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**NI43-101 TECHNICAL REPORT
ON THE DIVISION MOUNTAIN
COAL PROPERTY AND RELATED
EXPLORATION LICENCES,
YUKON
TERRITORY, CANADA**

Located at Latitude 610 20' N and Longitude
1360 05' W

Submitted to:
2560344 Ontario Inc.

Date:
July, 2017

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TITLE PAGE

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TABLE OF CONTENTS

1	Summary	1
2	Introduction	5
3	Reliance on Other Experts.....	7
4	Property Description and Location	8
5	Accessibility, Climate, Local Resources, Infrastructure and Physiography	11
5.1	Accessibility.....	11
5.2	Physiography.....	13
5.3	Local Resources and Infrastructure	13
5.4	Climate	14
6	History	14
7	Geological Setting and Mineralization	19
7.1	Regional Geology	19
7.2	Stratigraphy – Division Mountain.....	20
7.2.1	Tanglefoot Formation (Laberge Group).....	20
7.2.2	Richtofen Formation (Laberge Group).....	21
7.2.3	Andesite	26
7.3	Stratigraphy – Whitehorse Trough	26
7.3.1	Cache Creek Terrane	26
7.3.2	Lewes River Group	28
7.3.3	Nordenskiold Formation (Laberge Group)	28
7.3.4	Tantalus Formation	28
7.4	Detailed Geology of the Division Mountain Coal Measures	28
7.5	Structural Geology	29
7.6	Mineralization	31
7.6.1	Division Mountain	31
7.6.2	Mineralization on Other Exploration Licences	32
7.7	Coal Quality	32
7.7.1	Division Mountain	32
7.7.2	Coal Quality on Other Exploration Licences	34
7.8	Coal Bed Methane and Conventional Hydrocarbons.....	34
8	Deposit Type	35
9	Exploration	36
9.1	Division Mountain	36
9.2	Division Mountain Area	37
9.2.1	Red Ridge	37
9.2.2	Upper and Lower Cub Mountain	37
9.2.3	Corduoy Mountain	38
9.3	Campbell Highway and Walsh Mountain	38
9.4	Five Fingers Area	39
9.5	Carmacks Area	39

10	Drilling	40
10.1	Division Mountain	40
10.2	Division Mountain Area	41
10.2.1	Hull Mountain	41
10.2.2	Cub Mountain	41
10.2.3	Corduoy Mountain	42
10.3	Other Exploration Licence Areas	42
10.4	Geotechnical Drilling	42
10.4.1	Toppling Failures	42
10.4.2	Wedge Failures	42
10.4.3	Planar Failures	43
10.4.4	Circular Failure	43
11	Sample Preparation, Analysis and Security	43
11.1	Sample Preparation	43
11.2	Analysis	44
11.3	Secutiry	44
12	Data Verification	45
13	Mineral Processing and Metallurgical Testing	45
14	Historic Mineral Resource Estimate	46
14.1	Methodology and Approach	46
14.2	Historic Mineral Resource Estimate	47
15	Historic Mineral Reserve Estimate	49
16	Mining Methods	50
16.1	Optimum Pit and Geotechnical Analysis	50
16.1.1	Pit One – West Wall	51
16.1.1.1	Circular Failure Mode	51
16.1.1.2	Planar Failure Mode	51
16.1.2	Pit One- East Wall	52
16.1.2.1	Circular Failure Mode	52
16.1.2.2	Planar Failure Mode	52
16.1.3	Recommended Slopes	53
16.2	Selection of Mining Method	54
16.2.1	Design Criteria and Assumptions	54
16.2.2	Geotechnical Design Parameters	55
16.2.2.1	Pit Wall Stability	55
16.2.2.2	Dump Slope Stability	55
16.2.3	Other Design Parameters	56
16.3	Sequence of Operations	56
16.3.1	Topsoil Stripping	58
16.3.2	Drilling and Blasting	58
16.3.3	Overburden Stripping	58
16.4	Coal Mining	58
16.4.1	Production and Productivity Levels	59
16.4.2	Operating Efficiency	59
16.4.3	Equipment Scheduled Hours	59
16.4.4	Mine Maintenance	60

	16.5	Water Management – Mine Pit	60
	16.5.1	Pit In-flow	62
	16.5.2	Groundwater	62
	16.6	Mine Access and Haul Roads	62
	16.6.1	Haul Road Design Parameters	62
	16.6.2	Mine Access	63
	16.7	Coal Transport	63
	16.8	Ash Disposal	64
	16.9	Reclamation and Closure	64
	16.10	Mine Planning	64
	16.10.1	Methodology	64
	16.10.2	Mine Plan Overview	65
	16.10.3	Mine Schedule	71
	16.10.3.1	Years 1 Through 5	71
	16.10.3.2	Years 6 Through 10	71
	16.10.3.3	Years 11 Through 15	71
	16.10.3.4	Years 16 Through 20	71
	16.10.4	Dump Schedule	71
17		Recovery Methods	77
18		Project Infrastructure	77
	18.1	Equipment Selection	77
	18.2	Coal Handling Facilities	77
	18.2.1	Surface Facilities	80
	18.2.2	Mine Support Facilities	80
	18.3	Waste Drilling.....	81
	18.4	Waste Stripping	81
	18.5	Coal Mining	81
	18.6	Coal Transport	81
	18.7	Mining Support Equipment	82
19		Market Studies and Contracts	82
20		Environmental Studies, Permitting and Social or Community Impact.....	83
	20.1	Environmental Setting	83
	20.2	Permitting	83
	20.2.1	Permitting – Exploration Licence	83
	20.2.2	Permitting – Mine Licence	85
	20.2.3	Yukon Water Board	88
	20.2.4	Land Use Permit	89
	20.2.5	Lease Acquisition	89
	20.2.6	Environmental and Detailed Engineering Studies	90
	20.3	Environmental and Socio-Economic Impacts	90
	20.3.1	Impact and Risk Assessments	90
	20.3.2	First Nations Relations and Consultation	91
	20.3.3	General Public Relations	91
	20.3.4	Yukon Mine Site and Reclamation Policy	91

21	Capital and Operating Costs	92
21.1	Capital Costs	92
21.1.1	Methodology	94
21.1.2	Mine Development	94
21.1.3	Power Line	94
21.1.4	Water Management and Drainage Infrastructure	96
21.1.5	Access Development	96
21.1.6	Coal Transportation Corridor	96
21.1.7	Contractors	96
21.1.8	Infrastructure and Facilities	96
21.1.9	Mobile Equipment	96
21.2	Operating Costs	96
21.2.1	Methodology	96
21.2.2	Unit Costs	102
21.2.2.1	Waste Stripping	102
21.2.2.2	Drilling and Blasting	102
21.2.2.3	Mining	102
21.2.2.4	Coal Handling	102
21.2.3	Labor	104
21.2.3.1	Hourly Personnel	104
21.2.3.2	Salaried Personnel	104
21.2.4	Materials, Supplies, and Services	106
22	Economic Analysis	107
22.1	Overview	107
22.2	Financial Assumptions	108
22.2.1	Cost Analysis Basis	108
22.2.2	Coal Price	108
22.2.3	Taxes and Royalties	110
22.3	Sensitivity Analysis	110
22.4	Debt Financing	114
22.5	Mine Payback	114
23	Adjacent Properties	116
24	Other Relevant Data and Information.....	116
24.1	Exploration Work Schedule – 2017	116
24.2	Project Development Schedule – 2018 or Beyond	116
24.3	Environmental Assessment and Permitting Timelines	116
24.3.1	Facilities and Infrastructure Construction.....	119
24.3.2	Purchase of Mobile Equipment	119
24.3.3	Human Resources	119
24.3.4	Production Start-up	119
25	Interpretation and Conclusions	119
26	Recommendations	120
27	References	122

List of Tables

3.1	Average Coal Quality Analysis	1
4.1	Coal Licences and Leases	11
6.1	Summary of Exploration Activity	17
7.1	Coal Quality Analysis	33
14.1	Historic Coal Resource Summary	47
14.2	Historic Coal Resource by Section	47
14.3	Historic Coal Resource by Seam	48
15.1	Historic Coal Reserve Summary	49
16.1	Pit One (West Wall) – Circular Failure	51
16.2	Pit One (West Wall) – Planar Failure	52
16.3	Pit One (East Wall) – Circular Failure	52
16.4	Pit One (East Wall) – Planar Failure	53
16.5	Pit Shell Recommendations	53
16.6	Strip Ratio Comparison	54
16.7	Recommended Wall Angles	56
16.8	Major Equipment Productivities	60
16.9	Mining Volumes Summary	66
21.1	Capital Expenditures Summary	95
21.3	Operating Expenditures Summary (I)	97
21.3	Operating Expenditures Summary (II)	98
21.4	Operating Unit Cost Summary	102
21.5	Mining Equipment Unit Costs	103
21.6	Summary of Wages and Salaries	104
21.7	Labor Distribution	105
22.1	Cash Flow Summary	108
22.2	Cash Flow Analysis	109
22.3	Cash Flow Summary with and without Debt Financing	114
24.1	Project Development Schedule	117

List of Figures

2.1	Location Map	6
4.1	Division Mountain General Geology and Coal Leases	9
4.2	Claims Location Map	10
5.1	Division Mountain Access Route	12
7.1	Map of Western Canada Cordillera	20
7.2	Generalized Geology of the Whitehorse Trough	21
7.3	Geological Map of the Division Mountain Area	23
7.4	Stratigraphic Representation of the Whitehorse Trough	24
7.5	General Geology Map of the Whitehorse Trough	27
7.6	Structural Geology Map of the Whitehorse Trough	30
16.1	Sequence of Mining Operations	57

16.2	Water Management	61
16.3	Final Pit Shell (Sections)	67
16.4	Project Life Strip Ratio Profile	69
16.5	Pit Layout with Cross Sections	70
16.6	Mine Schedule (Year 1)	72
16.7	Mine Schedule (Year 5)	73
16.8	Mine Schedule (Year 10)	74
16.9	Mine Schedule (Year 15)	75
16.10	Mine Schedule (Year 21)	76
18.1	Materials Handling Flow Sheet	78
18.2	Materials Handling Site Plan	79
21.1	Capital Expenditures	93
21.2	Operating Cash Costs (\$/t)	100
21.3	Operating Cash Costs (Total \$)	101
22.1	Sensitivity to Coal Sales Price	111
22.2	Sensitivity to Operating Expenditure	112
22.3	Sensitivity to Capital Expenditure	113
22.4	Cumulative Cash Flow and Payback Period	115

List of Appendices

1. Cross Sections of Coal Measures
2. Minfiles
3. Coal Quality Data
4. Resources Summary and Resources by Seam
5. Geotechnical Report – Division Mountain
6. Caterpillar FPC Report
7. Detailed Calculation of Equipment Hours
8. Capital Expenditures and Operating Costs
9. Operating Expenditures

1 Executive Summary

The Division Mountain coal deposit is located 90 km north-northwest of Whitehorse in south western Yukon Territory (See Figure 2.1). Access is by a 31 km four-wheel drive road leaving the Klondike Highway at Braeburn. The project area lies 20 km west of the highway and parallels the Yukon Energy Corporation electrical transmission grid. This point is 290 km by road from a year-round tidewater port at Skagway, Alaska.

The coal deposit is 100 % controlled by 2560344 Ontario Inc. Ltd. Most of the area of detailed exploration at Division Mountain lies within five coal leases which grant mining rights for a renewable twenty-one year term. In addition the company owns fifteen active Territorial Coal Exploration Licences encompassing approximately 244,520 hectares (ha) of coal bearing stratigraphy in the Division Mountain area. These were acquired in October 1992 and are held under renewable three-year terms.

Exploration at Division Mountain has been directed toward outlining sufficient resources to support an export coal mine and/or a 20 to 50 megawatt (MW, net) generating station for a period in excess of twenty years. Exploration on the property occurred between 1972 and 2008, and has comprised of 10.2 kilometers of excavator trenching, 68 diamond drill holes totaling 11,442 meters, and 20 reverse circulation percussion drill holes totaling 1,869 meters.

Prior to the 1990's exploration activity for coal was also quite active in the northern part of the Whitehorse Trough and this also included geological mapping, prospecting, geophysical investigations, trenching, and drilling on some of the coal occurrences within the licence holdings. There was also limited historic coal production in the Five Fingers Area.

Exploration to date at Division Mountain has identified a historic probable reserve of 26.4 million tonnes and a historic measured resource of 52.5 million tonnes (Mt) of high Volatile "B" Bituminous coal. The Division Mountain deposit remains open to the southeast, north, and west. Approximately 47.2 Mt of the resource falls into the area covered by the five coal leases while 5.3 Mt lie just to the southeast of leases, on licenses also controlled by 2560344 Ontario Inc. It is proposed that the leases be extended to cover the entire deposit.

Calculated weighted average for Division Mountain raw coal, on an air dried basis, is shown in Table E.1.

TABLE E.1 : COAL QUALITY - AIR DRIED BASIS AND BY WEIGHTED AVERAGE

Calorific Value cal/g	Residual Moisture %	Ash %	Volatile Matter %	Fixed Carbon %	Sulphur %
5159	2.8	27.6	26.3	43.7	0.45

Reverse circulation percussion drilling, excavator and hand trenches have exposed both coal and favorable stratigraphy within a 7.5 kilometer radius of the Division Mountain coal deposit. There are also numerous other known coal occurrences within the licence holdings, many of which have not been extensively explored.

These occurrences, especially those in the northernmost licence area are of interest as historic sampling and testing of these units by other parties have identified that the coal in these areas may be of higher quality than that identified at Division Mountain.

The coal at Division Mountain also holds the potential to host coal bed methane and/or conventional hydrocarbons. This has been documented in a number of assessment reports and most recently by several studies on the hydrocarbon potential of the Whitehorse Trough by the Yukon Geological Survey. Historic estimates for coal bed methane in the Division Mountain area were noted in exploration efforts in the 1990's by R.C. Carne but have not been investigated to any degree. Therefore the overall potential of coal bed methane deposits within the Division Mountain deposit and the exploration licences can only be described as inconclusive. However, recent study efforts by the Yukon Geological Survey on the potential for both conventional and unconventional hydrocarbon resources within the Whitehorse Trough highlighted the Division Mountain and Five Fingers areas as potentially good host areas and this is very encouraging as both are covered by coal exploration licences owned 100% by 2560344 Ontario Inc.

A pre-feasibility level study was completed in 2008 by the Norwest Corporation (Norwest) of Salt Lake City, Utah. The study was based on the coal being surface mined using conventional truck/shovel practices, with a run-of-mine (ROM) product sold as a fuel for a local 50MW (net) generating station. This operational scenario described by Norwest (2008) to date demonstrates better economics than an operation where coal would also be exported to global markets. More studies are required to also analyze the feasibility of a mine mouth generating station in Yukon.

A preliminary geotechnical analysis involving circular and planar failure tests suggested that an un-benched pit wall in the range of 25 – 50 meters in height would meet stability criteria for the pit design.

Norwest evaluated four potential pits to determine which mine pit would provide the best project economics for a 20 year mine operation. Pit 1 was selected for development as it was found to have the lowest strip ratio of 2.2 bcm/tonne (Norwest, 2008). Pit 1 targets the eastern limb of the Cairned Syncline. The ultimate pit shell consists of a 55-70 meter deep pit at geotechnically stable wall angles of less than 37 degrees. This pit would provide approximately 20 years of production at an annual production rate of 240,000 tonnes. This production rate would supply an average of 4,997 kcal/kg coal which would be sufficient to meet all of the needs of a 50MW (net) mine mouth power facility that would be independently operated. The General Mine Layout is presented in Figure E.1.

The mining method proposed included topsoil stripping, drilling and blasting of the overlying waste, and stripping of waste and coal using a back hoe excavator. The waste would then be transported to spoil dumps and the coal to a crushing facility for sizing using a fleet of mining trucks. At the crushing facility, the coal would be loaded into a load pocket and fed to a primary crusher. It would then be conveyed to a secondary crusher for final sizing. The coal would be stockpiled to a maximum 50,000 un-pushed stockpile using a radial stacker. From the stockpile the coal would be loaded by a front-end loader into a mining truck for haulage to the power generating station.

Norwest (2008) provided estimates for equipment productivities and costs, mine maintenance, water management, a power line, and access/haul roads. Capital costs were estimated to be CDN\$14.51 million including a 10% contingency. At that time, mobile equipment costs accounted for 58.5% of the total capital expenditures with infrastructure and facilities, and mine development accounting for 35% and 6.5% of total capital costs, respectively

Operating costs were noted by Norwest (2008) to include unit costs (i.e., waste stripping, drilling, blasting, mining, handling, transport, and labor), materials supplies and services, and taxes/royalties. A payback period of 4.4 years at an undiscounted rate was estimated by Norwest (2008). These financial estimates and the associated economic analysis are considered historic as they need to be updated.

A sensitivity analysis was also conducted by Norwest (2008) It noted that the project economics were most sensitive to variations in the coal price, less sensitive to variations in operating costs, and least sensitive to changes in capital cost.

Estimates were limited in their scope by Norwest (2008) and it is felt that detailed quotations and examinations of possible areas of improved productivity could result in improvements to the project economics but this would require a number of engineering, geotechnical, geological, environmental, market, and financial studies to be undertaken. Documented estimates and statements by Norwest (2008) at best can now only be considered as historical estimates and a perspective of the potential project economics at that time. They need to be fully updated and reviewed in order for any conclusions to be drawn as to the current project economics.

A permitting strategy that would include detailed work plans for environmental studies, marketing studies, First Nations relations and consultation processes, and all of the requirements for a project application is a logical step that would need to be undertaken by 2560344 Ontario Inc. to advance the Division Coal Project into the pre-development phase.

However, the current objective of 2560344 Ontario Inc. is to conduct exploration activities to examine the potential for higher quality coal within known and possibly new coal occurrences on its current exploration licence holdings and to conduct efforts to identify possible extensions of the coal resource at Division Mountain to the southeast. A budget of \$100,000 has been recommended for this program in 2017.

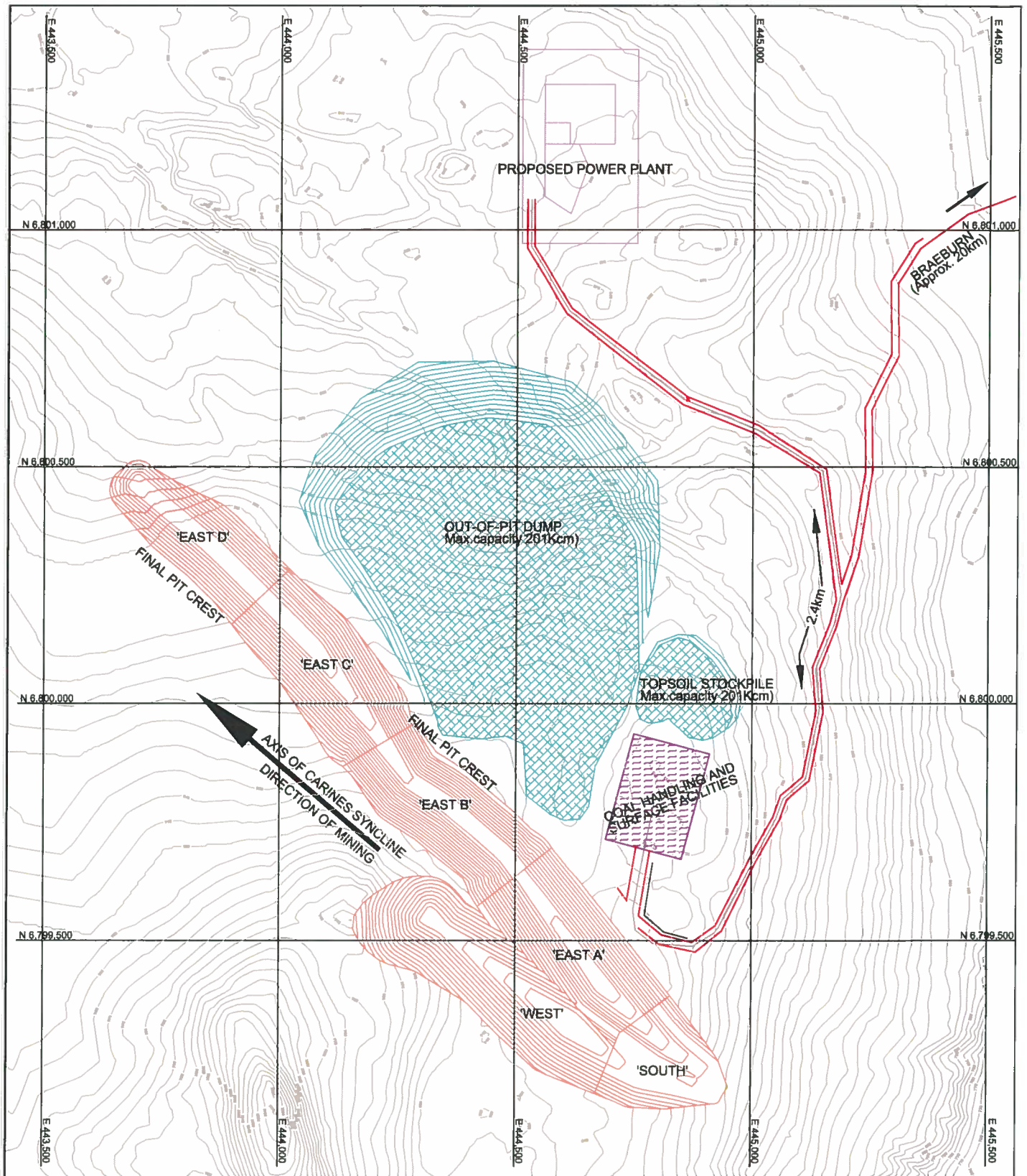


FIGURE E.1

2560344 Ontario Inc.
DIVISION MOUNTAIN
GENERAL MINE LAYOUT

DATE: 01/05/2017

K. Brewer P.Geo.

2 Introduction

The Division Mountain coal property is located at latitude 61°20' N and longitude 136°05' W on NTS map sheet 115 H/8, 90 km north-northwest of Whitehorse and 290 km from tidewater at Skagway, Alaska (See Figure 2.1). It is 100% owned by 2560344 Ontario Inc. of which most of the deposit is covered by five coal mining leases with the remainder covered by an exploration licence. These leases along with the other exploration licences held 100% by 2560344 Ontario Inc. cover a majority portion of the Whitehorse Trough coal basin that extends northwards for over 100 kilometers.

In the spring of 2005 Norwest was retained by Cash Minerals Ltd. to assist with ongoing exploration efforts and conduct a comprehensive reviews of all previous exploration efforts in order to complete an update of the resource calculations for the property. The assignment included a review by Norwest of all exploration procedures and results; compilation of regional and property-scale geological data and drill data from public sources, assessment reports and company reports. The results of the work were presented in a report titled *Geologic Evaluation and Resource Calculation on the Division Mountain Property, Yukon Territory, Canada* (Becker, 2005).

Upon completion of the 2005 exploration program Norwest was then further asked to continue a range of geological, geotechnical and preliminary engineering studies to further advance the project. This initially resulted in the reporting of a Scoping Study in 2006 which was then further upgraded with additional geotechnical, geological, engineering and exploration drilling to complete a feasibility study in 2008. The author responsible for the preparation of the feasibility study was involved in a range of activities at the site and supervised a majority of the work efforts. He was also previously involved in the exploration programs conducted in the fall of 1994, spring of 1995 and visited the property on July 5 and 6, 2005. All of these study efforts by Norwest were completed for Cash Minerals Ltd.

Recently, the author of this report was contracted by 2560344 Ontario Inc. who have recently acquired all of the coal leases and licences from Pitchblack Resources Inc. to compile all previous work related to the detailed studies of the Division Mountain deposit and surrounding area, and to report on the prospectivity of all of the other exploration licenses in an NI 43-101 report.

Due to the dates of previous work by Norwest all resources and reserve estimates are deemed historic and all financial data and related assumptions are out-of-date and only presented for background information purposes and to ensure all known information to date is summarized and presented in an NI 43-101 report format. The author had managed the holdings for Pitchblack Resources Inc. who had acquired the licences from Cash Minerals Ltd. in a friendly transaction and had conducted several visits to the property during the period 2009-2011 to both verify data, inform the company of the property status, and conduct promotional activities.

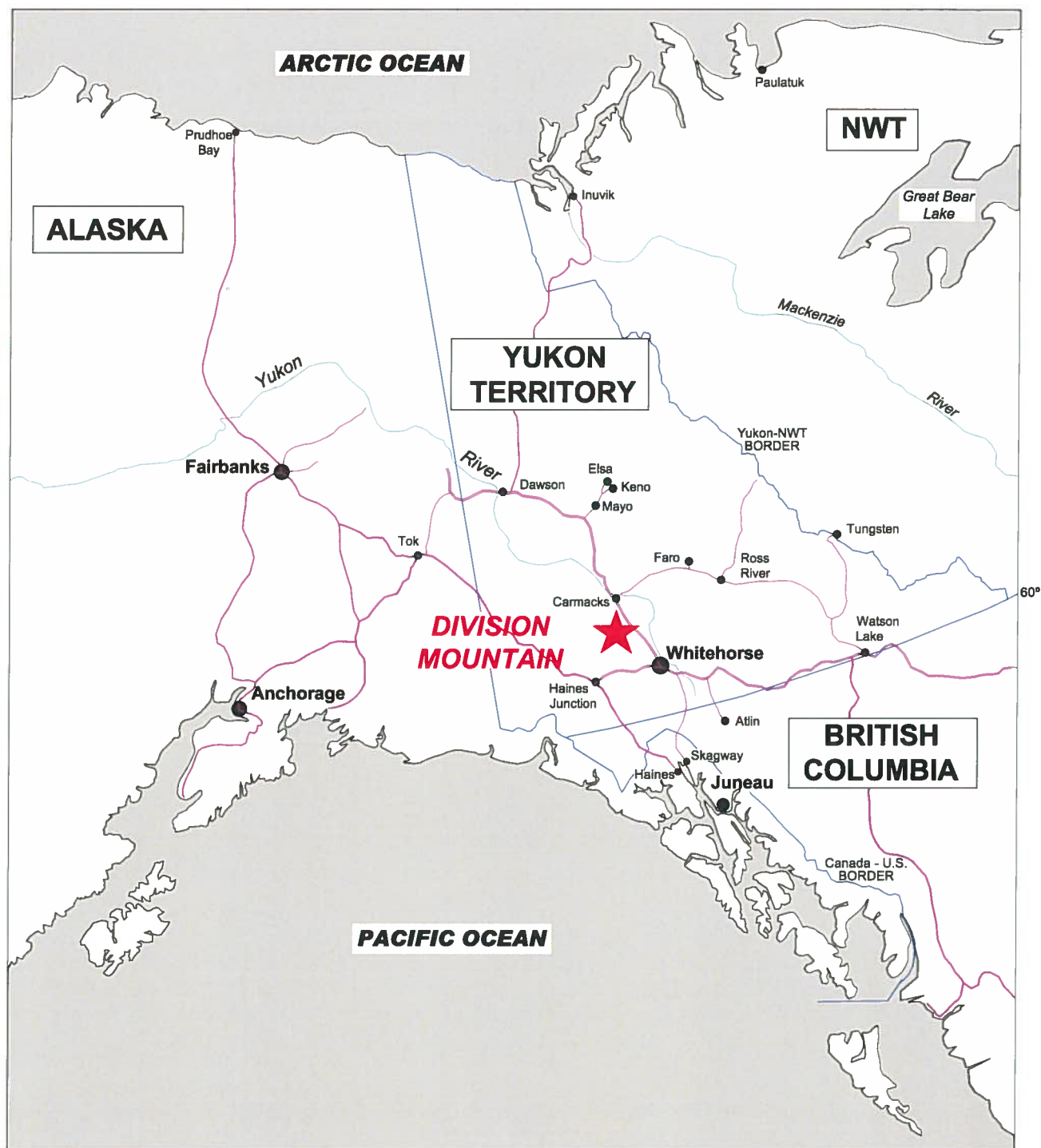


FIGURE 2.1

2560344 Ontario Inc.
DIVISION MOUNTAIN
PROPERTY LOCATION

DATE: 01/05/2017

K. Brewer P.Geo.

Norwest were reliant within their own reports during 2005, 2006, and 2008 on previous resource and reserve estimates and data gathered from assessment reports, public sources, borehole geophysical logging performed by Roke Oil Enterprises Ltd. (Roke) of Calgary, Alberta and geological surveys performed by Archer, Cathro & Associates (1981) Limited, with offices in Vancouver, British Columbia and Whitehorse, Yukon Territory and property visits. The current author has also reviewed all of these reports as well as recent publications by the Yukon Geological Survey all of which are cited in Section 27 (References) of this technical report.

