-035FC 16.8
74-RR-153 34.0
A4P 19.9
13-RR-025PC 42.9
13-RR-024BFC 34.3
13-RR-017PC 34.1
13-RR-016FC 30.7
13-RR-002PC 23.0
13-RR-007FC 37.2
74-RR-159 19.6

Legend

- Leased Property
- Applied For Lands
- 20 — Seam 2 Ash Isopleth (Percent Air Dry Basis)
- Seam 2 Outcrop
- 81-RR-DDH4 24.9 — Drill Hole Location with Ash Percent (Air Dry Basis)
- 81-RR-05C 32.6 — Drill Hole Location with Additional Quality Data
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 13.2

RAW COAL QUALITY - ASH (%ad)
SEAM 2
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 13.2.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000

N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

81-RR-DDH4
64.5
13-RR-026FC
41.9
81-RR-07C
24.0
13-RR-031PC
41.6
A4B3
43.0
13-RR-025PC
42.9
13-RR-016FC
30.7
13-RR-002PC
26.1

Legend

- Leased Property
- Applied For Lands
- 40 — Seam 2R Ash Isopleth (Percent Air Dry Basis)
- Seam 2R Outcrop
- 81-RR-DDH4 64.5 — Drill Hole Location with Ash Percent (Air Dry Basis)
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 13.3

RAW COAL QUALITY - ASH (%ad)
SEAM 2R
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 13.3.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000

N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

D U 30
D U 100
D U 20
D U 20
D U 30
D U 20
D U 15
D U 100
D U 20
D U 20
D U 20
D U

20
15
20
25
30
35
40
40

13-RR-035FC
14.7
13-RR-024BFC
36.4
13-RR-007FC
41.9

Legend

- Leased Property
- Applied For Lands
- 20 — Seam 1 Ash Isopleth (Percent Air Dry Basis)
- Seam 1 Outcrop
- 13-RR-035FC 14.7 — Drill Hole Location with Ash Percent (Air Dry Basis)
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 13.4

RAW COAL QUALITY - ASH (%ad)
SEAM 1
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 13.4.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2A
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

81-RR-02C 0.46
81-RR-10C 0.43
81-RR-06C 0.49
81-RR-13C 0.43
81-RR-38C 0.39
13-RR-011BS2 0.70
81-RR-39C 0.44
74-RR-188 0.50
74-RR-198 0.45
13-RR-031PC 0.56
13-RR-026FC 0.62
81-RR-07C 0.45
81-RR-43C 0.71
74-RR-187 0.50
81-RR-DDH4 0.52
13-RR-032BS1 0.45
13-RR-035FC 0.52
74-RR-153 0.75
74-RR-201 0.47
74-RR-177 0.48
74-RR-205 0.55
13-RR-017PC 0.80
13-RR-025PC 0.54
74-C-68 0.50
13-RR-024BFC 0.52
13-RR-002PC 0.68
13-RR-007FC 0.50
74-RR-195 0.52
74-RR-159 0.68

0.4
0.5
0.6
0.7

D U 30
D U 100
D U 20
D U 15

Legend

- Leased Property
- Applied For Lands
- 0.6 — Seam 3 Sulphur Isopleth (Percent Air Dry Basis)
- Seam 3 Outcrop
- 81-RR-38C 0.39 — Drill Hole Location with Sulphur Percent (Air Dry Basis)
- 81-RR-10C 0.43 — Drill Hole Location with Additional Quality Data
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 13.5

RAW COAL QUALITY - SULPHUR (%ad)
SEAM 3
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 13.5.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

81-RR-05C 0.39
81-RR-13C 0.38
81-RR-38C 0.93
81-RR-09C 0.42
81-RR-DDH4 0.42
81-RR-39C 0.43
81-RR-07C 0.43
74-C-55 0.37
74-C-56 0.42
13-RR-031PC 0.59
74-RR-156 0.54
74-RR-142 0.58
74-RR-177 0.72
13-RR-035FC 0.43
74-RR-153 0.63
13-RR-025PC 0.54
13-RR-024BFC 0.62
13-RR-016FC 0.77
13-RR-017PC 0.54
13-RR-002PC 0.61
13-RR-007FC 0.43
74-RR-159 0.67