3 Reliance on Other Experts

The author disclaims information described in the following paragraphs since this information was extracted from sources which may not have been compiled by a qualified person, or by the author and for reasons stated below:

- **Claim Information:** Information about the location and status of five coal leases and fifteen coal exploration licenses was provided by company documents and offices of the Whitehorse mining recorder. The author has independently verified their validity.
- **Assessment Reports:** Certain assessment reports summarizing exploration programs, and used to compile this report pre-dated the adoption of NI43-101 reporting standards. As such, and even where the author(s) appear to have been a qualified person(s) these earlier report presentations do not strictly adhere to the standards required under NI43-101.
- **Purpose of the NI 43-101 Report and Resource and Reserve Definitions:** Under no circumstances is this report to be considered an update or a revision of the previous work completed prior to the current authors involvement in the project from 2009 to current. This report merely provides a comprehensive summary of all previous work. Neither the author nor 2560344 Ontario Inc. are treating the resources and reserves as their own current resources and reserves. But it is believed that previous work is relevant and reliable based on the processes and practices that it understands Norwest followed and calculated in accordance with NI 43-101 standards. Neither is this report to be considered an update or a revision to the previously filed technical reports by Norwest.
- **Qualified Person:** The Qualified Person has not conducted sufficient work to classify the historical mi-neral resources and mineral reserve as current mineral resources and reserve and 2560344 Ontario Inc. is not treating the historic estimates as current mineral resources.
- **Sampling and Diamond Drill Data:** The author could not verify any of the previous drill hole logs with the core on site as testing for coal is done as whole sample and therefore there is no historical record of the coal portions of the core nor can one verify the coal quality estimates. The coal quality estimates are therefore also deemed historic.
- **Power Plant Study:** Sections 18, 21 and 22 of this report references the findings of a pre-feasibility level study performed by Norwest. That study relied, in part, upon the findings of an independent study on a local mine-mouth generating station (Division Mountain Power Project, SNC-Lavalin, July 2006). The author was not provided with a copy of this report and therefore cannot verify the validity of the findings. Considering the date of this work it would also be necessary update all of this work which was beyond the current scope of work and objectives of this report by 2560344 Ontario Inc.
- **Market Study:** As above, Section 19 of this report references the findings of a pre- feasibility level study performed by Norwest. That study also relied, in part, upon the findings of an independent study on the potential markets for Division Mountain coal (The Markets for Division Mountain Steam and PCI Coals, McCloskey Group Ltd., August, 2008). The author was not provided with a copy of this report and therefore cannot verify the validity of the findings.

Considering the date of this work it would also be necessary update all of this work which was beyond the current scope of work and objectives of this report by 2560344 Ontario Inc.

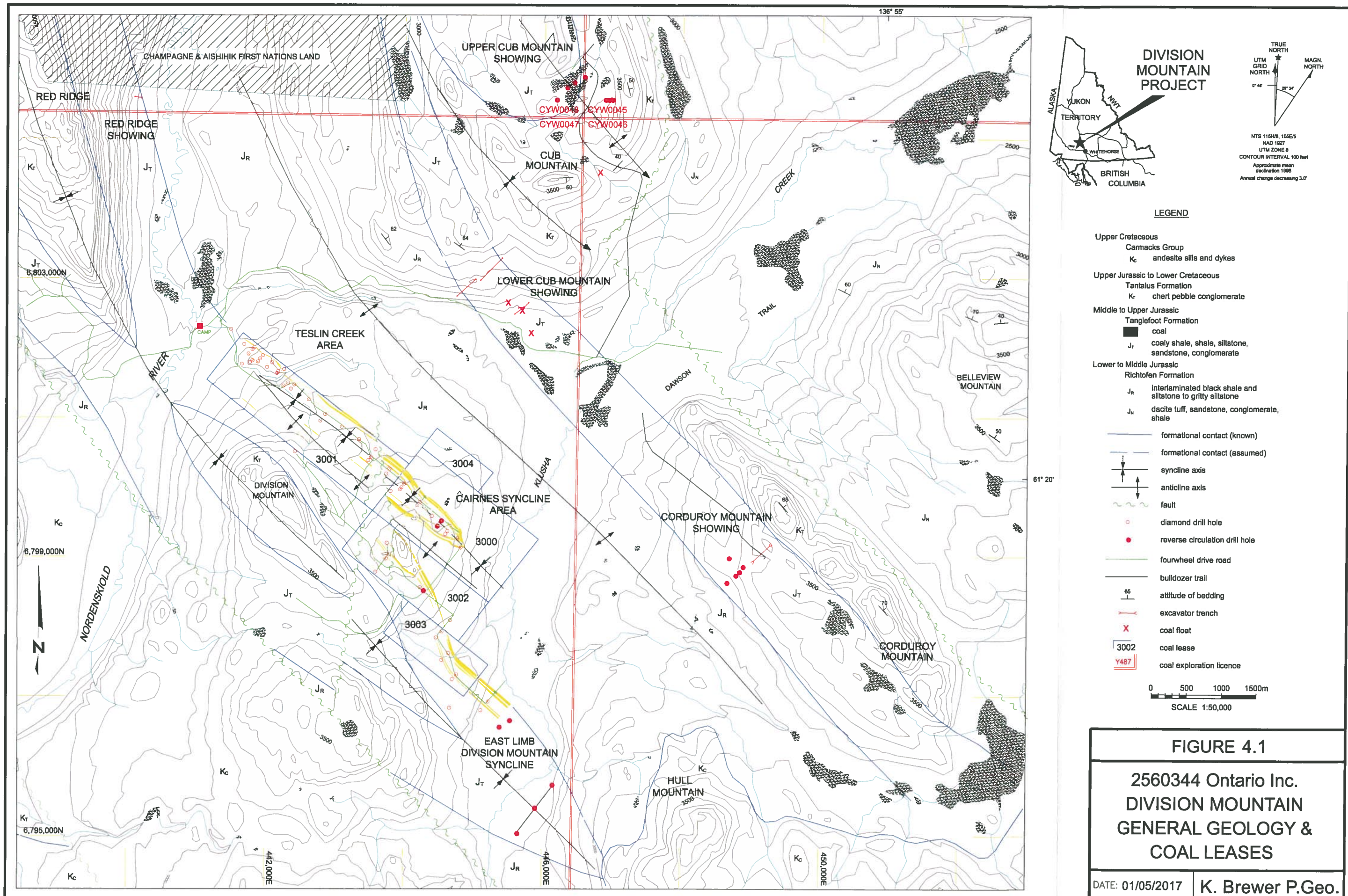
- Capital and Operating Costs: As above, Sections 21 and 22 refer to data and estimates of costs gathered by Norwest during the period 2006-2008. The estimates are out-of-date and are provided for back-ground information only. They are not considered to be accurate or reliable and therefore any previous conclusions regarding the project economics are considered to be historic. They merely indicate the status of the project in the past so that 2560344 Ontario Inc. and its investors have a comprehensive understanding of the project for current planning purposes to possibly update and advance the pro-ject.

4 Property Description and Location

The Division Mountain deposit is located at latitude 61°20' N and longitude 136°05' W on NTS map sheet 115 H/8, 90 km north-northwest of Whitehorse and 290 km from tidewater at Skagway, Alaska (Figure 2.1).

The area of detailed exploration and resource definition at Division Mountain lies largely within five Coal Leases. These leases are held by 2560344 Ontario Inc. and cover 776.4 ha. Under the Yukon Coal Regulations Act, the five coal leases grant coal mining rights for a renewable twenty-one year term (Figure 4.1).

In addition, fifteen (15) Territorial Coal Exploration Licences are also held by 2560344 Ontario Inc. extending from the Division Mountain area northwards (not contiguously) to the Five Fingers Rapid Area, and eastwards from Carmacks adjacent to the Robert Campbell Highway (Figure 4.2). The easternmost licence (CYW) is isolated and only accessible by helicopter and is located in the Walsh Creek area. The licences cover a total area of 244,520 hectares. Under the Coal Regulations Act, these licences are valid for a three-year, renewable term.



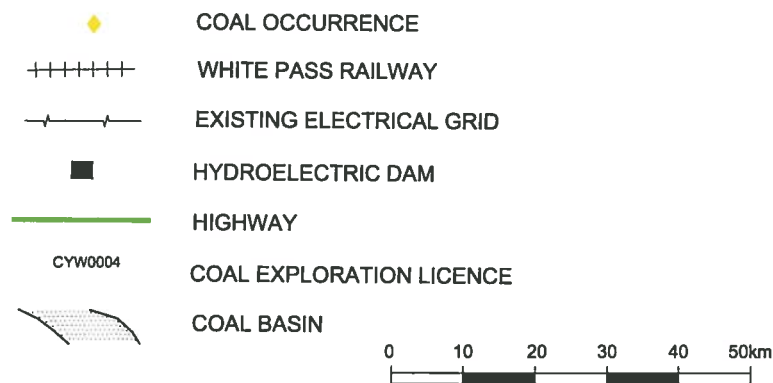
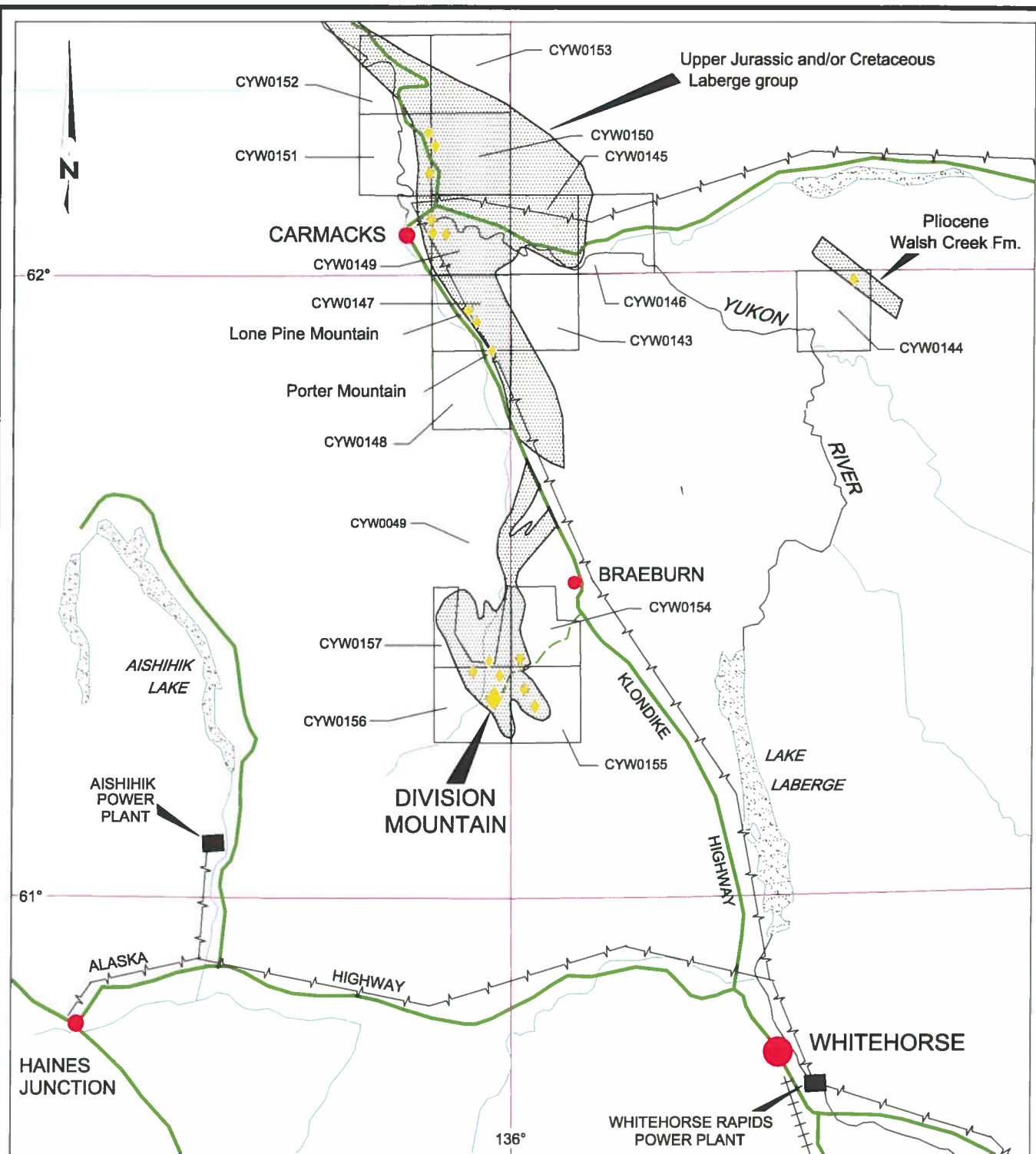


FIGURE 4.2

**2560344 Ontario Inc.
DIVISION MOUNTAIN
EXPLORATION LINCESSES**

DATE: 03/07/2005

K. Brewer P.Geo.

These licences cover a majority of the known coal stratigraphy in the Whitehorse Trough total approximately 244,520 hectares and extend from the Division Mountain area northwards to Five Fingers area and eastwards along the Robert Campbell Highway for approximately 45 kilometers.

The exploration licences and leases encompass Upper Jurassic, Lower Cretaceous and Tertiary coal-bearing stratigraphy including a number of previously known coal occurrences. Renewal dates for the Coal Licences and Leases are given below in Table 4.1.

Table 4.1 Coal Licences and Leases

License No.	Minning District	Renewal Date
CYW0153,146-151, 143-144	Whitehorse	September 6, 2017
CYW0152, 145	Whitehorse	September 6, 2018
CYW0156-0157	Whitehorse	March 6, 2018
CYW0154-0155	Whitehorse	September 6, 2017
Lease No.		
CMW3000-3004	Whitehorse	April 18, 2038

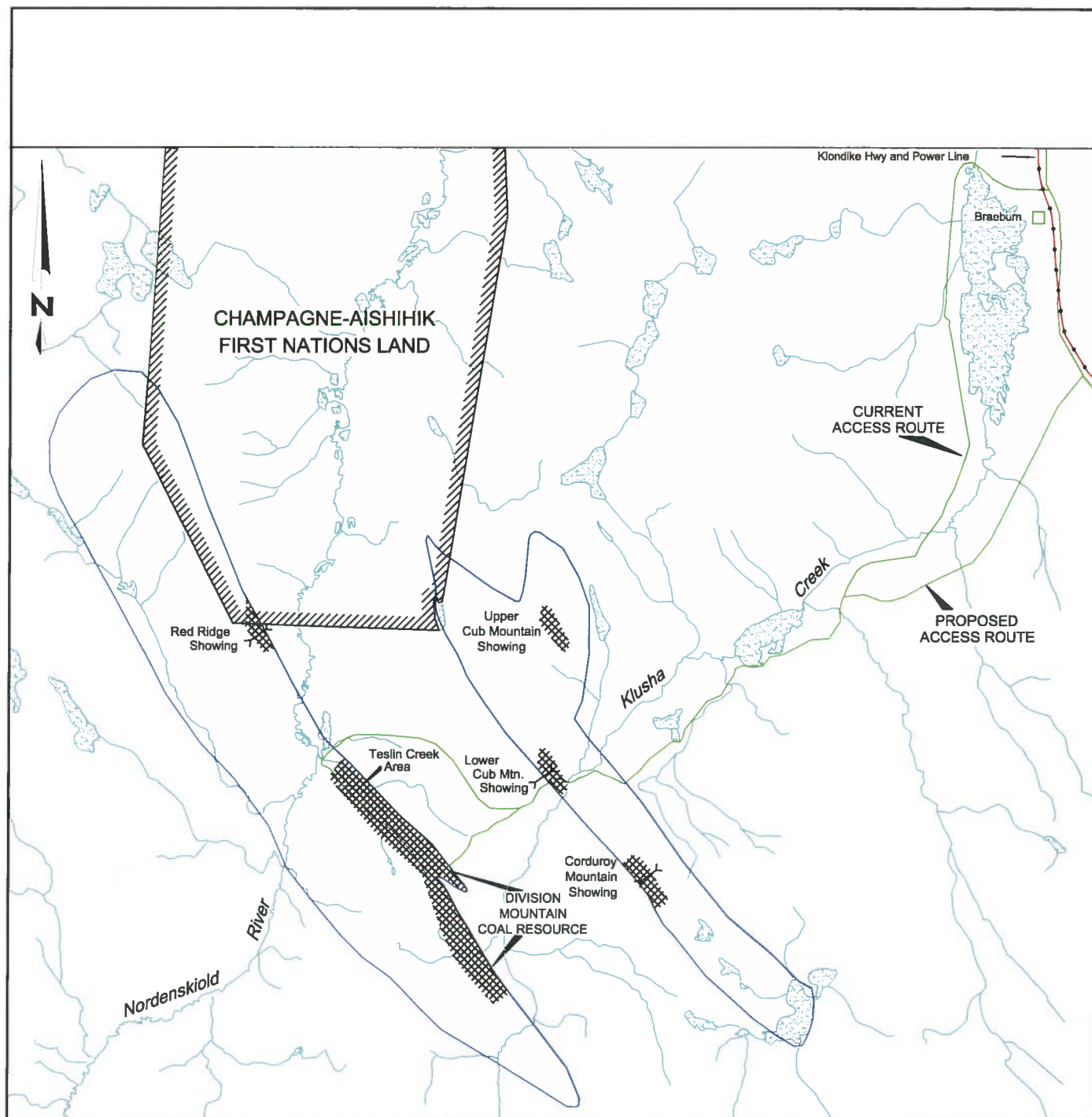
Under the Yukon Coal Regulations Act, exploration licenses are currently subject to rental fees of \$0.05/acre in the first year, \$0.10/acre in the second year and \$0.20/acre in the third and final year for each license period. Costs incurred by the license holder on exploration work may be reported to the Yukon Mining Recorder and credited against rental fees. Annual fees for the coal mining leases are currently levied at \$1/acre. Work conducted on the leases may be applied against the levy charges for a maximum period of five (5) years.

5 Accessibility, Physiography, Local Resources, Infrastructure and Climate

5.1 Accessibility

Access is by 85 km of paved highway from Whitehorse northwards on the Dawson Highway to Braeburn and then on a 31 km all-season four- wheel drive road from Braeburn (Figure 5.1) to Division Mountain.

Approximately one kilometer north of Braeburn Lodge you turn into a residential area. The northernmost portion of the lake has to be forded and this crossing is generally 50 meters wide and approximately 0.5-0.75 meters deep. The trail continues to the northwest and eventually joins the historic Dawson Trail stage route, which then extends southward and westward for a distance of approximately 22.5 kilometers to a point opposite the northwest end of Corduroy Mountain and approximately due east of the coal occurrences at Division Mountain. From this point, a variety of exploration trails have been constructed over the decades of activity in the area.



potentially coal-bearing stratigraphy



area of known coal deposits

FIGURE 5.1

2560344 Ontario Inc.
DIVISION MOUNTAIN
ACCESS ROUTE

DATE: 01/05/2017

K. Brewer P.Geo.

The main property trail extends another 8.5 kilometers westward across Klusha Creek Valley and then climbs up the slopes of Division Mountain to the southernmost portion of the deposit area. There are a number of short steep grades (7 – 15% slope) along the stretch just prior to the trail descending into the Nordenskiöld valley.

The access trail is generally 3-4 meters wide and is currently passable with an ATV. Minor upgrading of the trail would be required to allow for 4wd truck access.

5.2 Physiography

Tree line in the property area is at approximately 1300 meters on south-facing slopes with willow, alder and black spruce at lower elevations giving way to dwarf birch, alder and stunted spruce at tree line, and finally to grass and lichen at elevations above 1500 meters. Stands of heavy timber occur at lower elevations near Braeburn Lake.

Topography in the Division Mountain area is characterized by rolling hills and broad river valleys with local regions of moderate to steep relief along northerly-trending ridges. Elevations range between 670 and 1680 meters. Most of the area is mantled by glacial till and outwash between 1 and 60 meters thick. Permafrost is generally restricted to poorly drained areas of moderate to dense vegetation. Natural bedrock exposure is less than 5%, especially within the generally recessive coal measures. Creeks flowing to the north and west off the property are tributaries of the Nordenskiöld River (approximately 5-8 meters wide and 2 meters deep), which is part of the Yukon River watershed, while creeks draining to the south and east flow into Klusha Creek (approximately 3 to 4 meters wide and one meter in depth), which joins the Nordenskiöld River further to the north. Several small lakes are present, some of which cover areas of up to 1.0 square kilometer.

The whole area is covered with volcanic ash to a depth of about 6 inches (Teslin Exploration Ltd., 1970).

The area appears to have escaped Pleistocene glaciation but glacio-fluvial outwash and loess exceeding 30 meters or more in thickness typically mantles all of the area below the 900 meter elevation level (Carne, 1992). Above the 900 meter elevation level, residual overburden cover is typically thin and bedrock exposures are more common.

5.3 Local Resources and Infrastructure

The nearest permanent buildings are at the northern end of Braeburn Lake just off the Klondike Highway. There are about 10-12 year-round and/or seasonal residential homes in the area. Braeburn Lodge is at Mile 55 of the Dawson Highway but now only comprises of a store and a seasonal restaurant. At Braeburn Lodge there is also a 3000 foot airstrip which runs immediately adjacent to the Dawson Highway.

The Whitehorse-Aishihik-Faro electrical transmission line parallels the Klondike Highway, 20 kilometers east of the main coal reserves. Being only 85 kilometers from Whitehorse, the project benefits from the infrastructure of the capital city of Yukon. Whitehorse has an international airport, it is the primary center for government and all of the regulatory agencies are also headquartered in Whitehorse, most of the First Nations have offices in Whitehorse or in the nearby communities, and the city also has numerous equipment and supplies stores. The city has a vibrant population of over 28,000 persons.

Yukon College is headquartered in Whitehorse. The college has established the Centre for Northern Innovation in Mining (CNIM) that develops and delivers innovative and flexible employment and career training to suit the labour needs of Yukon's mining sector. Its facilities are state-of-the-art and include mobile classrooms and high-tech simulators. Through the Yukon Research Centre, CNIM conducts applied research to grow and improve the competitiveness of Yukon's mining sector and its environmental sustainability.

Whitehorse also has a large base of consultants and specialists with expertise in environmental, engineering, mine planning, geology, and construction and also a work force that is experienced in all aspects of exploration, mine development and operations.

5.4 Climate

The area has a continental climate with low levels of precipitation and a wide temperature range. Temperatures range from -40°C in the winter to 30°C in the summer. Summers are typically pleasant with extended daylight hours whereas winters are long and cold. Lakes in the area are suitable for floatplane use during the ice-free period of early June to late September. Explorations programs are usually conducted between late-May and mid-October but winter drill programs have been conducted on the property to take advantage of easier access over frozen ground which also limits the environmental impact associated with construction of temporary drill access roads.

6 History

There has been over a century of exploration activity in the Division Mountain area (Table 6.1). In 1903, John Quinn and H.E. Porter staked coal near Division Mountain. In 1907 D. Cairnes of the Geological Survey of Canada mapped and sampled three coal seams in Teslin Creek Canyon, 2 km north of Division Mountain. An additional coal occurrence was located by Cairnes near the base of Red Ridge approximately 5 km northwest of the Teslin Creek showings (Figure 4.1).

No exploration was carried out on the showings until 1970 when Arjay Kirker Resources Ltd. For Teslin Exploration Ltd. excavated seven bulldozer pits near the Teslin Creek coal outcrop. Eight seams were exposed ranging in thickness from 0.6 to 4.4 m. A 1047 m, six-hole diamond drill program conducted in the Teslin Creek area by Arjay Kirker in 1972 outlined a geological resource of 2.5 Mt (historic resource estimate was not completed to the standards of NI43-101). Also in 1970, Norman H. Ursel Associates Ltd. conducted geological mapping of the Cub Mountain area. Teslin Exploration Ltd. also conducted exploration and drilling of coal seams north of Carmacks in 1971. Proximate analysis was conducted on samples in 1972.

However in 1974, a decision by the Government of Canada to proceed with construction of the Aishihik hydroelectric project resulted in termination of coal exploration at Division Mountain by Teslin Exploration Ltd. In 1975, Allen Resource Consultants Ltd. (Resourcex Ltd.) located coal float on Cub Mountain in gopher holes (Allen, 1975).

In 1991, the Geological Survey of Canada carried out detailed analysis of coal samples including petrological and geochemical studies on samples obtained from some of the trench sites still exposed from previous exploration efforts.