0.4 0.5 0.6 0.7 0.8 0.9

Legend

- Leased Property
- Applied For Lands
- 0.6 — Seam 2 Sulphur Isopleth (Percent Air Dry Basis)
- Seam 2 Outcrop
- 74-RR-153 0.63 — Drill Hole Location with Sulphur Percent (Air Dry Basis)
- 81-RR-05C 0.39 — Drill Hole Location with Additional Quality Data
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 13.6

RAW COAL QUALITY - SULPHUR (%ad)
SEAM 2
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 13.6.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000

N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

81-RR-10C 6.5
81-RR-02C 4.8
81-RR-06C 4.2
81-RR-13C 3.8
81-RR-38C 3.5
13-RR-011BS2 2.0
81-RR-39C 5.2
13-RR-026FC 6.1
81-RR-43C 4.5
81-RR-07C 3.8
81-RR-DDH4 3.4
13-RR-032BS1 5.5
74-RR-188 5.5
13-RR-031PC 4.5
74-RR-187 2.0
74-RR-177 6.5
A1P 5.0
13-RR-035FC 5.5
74-RR-153 3.0
A4P 5.5
13-RR-017PC 4.5
13-RR-025PC 4.0
74-C-68 6.4
13-RR-002PC 5.0
13-RR-007FC 6.5
74-RR-159 6.0

6.0
5.0
4.0
3.0

D U 30
D U 100
D U 20
D U 15

Legend

- Leased Property
- Applied For Lands
- 5.0 — Seam 3 Free Swelling Index Isopleth (Value)
- Seam 3 Outcrop
- 81-RR-38C 3.5 — Drill Hole Location with Free Swelling Index (Value)
- 81-RR-10C 6.5 — Drill Hole Location with Additional Quality Data
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 13.7

RAW COAL QUALITY
FREE SWELLING INDEX (VALUE)
SEAM 3
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

CAD_GROUP\5184.000\FIGURE 13.7.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000

N

Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault F0 - Regional - Brazeau Thrust

81-RR-05C 4.1
81-RR-13C 2.9
81-RR-38C 4.9
81-RR-09C 3.6
81-RR-39C 2.7
81-RR-DDH4 3.7
74-C-55 2.0
74-C-56 4.5
81-RR-07C 5.8
13-RR-031PC 4.0
74-RR-156 6.0
74-RR-153 2.5
13-RR-035FC 1.5
74-RR-177 1.5
13-RR-017PC 2.0
A4P 5.5
13-RR-025PC 1.0
13-RR-024BFC 1.0
13-RR-016FC 3.5
13-RR-002PC 4.5
13-RR-007FC 2.0
74-RR-159 6.0

Legend

- Leased Property
- Applied For Lands
- 4.0 — Seam 2 Free Swelling Index Isopleth (Value)
- Seam 2 Outcrop
- 81-RR-38C 4.9 — Drill Hole Location with Free Swelling Index (Value)
- 81-RR-05C 4.1 — Drill Hole Location with Additional Quality Data
- Fault

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 13.8

RAW COAL QUALITY
FREE SWELLING INDEX (VALUE)
SEAM 2
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 13.8.DWG

14.0 MINERAL RESOURCE ESTIMATES

14.1 Introduction

Following development of a stratigraphic geological model for the Ram River property by BOYD, an estimate of the coal resources was developed. This chapter contains a review of the NI 43-101 reporting standards, BOYD's estimation methodology, and our resource estimate for the Ram River property. This coal resource tonnage estimate was prepared as of 31 October 2019.

14.2 Definitions and Applicable Standards

Estimates of coal resources are always subject to a degree of uncertainty. The level of confidence that can be applied to a particular estimate is a function of, among other things: the amount, quality, and completeness of exploration data; the geological complexity of the deposit; and economic, legal, social, and environmental factors associated with mining the coal.

In accordance with NI 43-101, BOYD used the applicable definitions provided by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), as the "CIM Definition Standards on Mineral Resources and Mineral Reserves" (CIM Standards) to describe the degree of uncertainty associated with the estimate reported herein.

The definition of mineral (coal) resource provided by the CIM Standards is:

> *A Mineral Resource is a concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.*

Resources are subdivided into classes of Measured, Indicated, and Inferred, with the level of geologic confidence reducing with each class, respectively:

> *A "Measured Mineral Resource" is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling*

and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough to confirm both geological and grade continuity.

An "Indicated Mineral Resource" is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed.

An "Inferred Mineral Resource" is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes.

Coal resources are reported as in situ tonnage and are not adjusted for mining losses or dilution. Unless noted, estimates presented herein are reported in metric units. BOYD has not performed a mine plan or feasibility study to determine the economic mineability of the estimated tonnes.

14.3 Reasonable Prospects for Eventual Economic Extraction

RRCC has no history of production from the Ram River property. Surrounding operating mines include: Cardinal River, approximately 150 km to the northwest; Grand Cache, approximately 300 km to the northwest; and Fording River, approximately 200 km to the south-southeast.

RRCC engaged Norwest consultants to prepare a prefeasibility study and optimization study in 2017, which assessed mining options for the Ram River property. BOYD considers these studies and findings establish a general basis that the proposed mining project is likely to be economically viable.

14.4 Points of Observation

The geological database for the model was developed from review of exploration records and previous drill hole compilations, and includes the results of 599 drill holes. From these, 332 drill holes provided coal seam stratigraphic control and 315 drill holes provided unconsolidated sediment control. Outcrop mapping data were incorporated in modelling coal seam subcrops.

Drill holes were reviewed on the basis of the type of drilling and level of information collected. These categories were used to determine the Points of Observation (PO) that were suitable for use in building the geological and coal quality models, as well as determining the extent of each resource classification. Two types of PO were used to determine the resource extents for each interval: coal quality PO, and structural PO:

- Structural POs include both open holes and cored holes that were logged using downhole geophysical tools, or a suitably high level of logging information was achieved. Seam thickness intersections were excluded if anomalous due to faulting, interaction with subcrop, or geostatistical outliers (greater than three standard deviations). The structural POs were used to develop the stratigraphic structural model.

- Coal Quality POs are defined as seam intersections with recovered samples that were analysed for proximate analysis. Core recovery and sample analysis was undertaken on at least 85% of the seam thickness, typically determined by analysis of geophysical logs. On the basis of the 2018 Millcreek Optimization study and further assessment by BOYD, an additional 17 coal quality points from 11 drill holes identified by the 2018 optimization study and 4 coal quality points from 3 drill holes identified by BOYD, including points with sample core recoveries between 73% to 85% (details provided in Section 12). The Coal Quality POs were used to develop the coal quality stratigraphic model.

14.5 Confidence Criteria

Geological assuredness is established by the availability of both structural (thickness and elevation) and quality information for each individual coal seam. Classification is generally based on the concentration or spacing of exploration data, which can be used to demonstrate the geologic continuity of the deposit.

Geological Survey of Canada provides standardized guidelines for classifying coal deposits in publication GSC 88-21. BOYD considered the guideline as part of the resource estimation. BOYD's previous assessment concluded the Geological Type of the Ram River property is moderate overall, but Low-Type B within the established underground mineable area.

The following table provides the general criteria used by BOYD in the classification of the reported coal resource tonnages:

Classification (Geologic Confidence)	Data Point Spacing (m) (radial distance)	
	Structure	Quality
Measured	< 900	< 2,000
Indicated	< 1,800	< 4,000
Inferred	< 4,000	< 8,000

Extrapolation or projection of resources in any category beyond any PO does not exceed the half the point spacing distance. We assigned these spacing criteria based on our independent assessment of the site-specific geologic conditions encountered or expected at the Ram River property. We believe these criteria are appropriate and provide the required level of geological assurance.

14.6 Resource Limits and Parameters

The following parameters were applied in our estimation of the coal resources at the Ram River property:

- The base of weathering horizon was used as the upper constraint of the resource. Oxidized coal, including areas where seams have been partly oxidized, is excluded.
- A maximum depth of 600 m was applied.
- A minimum seam thickness of 1.0 m was applied for the Measured and Indicated Resources, with the exception of rare localized thinning. A minimum seam thickness of 0.2 m was applied for the Inferred Resources of Seam 2R and Seam 1, on the basis of close association with Seam 2.
- A maximum separable stone parting thickness of 0.3 m was considered.
- A maximum raw ash content of 50% (ad) was considered for the Measured and Indicated Resources. Higher ash material (max 65%ad) of the Seam 2R was not excluded from the Inferred Resource.
- A 25 m standoff either side of major faults was applied to Measured Resources, and quantities within that standoff zone were re-categorised as Indicated Resources.
- No standoff from the Crown Lease - coal tenure boundaries was applied.
- Crown Leases and Crown Leases under application have been considered equivalent. No exclusions for applications areas have been applied.