The W4 Joint Venture was then encouraged to explore for coal in the area and completed a minor trenching and short hole (2 holes) program at Division Mountain. Sample testing was completed by Birtley Engineering (Canada) Ltd. of Calgary who reported that a trench sample provided a calorific value of 7500 kcal/kg, 0.3% Sulphur and 21.8% ash, of which the ash occurred as adventitious material and could therefore be removed by washing (Carne, 1992). They reported various coal seam intersections of between 4.7 and 12.1 meters (Carne, 1990, 1992) and test results of 31.3% Ash, 22% volatile matter, 45% fixed carbon, 0.5% Sulphur, and a calorific values ranging from 7130-7870 kcal/kg, and 2.5% moisture. Carne (1992) noted that the coal qualities being identified were comparable with thermal coal quality values in a range of coal deposits in British Columbia, Alberta and Alabama. (Carne (1992) also concluded that the Division Mountain basin appeared to have good potential for coal bed methane (CBM). The coal was noted to have a high liptinite content (spores, cuticular plant matter, resins and waxes) and this coupled with the high volatile rank, suggested that the potential for significant CBM was high. Carne (1992) then further noted that depending on the method of calculation, the CBM potential of the Division Mountain area ranged from 17.5 billion cubic meters to 75 billion cubic meters (Carne, 1992). Carne based his own estimates for CBM potential at that time using the Alberta Geological Survey Method of estimation which was noted at that time to be 13.5 cubic meters of gas per tonne of bituminous coal in seams greater than 0.5 meters thick, half of which is then considered to be recoverable. Carne concluded that further exploration should be conducted in the area, and along with proximate and ultimate analyses of coal seams, the coal should also be tested for CBM.

In October 1992 Cash Resources Ltd. purchased four Territorial Coal Exploration Licenses enclosing the Division Mountain coal occurrences and later applied for others covering extensions of the favorable rocks to the north. During the 1993 field season 16 holes totaling 1,810 m were drilled to test the Teslin Creek area (Weng-zynowski et al. 1994). This diamond drilling program defined four seams with an average raw coal aggregate thickness of 10 m over a 1 km strike length forming the eastern limb of the Cairnes Syncline. Measured near-surface resources were calculated at 2.6 Mt to a depth of 200 m, confirming the Arjay Kirker estimate (historic resource estimate was not completed to the standards of NI43-101). Hand trenching at Red Ridge 5 km to the north exposed a total thickness of 11.4 m of raw coal in three seams and demonstrated lateral continuity of the coal measures.

An exploration program consisting of 5.9 kilometers of excavator trenching and 6,034 m of HQ-size diamond drilling in 32 holes was carried out during 1994 and 1995 to explore a 5 km long south- easterly extension of previously known coal-bearing strata along the limbs of a northerly- plunging syncline-anticline pair (Gish, 1995 and Gish, 1996). This work was successful in discovering a new area of coal deposition with thicker seams than the Teslin Creek area and a dramatically lower strip ratio.

All coal drill intersections greater than 1 meter thick were submitted for proximate analysis, generally in samples composed of the entire seam core intersection. In conjunction with the 1994 and 1995 programs environmental surveys, including biological and botanical inventories and water quality assessment, were carried out (Gish, 1995 and Gish, 1996) and representative intersections of coal from the 1993 drill program was composited for secondary tests such as grindability, washability, ash chemistry and Ultimate Analysis.

Exploration during 1997 consisted of 1,667 meters of HQ-size diamond drilling in ten holes and twenty-one excavator trenches totaling 2,695 meters on both Division Mountain and Corduroy Mountain (Gish et al, 1998). The diamond drilling focused on further delineating west-dipping coal-bearing strata discovered during the 1994-1995 exploration season. The objective of the program was to increase resources from approximately 30 million tonnes of coal to 50 million tonnes (Gish, 1998). More than 900 meters of strike length was added to the southwest while the average aggregate raw coal thickness increased to 24.7 meters.

A short excavator trenching program was conducted in early fall 1998 by Cash Resources (Gish, 1998). The work consisted of six excavator trenches totaling 1,329 meters and was designed to test favorable Tanglefoot Formation stratigraphy in the vicinity of Cub Mountain, approximately 4.5 km northeast of Division Mountain. No significant coal seams were exposed in any of the trenches. In November 1998 the Division Mountain property was optioned to Usibelli Coal Mine, Inc. (Usibelli) (Sedar, 1998b). Exploration in the spring of 1999 consisted of 20 reverse circulation percussion drill holes totaling 1,869 meters and 4 excavator trenches totaling 315 meters (Gish, 2000). The excavator trenching and three of the drill holes were designed as a check of geologic data that formed the basis of the 1998 historic resource estimate but the bulk of the reverse circulation drilling was carried out to explore three target areas outside the defined deposit. The program confirmed the results of earlier drilling and outlined several new coal seams on Corduroy Mountain but ultimately Usibelli dropped its option on the property in May 1999 (Sedar, 1999).

On March 13, 2001 Cash Resources Ltd. announced a change of name to Cash Minerals Ltd.. (Sedar, 2001).

In 2005, Cash Minerals Ltd. completed a total of four diamond drill holes (886.57 m) on the Division Mountain property. That same year, Norwest Corporation ("Norwest") of Salt Lake City, Utah, was contracted by Cash Minerals Ltd. to complete an initial resource estimate to NI 43-101 standards. The results of the 2005 drilling program, a review of all previous assessment work, coal quality tests and a site visit were completed and a report entitled "Geologic Evaluation and Resources Calculation on the Division Mountain Property, Yukon Territory, Canada" was prepared by T. Becker and published on March 9, 2005.

This initial report by Norwest was followed up with a series of reports between 2006-2008 including:

- Norwest Corporation., 2008. Division Mountain Project Pre-Feasibility Study for Cash Minerals Ltd.
- SNC-LAVALIN Thermal Power, 2006 Division Mountain Power Project for Cash Minerals Ltd.
- The McCloskey Group, Ltd., 2008. The Markets for Division Mountain Steam and PCI coals for Cash Minerals Ltd.

Various changes in management of the company then occurred and on June 24, 2010 Cash Minerals Ltd. announced a name change and share consolidation to Pitchblack Resources Inc. ("PIT"). On January 22, 2013, PIT contracted Mines Online Inc to undertake promotional efforts to sell the property. The author conducted a series of visits to the property between 2009 and 2011 to update the management on the status of the property, examine the condition of core storage at site, and to locate former diamond drill hole locations. A majority of the former drill hole locations were verified and located at their prescribed locations. As whole core of coal samples was removed for testing the author as previously stated was unable to verify any of the coal data but did find that the remainder of the core was relatively intact.

Table 6.1 *An outline of exploration activity in the Division Mountain area.*

Date	Exploration company	Work performed and highlights	Reference
1903	John Quinn and H.E. porter	• staked coal near Division Mountain	Yukon Minfile (1997)
1970	Norman H. Ursel Associates Ltd.	• Cub Mountain area; geological mapping, no coal found (NW corner of NTS block 105E/5)	Hunt (1994)
1970, 1971	Arjay Kirker Resources Ltd. for Teslin Exploration Ltd.	• Division and Vowel mountains-bulldozer treching (7 trenches totalling 167 m near Teslin Creek), mapping, sampling and test I.P. survey ove coal outcrops near Teslin Creek • reconnaissance geological mapping, road building • estimated reserves at 41 million tons • exposed aggregate thickness of 18.6 m of coal over an interval approximately 305 m • explored Corduroy Mt, no coal located	Kirker (1971); Craig and Laporte (1972)
1972	Arjay Kirker Resources Ltd. (Archer, Cathro and Associates Ltd.)	• drilled 6 diamond drill holes in Teslin Creek area (totalling 1047 m) • coal seams intersected vary from 4.6 to 5.9 m • 24.8 m aggregate thickness of coal seams > 0.5 m • reserves calculated as 2.8 million tons	Phillips (1973)
1975	Allen Resource Consultants Ltd. (Resource Ltd.)	• located coal float on Cub Mountain in gopher holes, believed to be within the Tantalus formation	Allen (1975)
1977	Hill for Cyprus Anvil Mining Corp.	• collected coal samples for analysis	Hunt (1994)
1978	Hill for Utah Mines Ltd.	• collected coal samples for analysis	Hunt (1994)
1978	Manalta Coal Ltd.	failed to locate any additional coal seams	Hunt (1994)
1990-1991	All-North Resources Ltd. and W4 Join Venture	• trenching and mapping near Teslin Creek	Yukon Minfile (1992)
1990	Geological Survey of Canada	• one 1972 bulldozer trench was remapped and carefully sampled (Teslin Creek) for Beaton et al. report	Beaton et al, (1992)
1992	Beaton et al, (University of Western Ontario)	• petrography, geochemistry and utilisation potential of the Division Mountain coal occurrence (Cairnes Seam)	Beaton et al, (1992)
1993	Cash Resources Ltd. (Allister Peach Geo-Consulting Ltd.)	• drilled 16 holes totalling 1810 m near Teslin Creek • intersected over 28 coal seams > 0.5 m thick • total in situ reserves estimated at 11 139 920 tonnes • hand trenching at Red Ridge exposed 11.4 m coal	Peach (1993); Wengzynowski and Carne (1993, 1994)
1994-1995	Cash Resources Ltd. (Archer, Cathro and Associates Ltd.)	• 5.2 km of excavator trenching • 6034 m of HQ-size diamond drilling in 32 holes • aggregate coal thickness 10 to 32 metres • estimated open pit reserves of 31.7 million tonnes	Carne and Gish (1996)
1996-1997	Cash Resources Ltd. (Archer, Cathro and Associates Ltd.)	• 1667 m of HQ-size diamond drilling in 10 holes • 21 excavator trenches totalling 2695 m at Division and Corduroy mountains • hand trenches southwest of Cub Mountain • raw coal reserves estimated at 54.7 million tonnes	Burke (1998); Gish and Carne (1998)
1998	Cash Resources Ltd. (Archer, Cathro and Associates Ltd.)	• 1329 excavator trenching at Cub Mountain • property optio-ed to Usibello Coal Mine Inc.	Burke (1999)
1999	Cash Resources Ltd. (Archer, Cathro and Associates Ltd.)	• 1,869 m of RC drilling in 20 holes and 4 excavator trenches totalling 315 m at Division Mountain	

History Cont.

Date	Exploration company	Work performed and highlights	Reference
2000	Usibelli Coal Mine Inc.	• Released Property option for Division Mtn	
2001	Cash Minerals Ltd.	• Cash Resources Ltd. changes name to Cash Minerals Ltd.	SEDAR, 2011
2005	Cash Minerals Ltd.	• 866.6 m of diamond drill holes at Division Mtn. Norwest Corporation Ltd, contracted to complete An NI 43-101 Resource Estimate	SEDAR, 2005 Norwest, 2005
2006	Cash Minerals Ltd.	• SNC Lavatin Ltd complete a study on thermal power • Norwest complete geotechnical drill holes	SEDAR, 2006
2008	Cash Minerals Ltd.	• Norwest complete a prefeasibility study for Division Mtn that concludes coal exporting is not feasible but a mine mouth thermal power facility project is the most feasible development option Mcloskey Group Ltd. complete a market study on steam And PCI coals	SEDAR, 2008
2009	Cash Minerals Ltd.	• Changes in corporate management	SEDAR, 2009
2010	Pitchblack Resources Ltd.	• Cash Minerals Ltd. changes its name to Pitchblack Resources Ltd.	SEDAR, 2010
2013	Pitchblack Resources Ltd.	• Mines Online Inc. contracted to promote the Division Mtn. Property	SEDAR, 2013
2008-2017	Yukon Geological Survey	• Range of studies focus on the hydrocarbon an Cbm potential in the Whitehorse Trough and highlight the Division Mtn property and Five Fingers area as 2 of 3 areas Trough with significant potential to host hydrocarbon deposits	YGS publications
2017	2560344 Ontario Inc.	• Acquire the Division Mtn Property and related Exploration Licences	SEDAR, 2017

Recently the Yukon Geological Survey has been actively studying the hydrocarbon and coal bed methane potential of the Whitehorse Trough (YGS Open File 2015-23; Lowey et al, 2008 and 2009; Beaton et al, 1992; Hayes et al, 2012; White et. al, 2012, Hutchison, 2017). These reports noted that the Whitehorse Trough is a frontier intermontane basin that is prospective for oil and gas from both conventional and unconventional reservoirs in nine possible plays. All nine plays were deemed prospective for gas and three were deemed to have potential for oil as well. They further highlighted three areas with the greatest potential for hydrocarbon resources, two of which (i.e. Five Fingers Area and Division Mountain) are within the coal exploration licence areas held by 2560344 Ontario Inc. The studies have concluded that the evidence for the presence of both conventional and unconventional hydrocarbons in the Whitehorse trough is compelling and assessed volumes are sufficiently substantial to support additional exploration and assessment work (Hayes et. al, 2012).

7 Geological Setting and Mineralization

This section describes regional geology, stratigraphy and structural geology of the Division Mountain property.

7.1 Regional Geology

The Division Mountain area lies within Whitehorse Trough, a northwest-trending, fore-arc basin comprised of Mesozoic volcanic and sedimentary rocks (Figures 7.1 and 7.2). The Whitehorse Trough constitutes the northern end of the Intermontane Belt of the Canadian Cordillera. The Whitehorse Trough sequences are bounded by the Omineca Crystalline Belt to the east and the Coast Plutonic Complex to the west. The Division Mountain terranes are bounded by the Braeburn Fault to the north and the Miners Fault to the south. Yukon Crystalline Terrane comprises both Paleozoic igneous and sedimentary rocks as well as their meta-morphosed equivalents. The Whitehorse Trough contains the coal-bearing strata currently under exploration.

During Late Triassic time an island arc assemblage consisting of a 7,000 m thick succession of Lewes River Group aphyric to augite-phyric basaltic andesite flows, breccias and tuff, conglomerate, wacke, limestone and shale was deposited within Whitehorse Trough. Succeeding Jurassic basin-fill stratigraphy is more complex due to disconformities and hiatus in sedimentation and to diachronous or inter-fingering relationships in the shallow water and nearshore facies. In general, two sequences are present: Lower to Upper Jurassic conglomerate and sandstone turbidites of the marine to deltaic Laberge Group; and, Upper Jurassic to Cretaceous conglomerate, sandstone, mudstone and coal of the largely alluvial Tantalus Formation.

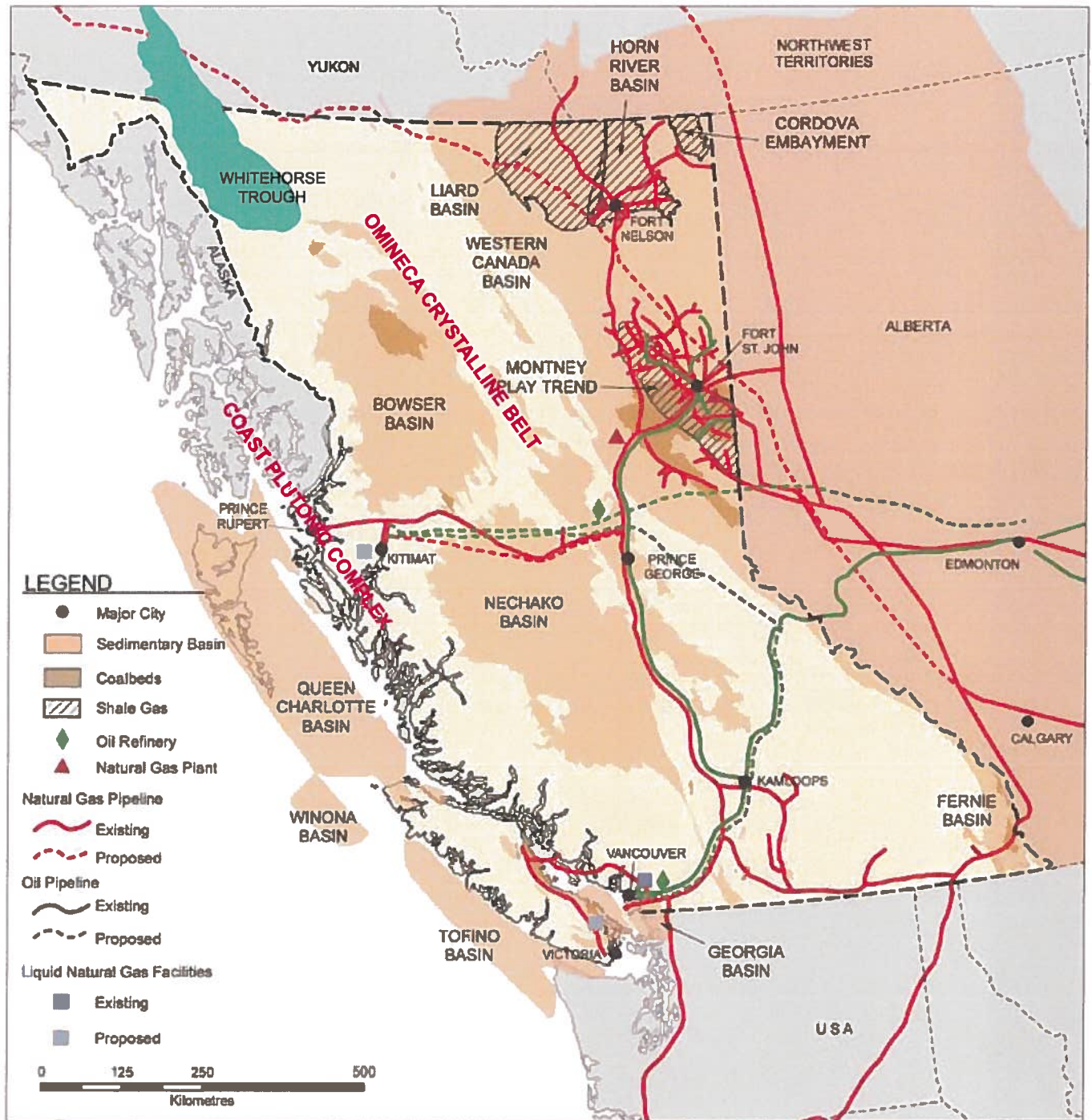


FIGURE 7.1

2560344 Ontario Inc.
**MAP OF WESTERN CANADA
CORDILLERA, SHOWING LOCATION
OF WHITEHORSE TROUGH
AFTER YGS. MR6**

DATE: 01/05/2017

K. Brewer P.Geo.

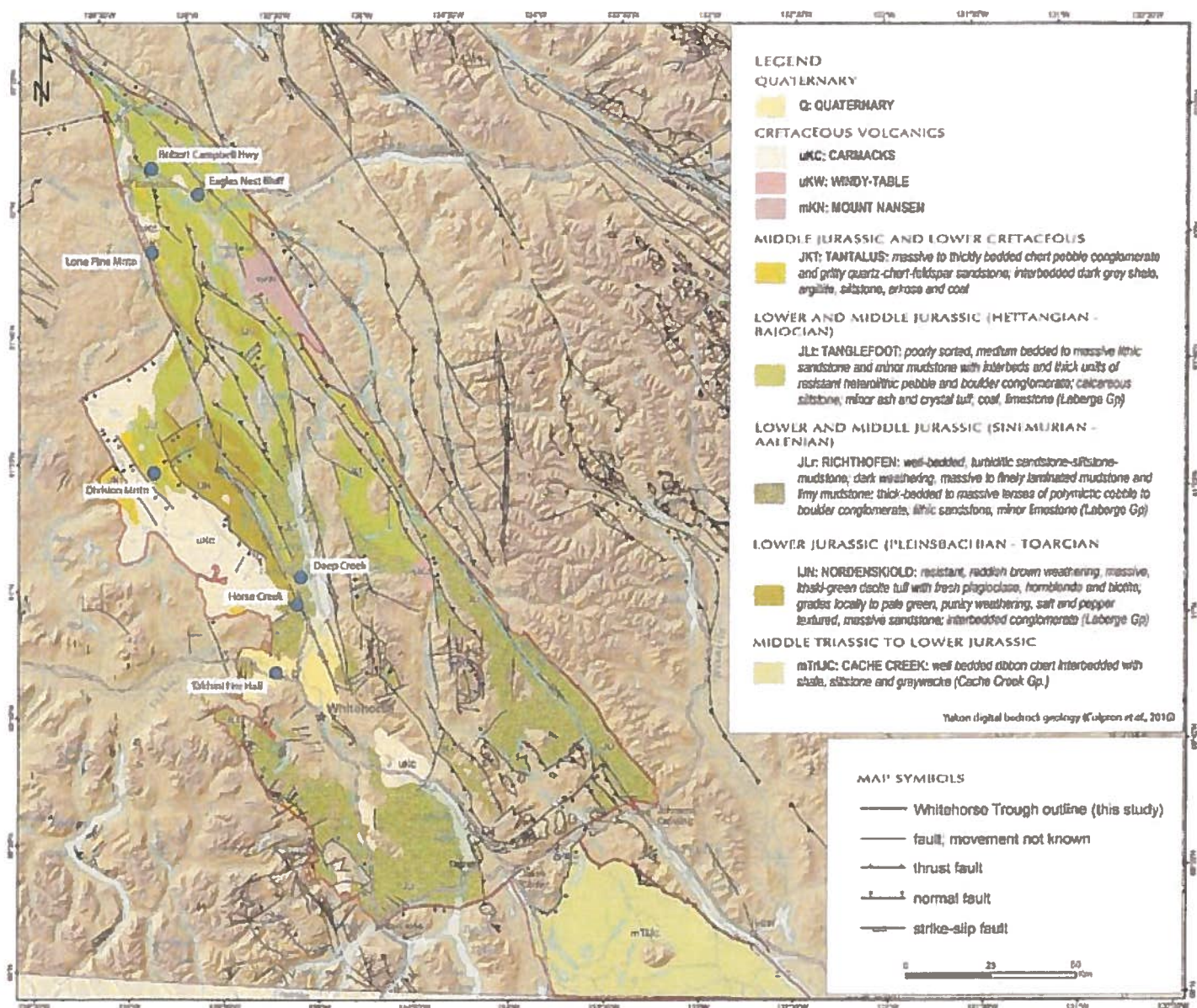


FIGURE 7.2

2560344 Ontario Inc.

**GENERALIZED GEOLOGY OF THE
WHITEHORSE TROUGH AFTER
COLPRON, 2011**

DATE: 01/05/2017

K. Brewer P.Geo.

7.2 Stratigraphy

Generalized geology of the Division Mountain area is given in Figure 7.3. A stratigraphic representation of the Whitehorse Trough is presented in Figure 7.4 (after Hart, 1997). Detailed geology of the main area of exploration along with Section locations is shown in Figure 2.1, with cross - sections through the coal measures (see Appendix 1).

Whitehorse Trough stratigraphy can be divided using major bounding disconformities between distinct sedimentary sequences deposited along the basin margins. These sequences are the Lewes River Group shallow marine carbonate and clastic rocks; Laberge Group conglomerate and sandstone turbidites; and the Tantalus Formation, a largely alluvial package of chert pebble conglomerate, sandstone, shale and coal.

The Lewes River Group represents to oldest stratigraphy within the Trough consisting of Upper Triassic to Jurassic volcanoclastic conglomerates overlain by alternating lenses of greywacke and limestone.

The Laberge Group is subdivided into the following formations: (i) Conglomerate Formation, Hettangian to Bajocian in age, and consisting of polymitic cobble-boulder conglomerates dominated by granitic to granodioritic clasts; (ii) Richtofen Formation, Hettangian to Bajocian in age, and consisting of interlaminated black shale and wispy silt to fine sandstone laminae; and (iii) the Nordenskiöld Dacite, of Sinemurian to Toarcian age, and consisting of thick epiclastic and primary dacite tuffs and flows.

In the Division Mountain area, the stratigraphy encountered within the coal measure is comprised of three distinctive lithologies; coal bearing strata within the Tanglefoot Formation; the underlying Richtofen Formation; and intrusive andesite bodies (Gish, 1995).

7.2.1 Tanglefoot Formation

The Tanglefoot Formation is the main coal-bearing unit on the property and occurs as fining-upward cycles of subrounded, clast-supported quartz granule conglomerate, brown coarse-grained sandstone and chocolate brown siltstone that often contains plant fossils; and black shale, coaly shale, shaly coal and coal (Gish, 1995). Contacts vary from gradational over several meters to sharp. Thicknesses of all of the constituents of an individual cycle and the number of cycles encountered per drill section vary greatly (Gish, 1995). Often a unit of grey arkosic sandstone with 2 to 8 mm angular rip-up clasts of coaly shale and/or shale lies between the lower contact of the earliest coal-bearing cycle and the Richtofen Formation (Gish, 1995).

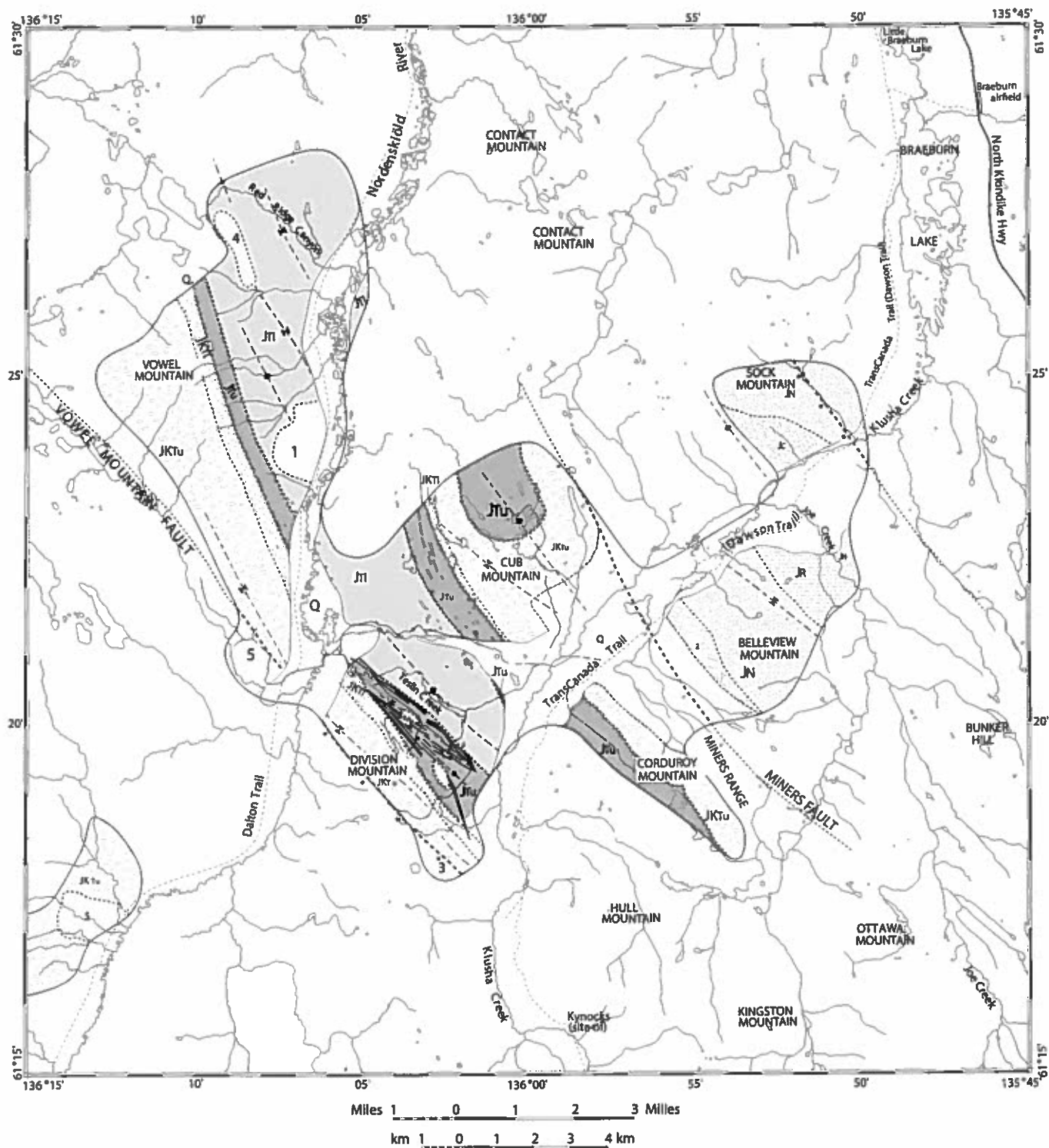


FIGURE 7.3

2560344 Ontario Inc.
GEOLOGICAL MAP OF THE
DIVISION MOUNTAIN AREA
AFTER ALLEN (2000)

DATE: 01/05/2017

K. Brewer P.Geo.

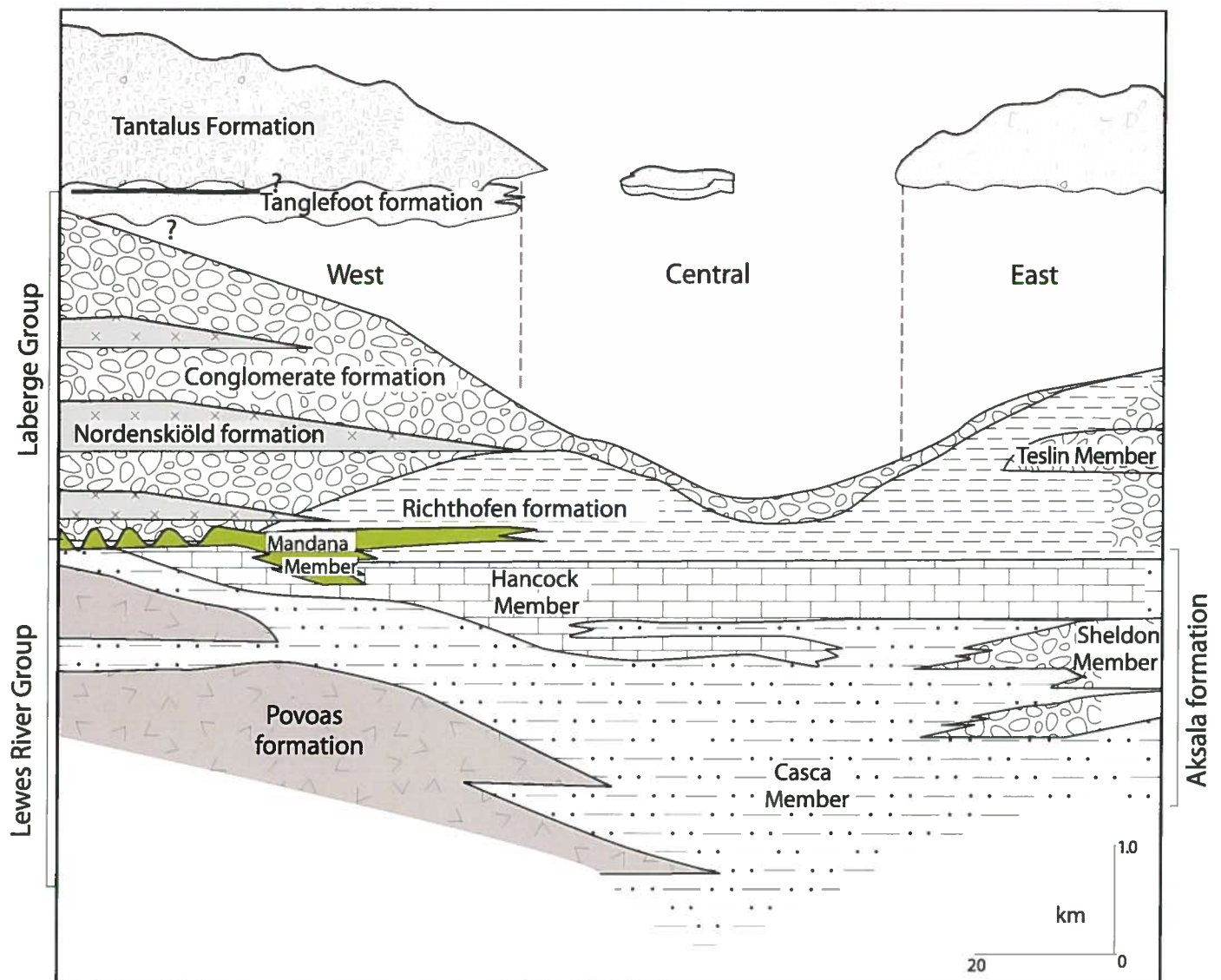


FIGURE 7.4

2560344 Ontario Inc.
**STRATIGRAPHIC REPRESENTATION
 OF THE WHITEHORSE TROUGH**
 (After Hart, 1999)

DATE: 01/05/2017

K. Brewer P.Geo.

A section measured at Red Ridge consists of fifteen sedimentary cycles, each on the order of approximately 10 m thick. A typical cycle consists of:

1. A scour-based arkosic pebble conglomerate containing fossils, twigs and branches lying transverse to paleoflow along 1 to 2 m trough foresets;
2. Conglomerate lags infilling troughs as lenticular beds;
3. A fining-upward zone of medium- to fine-grained arkose containing trough cross-beds, which exhibit an upward decrease in set size;
4. Grey organic rich shale or shaly mudstone containing leaves, grasses and *Metasequoia* needles and twigs;
5. Coaly shale to shaly coal, commonly rich in coalified twigs and branches;
6. Banded coal;
7. Either a transition back to grey shale or an abrupt termination by the basal pebbly conglomerate bed of the next cycle.

The depositional environment was one of a broad coastal zone characterized by tidal marshes and high-constructive river-dominated deltas (Lowey, 2008) and a rapidly aggrading flood-dominated delta. Cross-bedded conglomerate-sandstone cycles represent point-bar deposits from a high energy fluvial system.

Paleocurrent variance supports a meandering river interpretation. Of particular interest is that, despite the generally coarse-grained nature of the channel sandstones and conglomerates, the overbank deposits and related coals are relatively thick and demonstrate remarkable lateral continuity. The coal seams were deposited in long-lived delta plain swamps that served as collection sites for transported organic material and for generation of peat bogs. Closer to the Tanglefoot-Tantalus contact, coal becomes less abundant. Instead, grey shale and coaly shale predominates as much thinner beds than the coal seams lower in the succession.

Trenching in the vicinity of Cub Mountain and Corduroy Mountain exposed northeast-dipping coal and Tanglefoot Formation stratigraphy. This is probably a fold repeat of the coal-bearing Division Mountain and Cairnes Syncline Tanglefoot Formation sequences.

Resistant beds of thick-bedded chert pebble conglomerate of the Upper Jurassic to Lower Cretaceous Tantalus Formation cap the Tanglefoot Formation coal-bearing sequence, forming prominent topographic highs at Division Mountain, Red Ridge and Corduroy Mountain. Depositional environment of the Tantalus Formation appears to be one of an active flood plain. Coal has previously been mined within the Tantalus conglomerates 100 kilometers to the north of Division Mountain in the Carmacks region. Coal float has been found in the vicinity of gopher holes in areas underlain by the Tantalus Formation at Division Mountain and Red Ridge but to date none has been found in bedrock.

7.2.2 Richtofen Formation

The lithologically distinctive Richtofen Formation serves as an easily recognizable base for the overlying coal measures (Gish, 1995). Brown weathering black mudstone, with wispy siltstone to fine sandstone laminae in the form of low amplitude cross-stratification, alternates with thick (>10 meters) intervals of massive brown weathering calcareous sandstone. Fossil gastropods were found in the Richtofen Formation in diamond drill hole 94-38 (Gish, 1995). However these are not considered index fossils and cannot therefore be used for accurate dating (Gish, 1995).

A Lower to Middle Jurassic depositional span is recorded elsewhere in Whitehorse Trough for the unit but since this sequence is likely diachronous, being a record of a nearshore facies that migrated with basin fill, the precise age of the Richtofen Formation in this area will remain unknown until it can be locally constrained by paleontological data.

7.2.3 Andesite

Small stocks, dykes and sills of porphyritic basalt, andesite and dacite intrude the Tanglefoot Formation coal measures. This intermediate to mafic altered andesite to basalt sequence, of likely intrusive origin, appears for the most part to be sill-like bodies conformable with the Tanglefoot and Richtofen stratigraphy although they do on occasion crosscut the formations (Gish, 1995). The presence of glassy chill zones and rare amygdaloidal textures are indicative of emplacement in a near-surface setting (Norwest, 2008). Colours vary from pale green to dark green. Carbonate veins, veinlets and stringers are common throughout (Gish, 1995). Composition is primarily cryptocrystalline clay and/or plagioclase, carbonate, augite and quartz (Gish, 1995). Age of the intrusions is unknown but they are probably related to regionally extensive volcanic rocks of the Upper Cretaceous Carmacks Group, which unconformably overlie the Laberge and Tantalus stratigraphy in the Di-vision Mountain area. In 1995 eight drill core samples were sent for analysis at Vancouver Petrographics Ltd. in Langley, British Columbia (Gish, 1995). All the samples were recognized as intermediate-mafic volcanic lithology, representing altered porphyritic andesite to basalt.

7.3 Stratigraphy – Whitehorse Trough

Other important stratigraphic units assigned to the Whitehorse trough basin underly the coal exploration licence areas of 2560344 Ontario Inc. and will now be briefly described in the following sections (also see Figure 7.5).

7.3.1 Cache Creek Terrane

The Cache Creek Terrane is an oceanic allochthon within the Whitehorse trough that comprises of a massive, finely crystalline, locally crinoidal and fusiline limestone with limestone breccia, recrystallized limestone, and minor dolostone (Colpron, 2011). These rocks were thrust over Whitehorse Trough strata during a Middle Jurassic accretionary event.

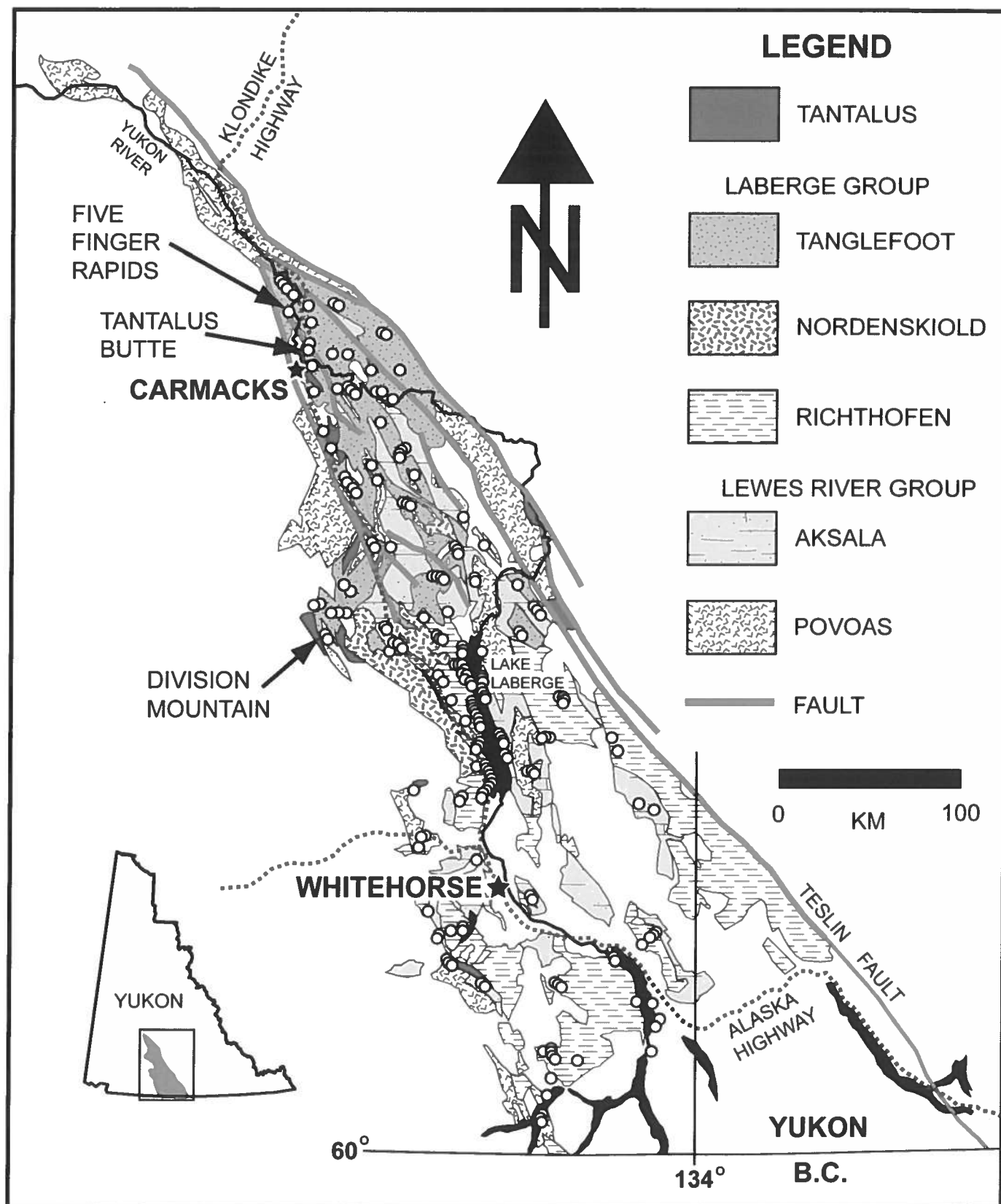


FIGURE 7.5

2560344 Ontario Inc.
GENERAL GEOLOGY MAP OF
WHITEHORSE TROUGH YUKON
(After Colpron et. al. 2000)

DATE: 01/05/2017 K. Brewer P.Geo.

7.3.2 Lewes River Group

In the Whitehorse trough the Lewes River Group is represented by the Povoas Formation and the Aksala Formation.

The Povoas Formation is interpreted as predominantly subaqueous lava flows and volcanoclastic deposits (Templeman-Kluit, 1978).

The Aksala Formation is assigned to the upper member of the Lewes River Group. The Aksala Formation is interpreted as platform to slope, reef, and littoral deposits (Templeman-Kluit, 1978).

An unconformity (spanning approximately 5 Ma.) separates this formation of the Lewes River Group from the overlying Laberge Group (i.e. Richtofen, Nordenskiöld and Tanglefoot Formations).

7.3.3 Nordenskiöld Formation (Laberge Group)

The Nordenskiöld Formation is the middle unit of the Laberge Group and underlies the Tanglefoot Formation and overlies the Richtofen Formation. It is characterized massive bedded crystal-rich volcanoclastic rocks. It is approximately 100 meters thick and occurs mainly as isolated, massive outcrops near the centre and western margins of the Whitehorse Trough. U-PB zircon ages date the formation at a range of 188.5 – 182.5 Ma. It represents mainly subaerially erupted pyroclastic beds.

7.3.4 Tantalus Formation

The Tantalus Formation (Middle Jurassic-Lower Cretaceous) overlies unconformably with the Tantalus Formation, the uppermost sequence of the Laberge Group. It consists of chert-pebble conglomerate and coal-bearing sandstone and mudstone. This formation is host to the major coal deposits mined at Tantalus Butte and Tantalus immediately northeast of Carmacks. This formation is at least 1000 meters thick and occurs widely scattered throughout the Whitehorse Trough and represents sedimentation in fluvial and lake environments.

7.4 Detailed Geology of the Division Mountain Coal Measures

Coal seams occur throughout the 450 meter thick Tanglefoot Formation but to date the thickest and most continuous accumulations of coal in the Division Mountain area are found to be present near the base of the Tanglefoot Formation. Internal stratigraphy and structure of the recessive coal measures is best illustrated on the geology map (Figure 2.1) and on cross sections showing drill hole data (Appendix 1).

At Division Mountain three depositional basins are present (Gish, 2000). On the southeastern end of the coal deposit at approximately Sections 9+00N and Section 10+050N, Seams 1a to 2b lie near the Tanglefoot-Richtofen contact. Seam 1a, which forms the base of the coal measures, is unusually thick here. For example in Hole 97-61 Seam 1a reached a maximum thickness of 17.3 meters (Gish, 2000). A relatively thick barren interval lies between Seams 2 and 3.

A stratigraphic cut-out or pinch-out is thought to occur on Section 10+050N where only Seam 1a at 1.7 meters thick is present near surface (Gish, 2000). However Hole 97-60 intersected a 16.8 meter thickness in the same seam just 80 meters down the dip (Gish, 2000).

Between Section 10+050N and Section 13+962N, another pinch-out is present (Gish, 2000). Seams 1 to 3 are moderately thick and lie in an evenly spaced manner within a 50 meter stratigraphic interval approximately 20 to 30 meters above the Tanglefoot-Richtofen contact. Seams 4 and 5 are also present above a 40 to 50 meter barren interval.

Northwest of Section 13+962N, Seams 1 and 2 are not present (Gish, 2000). A number of relatively thin subsidiary splits of Seams 3, 4 and 5 have been intersected by drilling, however only the basal Seams 3c and 3e have any economic significance (Gish, 2000).

7.5 Structural Geology

Deformation in the Whitehorse Trough occurred primarily as flexural slip folding during the Middle Cretaceous. Within Synclinal and anticlinal axes trend north-northwest, parallel to the trough axis (Figure 7.6). Fold wavelengths are generally between 500 meters and 2 kilometers, although complex tight folds with wavelengths less than 3 meters have been noted (Gish, 2000). The coal-bearing Cairnes Syncline outlined by 1994- 95 exploration trends 310° and plunges 9° to the northwest (Figure 12.1). The limbs dip between 25° and 72° . Drilling in 1997 and 1999 concentrated on the coal rich east limb of the Division Mountain Syncline about 2 kilometers south of the Cairnes Syncline. This syncline also trends approximately 310° with the east limb dip-ping 45 to 55° to the southwest. Exploration to date has not yet defined either the fold nose or the western limb of the Division Mountain Syncline. The folded stratigraphy has only been slightly modified by northwest- and northeast-trending normal faults with minor dip-slip displacements (Gish, 2000).

In the northernmost licence areas, the Tantalus Basins appear to have been deposited in narrow valley-confined systems during intervals of regional convergence of Stikinia, Quesnellia, and the Yukon-Tanana Terranes with the North American craton. Deformation of the pre-Tantalus strata in the Whitehorse Trough began in the Bajocian and continued during deposition of the Tantalus Formation, continuing into the Paleogene.

The en echelon pattern of folds in the Whitehorse Trough suggests that some dextral strike-slip movement may have occurred during Upper Jurassic to Lower Cretaceous folding and this may have directly influenced the geometry of the Tantalus basins (Colpron, 2011).

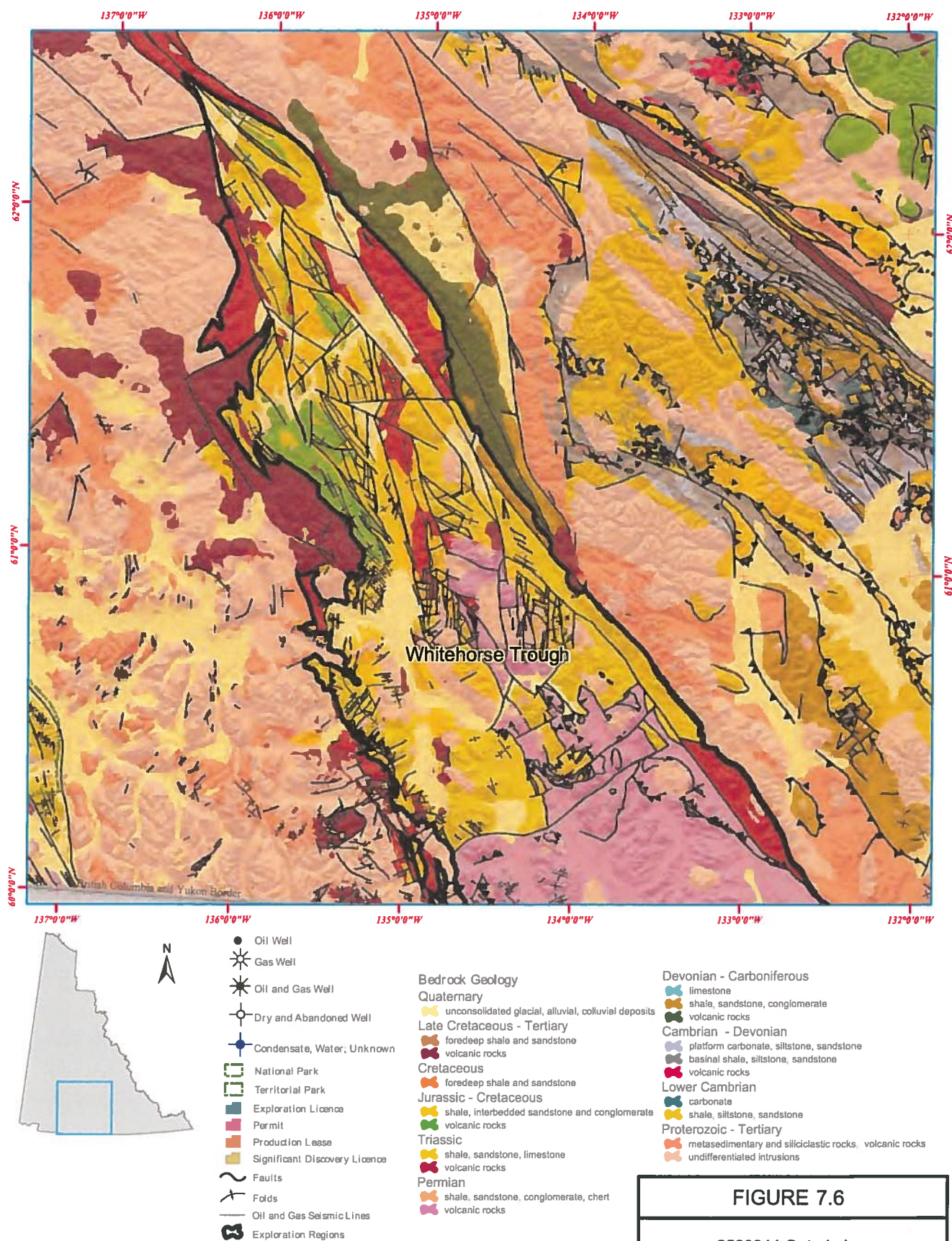


FIGURE 7.6

2560344 Ontario Inc.
STRUCTURAL GEOLOGY MAP
OF THE WHITEHORSE
TROUGH (EMR, 2011)

DATE: 01/05/2017

K. Brewer P.Geo.

Lowey (2008) estimated that the Tantalus and Tanglefoot Formations in the northern part of the Whitehorse Trough must have been buried by about 3-4 kilometers of strata, prior to Aptian to Albian uplift, erosion and deposition of volcanic strata (Mount Nansen Group) and overlying Carmacks Groups (Colpron, 2011).

7.6 Mineralization

Coal mineralization has been identified in a large number of occurrences throughout the Whitehorse Trough, many of which are included within the current licence holdings of 2560344 Ontario Inc. The focus of this report is on the coal found in the Division Mountain area but other coal occurrences occur in the Walsh Mountain area, Five Fingers area, and close to the community of Carmacks.

To the authors knowledge these occurrences have never been fully compiled in a singular report. However it is important to document them as the limited information on the occurrences clearly indicates the potential for further coal discoveries within the current licence holdings of 2560344 Ontario Inc. that could be of better quality than the coal reserves and resources identified at Division Mountain and therefore deserve further initial exploration using geological mapping, prospecting, trenching and possibly geophysical techniques. The MINFILES of these occurrences are included in Appendix 2.

7.6.1 Division Mountain

There are limited natural exposures of coal in the Division Mountain area. Almost all of the bedrock occurrences have either been located by hand or machine trenching through glacial till cover in areas of coal float or where coal-bearing stratigraphy has been projected to be present.

Coal seams occur throughout the 450 meter thick Tanglefoot Formation but the thickest and most continuous accumulations of coal are present near the base of the unit. Coal-bearing rocks comprise of inter-bedded sandstones and shales in roughly equal proportion (Carne, 1992). The coal seams are generally vitreous to dull black in color fissile to massive bedded and brittle (Gish, 1995). Fissility varies with argillaceous content (Gish, 1995).

Sections of coal with moderate to high amounts of argillaceous matter are also more susceptible to shearing. Pyrite content is low and occurs as flakes or plates along bedding/shear planes. Calcite veins (<1mm) also occur infrequently within the coal seams (Gish, 1995). Competency of the coal intersected in drill holes is variable but was, for the most part, rated as high (Gish, 1995).

Petrographic analysis of the coal seams noted that on a mineral-matter free basis, the coals form the Teslin Creek portion of the Division Mountain deposit contained an average of 54% vitrinite, predominantly desmocollinite. Macerals of the liptinite group (primarily sporangite) comprised on average 10% of the coal, and an average total inertite content (principally fusinites) was approximately 36% (Gish, 1996).

Internal stratigraphy and structure of the recessive coal measures is best illustrated on the geology map (Figure 2.1) and on cross sections showing drill hole data (Appendix 1).

7.6.2 Mineralization on Other Exploration Licences

There is no known detailed mineralization studies on any of the coal occurrences on the other coal exploration licences held by 2560344 Ontario Inc. In the northernmost section, the coals of the Tantalus deposits has been extensively studied and possibly could provide further reference to the specific nature of coal mineralization in that region. This level of detail is beyond the scope of this study but research into coal mineralization from the Tantalus mines may aid in exploration of the coal licences in that region.

7.7 Coal Quality

There is extensive information on coal quality in the Whitehorse Trough from studies conducted on the Division Mountain and Tantalus Mine deposits. Studies to date suggest that the coal quality improves in the northernmost sections of the Whitehorse Trough. Studies also show that slight variations in coal quality can exist within individual deposits as is the case in Division Mountain. The following sections provide an overview of the coal quality data in these areas.

7.7.1 Division Mountain

During the drilling programs in the late 1990's, whole core samples of coal intersections were sent to Chemex Labs Ltd. Of North Vancouver, B.C. in 1992, 1994 and 1995 and to Loring Laboratories Ltd. Of Calgary, Alberta in 1997 for proximate analysis (Gish, 2000).