In situ moisture calculations were made using total moisture, equilibrium moisture, inherent moisture and proximate analysis results, following methods outlined in ACARP Projects C10041 and C10042. In situ density calculations were made using the formula developed by Preston and Sanders (1993).

14.7 Resource Estimate

The estimates of coal resources presented below have been independently prepared by BOYD using Maptek Vulcan 11.0.4 In situ resourcing tools applied to the BOYD 2019 stratigraphic structural and coal quality models. In general, our estimates are the result of the following procedures:

- Review and validation of compiled database, and interpretation.
- Creation and validation of stratigraphic and coal quality models for the Ram River property.
- Review of available exploration data to ascertain the level of geologic continuity for each coal seam.
- Review and application of estimation assumptions, parameters, and criteria.
- Estimation of the coal resources based on the defined criteria.

In 2016, RRCC received a letter from the Alberta Government which clarified the 1976 Alberta Coal Policy as it relates to RRCC. As is the case elsewhere in Alberta, the permitting of surface mining activities is subject to regulatory review and approvals.

BOYD estimated coal resources on the basis of open cut and underground mining. Coal resource estimates are based on total in-place seam tonnes and do not consider mining recovery or mine planning considerations. Geologic Type of the Ram River Property is judged to vary from Low-Type B to Moderate. Estimated in situ coal resources as at 31 October 2019 total 403 million metric tonnes (Mt), with an additional 285 Mt of inferred resources estimated, as follows:

ASTM Coal Rank	In Situ Resource (Mt)			
	Measured	Indicated	Subtotal (Meas. + Ind.)	Inferred
Med-High Volatile Bituminous	298	105	403	285

A summary of the estimated coal resource tonnage by coal seam follows:

Coal Seam	In Situ Resource (Mt)			
	Measured	Indicated	Subtotal (Meas. + Ind.)	Inferred
Seam 6	-	-	-	-
Seam 5	-	-	-	-
Seam 4	-	-	-	-
Seam 3	176	60	236	90
Seam 2R	-	-	-	63
Seam 2	122	45	167	71
Seam 1	-	-	-	61
Total	298	105	403	285

A summary of the estimated coal resource tonnage by property block follows:

	In Situ Resource (Mt)			
Block	Measured	Indicated	Subtotal (Meas. + Ind.)	Inferred
North	208	10	218	41
South	90	95	185	245
Total	298	105	403	285

A summary of the estimated coal resource tonnage by coal lease status follows:

	In Situ Resource (Mt)			
Block	Measured	Indicated	Subtotal (Meas. + Ind.)	Inferred
Coal Lease	292	93	385	192
Coal Lease Application	5	13	18	93
Total	298	105	403	285

A summary of the estimated coal resource tonnage by depth, and block follows. Resources are show at 50 m depth intervals from surface to 200 m, then 100 m intervals from 200 m to 600 m depth.

		In Situ Resource (Mt)			
Block	Depth	Measured	Indicated	Subtotal (Meas. + Ind.)	Inferred
North	0-50 m	22	2	24	4
	50-100 m	59	3	63	10
	100-150 m	78	3	81	11
	150-200 m	47	1	48	15
	200-300 m	3	-	3	1
	300-400 m	-	-	-	-
	400-500 m	-	-	-	-
	500-600 m	-	-	-	-
	Sub-Total	208	10	218	41
South	0-50 m	12	5	17	10
	50-100 m	19	9	29	20
	100-150 m	18	14	32	35
	150-200 m	18	21	39	41
	200-300 m	23	38	61	81
	300-400 m	-	5	5	33
	400-500 m	-	2	2	18
	500-600 m	-	-	-	6
	Sub-Total	90	95	185	245
Total		298	105	403	285

Figure 14.1 and Figure 14.2 following this text, are the resource blocks used for Seam 3 and Seam 2 estimates, respectively.