Coal quality data for the 1972 to 1997 drill core intersections are tabulated within the synoptic drill logs (See Appendix 3). Analytical certificates from the 1997 diamond drill core samples were also detailed by Gish (2000).

A seam by seam listing of coal quality data for each drill hole intersection is also presented in Appendix 3. Gish (2000) also calculated a tonnage estimate for each intersection using an area of influence equal to half the distance to the next drill hole but not exceeding 250 meters from the bedrock surface.

Gish (2000) noted that coal quality in the area of the relatively shallow-dipping southeast limb of the Division Mountain Syncline was better than the deposit average. For instance, he noted that the calorific value of the seam in this portion of the deposit was 5,315 cal/g versus the average of 5,161 cal/g, considered to be due largely to lower ash contents. Other seams in this portion of the deposit were also noted to have lower ash content (Gish, 2000), for example 8.7% ash (Seam 3d, Section 9+100N), 8.2% ash (Seam 3c, section 10+00N), 8.2% ash (Seam 3b, Section 9+700N), 13.0% ash (Seam 2c, section 9+700N), 12.3% ash (Seam 2b, 9+700N) and 14.3% ash (Seam 1b, 9+100N).

Gish (2000) concluded that the coincidence of shallow-dipping, low ash coal in thick seams is even more important in the context of the excellent potential for further expansion of near-surface reserves by additional drilling in the south-easternmost portions of the Division Mountain Syncline.

More recent coal quality tests have been conducted by Norwest (2005, 2006). Prior to 2005, limited studies had been conducted with regards to washability analysis and estimating the potential of coalbed methane resources. Norwest completed proximate analysis on samples from the 2005 drilling program and calculated an average analysis for the Division Mountain deposit raw coal, based on an air dried basis, to be 2.8%

Residual Moisture, 27.6% Ash content, 26.3% Volatile Matter, 43.7% Fixed Carbon, 0.45% Sulphur and a calorific value of 5,159 cal/g (see Table 7.1).

The average analysis corresponds to an ASTM rank of High Volatile Bituminous “B” Coal (Norwest, 2006). No coking test, long proximate analysis, or rank analysis has been performed on samples from the property (Norwest, 2008). The low Sulphur nature of the coal may reduce the need for expensive scrubbers in a thermal power generation facility (Carne, 1992). Trace element content is also very low with average selenium values of 0.6 ppm, antimony values of 0.5 ppm and arsenic values of 3.0 ppm (Carne, 1992).

With the current scenario of development proposed to provide coal only to a mine-mouth power generation facility there would be no need for the coal to be washed. However, if the Division Mountain coal was to be exported to global markets, it would need to be washed, prior to shipment.

Table 7.1 Coal Quality Analysis

Seam	Thickness Meters	Calorific Value cal/g	Residual Moisture %	Ash %	Volatile Matter %	Fixed Carbon %	Sulphur %	Bulk Density g/cc
5	3.1	4252	2.0	37.6	2.0	44.0	0.34	1.59
4	6.2	5390	3.6	24.8	3.6	45.3	0.41	1.50
3e	3.9	5207	3.0	27.3	3.0	45.0	0.43	1.52
3d	3.1	5806	2.6	21.3	2.6	46.5	0.48	1.46
3c	3.7	5280	2.6	26.9	2.6	43.1	0.51	1.50
3b	3.4	5006	3.5	29.0	3.5	44.4	0.47	1.54
3a	4.5	5043	2.9	29.2	2.9	41.7	0.47	1.53
2d	7.7	5310	1.9	25.5	1.9	43.0	0.39	1.50
2c	2.2	5880	3.2	19.8	3.2	48.1	0.54	1.47
2b	5.4	4852	2.6	29.9	2.6	43.3	0.43	1.54
2a	3.6	5385	3.5	30.2	3.5	40.3	0.53	1.55
1c	1.3	4364	2.1	32.3	2.1	38.7	0.43	1.56
1b	3.3	5422	2.7	22.9	2.7	45.7	0.50	1.49
1a	10.1	5023	3.5	29.8	3.5	43.2	0.44	1.57
	4.4	5	2.8	2	2.8	4	0	1

7.6.2 Coal Quality on Other Exploration Licences

Coal quality data is available from the Tantalus mines and the occurrences at Five Fingers and Andesite.

As previously noted, the Tantalus mines are not included within the coal exploration licences but provide a strong indication of the coal quality that may exist within the northernmost coal licences held by 2560344 Ontario Inc. The main coal seam at Tantalus Butte was classified as high -volatile bituminous coal with an average analysis of 14% ash, 35% volatile, 51% fixed carbon and a gross calorific value of between 11,000 and 12,700 BTU.

At the Andesite coal occurrence, in 1910 the Department of Mines assayed thin seams of anthracite which gave sample results of 4.68% water (Moisture), fixed carbon 72.26%, 7.47% ash and non-coherent coke at 79.73%. Using the Research Council of Alberta formulas this would give a gross calorific value of the coal as between 15,700 to 16,000 g/BTU (Minfile, 115H 002, Appendix 2).

Teslin Exploration also sampled this occurrence from 3 localities and results ranged from 8.0 to 19.3% water (Moisture), 11.8 to 14.7% volatiles, 23.9 to 66.5% fixed carbon, and 0.5 to 0.6% Sulphur with the coal rank ranging from sub-bituminous A to sub-bituminous C and dry calorific value ranging from 4,750 to 10,340 g/BTU all non-coking .

At the Five Fingers coal occurrence, in 1908 the Department of Mines assayed two coal seams which gave results of 5.29% water (Moisture), 31.64% volatiles, fixed carbon 40.12%, 18.45% ash and reportedly produced an excellent, firm, coherent coke with reported gross calorific value of between 12,100 to 13,600 g/BTU (Minfile, 115I 004, Appendix 2). Teslin Exploration also sampled this occurrence and results ranged from 8.4% water (Moisture), 16.7% ash, 32.8% volatiles, 40.1% fixed carbon, and 0.2% Sulphur with the coal rank high volatile bituminous C and dry calorific value of 10,740 g/BTU all non-coking.

7.7 Coal Bed Methane and Conventional Hydrocarbons

R.C. Carne was one of the first geologists to discuss the potential for coal bed methane in the Division Mountain area. In 1992, he reported that "the coal has a high liptinite content) and this coupled with the high volatile rank, suggests that the potential for significant coalbed methane resource is high.

Coal bed methane is a gas created as a result of coal formation. Natural gas is approximately 74% methane. Gas from coal beds is approximately 98% methane and is invariably low in hydrogen sulphide and sulphur dioxide, regardless of the Sulphur content of the coal and coal measures (Carne, 1992). Coal bed methane has a calorific value similar to, and substitutes readily for, natural gas (Carne, 1992). The gas content of a coal bed is variable and is related to gas formation during coalification as well as the post-depositional history and current geological condition of the coal bed.

In the 1990's the Alberta Geological Survey standard used for estimating coal bed methane potential was 13.5 cubic meters of gas per tonne of bituminous coal in seams greater than 0.5 meters thick, half of which is considered to be recoverable. Carne (1992) used this methodology to estimate that the recoverable coal bed methane potential of Division Mountain could be as high as 75 billion cubic meters.

Lowey et al., (2009) evaluated over 600 samples from the Aksala, Richtofen, Tanglefoot and Tantalus Formations using Rock-Eval programmed pyrolysis and combustion testing complimented with a study of thermal alteration indices (TAI) of palynomorphs, conodont alteration indices (CAI) and vitrinite reflectance. The Povoas and Nordenskiöld Formations were not sampled as they consist of volcanic and volcanoclastic rocks, and hence have no source rock potential.

Both the Tanglefoot and Tantalus Formations were defined to be good source rocks and that are immature to early-mature and gas-prone. They noted that potential petroleum (gas) generative intervals occur at surface and in the shallow subsurface in deltaic mudstones (Tanglefoot Formation) and fluvial mudstones (Tantalus Formation). They concluded that the most prospective areas for petroleum exploration included Five Finger Rapids, Division Mountain and Tantalus Butte and in the northern portion of the Whitehorse Trough. As previously noted, with the exception of Tantalus Butte, the coal exploration licences cover all of these prospective areas for petroleum exploration.

Petrel Robertson Consulting Ltd. who completed an assessment of the petroleum resource potential of the Whitehorse Trough for the Yukon Geological Survey in 2012 concluded that there was hydrocarbon prospectivity in nine plays:

1. Cache Creek Assemblage Structural (speculative)
2. Lewes River Structural
3. Hancock Stratigraphic
4. Tanglefoot (Structural)
5. Tanglefoot (Stratigraphic)
6. Tanglefoot CBM (Speculative unconventional)
7. Richtofen Stratigraphic/Tight shale/shale gas (Speculative unconventional)
8. Tantalus Stratigraphic/Structural
9. Tantalus CBM (Speculative unconventional)

It is recommended that a summary report compiling all of the study results relating to the potential for conventional and unconventional hydrocarbons, including coal bed methane, be compiled for 2560344 Ontario Inc.

8 Deposit Types

As specified in GSC Paper 88-21 coal deposits are commonly classified with respect to their “Geology Type”. Coal “Geology Type” is a definition of the amount of geological complexity, usually imposed by the structural complexity of the area. The classification of a coal deposit by “Geology Type” determines the approach to be used for the resource/reserve estimation procedures and the limits to be applied to certain key estimation criteria. The identification of a particular “Geology Type” for a coal property defines the confidence that can be placed in the extrapolation of data values away from a particular point of reference such as a drill hole.

The classification scheme of GSC Paper 88-21 is similar to many other international coal reserve classification systems but it has one significant difference. This system is designed to accommodate differences in the degree of tectonic deformation of different coal deposits in Canada. Four classes of Geology Type are provided for that range from the first, “low”, which is for Plains type deposits with low tectonic disturbance; to the fourth, “severe”, which is for Rocky Mountains type deposits.

The Division Mountain property falls within the 'moderate' category based on broad open folds (wavelengths from 400 meters to well over 1.5 kilometers), relatively uncommon faults (displacements ranging from 10's of meters up to 100 meters) and average bedding inclinations of approximately 50° (range from 25° to 72°). Coal deposits are further classified on the basis "Deposit Type" as defined in GSC Paper 88-21 which refers to the extraction method most suited to the coal deposit. There are four categories, which are:

1. Surface
2. Underground
3. Non-conventional
4. Sterilized.

The Division Mountain deposit is considered to be a "Surface" mineable deposit.

9 Exploration

Extensive exploration during the period 1993-2008 at Division Mountain resulted in a significant reserve definition of Bituminous High Volatile B Coal discussed in Chapters 14 and 15 of this report.

Trenching and other exploration in the Division Mountain area at Cub Mountain and Corduroy Mountain exposed northeast-dipping coal sequences and Tanglefoot Formation stratigraphy. Gish (2000) noted that these coals were possibly a fold repeat of the coal-bearing Division Mountain and Cairnes Syncline Tanglefoot Formation sequences.

Exploration of the other coal licence areas held by 2560344 Ontario Inc. had limited exploration in the 1990's that was conducted primarily by Archer Cathro and Associates (1981) Limited.

This section provides an overview of exploration efforts since the 1990's on the coal exploration licence areas in the Whitehorse Trough.

9.1 Division Mountain

Extensive trenching programs have been conducted at Division Mountain and had good success in delineating coal seams and prospective exploration areas.

- The 1994 and 1995 excavator trenching programs utilized a Caterpillar 235 operated under contract by 10983 Yukon Ltd. of Whitehorse. The programs consisted of thirty (30) trenches totalling 5.9 kilometers in length and required 928 hours of excavator time
- The 1997 excavator trenching program required 569 hours of Hitachi UH09 excavator time to complete twenty-one (21) trenches totaling 2,695 m in length. The excavator was operated under contract by 15317 Yukon Inc. of Whitehorse
- Trenching in 1998 consisted of six trenches totaling 1,329 m completed with 116.5 hours of excavator time.
- In 1999 four excavator trenches totaling 315 m were completed with a Caterpillar 235 excavator operated by Caron Diamond Drilling Ltd. of Whitehorse.

Geophysical surveys have been conducted with limited success in delineating coal seams.

- In 1993 VLF-EM, EM-31 and total magnetic field surveys were conducted over 16.5 kilometers on grid crosslines between 10+000N and 15+182N. The readings were taken at 10 meter stations by Amerok Geophysics of Whitehorse, Yukon (Wengzynowski et al, 1994).
- Geophysical surveys during the 1994 exploration program included 36.9 kilometers of VLF-EM at 10 meter intervals on 300 meter lines spacing and 576 meters of reflection seismic surveys with a constant 4 meter geophone interval on selected VLF-EM lines (Gish, 1995). VLF-EM lines were run with 27.4 kilometers orientated at 130° and 9.5 kilometers orientated at 040°. The lines orientated at 130° were intended to test the eastern limb of the Division Mountain syncline while those orientated at 040° were used to better delineate the nose of the Cairnes syncline.

As previously noted, extensive drilling of the Division Mountain deposit has been conducted. The drilling program to date has been very successful in delineating the coal deposit at Division Mountain. Further drilling is required to explore potential areas for extension of the deposit to the southwest and unexplored areas to the west.

9.2 Division Mountain Area

Coal measures have also been identified at the Red Ridge, Upper and Lower Cub Mountain and Corduroy Mountain, occurrences, all within 7.5 kilometers of Division Mountain.

9.2.1 Red Ridge

The Red Ridge (also named Vowel, see Minfile, Appendix 2) coal occurrence was first discovered in 1907 by D.C. Cairnes of the Geological Survey of Canada. It lies approximately 5 kilometers along strike to the northwest of the Teslin Creek discovery area (Figure 2.1) and occurs approximately 245 meters below the base of the Tantalus Formation (Carne, 1992). In 1972 Arjay Kirker Resources Ltd. relocated the coal showing and measured a section from the top of Red Ridge northeast to the Nordenskiöld River, which defines 245 meters of Tantalus conglomerate overlying finer-grained Tanglefoot sedimentary rocks containing coal and carbonaceous shale. In 1993, a 25 meter hand trench was cut near the break-in-slope to the Nordenskiöld River valley (Figure 2.1). A further 15 meters was added to this trench in 1997. The trench profile consists of a blanket of glacial soil overlying a series of sub- horizontal layers of arkose-sandstone grit, sand lenses and coal fragment horizons varying in thickness from 20 to 70 cm. Structures within the coal fragment horizon are virtually nonexistent (Gish, 2000). The nature of the stratigraphy in the trench is most likely attributed to downhill creep of a coal horizon uphill at least 10 meters from the initial exposure and it was thought that the probable aggregate true width of the bedrock coal may be in the range of 12 to 15 meters (Gish, 2000). Gish (2000) made no comment as to whether the Red Ridge area should be further explored.

9.2.2 Upper and Lower Cub Mountain

The Upper Cub Mountain and Lower Cub Mountain showings (also known as Klusha, see Minfile 105E 028, Appendix 2) are located approximately 6 kilometers and 3 kilometers, respectively, to the northeast of the Division Mountain deposit (Figure 2.1). The Lower Cub Mountain Showing is 1.5 kilometers due south of Cub Mountain and the Upper Cub Mountain Showings are located 1.0-1.3 kilometers north of Cub Mountain.

In 1997 a 30 meter long hand trench was completed on the Lower Cub Mountain occurrence. The trench exposed coal, shale, siltstone and sandstone of the Tanglefoot Formation. It was cut perpendicular to bedding near the location where numerous patches of coal float were found. Excavator trenching tested this area in 1998 but only encountered 12.8 meters of coaly shale in fifteen seams, the thickest being 9.1 meters. Permafrost and overburden exceeding the 6 meter reach of the excavator prevented the exposure of bedrock in many of the trenches. Gish (2000) noted this area warranted a 500 to 600 meter, southwest oriented excavator trench from the Tanglefoot-Tantalus contact at Cub Mountain towards Division Mountain.

Favorable stratigraphy was identified at the Upper Cub Mountain occurrence but drilling in 1999 suggests that the area lies near the contact of the Tanglefoot and Tantalus Formations and maybe higher in the stratigraphy compared to where coal has been stratigraphically discovered in the Division Mountain area.

9.2.3 Corduroy Mountain

Corduroy Mountain (see Minfile 105E 022, Appendix 2) is located approximately 6 kilometers east-southeast of the Division Mountain deposit (Figure 2.1).

Tanglefoot Formation stratigraphy was explored by trenching on the west side of Corduroy Mountain in 1997. This area is 5 kilometers along strike to the southeast of the same stratigraphy exposed at Cub Mountain.

The 1999 trenching program completed a 360 meter long trench and uncovered an aggregate coal thickness of 23 meters in 25 coal seams, the thickest seam being 3 meters (Gish, 2000). Drilling in 1999 below the excavator trench exposed several additional coal seams with one hole returning an aggregate thickness of 17.96 meters of coal. The rocks strike 130 to 150 degrees and dip 45 to 85 degrees to the northeast. Due to overburden thickness which exceeded the 6 meter limit of the excavator, the most favorable part of the lower Tanglefoot stratigraphy at Corduroy Mountain was not explored (Gish, 2000). Gish (2000) recommended that further excavation trenching should be used to define targets for resource definition.

9.3 Campbell Highway and Walsh Mountain Regions

Several coal occurrences occur on the coal exploration licences (CYW 0149, CYW 0145, CYW 0146) along the westernmost portion of the Robert Campbell Highway and in the Walsh Mountain area (CYW 0144). These were as follows:

- Meyers (Minfile 115I 083, Appendix 2): Located at 62 degrees 4 minutes N by 136 degrees 3 minutes 52 seconds W. Dominion Explorers Ltd. conducted geochemical sampling in 1987 and are detailed in Yukon Assessment Report #092118.
- Eugene (Minfile 105L 038, Appendix 2): Located at 62 degrees 4 minutes 9 seconds N by 135 degrees 54 minutes 36 seconds W. No information on the nature of the occurrence is given. It was staked as a coal lease in August 2004 by Eugene K. Mack.
- Claire (Minfile 105E 011, Appendix 2): Located at 61 degrees 55 minutes 37 seconds N by 135 degrees 19 minutes 32 seconds W. Coal is reported to outcrop in Upper Jurassic Tantalus Formation rocks in the Claire Creek area. Reported by the Geological Survey of Canada but never investigated. This occurrence is helicopter accessible only.

- Walsh (Minfile 105E 012, Appendix 2): Located at 61 degrees 57 minutes 33 seconds N by 134 degrees 47 minutes W. Coal float was reported in Walsh Creek prior to 1938. Anvil Mining Corporation conducted limited prospecting in 1966. Coal Exploration Licence 6 was issued to Atlas Exploration Ltd. in 1969 and they carried out prospecting in 1970 the results of which are detailed in Yukon Assessment Report #060585. In 1976-1977, Kerr Addison Mines Ltd. explored the area as coal licences 59 and 60 and conducted ground and airborne geophysical surveys and geological mapping which was reported in Yukon Assessment files #061630; #061631 and #061632. Anvil are also reported to have located several seams of poor grade shaly coal. This occurrence is helicopter accessible only.

9.4 Five Fingers Area

The Five Fingers Area is host to coal occurrences at Five Fingers and Rink. These are as follows:

- Five Fingers (Minfile 115I 004, Appendix 2): Located at 62 degrees 12 minutes 9 seconds N by 136 degrees 20 minutes 25 seconds W. Coal was first noted at Five Fingers in 1877 by G.M. Dawson and first staked as coal lease 214 in 1898 by W. T. Edmonds. It was then restaked as coal leases 256 and 258 in 1899 by J. Cameron and C.E. Miller who mined several hundred tonnes near surface by 1904. The coal was extracted from two, high volatile bituminous coal seams each up to 1.2 meters in thickness and that outcrop on the surface. George J. Milton acquired the property in 1905 and formed the Five Fingers Coal Inc. which attempted unsuccessfully to diamond drill and then drove two declines (a total of 345 meters of development) by 1907. The mine was abandoned in 1908 in favor of the coal seams at the Tantalus Mine. In 1966 the original coal leases were acquired by Yukon Coal CL who then transferred them to Anvil Mining Corp. in 1966. Teslin Explorations Limited acquired the surrounding area in 1970 and these coal leases were then transferred to Cyprus Anvil Mining Corp who conducted geological mapping of the area in 1977. The occurrence is noted to comprise of two coal seams 1.1 and 1.4 meters wide and separated by 7.6 meters of rock. The seams strike north and dip 16 degrees. The coal is noted to occur within the Laberge Formation. Coal quality at this site is noted in section 7 of this report. This occurrence is road accessible.
- Rink (Minfile 115I 092, Appendix 2); Located at 62 degrees 18 minutes 59 seconds N by 136 degrees 22 minutes 32 seconds W. Coaly soil was reported by the Geological Survey of Canada but never investigated. No further information is provided. It may require a boat to access the occurrence as it appears to be on the western side of the Yukon River.

9.5 Carmacks Area

There are numerous coal occurrences and former mines near the community of Carmacks. This area includes the Tantalus mine deposits which are not included with the exploration licence areas. However the licences do include two occurrences as follows:

- Losch (Minfile 115H 001, Appendix 2): Located at 61 degrees 56 minutes 13 seconds N by 136 degrees 9 minutes 44 seconds W. This was staked as coal lease 4096 by H.E. Porter in 1902. It was restaked as Losch in 1958 by D. Jennings and A. Roy who drove a 4.6 meter tunnel in 1959. Resourcex Ltd acquired the coal exploration licence 36 in 1976 and conducted some exploration which was reported in Yukon assessment file #061357. It was then leased in 1981 to Fargo Corp. The coal occurrence is thought to be that reported on Lone Pine Mountain by the Geological Survey of Canada, It is reportedly 2.1 meters thick strikes 150 degrees and dips steeply northeast but is largely obscured by overburden.

- Andesite (Minfile 115H 002, Appendix 2): Located at 61 degrees 52 minutes 57 seconds N by 136 degrees 6 minutes 48 seconds W. This occurrence was initially staked as coal lease by H.E. Porter in 1900. No records of any work done at this time are recorded. It was then restaked in 1970 by P.F. Gunder and sampled by Teslin Explorations Ltd who wrote an assessment report. In 1976 Resoursex Ltd acquired Exploration License 36 who then leased it to Fargo Corp in 1981. Resoursex completed some work which is reported in Yukon Assessment file #061357. Thin seams of anthracite are noted to occur within contorted beds of Tantalus Formation rocks near the contact of a syenite stock. Bulldozing of the Dawson (Klondike) Highway has exposed coal seams on the east side at Mileposts 85.5 and 88.0. High quality samples were reported from this occurrence (see Section 7 of this report).

10 Drilling

10.1 Coal Exploration Drilling - Division Mountain

A total of 68 diamond drill holes (11,441.57 m) and 20 reverse circulation percussion drill holes (1,869 m) along with numerous trenches have been completed on the property. Geology and drill hole locations in the area of detailed exploration are shown on Figure 2.1 with cross sections through the coal measures (Appendix 1). All 68 of the diamond drill holes and 3 of the reverse circulation percussion drill holes were drilled in a 6.5 kilometer long by 1.5 kilometer wide southeast trending area. Seventeen of the reverse circulation percussion drill holes explored three target areas outside the defined deposit.

The 1993, 1994, 1995 and 1997 diamond drilling programs were contracted to E. Caron Diamond Drilling of Whitehorse. The drilling was done with one or two skid-mounted Longyear 38 wire-line equipped drills. All holes were drilled with HQ (6.25 cm diameter) equipment however, badly broken ground necessitated reducing to NQ (4.75 cm diameter) equipment in some holes. Core recovery of the coal intersections averaged about 96%.

Reverse circulation percussion drilling in 1999 was carried out by Midnight Sun Drilling Co. Ltd. using a track-mounted Schramm T6585WS drill supported with a Clark skidder.

Down-hole geophysical logging was performed in 1999 on all reverse circulation drill holes by Amerok Geoscience Ltd. of Whitehorse, Yukon (Gish, 2000). Resistivity was measured using an IFG BMP-04 galvanic resistivity tool, with 16 inch and 48 inch electrode spacing. Natural radioactivity was quantified with an IFG BSG-01 four channel gamma probe with windows in the 100 KeV to 3 MeV range. Measurement time was constant at one second. The results of these surveys were inconclusive and failed to accurately define the coal seams.

In 2005 a total of four diamond drill holes (886.57 meters) were completed on the property. Diamond drilling and bulldozer support was contracted to E. Caron Diamond Drilling of Whitehorse. The drilling was done with one skid-mounted Val d'Or wire-line equipped drill and a D7E bulldozer for drill pad construction and drill moves. Holes 05-85, 05-86 and 05-87 were completed with standard HQ equipment while the bottom of holes 05-87 and all of 05-88 were drilled with HQ3 bits and a split core tube.

PVC tubing with an inside diameter of 5.08 cm was inserted into drill holes 05-86, 05-87 and 05-88. For each of these holes electrical heat tape was suspended inside the PVC tubing from surface to a depth of 60 meters. The completion of these drill holes with PVC tubing and heat tape may enable the permafrost to be thawed when access to the hole is required.

Aurora Geosciences Ltd. of Whitehorse, Yukon was retained to perform down-hole geophysical logging. They attempted to record natural gamma, self-potential (SP) and resistivity logs in hole 05-85 but due to excessive caving they were not able to log this hole and abandoned any additional surveys. Roke Oil Enterprises Ltd. of Calgary, Alberta was then asked to perform additional logging. Roke arrived on the property as the final hole of the 2005 program was completed. Roke was unable to perform SP and resistivity surveys since the logging sonde was damaged in transit. They were able to log holes 05-86, 05-87 and 05-88 with gamma ray, neutron and electron bulk density equipment. For each of these holes the HQ rods were lowered to the bottom of the hole then logging was performed through the rods. The rods were then pulled from the hole and the holes logged with a caliper sonde. The results were plotted on strip logs and provided in digital format.

The 2005 drilling program provided large diameter drill core that was used for geotechnical studies. The geotechnical logging of all drill holes was performed by Archer Cathro and Associates (1981) Limited personnel under instructions and supervision by EBA Engineering Consultants Ltd. of Whitehorse, Yukon.

All drill holes were marked with a 1.5 meter long wooden plug, bearing an aluminum tag inscribed with hole number, date drilled, azimuth, dip and total depth. Surface inclination of the diamond drill holes was determined using a Brunton compass with downhole inclination determined by acid tests, with the surveys showing little or no change from surface inclinations.

10.2 Coal Exploration Drilling - Division Mountain Area

10.2.1 Hull Mountain

In 2006 the Hull Mountain area was selected as a target for reverse circulation drilling to assess whether the relatively abundant and thick coal seams of Division Mountain continue beneath Klusha Creek Valley. A track-mounted percussion drill was used. Three holes were attempted but none were completed through the overburden that exceeded 20 meters in thickness. Carne (2006) noted that further exploration in the form of geological mapping and excavator trenching is warranted on the northwest slope of Hull Mountain where depths may be thinner and/or a return to the proposed original drill sites with a more robust drill.

10.2.2 Cub Mountain

In 1999 an exploration program was funded and managed by Usibelli Coal Mine Inc. under an option agreement from Cash Resources Ltd. Seven holes (99-78 to 99-84) were drilled just north of Cub Mountain and a total of 77 meters of trenching in four locations was conducted (Gish, 2000). In 2006, four (4) holes totaling 581.5 meters of reverse circulation drilling were completed along the Division Mountain north access road in the Cub Mountain area. The holes were designed to explore the Upper Member of the Tanglefoot Formation for coal (Carne, 2006). Coal float was noted to occur nearby the drill sites (Carne, 2006). The drill holes intersected (Carne, 2006). Recovery of drill cuttings was poor in softer lithologies, especially below the water table and consequently no uncontaminated samples were available for coal quality analyses. The only significant intersection was a 1.6 meter coal seam with low to moderate apparent ash content. It was thought that the seams in this area were thin and were part of the upper portion of the Tanglefoot Formation Upper Member while better coal intersections in Division Mountain for at the base of the Tanglefoot Formation Upper Member (Carne, 2006). Further exploration was deemed not to be

possible targets in this area. Further exploration would have to consider possible locales where the lower portion of the Upper Tanglefoot Formation Upper Member may be at or near the surface.

10.2.3 Corduroy Mountain

In a letter from Usibelli to Cash Resources in 1999, Usibelli noted that they also conducted three drill holes in Corduroy Mountain all of which encountered coal (Gish, 2000). Unfortunately the drill logs were poorly recorded with no specific locations of the drill holes and so these locations are unknown. However, they do indicate that further exploration in Corduroy Mountain may be warranted.

10.3 Coal Exploration Drilling - Other Exploration Licence Areas

With the exception of the Five Fingers occurrence, there is no record of any other drilling on the other coal exploration licenses. The drilling at Five Fingers was noted to be unsuccessful (See Section 7 of this report).

10.4 Geotechnical Drilling at Division Mountain

In July, 2005, four diamond drill holes were drilled and sampled as part of an exploration program at the Division Mountain site.

Norwest Corporation was engaged by Cash Minerals to provide stability analysis and pit wall recommendations for geotechnical data obtained in this program.

Drilling/logging/sampling were supervised by Archer-Cathro Consultants site geologists with onsite assistance from EBA Engineering from Whitehorse and technical support and review from Norwest.

Development of pit wall angles required the identification of potential failure modes for the given pit configurations. Primary failure modes were evaluated individually to identify failure potential (Norwest, 2006). The failure modes of concern for a pit in bedded geology such as Division Mountain include the failure types described in the following sections.

10.4.1 Toppling Failures

Toppling failures were judged as low probability based on the geometry of the pit walls and bedding which limit kinematic potential for failure.

10.4.2. Wedge Failures

In order to limit the potential for wedge failures along weak bedding planes, the pit designs had been completed with pit walls oriented parallel to bedding structure without undercutting and daylighting of strata bedding. Additional data will be required as part of detailed engineering and design to evaluate potential for wedge failures along cross structures such as cross jointing or faulting.

10.4.3 Planar Failures

Planar failures along weak bedding planes typically represent the highest potential for footwall slope failures. Evaluation of the pit stability included analyses of failures due to planar failure modes.

10.4.4 Circular Failures

Circular failures through the jointed and fractured rock mass affecting overall wall stability were also considered a significant potential failure mode. Deep-seated circular failures may occur in walls of any geometry or structure if stable wall angles are exceeded.

Based on the configuration of the pits and the level of detail of the existing data, the report by Norwest (2006) only considered the last two failure modes, Planar and Circular Failure.

11 Sample Preparation, Analyses and Security

11.1 Sample Preparation

This section describes the sampling method followed during the 1993 to 2005 coal quality testing programs conducted by Cash Minerals Ltd. and its contractors. The 2005 exploration and sampling programs were carried out under the supervision of a qualified person (Mr. R.C. Carne, M.Sc., P.Geo.) with Archer Cathro & Associates (1981) Limited & Associates (1981) Limited of Whitehorse, Yukon.

The following drill core sampling protocol is reported to have been used during the drilling programs:

- Core was lightly washed and measured.
- Core was geotechnically logged using a standardized technique defined by EBA Engineering Consultants Ltd.
- Core was geologically logged using a standardized technique defined by Archer, Cathro & Associates (1981) Limited.
- Sample intervals were selected based on coal and parting lithological breaks selected by using geological logs. Top and bottom coal samples for each coal seam were sampled individually with a maximum interval of 30 cm. The minimum coal sample interval for the remainder of the coal seam was approximately 30 cm. Internal partings were sampled separately, with a minimum interval of 10 cm. Roof and floor materials for each coal seam were sampled at approximate 15 – 30 cm intervals, based on lithologic and natural breaks.
- Sample intervals were marked in the wooden core boxes and all core boxes were stored in a secure manner on the property.
- For each sample interval all the cored material was sent for analysis.
- Sample material was double bagged in 6 mm plastic bags with a sample tag placed between the two sample bags. Two or three samples were placed in a fiberglass bag, sealed with a metal clasp and sample numbers were marked on the outside of the bag with felt pen.

11.2 Analysis

This section describes the sample handling procedures followed during 2005 exploration program conducted on behalf of Cash Minerals Ltd. Samples were collected from exploration efforts and submitted for analysis using methods that are consistent with typical industry practices (Carne, 1992, 1995, 1996; Gish, 1999, 2000, Norwest 2005, 2006).

During the program all samples were transported from the property to Whitehorse by truck, escorted by the geological crew, and then shipped via Greyhound Courier Express to SGS Canada Inc. (SGS) in Delta, B.C.

SGS provided proximate analyses on air-dried, as received and dry bases. The SGS facilities are accredited according to the International Standardization Organization 9001 requirements (ISO 9001). For the most part reports on historic test results were based on proximate analysis on "as received" and "air-dried" bases.

Proximate analysis tests were conducted under the strictest of laboratory controls, along with applicable standards that included (After SGS, 2017):

- Moisture (ASTM D 3173, ISO 11722, AS 1038.3): Moisture is the water that exists in the coal at the site, time, and under the conditions it is sampled. The amount of moisture is measured by measuring the loss in mass between an "as-mined" sample that has been heated under controlled condition to drive off the water that is not contained within the chemical structure of the coal.
- Sulphur (ASTM D4239, ISO 351, AS 1038.6): It is important to measure the Sulphur content in coal samples to evaluate the potential for Sulphur emissions from coal combustion, or for contract specification purposes.
- Calorific Value (ASTM D5865, IS) 1928, AS1038.5): The calorific value of coal or coke is the heat liberated when the solid fuel undergoes complete combustion in oxygen. Generally samples are tested in a bomb calorimeter and then a total heat energy measure is obtained.
- Volatile Matter (ASTM D3175, ISO 562, AS 1038.3): Volatile matter includes the components of coal, except for water, which are liberated at high temperature in the absence of oxygen. Volatile matter is a key health and safety concern as coals high in volatiles have an increased risk of spontaneous combustion. Samples are tested by initially measuring the mass of volatiles before and after weight analysis under strictly controlled conditions.
- Fixed Carbon (ASTM D5142, ISO 17246): The fixed carbon content of coal is determined by subtracting the percentages of moisture, volatile matter and ash from the original mass of the coal sample: the solid combustible residue that remains after a coal has had the volatiles driven off. From this an estimate of the amount of coke the individual coal sample will yield is obtained.
- Ash: Most ash analysis tests include ash elemental tests, ash fusion tests and coal ash analysis.

Another form of testing coal is to conduct an Ultimate Analysis Test which produce more comprehensive results than the proximate analysis. Ultimate Analysis Test may be used to determine the elemental composition of the coal including moisture, ash, carbon, hydrogen, nitrogen, sulphur, and oxygen. SGS provided certified test results for all analysis.

11.3 Security

As coal samples are a relatively low-value bulk commodity, no extraordinary security procedures were followed.

12 Data Verification

The sample data described in this report was collected by Archer Cathro & Associates (1981) Limited who conducted the exploration programs on the Division Mountain property between 1972 and 2005.

In examining and verifying the sample data in this report, Norwest and the author performed the following tasks:

1. Original assay certificates were reviewed.
2. Reported drill core analyses were checked against sampling numbers in the drill logs and the original analysis certificates to ensure accurate reporting.
3. The range of reported results and their geographic distribution were checked against similar ranges and distributions from properties containing similar mineralization.
4. The author personally visited the property on several occasions during the period 2008-12 during the months of July and August, and verified the existence of core but did not log any of it and also verified a large representative portion of the drill hole locations for their location accuracy.
5. As coal samples were tested with whole core analysis it was impossible for the current author to verify any previous coal testing and is therefore reliant on previous reporting which appears to have been conducted to NI 43-101 standards.
6. The author was not involved with any of the data modelling or the reserve and resource calculations by Norwest (2005, 2006, 2008), nor has he been provided with an original copy of the data model used. He is therefore reliant on the previous reporting on these historical reserve and resource calculations which appear to have been conducted by Norwest (2005, 2006, 2008) to NI 43-101 standards. Previous resource calculations to Norwest's efforts by others (e.g., Carne, 1995, 1996;) are not thought to have been prepared to NI 43-101 standards.
7. T. C. Becker of Norwest (2005, 2006) also logged some of the core from the 1994 and 1995 programs and mapped most of the excavator trenches and was actively involved in the exploration programs in 2005 and 2006.

In 1999 Usibelli drilled three reverse circulation percussion drill holes and dug four excavator trenches in the area of the historic resource estimate. As part of their quality control measures they selected 5 samples from Trench 04 and sent these samples for analysis to both the Usibelli Coal Mine, Inc. in Healy, Alaska and the Commercial Testing and Engineering Company in Denver, Colorado and results were found to be highly consistent.

13 Mineral Processing and Metallurgical Testing

The equivalent terminology, which will be used in this report on coal, is "Coal Processing".

14 Historic Mineral Resource Estimates

14.1 Methodology and Approach

Based on exploration programs, analysis of results, and modelling efforts by Norwest between 2005 and 2008, that also included the results of all previous exploration efforts conducted by Archer

Cathro & Associates (See Carne, 1995, 1996, 1998, 1999; Gish 1999, 2000) historic mineral resources were estimated to comply with standards prescribed in National Instrument 43-101. For the classification, estimation and reporting of coal resources for the Division Mountain property and in accordance with National Instrument 43-101, Norwest (2005, 2006, 2008) used the Canadian Institute of Mining, Metallurgy and Petroleum's CIM "Definition Standards on Mineral Resources and Reserves" adopted by CIM Council on November 14, 2004 and referenced the Geological Survey of Canada Paper 88- 21 "A Standardized Coal Resource/ Reserve Reporting System for Canada" (Hughes, et al, 1989).

The resource calculation methodology by Norwest in deriving resource estimates in 2005 and 2006 approximated that used in 1998 by Mr. R.C. Carne, M.Sc., P.Geo and by Gish (2000) in earlier reports.

The following paragraphs outline the methods used for the resource estimation.

1. Reviewed Exploration Data: Verified data as outlined earlier in this report as well as checked synoptic logs, drill hole locations, geologic model and coal rank.
2. Geology Type: Falls within moderate category based on broad open folds (wavelengths from 500 to well over 1.5 km), relatively uncommon faults (displacements from 10's m up to 200 m) and average bedding inclinations of 50° (range from 25° to 72°).
3. Data Points: Only diamond drill hole data was used. The drill sections are spaced approximately 300 m apart. For coal seams with multiple analyses a weighted average of all samples was taken to represent the seam. For intervals with no analyses due to core loss the interval was assigned a value equal to the arithmetic average of the adjacent intervals.
4. Seam Thickness: Seam thicknesses were calculated using trigonometry and confirmed by measurements from drill sections. Minimum allowable coal bed thickness was 0.5 meters. Only five resource blocks were less than 1.0 m thick and the average for all blocks was 4.4 meters.
5. Definition of Resource Block: Length defined as horizontal distance, width measured in plan of section and thickness measured as true width. The coal bulk density for work prior to 2005 was based on the rank of coal, ash content and extrapolated from a table provided in Paper 88-21, for the 2005 work this data was provided by SGS.
6. Criteria of a Resource: All resources are of immediate interest and fall into the measured categories. Measured resources require the distance from nearest data point to be between 0 and 450 meters.
7. Method of Estimating Resources: On the horizontal plane the length of the measured resource blocks was projected to half the distance between adjacent drill sections. For section 8+950N where there was no adjacent drill section to the southeast the length was projected 225 meters from the drill section.
 - a. On the plane of the drill section the width of the measured resource blocks were measured from surface to the first drill hole, this distance never exceeded 225 meters. If two or more drill holes existed on the same section then the width was extended down dip to half the distance between the next drill hole, again this distance never exceeded 225 meters. The resource block width was then extended down dip to a distance, which represented a 'reasonable' resource depth (see below).

- b. For this deposit type the maximum depth from surface, as defined in Paper 88-21, is when the ratio of 'bank' cubic meters/tonne of the last tonne exceeds 20:1. This ratio was not approached in these resource calculations instead the bottom of the resource was taken to be a 'reasonable' depth.
- c. Along the east limb of the Division Mountain Syncline the depth of the resources ranged from 270 meters at the south (8+950N) to 290 meters in the middle and 270 meters at the north (10+710N).
- d. In the area of the Cairnes Syncline it ranged from surface at the south (10+610N) to 300 m at the north (12+124N). In the Teslin Creek area the reasonable depth was taken as 200 m for section line 12+754N to 13+353N and 150 m for section line 14+075N to 14+404N.

14.2 Historic Measured Resource Estimate

All resources fall into the Measured category based on the criteria provided in GSC Paper 88-21 and the results of the 2005 and 2006 drilling efforts which indicated that seam continuity and geological correlations could be made for distances of over 500 meters (Norwest 2008).

A total near-surface historical "Measured" resource of 52.5 Mt was defined (Table 19.1) by Norwest (2005, 2006, and 2008). Approximately 47.2 Mt of the resource falls into the area covered by the five coal leases while 5.3 Mt lie just to the southeast of Lease CMW3003 on section line 8+950N (covered by Coal License CYW0156).

Table 14.1 Historic Coal Resource Summary

Resource Area	ASTM Coal Rank	In- Place Resources (Tonnes In Millions)		
		Measured	Indicted	Inferred
Division Mt.	High Volatile Bituminous B	52.493	0	0
Total		52.493		0

From the historic resource summary, which appears in Appendix 4 the following is a summary of the historic resource by section (Table 14.1) and by seam (Table 14.2) as follows:

Table 14.2: Historic Coal Resource (by Section) (After Norwest, 2008)

Section	Measured Tonnes
8+950N	5,276,986
9+510N	6,089,845
9+800N	2,781,878
10+050N	2,165,531
10+375N	4,849,068
10+710N	5,149,910
10+725N	408,011
10+914N	2,830,259
11+244N	3,284,341
11+500N	4,853,319
11+829N	4,815,704
12+134N	4,136,997
12+754N	998,906
12+048N	1,573,850
13+353N	1,847,102
14+075N	543,072
14+267N	512,517
14+404N	376,239
Total	52,493,533

Table 14.3 Historic Coal Resource (by Seam) (After Norwest, 2008)

Seam	Total Tonnes
5	689,459
4	4,000,541
3e	1,568,216
3d	631,286
3c	3,827,802
3b	5,434,376
3a	4,560,362
2d	1,280,810
2c	1,112,480
2b	4,446,186
2a	2,532,918
1c	477,681
1b	2,261,158
1a	19,760,257
Total	52,493,533

15 Historic Mineral Reserve Estimate

A coal reserve is the economically mineable part of a Measured or Indicated coal resource supported by at least a Preliminary Feasibility level study, which includes information on mining, processing, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. Coal reserves are sub-divided in order of increasing confidence into “Probable” and “Proven” reserves, respectively. A “Probable” reserve is the economically mineable part of an “Indicated” resource and, in some cases may include a portion of a “Measured” resource. A “Proven” reserve is the economically mineable part of a “Measured” resource. A pre-feasibility level study by Norwest in 2008 included an estimate 26.4 Mt of in-place coal reserves, in the Proven assurance category (see Table 15.1). The study was based on the coal being surface-mined using conventional truck/shovel practices. It was envisioned that there would be a run-of-mine product that will be sold as fuel for a local “mine mouth” 50MW (net) generating station.

Table 15.1 Historic Coal Reserve Summary

Area	ASTM Coal Rank	In- Place Resources (Tonnes In Millions)	
		Proven	Probable
Division Mt.	High Volatile Bituminous B	26.372	0
Total		26.372	

Key assumptions of the mine plan that formed the basis of the historic reserve estimate by Norwest (2008) included:

- Out-of-seam dilution (OSD) of 5cm from the roof and from the floor of each coal strata
- Minimum mineable coal seam thickness of 0.5 meters
- Includes provisions for mining loss.

Mineral reserves estimates may be materially affected by the following factors (after Norwest, 2008):

- Permitting is expected to be challenging
- Reclamation planning should be performed to a greater level of detail with involvement from regulatory authorities secured as early as possible in the permitting process
- Labor in the region is generally available but if other mine developments proceed it may become more challenging to recruit locally for technical positions.
- The impact on local communities should be evaluated.
- The coal washability database should be expanded for more accurate prediction of wash yields.
- Specific markets should be defined.
- The viability of a mine mouth power generation facility needs to be determined.

16 Mining Methods

16.1 Optimum Pit and Geotechnical Analysis

Data related to the pit geotechnical characteristics was gathered from a variety of sources by Norwest (2006) including:

- Geological cross-sections showing the interpreted geological structure in the pit areas
- Geotechnical core logging of diamond drill hole cores from four holes
- Laboratory testing of representative core samples (point load tests)
- Rock mass classification (RMR) of strata based on geotechnical core logs

Details of data analysis may be found in Norwest's geotechnical report (see Appendix 5).

Experience with bedded pit walls in western Canadian coal mines has led to the development of a substantial database of material properties and behaviors which have allowed for the successful design of pit walls in a variety of conditions. Given competent rock strata below the coal seam, pit designs including un-benched walls have been successfully mined to depths in excess of 100 meters.

The limiting factors for the height of un-benched pit walls which can be maintained include:

- Intact pit wall rock strength and jointing
- Dip of the pit wall
- Thickness of bedding.

The rock strata below primary coal seams in each cross-section (see Data Analysis, above) were studied by Norwest (2008) to determine the potential to excavate an un-benched pit wall to some height to minimize the overall pit strip ratio.

Review of the core logs and RMR data by Norwest (2008) showed that the strata below wall coal seams consist of moderate thickness (2-10m) of relatively competent (30-50 RMR) shale and sandstone zones which are subsequently underlain by weaker layers of coal or shale.

Preliminary analyses showed that based on the pit wall rock strength and thickness, an un-benched pit wall in the range of 25-50 meters in height would meet stability criteria for the pit design. The remaining portion of the pit wall would be benched to surface with bench face angles determined by bedding dip on footwalls or cut at 65 degrees on high walls. Berms between benches were set at a minimum width of 8m as per regulatory requirements.

The general stability and failure modes for specific areas of the project are were investigated. In Pit One, three cross sections (10+914, 11+500 and 11+829) were specifically studies that aligned to the 2005 core holes on which rock strength data was based. The geologic cross sections previously prepared by Archer Cathro may be seen in Appendix 1.

16.1.1 Pit One – West Wall

The bedding of the rock strata are moderately dipping at a comparatively constant dip for the full height of the west wall.

Based on this bedding configuration, typical practice in western Canadian coal mines is to implement fully benched pit walls where bench heights and berm widths are dependent on variations in rock strength and bedding dip. Pit wall bench and berm design must follow variations in bedding dips. Bilinear planar failure of the pit wall is the failure mode of greatest concern for initial pit wall design. The stratigraphic units in the pit wall vary from the weak coal layers with an RMR of 25 to conglomerates with an RMR of 60.

16.1.1.1 Circular Failure Mode

Factors of Safety (FOS) were calculated assuming circular failure in the western wall of Pit 1. Strength properties of reasonably competent rock (mudstone) in relatively large pits were assumed based on the aforementioned data analysis. All values are calculated with the water table drawn down to 150 meters from the surface which assumes groundwater drawdown by deep pumps. Sections 10+914 and 11+829 were found to meet the base criteria (a minimum FOS of 1.2). Section 11+500 was found to exceed the FS, even with the use of 'improved' rock strength properties, suggesting that a high wall angle of less than 37° would be required (see Table 16.2).

Table 16.1 Pit One (West Wall) – Circular Failure (After Norwest, 2008)

Cross Section	Wall Angle (degree)	Base case FOS	Improved FOS
10+914N	32	1.56	NA
11+500N	37	1.10	1.17
11+829N	32	1.26	NA

16.1.1.2 Planar Failure Mode

In addition to the stability analyses for the circular failure for the full pit wall, pit wall designs were evaluated for bilinear planar failure at a minimum FOS = 1.2 along the footwall strata. This evaluation was carried out to determine if the wall angles suitable for overall circular failure mode were compatible with the bilinear failure mode. The maximum bed thickness for planar failure evaluation was 2 meters which is relatively conservative based on the geotechnical data.

The bi-planar failure mode analyses returned overall pit wall angles equal to the pit wall angles for circular failure mode with the exception of section 11+829. The analyses show that Section 11+829 could be steepened to 35 degrees if planar failure were the dominant mechanism with a corresponding decrease in strip ratio. Limiting overall wall angles for the planar failure mechanism are shown in Table 16.2.

Table 16.2 Pit One (West Wall) – Planar Failure

Cross Section	Wall Angle (degree)
10+914N	32
11+500N	37
11+829N	35

16.1.2 Pit One – East Wall

The geology of the Pit 1 east pit wall can be generally described as having moderately dipping bedding at a relatively constant dip for the full height of the east wall. Stability analyses for the east wall mirrored analyses completed for the Pit 1 west wall, as above. Pit walls were analyzed with consideration to circular wall failure and bilinear planar failure mechanisms.

16.1.2.1 Circular Planar Mode

Factors of safety were calculated for circular failure of the overall pit wall with ‘base case’ rock strength properties assumed as above. All values were calculated with the groundwater table drawn down to 150 meters from the surface. Similar to the Pit 1 west wall, sections 10+914 and 11+829 met the minimum FOS = 1.2 criteria while section 11+500 required the ‘improved’ case strength properties to meet the minimum FOS criteria. The FOS values and overall wall angles are summarized in Table 16.3.

Table 16.3 Pit One (East Wall) – Circular Failure (After Norwest, 2008)

Cross Section	Wall Angle (degree)	Base case FOS	Improved FOS
10+914N	32	1.56	NA
11+500N	37	1.10	1.17
11+829N	32	1.26	NA

16.1.2.2 Planar Failure Mode

In addition to the stability analyses for the circular failure for the full pit wall, pit wall designs were evaluated for bilinear planar failure at a minimum FOS = 1.2 along the footwall strata. This evaluation was carried out to determine if the wall angles suitable for overall circular failure mode were compatible with the bilinear failure mode. The analyses showed that the planar failure mechanism wall angles are compatible with the circular failure pit walls. Overall wall angles derived from this evaluation are summarized in Table 16.4.

Table 16.4 Pit One (East Wall) – Planar Failure (After Norwest, 2008)

Cross Section	Wall Angle (degree)
10+914N	32
11+500N	41
11+829N	36

16.1.3 Recommended Slopes

Using the available data and estimating “base” case and “improved” case rock strength parameters, stability evaluation of the pit walls was completed focusing on the two failure mechanisms deemed most important in terms of overall pit configuration, specifically circular failure and planar failure. The geotechnical evaluation showed that although the majority of pit wall cross-sections met the minimum criteria under base case assumptions, certain cross-sections did not meet minimum FOS without assuming “improved” case strengths (Pit 1, 11-500 East and West (marginal). Table 16.5 summarizes the current recommended pit wall angles for the large pit shell design. Note that wall angles obtained using the “improved” case rock strength parameters are shown in italics.

Table 16.5 Pit Shell Recommendations (After Norwest, 2008)

Pit	Cross Section	Wall Angle (west) in degree	Wall Angle (east) in degrees
1	10+914N	32	1.56
1	11+500N	37	1.10
1	11+829N	32	1.26

The Division Mountain project resource consists of a central plunging syncline, in addition to three separate, outlying synclinal limbs (Figure 2.1). An optimum pit shell was determined that would provide the reserves required, taking into account strip ratio, geotechnical concerns, ramping and access, and exposure of multiple coal seams for blending.

Various pit shells were designed for each of the four major resource areas that would provide approximately 20 years of coal production. The general criteria in designing these pit shells was to design the pits to be as long, and therefore as shallow, as practical. This was assumed to minimize overall pit depth, thereby easing ramping restrictions and maximizing truck productivity. In addition, it ensured a broad exposure of various coal seams which was assumed to ease blending for coal quality.

A strip ratio was then calculated for various combinations of pit shells at varying depths, taking into account the design parameters and assumptions described below (see Table 16.6). The intent of this was to analyze pit shells in order to arrive at the lowest strip ratio shell (or shells) and thus optimize the project value.

Table 16.6 Strip Ratio Comparison (After Norwest, 2008)

	Waste (bcm)	Coal (tonnes)	Strip Ratio (bcm/tonnes)
Pit 1 and 4	13,691,085	5,117,830	2.7
Pit 1,2,3 and 4	14,527,439	5,066,808	2.9
Pit 1	11,145,227	4,981,689	2.2

Once Pit 1 alone was shown to have the lowest strip ratio, the pit shell design was fine-tuned to provide 20 years of production (4.8Mt total).

Pit 1 targets the eastern limb of the Cairnes syncline (Figure E.1). The ultimate pit shell consists of a 55 – 70 meter deep pit, at geotechnically stable angles. Pit 1 was found by Norwest (2008) to yield the lowest strip ratio, at 2.2 bcm/tonne recovered. Of the various pit shell combinations analyzed, Pit 1 alone is considered to be the optimum based on its low strip ratio, low overall stripping cost and maximized profitability. The low stripping ratio in Pit 1 is attributable to its relatively shallow dip angle, greater coal thickness and lower amount of overlying weathered material.

16.2 Selection of Mining Method

Factors considered in selecting an optimum mining method include:

- Depth of reserve and required production levels
- Complexity of seam (dip, number of separate strata, thickness of strata, etc)
- Site location (topography, access)

Based on the factors above, and on Norwest's knowledge of similar mining operations, it is proposed that the Division Mountain be stripped using conventional 'truck/shovel' operations. This will include topsoil stripping, drilling and blasting of the overlying waste, and stripping of waste and coal using a backhoe excavator. Waste and coal will be loaded into a fleet of mining trucks for haul to the spoil dumps or coal crusher, as appropriate. Selection of specific equipment is discussed further in this section of the report.