14.8 Estimated Coal Quality

In Situ coal quality has been estimated for each of the resource categories and areas described above. The table below summarises the quality by seam group and resource confidence category as at 31 October 2019:

Seam - Block	Mass (Mt is)	Relative Density (g/cc is)	Moisture (% ad)	Ash (% ad)	Volatile Matter (% ad)	Fixed Carbon (% ad)	Calorific Value (kcal/kg ad)	Total Sulphur (% ad)	Free Swell Index (FSI)
Measured Resources									
Seam 3 – North	122	1.43	1.0	20.9	26.2	52.2	6,510	0.54	4.6
Seam 3 – South	54	1.42	0.9	19.5	25.0	54.8	6,680	0.54	5.0
Seam 2 – North	86	1.48	1.1	27.1	23.7	48.1	5,930	0.51	3.3
Seam 2 – South	36	1.46	1.1	25.4	23.6	49.9	6,110	0.57	4.0
Subtotal	298	1.44	1.0	23.0	25.0	51.2	6,330	0.54	4.3
Indicated Resources									
Seam 3 – North	5	1.43	1.0	21.8	26.4	51.5	6,410	0.55	4.8
Seam 3 – South	55	1.42	0.9	19.3	25.1	54.8	6,690	0.54	4.9
Seam 2R*	-	1.68	1.5	43.7	17.4	37.4	4,340	0.43	1.0
Seam 2 – North	5	1.50	1.2	28.4	23.8	46.5	5,790	0.55	2.9
Seam 2 – South	40	1.46	1.1	25.1	23.6	50.2	6,140	0.57	4.1
Seam 1*	-	1.50	1.1	25.8	29.2	43.9	6,070	1.77	6.0
Subtotal	105	1.43	1.0	22.1	24.5	52.5	6,430	0.55	4.5
Total	403	1.44	1.0	22.8	24.9	51.5	6,350	0.54	4.3

* Seam 1 and Seam 2R represent inferred resources and are shown for completeness. As such, they are excluded in weighted average summaries for indicated and measured resource coal quality.

Coal processing of Ram River property coal is planned to establish final product coal quality.

14.9 Previous Estimates

Resource estimates for the Ram River property have been completed a number of times, as part of successive exploration programs between 1974 and 2017. The 2013, 2017, and 2019 resource estimates have been compared. The historical resource estimates completed in 1974, 1980, and 1982 were not reported in accordance with NI 43-101 terminology: those historical reports have been reviewed in previous Ram River property reports and have not been included in this report.

In 2013, BOYD completed a resource estimate for the Ram River property, in accordance with NI 43-101. The 2013 estimate was based on historical data and new coal quality results from the 2012 bulk sample. An underground mineable resource (measured and indicated) of 359 Mt of medium-high volatile bituminous coal was reported across the Ram River property. A separately reported estimate of 53 Mt of open cut resources was made.

In 2017, Norwest completed a PFS on part of the Ram River property. The companion 2017 technical report included resources estimates completed as part of the PEA and PFS, reported in accordance with NI 43-101. The updated resource estimate was based on 2013-2014 exploration results. An underground and surface mineable resource (measured and indicated) of 414 Mt was reported across the Ram River property.

In 2019, BOYD developed a stratigraphic geological model for the Ram River property. The stratigraphic model was built based on independently reviewing the compiled exploration database, interpretations and PFS geological model. No additional exploration was completed for the 2019 estimate. BOYD completed a 2019 resource estimate for the Ram River property generally in accordance with NI 43-101. An underground and surface mineable resource (measured and indicated) of 403 Mt was reported across the Ram River property.

Key changes between the 2017 and 2019 geological model and resource estimates include:

- The complete stratigraphic sequence of identified coal seams has been modelled, resulting in an estimated 61 Mt Inferred Resource for Seam 1.
- Weathering defaults have been replaced with modelled weathering observations from drill holes. The base of weathering was found to be 3 m to 4 m deeper than previous estimates, resulting in an estimated resource reduction of 2.5%.
- The number of coal quality points of observation have been increased. Quality points were re-composited to verify that sampled intervals represent the coal seam intervals.
- Re-assessment of in situ raw ash resulted in an estimated increase of 1.4% (db) (19.3% to 20.7%) for Seam 3 and 4.2% (db) (23.1% to 27.3%) for Seam 2.
- Coal quality parameters have been spatially modelled by coal seam across the deposit.
- A detailed reassessment of in situ moisture and in situ density has been applied to the coal quality model.

Following this chapter are:

Figures:

14.1: Coal Resource Blocks – Seam 3
14.2: Coal Resource Blocks – Seam 2

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

SYNCLINE
ANTICLINE
Fault - F1
Fault - F2
Fault - F3
Fault - F4
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault - F2B
Fault F0 - Regional - Brazeau Thrust
D U 30
D U 100
D U 20
D U 15

Legend

- Leased Property
- Applied For Lands
- Seam 3 Outcrop
- Drill Hole Location
- Drill Hole with Quality Data
- 200 — Seam 3 Depth Contours (m)
- Fault

RESOURCE CLASSIFICATION

- Measured
- Indicated
- Inferred

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 14.1

RESOURCE CLASSIFICATION MAP
SEAM 3
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 14.1.DWG

E 580,000
E 585,000
E 590,000
E 595,000
N 5,795,000
N 5,790,000
N

SYNCLINE
ANTICLINE
Fault - F1
Fault - F2
Fault - F2B
Fault - F3
Fault - F4
Fault - F4B
Fault - F5
Fault - F6
Fault - F7
Fault - F8
Fault - F9
Fault F0 - Regional - Brazeau Thrust
D U 30
D U 100
D U 20
D U 15

Legend

- Leased Property
- Applied For Lands
- Seam 2 Outcrop
- Drill Hole Location
- Drill Hole with Quality Data
- 200 — Seam 2 Depth Contours (m)
- Fault

RESOURCE CLASSIFICATION

- Measured
- Indicated
- Inferred

UTM Zone 11 NAD83 Meters

SCALE (m)
500 0 1000 2000

FIGURE 14.2

RESOURCE CLASSIFICATION MAP
SEAM 2
RAM RIVER PROPERTY
Alberta, Canada

Prepared For
RAM RIVER COAL CORP.

John T. Boyd Company

November 2019
Scale 1 : 50,000

Q:\CAD_GROUP\5184.000\FIGURE 14.2.DWG

15.0 MINERAL RESERVE ESTIMATES

This report is limited to a development of stratigraphic geological model and coal resource estimate.

A reserve estimate based on previous estimates of resources may no longer be valid. BOYD has not done sufficient work to classify the 2019 resource estimates as current mineral reserves.

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16.0 MINING METHODS

This report is limited to a development of stratigraphic geological model and coal resource estimate. The Mining Methods section is not applicable as part of a Technical Report Coal Resource Estimate requirements for the Ram River property.

Mining Method assessments based on previous estimates of resources may no longer be valid.

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17.0 RECOVERY METHODS

This report is limited to a development of stratigraphic geological model and coal resource estimate. Recovery Methods section is not applicable as part of a Technical Report Coal Resource Estimate requirements for the Ram River property.

Recovery Method assessments based on previous estimates of resources may no longer be valid.

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18.0 PROJECT INFRASTRUCTURE

This report is limited to a development of stratigraphic geological model and coal resource estimate. An estimate of Project Infrastructure is not applicable as part of a Technical Report Coal Resource Estimate requirements for the Ram River property.

Project infrastructure assessments based on previous estimates of resources may no longer be valid.

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19.0 MARKET STUDIES AND CONTRACTS

This report is limited to a development of stratigraphic geological model and coal resource estimate. A Market Study or Coal Contracts section is not applicable as part of a Technical Report Coal Resource Estimate requirements for the Ram River property.

Market studies based on previous estimates of resources may no longer be valid.

U:\BOYD_PROJECTS\5184.000 Ram Coal - Stratigraphic Model and Resource Estimation\BOYD Reports\Final\19.0 Market Studies.docx

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

This report is limited to a development of stratigraphic geological model and coal resource estimate. Formal Environmental, Permitting, and Social or Community Impact studies have not assessed for this report. Information from the previous technical report PFS 2017 is considered current

BOYD understands that an approved coal mining permit is not currently in place for the Ram River property. However, we have not identified a reason why a mining permit should not be secured.

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21.0 CAPITAL AND OPERATING COSTS

This report is limited to a development of stratigraphic geological model and coal resource estimate. Projection of Capital and Operating Costs is not applicable as part of a Technical Report Coal Resource Estimate requirements for the Ram River property.

Capital and Operating Cost assessments based on previous estimates of resources may no longer be valid.

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22.0 ECONOMIC ANALYSIS

This report is limited to a development of stratigraphic geological model and coal resource estimate. An economic analysis is not applicable as part of a Technical Report Coal Resource Estimate requirements for the Ram River property.

Economic analysis based on previous estimates of resources may no longer be valid.