16.2.1 Design Criteria and Assumptions

The following is a list of design criteria and assumptions used in the mine planning aspects of this study.

- Annual production of 240,000 tonnes. This supplies an average 4,997 kcal/kg coal to a 50MW (net) power plant
- A project life of 20 years. It is anticipated that further drilling will delineate additional reserves that may be used as a source for mine-mouth power, or serve in export steam and/or PCI markets.
- A 30% swell factor for waste material. A final swell of 10% for material that is truck hauled and dumped. Negligible swell for re-compaction of ash. A re-swell of 20% for waste dump material that is re-handled in regrading and reclamation operations.

- A 30% swell factor for waste material. A final swell of 10% for material that is truck hauled and dumped. Negligible swell for re-compaction of ash. A re-swell of 20% for waste dump material that is re-handled in regrading and reclamation operations.
- Out-of-seam dilution (OSD) of 5cm from the roof and floor of each coal strata. OSD is assumed to have a SG of 2.2.
- Overall coal recovery factor of 90%. This accounts for pit loss (fenders, thin seams, transport loss etc).
- Bench height is assumed to be 5 meters, which is an efficient match for the proposed backhoe excavator (see Equipment Selection, Section 18).

16.2.2 Geotechnical Design Parameters

Pit wall stability in moderately dipping bedded rock formations such as those at Division Mountain may be governed by any one of several mechanisms (after Norwest, 2008):

- Circular failure
- Planar failure along bedding
- Failure within benches (toppling, wedge)
- Wedge failure along weak strata and/or faults.

Given the level of data available, Norwest only considered the first two failure modes in its evaluation (see Memorandum: Division Mountain Coal Geotechnical Report for Feasibility Study, July 21, 2006, included in Appendix 5).

16.2.2.1 Pit Wall Stability

The rock strata in the both walls of the proposed pit are at a relatively constant dip. Biplanar failure of the pit wall is the failure mode of greatest concern, though circular failure has also been considered. Wall angles have been recommended to provide a minimum Factor of Safety (FOS) of 1.2. In the absence of definitive hydrology data in the area, it has been assumed that the ground water table would be drawn down 150 meters from the surface.

This assumption relates to a previous proposed project which called for greatly increased annual production and pit depth. The assumed groundwater draw-down depth is therefore far in excess of the 55-70 meter deep pit bottom assumed in this revised study. This would need to be addressed in further groundwater studies.

16.2.2.2 Dump Slope Stability

As described below, all waste material will be hauled to an adjacent out-of-pit dump. Waste rock dumps will be comprised of waste material comprised of mainly sandstone, siltstone, shale, pebble conglomerates and andesite. The proposed out-of-pit dump is located on gently sloping topography ranging from 1° to 10° slopes.

Geotechnical investigation of the foundation rock will need to be performed to fully evaluate the suitability of the dump platform. In addition, the composition of dump material will be highly heterogeneous, with various rock types (see Geology, Section 7) being present, as well as 'fly' and 'bottom' ash from the power plant. Depending on the plant design, some portion of the ash may need to be disposed of in lined-pits to prevent seepage into the water table. Further study of plant design has yet to be completed.

Dump height will range from 10 to 55 meters. No permanent infrastructure, road access or any other area of potential traffic will be located within a horizontal distance equal to the adjacent dump height (minimum horizontal distance at any point is approximately 35 meters). Waste will be dumped in 10 meter lifts, unless further geotechnical analysis of waste material suggests otherwise.

16.2.3 Other Design Parameters

Based on Norwest's geotechnical evaluation of Division Mountain recommendations have been made for maximum overall wall angles (see Table 16.7 and Appendix 5).

The overall pit shell was constructed based on these recommended angles. The pit shell was designed so that the final designed angle is the lesser of the recommended and natural bedding angles. This ensures that no design pit will be undercut by natural bedding.

Table 16.7 Recommended Wall Angles

Cross Section	West Pit (Degrees)	East Pit (Degree)
10+914N	32	37
11+500N	37	41
11+829N	32	36

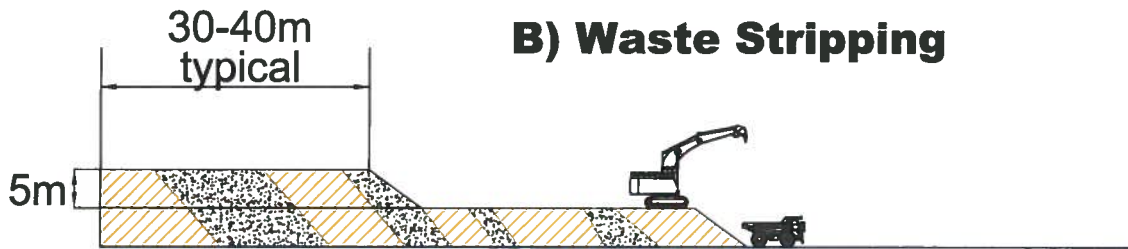
16.3 Sequence of Operations

The sequence of mining operations proposed in the mining method is described below in approximate order (Figure 16.1). The individual operations need to be planned in greater detail and coordinated to ensure smooth-running and efficient production of coal.

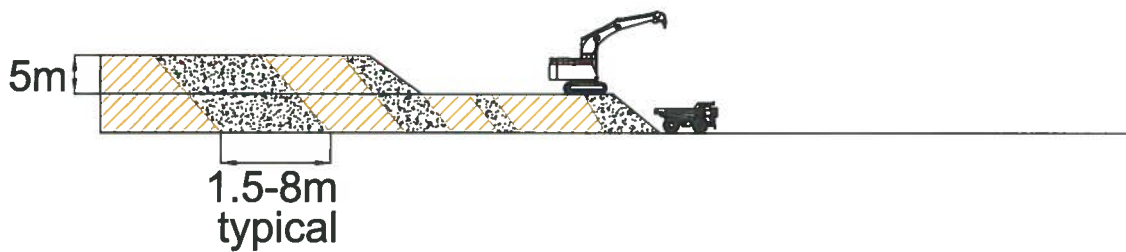
A) Directional Drilling of Waste



B) Waste Stripping



C) Coal Mining



D) Miscellaneous (Backup, Cleanup, etc.)



FIGURE 16.1

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SEQUENCE OF MINING
OPERATIONS

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16.3.1 Topsoil Stripping

Topsoil will be stripped in advance of waste stripping operations, waste dumping and facilities construction and stockpiled in a separate dump for later use. "Direct haul" of suitable plant growth material (SPGM) has been demonstrated to be effective in ensuring that re-vegetation efforts are successful. However, as reclamation of the dump begins near the completion of stripping operations, direct haul of significant quantities of topsoil is not expected to be possible.

16.3.2 Drilling and Blasting

It is currently assumed that all waste strata over 50 centimeters thick may need to be drilled and blasted. Furthermore due to the friable nature of the ore, it is assumed that a powder factor of 0.35 kg/bcm will be sufficient to fragment waste material for suitable loading (any thin seams of waste encountered will be broken by the excavator or ripped by the track dozer). It is proposed that an Atlas Copco ROCL7 (or equivalent) drill be used. This drill will allow 'angled' drilling of the waste interburdens (Figure 16.1). Alternate options are to 'deck' the drill holes or simply drill and lightly blast (or 'bump') both coal and waste in the same block.

In Norwest's experience both these methods would lead to increased out-of-seam dilution (OSD) and so have not been studied in any detail. Significant costs savings in blasting may be possible with further studies on the nature of the coal and waste materials in the proposed pit.

The Division Mountain coal is reportedly friable. It is therefore expected that the coal will not require blasting prior to mining and may simply be broken through excavation.

16.3.3 Overburden Stripping

Maximum pit depth will be 55-70 meters below topography. Waste material will be stripped primarily by a backhoe excavator. The excavator may load the material either from the bench floor or top, depending on the thickness of the material and degree of fragmentation (Figure 16.1). It is assumed that issues such as deployment and practice of the machine will be covered in shorter range planning. Top-loading is generally much more productive.

The Front End Loader (FEL) may be used in the event that the backhoe is not operational, or that the FEL is better suited to a specific loading condition (e.g. material pushed to a flat bench). Waste material will be hauled to an out-of-pit dump. As the project progresses material may be directly hauled into the open final pit created, leading to significant gains in productivity and reduced operating costs.

16.4 Coal Mining

It is not expected that the coal will require blasting. Coal will be mined using the backhoe excavator (or the FEL, as appropriate). One backhoe excavator will be used for both waste stripping and coal mining operations, and will have to be scheduled accordingly.

Particularly in the case of thin seams, it is suggested that the excavator be positioned directly down-dip of the coal it is mining, in order to maximize the operators control over out-of-seam dilution (OSD).

The Division Mountain reserve contains an unusually high number of thin seams of coal and, therefore, increased opportunity for contamination and degradation of coal quality by OSD. Every effort must be made to mine the seams cleanly.

Once mined, coal will be hauled by mining truck to the crushing facility. The coal will be dumped into a load pocket and fed to the primary breaker. It will then pass by conveyor for secondary crushing and sizing. Finally the coal will be stockpiled using a radial stacker.

16.4.1 Production and Productivity Levels

Equipment productivities and operating hours are based on Norwest's experience and database of equipment working in similar conditions. Caterpillar's FPC software was used to estimate truck productivities (Appendix 6).

16.4.2 Operating Efficiency

Based on Norwest's experience, mechanical availability is assumed to be 85% for all mobile equipment except the drill and motor grader, which are estimated at 80%. Operating delays are assumed to account for 12% of total time. A 12 hour shift includes the following operational (scheduled) delays:

- Shift start (15 min.)
- Shift break (15 min.)
- Lunch (30 min.)
- Shift break (15 min.)
- Shift end (15 min.)

16.4.3 Equipment Scheduled Hours

Equipment productivities for the excavator and FEL were calculated from first principles using estimates of swing cycle times, load times, etc. Truck productivities were calculated by estimating haulage profiles then modeling them using Caterpillar's FPC productivity estimating software (Appendix 6). Ancillary and support equipment hours were either nominal or assumed to be tied to major equipment hours. Table 16.8 summarizes the productivities for the major pieces of equipment (see Appendix 7 for detailed calculations).

Table 16.8 Major Equipment Productivities

Equipment	Productivity
6 cum Backhoe Excavation (Waste)	376 bcm/op-hr
6 cum Backhoe excavation (Coal)	621 t/op-hr
35 tonne class trucks (Waste)	89-115 bcm /op-hr
35 tonne class trucks (Coal)	219-334 t /op-hr
5.5 cum FEL (Stockpile loading)	433 t /op-hr

For each major piece of equipment and task, Norwest (2008) took the total quantity of material handled and divided it by the estimated productivity to yield operating hours.

16.4.4 Mine Maintenance

Routine maintenance of the equipment is assumed to be handled by the on-site maintenance employees. All major maintenance and equipment overhauls are assumed to be covered by service contracts with the equipment dealer.

It is generally considered cost effective to purchase heavy equipment from one of several major mining equipment manufacturers. In the case of excavators, front end loaders and mining trucks those manufacturers would be Caterpillar and Komatsu. While this report does not endorse any particular brand, for the purpose of cost estimating quotes were gathered for used Caterpillar equipment only. The difference between used Caterpillar equipment and its Komatsu equivalent may be considered to be minimal.

16.5 Water Management – Mine Pit

Accumulated water in and around the pit and dump areas may lead to problems in both production and safety including:

- Instability of pit walls
- Instability of in-pit or out-of-pit dump slopes
- Unsafe and unproductive haul road surfaces
- Increased potential for coal loss and OSD.

In the summer of 2005, an exploration drilling program was conducted at the Division Mountain project site in order to better delineate the geology. A program of geotechnical and hydrological testing was also intended. However, due to difficulties in accessing the site with the appropriate equipment, there was very little hydrological information gained. Complete hydrological testing must be performed before any detailed project planning may begin.

A water management plan will be essential in order to prevent accumulation of water within the pit. It is proposed that there be two elements to any plan that it is implemented, dealing with issues that arise from both pit in-flow and groundwater.

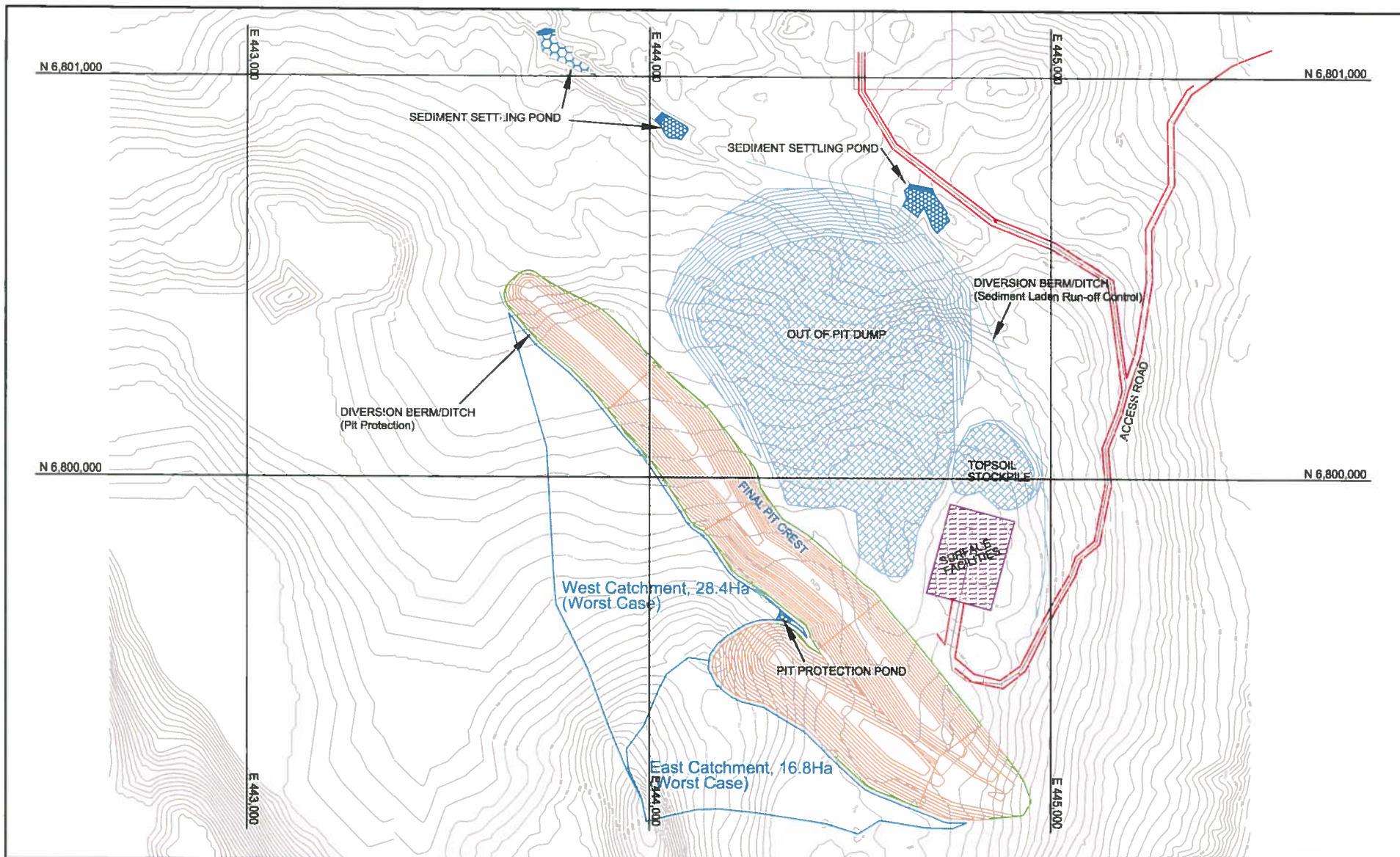


FIGURE 16.2

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DIVISION MOUNTAIN
WATER MANAGEMENT

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16.5.1 Pit In-Flow

The first element is to prevent inflow of water into the pit from the surrounding topography. The Division Mountain reserve is located on relatively high ground, however, there is still potential for inflow of surface water into the pit. The final pit limits were analyzed to determine potential in-flows. The largest, or 'worst case' watershed areas were calculated for each direction of flow. In both cases the largest watershed occurred near the end of the project life (Figure 16.2). The worst case watershed areas are approximately 28.4 hectares and 16.8 hectares for the western and eastern limbs, respectively.

Potential surface run-off into the pit may be diverted with the use of diversion dikes or ditches (see Figure 16.2 for proposed locations of these 'pit protection' structures). Flow would be diverted into ponds for settling-out of solid sediments, or later use within the mine, as applicable.

16.5.2 Groundwater

Based on observations of water presence in some of the drill holes on the project area, it is expected that groundwater will be encountered during mining. That groundwater may be collected with the use of in-pit sumps. It is assumed that sizing and location of those sumps would be adequately covered in short range planning. In-pit water will have to be pumped out of the pit in order to ensure that mining operations are not disturbed. Any water from disturbed lands (pit, waste dump, sur-face facilities) is assumed to be contaminated with particulate matter and other impurities. Contaminated water will be collected in sediment-settling ponds prior to release into the undisturbed drainage system.

Further drilling is required to be done in order to better understand groundwater flows, regional hydrology, and hydrogeology in the immediate region of the Division Mountain resource and to prepare the project application as water management issues are critically and extensively reviewed by regulatory authorities.

16.6 Mine Access and Haul Roads

16.6.1 Haul Road Design Parameters

There will be several different types of access road constructed and/or maintained during the Division Mountain project:

- In-pit haul road and ramp
- Out-of-pit temporary surface access
- Permanent surface roads (site access and power plant coal haulage corridor).

The general design parameters are as follows:

- One way traffic – 2 times maximum vehicle width (5 meters) + berm/ditch (2 times 2.7 meters) = 15.4 meters minimum; Two way traffic – 3 times maximum vehicle width (5 meters) + berm/ditch (2 times 2.7 meters) = 20.4 meter minimum

- Berm height would be a minimum of axle height of the largest wheeled piece of equipment (35tonne-class mining truck, axle height = 0.93 meters)
- Where a ditch is required instead of a berm (i.e., in cut) the width was assumed to be equal to the berm width
- Maximum haul road grades of 8% for mining trucks.

In-pit haul roads/ramps would be aligned along mining benches and excavated in the footwall of the eastern limb. Roads would need to be designed so as to provide adequate drainage.

Temporary surface roads would be constructed with the use of track dozers and motor graders. Cut and fill will be balanced. Any soft spots encountered may be plated with waste shale or coaly-shale.

Permanent surface roads would include a 20 kilometer access to the Klondike Highway, and a 2.4 kilometer coal transportation corridor to the nearby power plant. Norwest (2008) assumed that the 2.4 kilometer access road would be initially constructed and paid for by the power plant operators, but that the mine operators would take over maintenance responsibilities once the mine becomes operational. Construction of the power plant access road would be the responsibility of the mine operator.

Based on a site-visit in 2006 by Norwest, they expected that much of the region contains areas of alluvial outflow (gravel and river rock) could be a potential source of road construction material for sub-grade and top-dressing. Therefore they proposed that permanent haul roads be well-constructed and include features such as:

- Sub-grade material (typically 0.3 – 0.6 meters)
- Well graded top-dressing material (typically 200mm – 300mm of crushed 20mm gravel)
- Adequate drainage ditches and road crown
- Super-elevated curves
- 15 meters minimum width.

16.6.2 Mine Access

Norwest (2008) proposed a new access route to the mine and power plant (Figure 5.1). This would require a land use permit. The benefit of this proposed route is that it would bypass all of the local residences and Braeburn Lake. The route would also need to be surveyed in greater detail for planning and permitting purposes.

16.7 Coal Transport

Once sized and stockpiled, coal will be loaded by FEL into a mining truck for haul to the power generating station. It is proposed that the station will be located approximately 2.4 kilometers away (Figure E.1). Further detailed site surveys are suggested to identify if there is a suitable site closer to the pit. By standard regulation the power plant has to be located at least one kilometer from the pit edge.

16.8 Ash Disposal

Combustion by-products from the fluidized bed plant ('fly' and 'bottom' ash) will be hauled from the power generating station back to Division Mountain along the same route used for coal transportation. Ash may be disposed of in a suitable location. All ash placed in the spoil dump will need to be immediately 'plated' with a thin cover of waste rock to reduce the chance of it becoming airborne. It is assumed that the power plant operators would provide equipment and operator for ash haulage and any associated support, and take on all associated costs.

16.9 Reclamation and Closure

Yukon mining law concerning coal projects is still in its infancy but more clarity has been provided on reclamation and closure requirements through the Yukon policy on that subject and related guideline documents on technical and financial requirements.

Norwest (2008) made some preliminary comments on reclamation and closure. They noted that it would likely be a requirement for the final pit walls and dump slopes would need to be regraded with the intention of restoring the approximate original topography and drainage patterns in order to create a hydrological stable surface that would then ensure long term success in revegetation.

In their proposed outline for reclamation activities, Norwest (2008) noted that final slopes would not exceed a sustained 3:1 slope. Once regraded, stockpiled topsoil could then be spread, mulched and seeded, in common with similar practices in coal mines within British Columbia.

16.10 Mine Planning

A mine planning schedule of the Division Mountain reserve was proposed by Norwest (2008) for the entire 20 year project life.

16.10.1 Methodology

The mine plan and volumetrics by Norwest (2008) were based on work performed using Carlson's SurvCADD software, a 3D mine-modeling package. This software has become the industry standard within the US coal industries, and is widely used elsewhere (including Canada). Initially, a 3D "pit-shell" was constructed by Norwest (2008) on SurvCADD to represent the final limits of the ultimate pit. By calculating the total quantities of coal and waste within that pit-shell, the project reserves and strip ratio were then estimated. A pit-shell was chosen that yielded the required reserves (240Ktpa for 20 years, or 4.8 Million tonnes) at the lowest strip ratio.

That pit shell was then divided into smaller blocks for scheduling. The blocks were defined vertically in 5 meter intervals, reflecting the proposed bench height for the backhoe excavator. Each limb of the syncline was also divided into 'panels', typically 400 meters long (along the axis of the limb) and 40 – 180 meters wide (40 meters being the minimum practical working width at pit bottom).

The dimensions of the blocks represented the benches in which the backhoe excavator may effectively work. The length of the block also ensured adequate ramp access. In addition, the panel size would provide ample exposure of various coal seams to ensure run-of-pit coal blending for quality control. It is important to note that the block dimensions chosen by Norwest (2008) were merely for estimation and long-range mine planning purposes. They noted that the actual optimum practical dimensions of mining benches may change as operations commence and more detailed, short term, mine engineering was performed.

Once modeled in SurvCADD, the various blocks were analyzed to estimate coal and waste quantities, accounting for inclusion of 5 centimeters of OSD in the coal floor and roof. Those quantities were then input into a spreadsheet model, assigned run-of-mine (ROM) qualities, and scheduled in annual increments. Again, the blocks were scheduled in sufficient detail for long range, or Life-of-Mine, scale planning. A more detailed schedule would be needed for short range planning.

A summary of the annual volumetrics and ROM qualities may be seen in Table 16.9. Cross sections of the final pit shell are shown in Figure 16.3.

16.10.2 Mine Plan Overview

Generally, it is proposed that the Division Mountain reserve be mined from the 'nose' of the syncline to the extremes of its eastern limb, from south-east to north-west (Figure E.1). There were several advantages identified to this approach when considering mine planning and scheduling, including:

- Targeting of lower strip ratio regions in early years of project (South and West pit average 1.6:1, East C and D average 2.3:1)
- Mining in the direction of assumed water flow as then it is easier to avoid water in working face
- More productive hauls in the early years of the project

Table 16.9 Mining Volumes Summary

Year	Total Waste (bcm)	OB (bcm)	Topsoil (bcm)	Ash (bcm)	Delivered Coal (tonnes)	Effective SR (bcm/tonnes)	CV ¹ cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc
1	718,012	623,498	54,243	40,271	240,000	2.8	5,084	2.74	28.53	26.85	42.51	0.45	1.53
2	598,737	536,517	20,169	42,051	240,000	2.3	4,961	2.72	29.79	26.40	41.61	0.45	1.54
3	623,576	560,803	20,022	42,752	240,000	2.4	4,920	2.76	30.28	26.21	41.27	0.44	1.55
4	640,755	587,657	11,668	41,430	240,000	2.5	4,996	2.81	29.35	26.46	42.08	0.44	1.54
5	588,243	546,566	586	41,090	240,000	2.3	5,006	2.89	29.11	26.38	42.48	0.44	1.54
6	483,003	440,149	0	42,853	240,000	1.8	4,891	2.76	30.35	26.01	41.44	0.44	1.55
7	435,475	384,610	7,648	43,217	240,000	1.6	4,861	2.74	30.61	25.88	41.26	0.44	1.55
8	582,895	531,437	9,638	41,820	240,000	2.3	4,945	2.82	29.62	26.11	42.16	0.44	1.54
9	553,938	496,898	14,215	42,825	240,000	2.1	4,871	2.70	30.33	25.93	41.16	0.44	1.55
10	501,068	455,698	3,721	41,650	240,000	1.9	4,951	2.82	29.50	26.12	42.23	0.44	1.54
11-15	2,886,896	2,642,331	39,014	205,551	1,200,000	2.2	4,972	2.71	29.12	26.16	42.05	0.44	1.54
16-21	3,135,286	2,880,346	29,245	225,695	1,382,036	2.1	5,103	2.63	27.76	26.92	42.26	0.45	1.53
Total	11,747,884	10,686,509	210,169	851,206	4,982,036	2.2	4,997	2.72	29.05	26.40	42.00	0.44	1.54

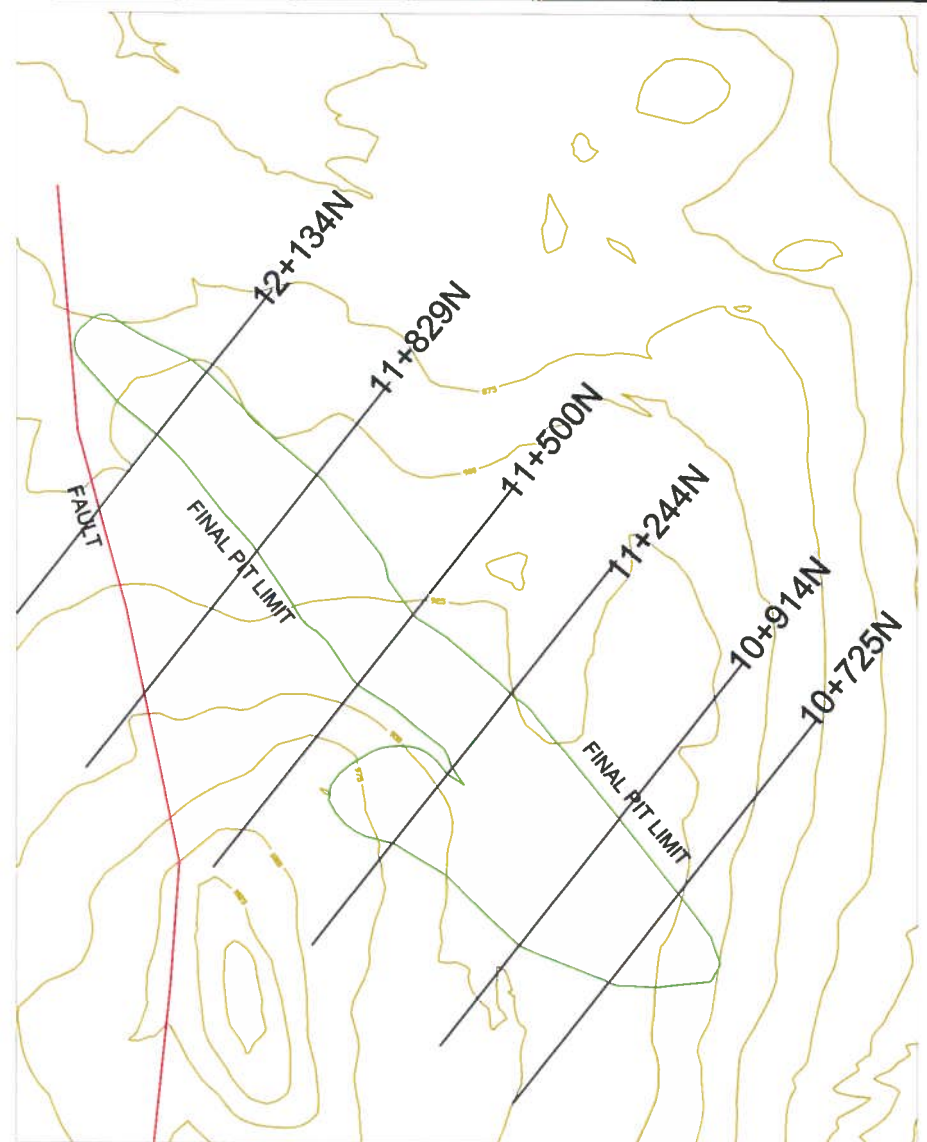
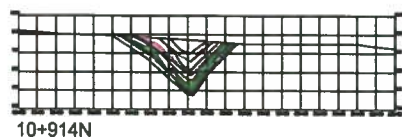
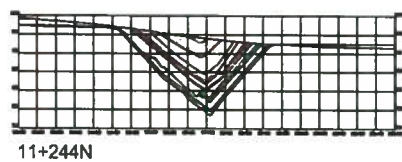
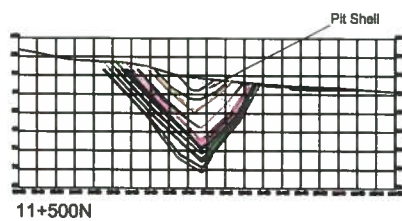
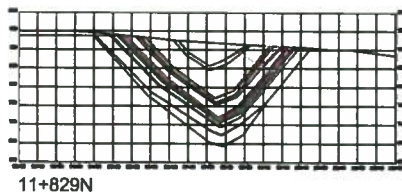
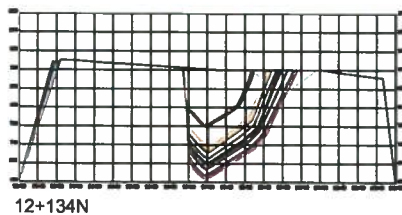


FIGURE 16.3

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DIVISION MOUNTAIN
FINAL PIT SHELL (SECTIONS)

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Norwerst (2008) noted that these advantages led to reduced costs and increased efficiencies in the early years of the project, which is typically the less productive part of a project's life. The Life-of-Mine strip ratio is illustrated in Figure 16.4 and the pit layout with cross sections is in Figure 16.5.