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23.0 ADJACENT PROPERTIES

BOYD is aware that Scurry Ram coal property lies immediately south and adjoins the Ram River property. In 2012, RRCC acquired the Scurry Ram coal holdings (which were owned by CONSOL).

The most recent mining in the nearby vicinity ceased in 1955 when the Nordegg Mine closed; this mine was located 26 km northwest of the Ram River property.

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24.0 OTHER RELEVANT DATA AND INFORMATION

24.1 Alberta Coal Policy

In June 1976 the Alberta government put in place a Coal Development Policy that classified lands in the province as being suitable for various types of coal mining. The Ram River property is within lands subject to the restrictions of Category 2. The policy as originally written, laid out that while it is possible to conduct coal exploration on Category 2 land, strict controls were enforced by Albertan authorities. Mine development was limited to underground mining only, and required approval that the surface effects of mining are environmentally acceptable.

RRCC subsequently received documentation from the provincial government (Alberta Government communication, July 2016) which provided clarification of the Coal Development Policy for Alberta from 1976, as it relates to the Ram River property. It confirmed that, as is the case elsewhere across Alberta, the permitting of surface mining activities is subject to regulatory review and approvals. BOYD considers as reasonable, the conclusions reached by RRCC as well as the Norwest 2017 PFS, that “coal Category 2 designation does not automatically preclude surface coal mine development”.

The Norwest 2017 PFS and technical report for the project, used the July 2016 clarification letter as support to consider surface mining techniques acceptable for the Ram River project.

24.2 Alberta Land Use Resource Development Framework

A summary assembled as part of the Norwest 2017 PFS of the potentially applicable permitting, development, and land-use policies, which may or may not be considered by provincial regulators in its review of the Aries Project, is summarized below.

- 1976 A Coal Development Policy for Alberta.
- 1983 Directive 61 – How to Apply for Government Approvals of Coal Projects in Alberta.
- 1984 Eastern Slopes Policy.
- 1986 Nordegg – Red Deer River Sub-Regional Integrated Resource Plan.
- 1986 Rocky – North Saskatchewan Sub-Regional Integrated Resource Plan.

The Nordegg and Rocky Sub-Regional Integrated Resources Plans (IRPs) from 1986 overlay the project area. These IRPs are planning documents prepared by the government and the public for improved management of Alberta’s land and

resources. Each plan presents the Alberta Government's resource management policy for the public lands and resources within the area. They are intended to be a guide to resource managers, industry, and the public whom have responsibilities or interests in the area. Language contained within each of the IRPs are favourable towards sustainable coal development, and they both make specific reference to the development of RRCC coal deposits within each IRP's Management Objectives.

24.2.1 Alberta Land-Use Framework

The provincial government adopted a provincial Land-use Framework (LUF) in 2008 whose purpose was to provide a land-use system that manages public and private lands and natural resources in a responsible manner. The LUF was incorporated as a new approach to managing provincial lands and natural resources to achieve, long-term economic, environmental, and social goals. The government recognized that the social, economic, and environmental goals are highly integrated, and that decision making and trade-offs for Alberta's land and resources would have to be considered. To date, two regional plans have been completed and approved, the Lower Athabasca and the South Saskatchewan.

The Ram River property is within the North Saskatchewan Regional Planning (NRSP) area which was initiated in 2014. Phase one of a three phase process has been completed and it was anticipated that phase two would begin later in 2017. RRCC team members have been actively engaged in the public and specific consultation for the NSRP. The process involves extensive public, municipal, industry and other interested groups engagement at a variety of levels. The Ram River coal deposits were identified in the NRSP Profile document which demonstrates the provincial government recognize the economic opportunities that exists with the Project.

25.0 INTERPRETATION AND CONCLUSIONS

BOYD considers that RRCC is following a logical program to explore, study, and develop the Ram River coal resources.

BOYD's independent coal resource study concludes that as at 31 October 2019:

- The Ram River property is underlain by a large, Low-Type "Moderate" coal deposit with an estimated 298 Mt Measured, 105 Mt Indicated, and 285 Mt Inferred coal resources.
- Total resources are estimated at 403 Mt of coal in the Measured and Indicated categories.
- Coal rank is medium to high volatile Bituminous with in situ coal quality on an air-dried basis summarised as follows:

Seam - Block	Mass (Mt is)	Relative Density (g/cc is)	Moisture (% ad)	Ash (% ad)	Volatile Matter (% ad)	Fixed Carbon (% ad)	Calorific Value (kcal/kg ad)	Total Sulphur (% ad)	Free Swell Index (FSI)
Measured Resources									
Seam 3 – North	122	1.43	1.0	20.9	26.2	52.2	6,510	0.54	4.6
Seam 3 – South	54	1.42	0.9	19.5	25.0	54.8	6,680	0.54	5.0
Seam 2 – North	86	1.48	1.1	27.1	23.7	48.1	5,930	0.51	3.3
Seam 2 – South	36	1.46	1.1	25.4	23.6	49.9	6,110	0.57	4.0
Subtotal	298	1.44	1.0	23.0	25.0	51.2	6,330	0.54	4.3
Indicated Resources									
Seam 3 – North	5	1.43	1.0	21.8	26.4	51.5	6,410	0.55	4.8
Seam 3 – South	55	1.42	0.9	19.3	25.1	54.8	6,690	0.54	4.9
Seam 2R*	-	1.68	1.5	43.7	17.4	37.4	4,340	0.43	1.0
Seam 2 – North	5	1.50	1.2	28.4	23.8	46.5	5,790	0.55	2.9
Seam 2 – South	40	1.46	1.1	25.1	23.6	50.2	6,140	0.57	4.1
Seam 1*	-	1.50	1.1	25.8	29.2	43.9	6,070	1.77	6.0
Subtotal	105	1.43	1.0	22.1	24.5	52.5	6,430	0.55	4.5
Total	403	1.44	1.0	22.8	24.9	51.5	6,350	0.54	4.3

* Seam 1 and Seam 2R represent inferred resources and shown for completeness. As such, they are excluded from weighted average summaries for Indicated and Measured resource coal quality.

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26.0 RECOMMENDATIONS

BOYD recommends that:

1. Additional exploratory core drilling (minimum 85% core recovery) be undertaken to further define raw coal quality of the coal seams throughout both resource block areas.
2. Additional study be completed to assess and further define the base of weathering across the drill hole database.
3. Further stratigraphic correlation and testing be undertaken of Seams 4, 5 and 6 to assist with determining the economic potential of mining these seams, as part of the overburden removal of the deeper coal seams.
4. Review, assess and correct identified issues in the RRCC drill hole database with a focus on unifying geophysical corrections observed in the seam picks, across all database components.
5. Undertake mine planning and optimization work to assess the application of strip mining methods.

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27.0 REFERENCES

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Norwest 2014 Preliminary Economic Assessment of the Ram River Property, Alberta.

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Estimation of In situ and Product Total Moisture, ACARP C10041, 2003.

Estimation of In situ Density from Apparent Relative Density and Relative Density Analyses, ACARP C10042, 2004

28.0 CERTIFICATE OF QUALIFICATIONS

Adrian J. Buck

I, Adrian J. Buck, Senior Geologist of John T. Boyd Company reviewed, and contributed to this report entitled Coal Resource Report, Ram River Property, Alberta, Canada prepared for Ram River Coal Corp. and dated 22 November 2019 do hereby certify:

- I am Senior Geologist of John T. Boyd Company of the Brisbane office located at Level 11, 388 Queen St, Brisbane, Queensland 4000, Australia.
- I graduated with a Bachelor and Masters of Science Degree in Geology (Hons) from the Queensland University of Technology in 1999 and 2008, respectively.
- I am a member of the Australian Institute of Mining and Metallurgy (Member 316668). I have worked as a geologist for over 16 years since my graduation from university.
- I have read the definition of “qualified person” set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101), and past relevant work experience, I fulfil the requirements to be a “qualified person” for the purposes of NI 43-101.
- I am responsible for the preparation of Sections 1 through 14, and 23 through 28 of the report titled: Coal Resource Report, Ram River Property, Alberta, Canada.
- I did not conduct any field visits for purposes of this report, but communicated with other John T. Boyd Company personnel who inspected the site in 2012.
- I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.
- I am independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.
- I have read NI 43-101 and Form 43-101F1, and to the best of my knowledge, the Technical Report, within the context of a coal resource estimate has been prepared in compliance with that instrument and form.
- On behalf of John T. Boyd Company and myself, I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public of the Technical Report.

Dated 22 November 2019
(Signed and Sealed)

Adrian J. Buck
Senior Geologist