They further noted that initial development of an open pit could typically lead to high stripping ratios as some additional work may be incurred in developing the pit edge and box cuts. In this mine plan, stripping ratios were also calculated to be higher by Norwest (2008) for the upper benches in each panel, and lower in deeper benches. This was because of a decreasing quantity of waste in each bench as the coal seams converged at depth (see Geologic Cross Sections in Appendix 1).

This plan by Norwest (2008) targeted the lower ratio region of the syncline in early years, but it was noted to not be enough to overcome the effect of the high ratio upper benches. Thus, the strip ratio profile over life of mine proposed by Norwest (2008) showed a slightly decreasing strip ratio over the mine life (they added that this effect would be more pronounced if mining were to progress from northwest to southeast).

Norwest (2008) also noted that there were ways to further reduce the strip ratio over the critical early years of the project. One possibility would be to mine coal in narrow strips along the extreme edges where the syncline limbs 'outcrop' (intersect the surface topography). While this would reduce stripping ratio and defer stripping until later, it would also lead to less efficient working conditions and reduced productivities. A trade-off study would have to be done to optimize plans.

Balancing the lower ratio mine schedules with the effect of productivities is a matter of detailed engineering, and not considered within the scope of this study.

An additional advantage to the proposed mine schedule is that it takes advantage of the natural topography to result in more productive hauls of waste in the earlier years of the project. If the mine were to start in the north-west it would require long, uphill hauls of waste to the out-of-pit dump in the early years.

Finally, it is possible that mining 'down' the plunge of the syncline will ease the problem of having water inundate the pit, as it is currently assumed that groundwater is traveling in that same direction. Additional drilling would be required to verify ground water condition and the detailed hydrological investigations will need to be completed in the pit and surrounding areas.

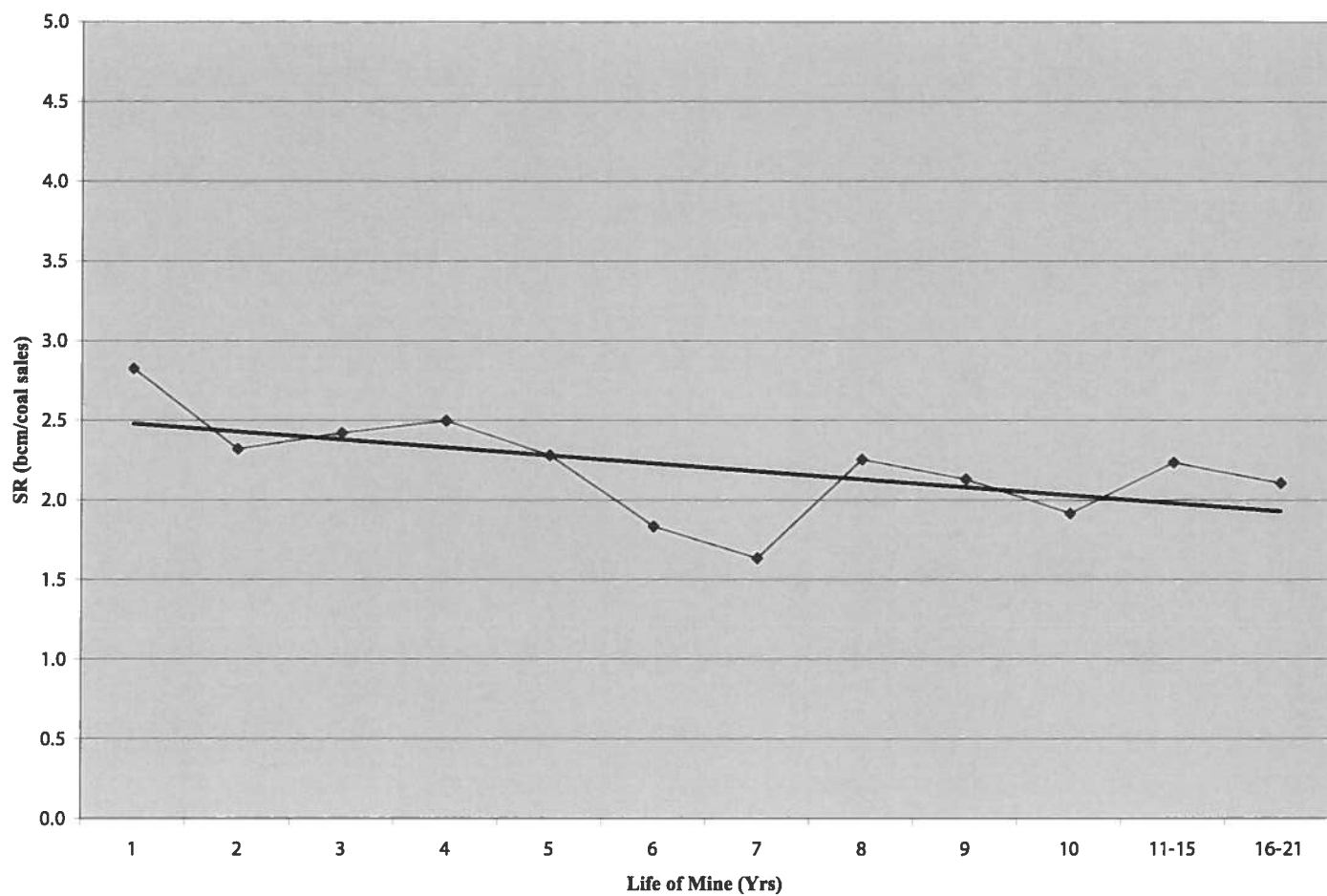
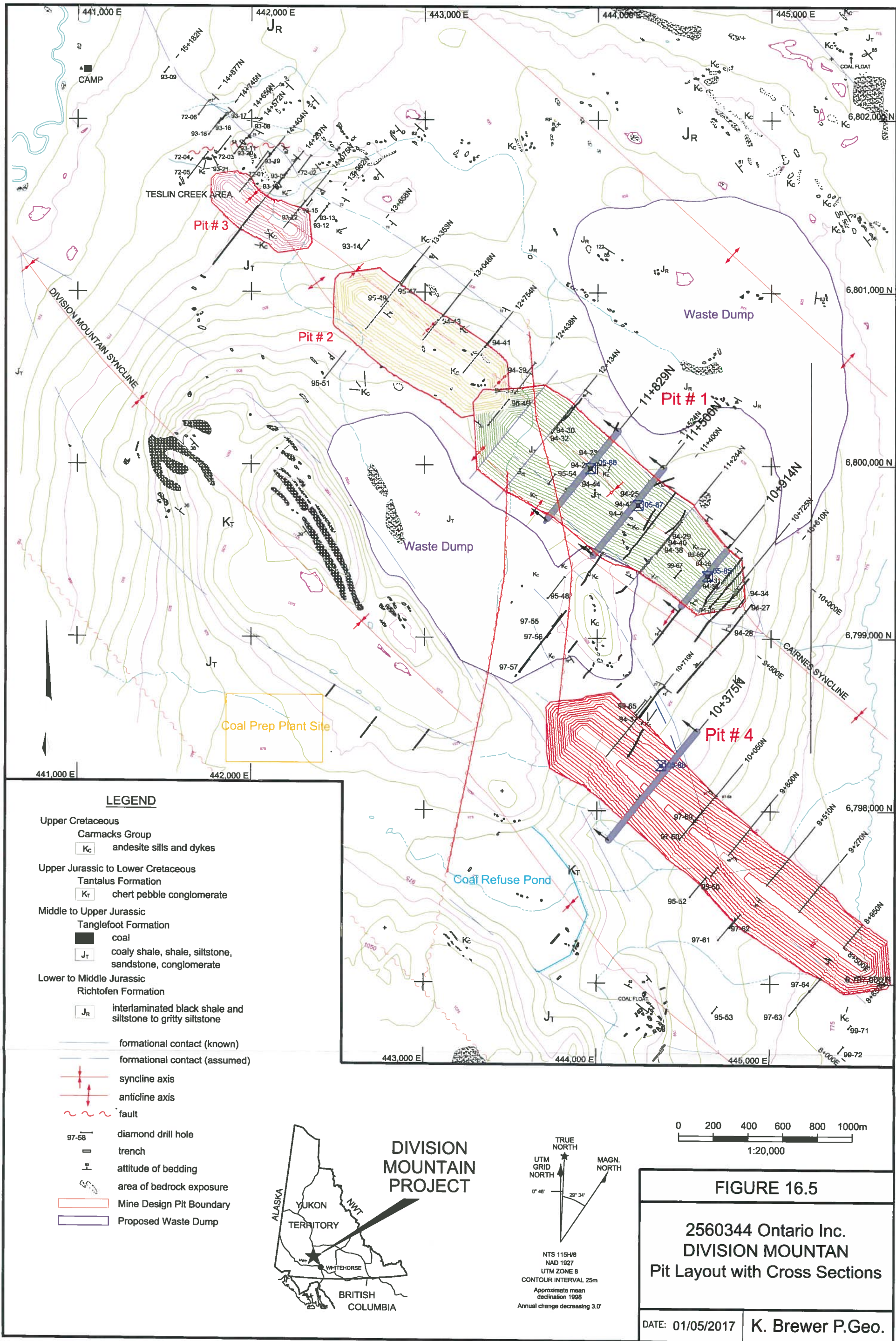


FIGURE 16.4

2560344 Ontario Inc.
DIVISION MOUNTAIN
PROJECT LIFE STRIP
RATIO PROFILE

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16.10.3 Mine Schedule

The mine schedule in four phases covering five (5) years per phase is described in the following sections (after Norwest, 2006).

16.10.3.1 Years 1 through 5

Development begins in the Western panel, the region of highest surface elevation. By early development of the higher elevation region of the mine, advantage is taken of hauling coal and waste across the uninterrupted panel East A. Developing the western panel at any other stage would result in inefficient or difficult hauls across or around open pits. The upper benches of the East A panel are then developed. The South panel follows, with its low strip ratio balancing the higher strip ratios of East A and, to a lesser extent, the West panel. An approximation of the mining schedule is shown in Figures 16.6 - 16.10.

16.10.3.2 Years 6 through 10

In Year 7, development of the East B panel begins. This allows balancing of the high-ratio upper benches of East B with the lower elevation (and lower strip ratio) benches of East A. The West and South panel continue to be developed. The mining plan was scheduled to ensure that at no point does a West panel bench be developed at a lower elevation than an adjacent East A panel bench. This results in the most efficient haulage route, with no unnecessary rises in elevation. Similarly, at no point does an 'East A' bench descend below a South panel bench (Figure 16.8).

16.10.3.3 Years 11 through 15

Both the West and South panels are completed in Year 11. The lower benches of East A continue to be balanced with the high ratio, upper benches of East B. During Year 13 development begins in East C (Figure 16.9). Reclamation of the lower portions of the waste dump also begins in Year 13.

16.10.3.4 Years 16 through 20

Development of the East C panel continues, corresponding with mining of the low-ratio, lower elevations of panel East B. As East B is completed, development of East D begins. As designed, mining continues in panel East D for an additional 9 months beyond the end of Year 20 (Figure 16.10).

16.10.4 Dump Schedule

During the Life of Mine a total of 12.6Mcm of waste material is hauled to an out-of-pit dump located north of the eastern limb (see Figures 16.6 through 16.10). This waste material includes 11.8 million cubic meters of waste rock overlying coal, and an additional 0.8 million cubic meters of ash from the generating station.

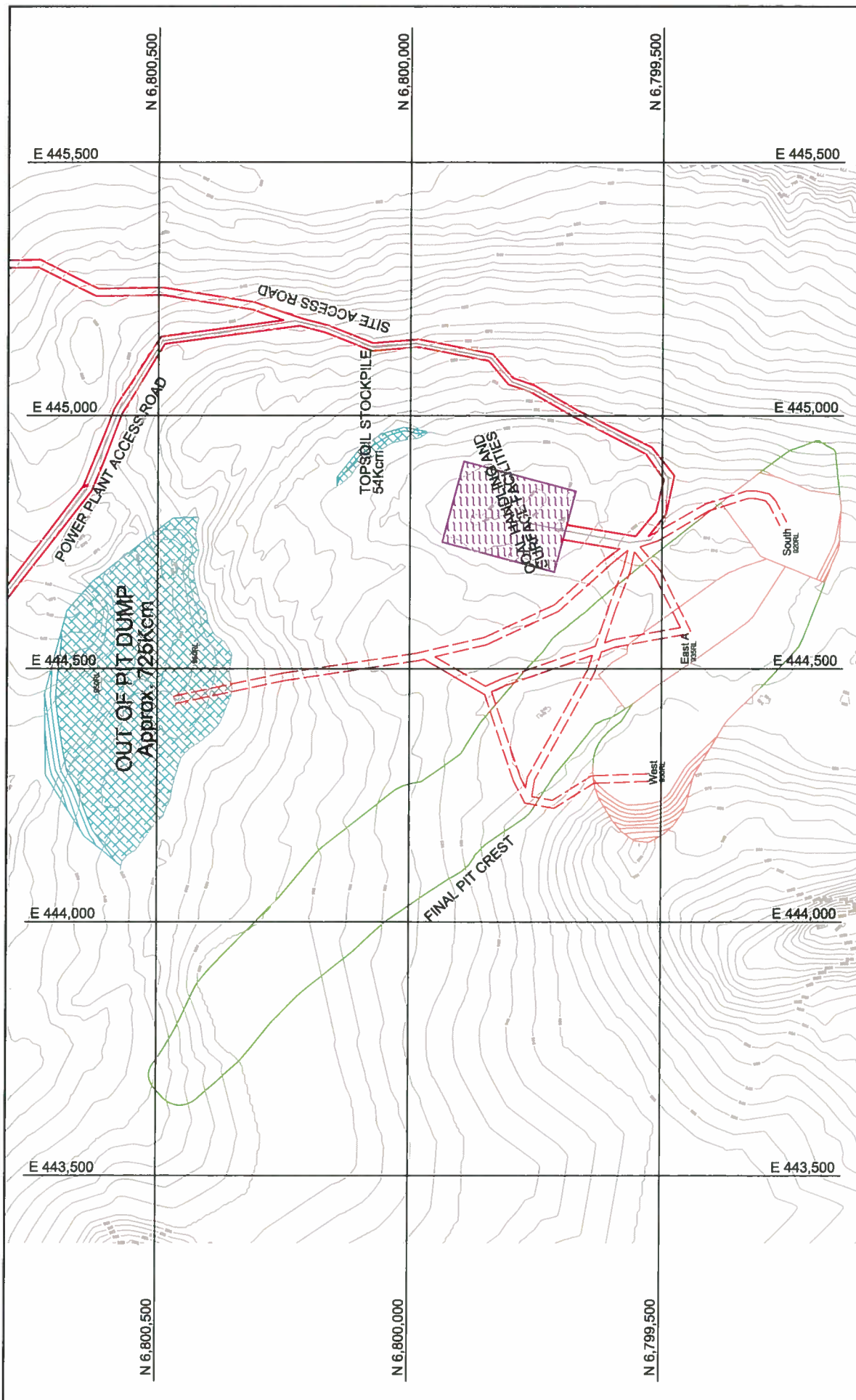


FIGURE 16.6

2560344 Ontario Inc.
DIVISION MOUNTAIN
MINE SCHEDULE (YEAR 1)

DATE: 01/05/2017 K. Brewer P.Geo.

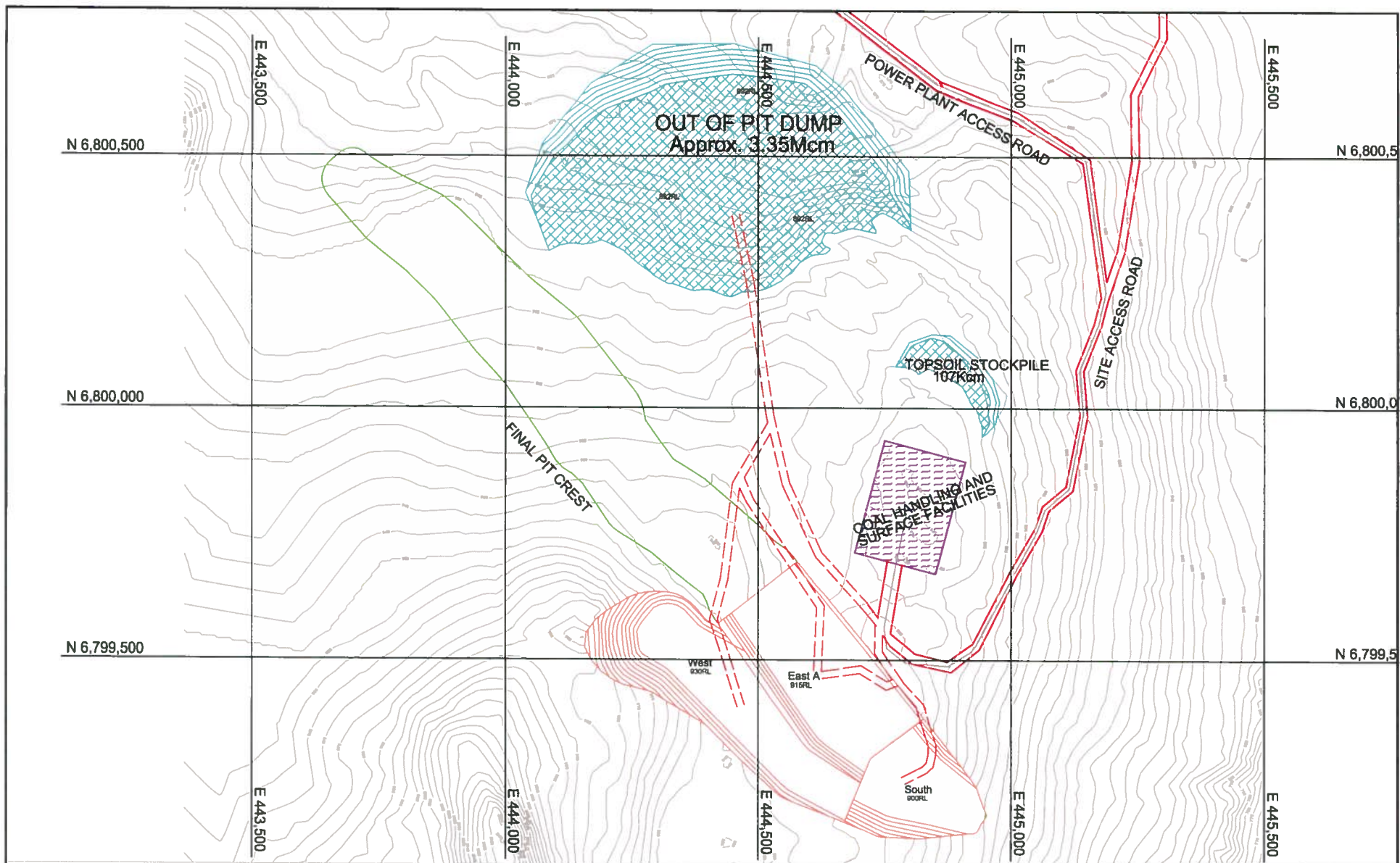


FIGURE 16.7

2560344 Ontario Inc.
DIVISION MOUNTAIN
MINE SCHEDULE (YEAR 5)

DATE: 01/05/2017 K. Brewer P.Geo.

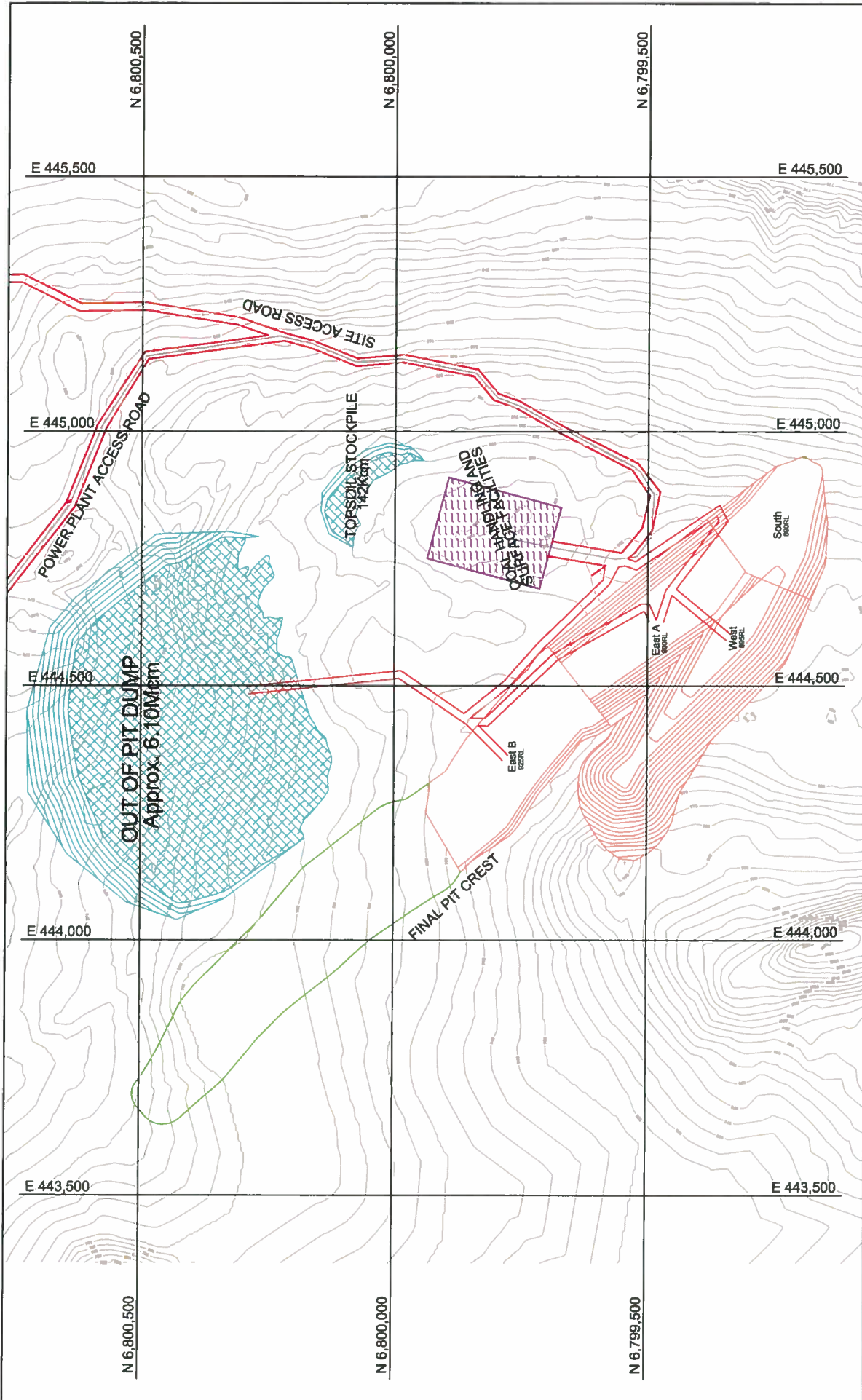


FIGURE 16.8

2560344 ONTARIO INC.
DIVISION MOUNTAIN
MINE SCHEDULE (YEAR 10)

DATE: 01/05/2017

K. Brewer P. Geo.

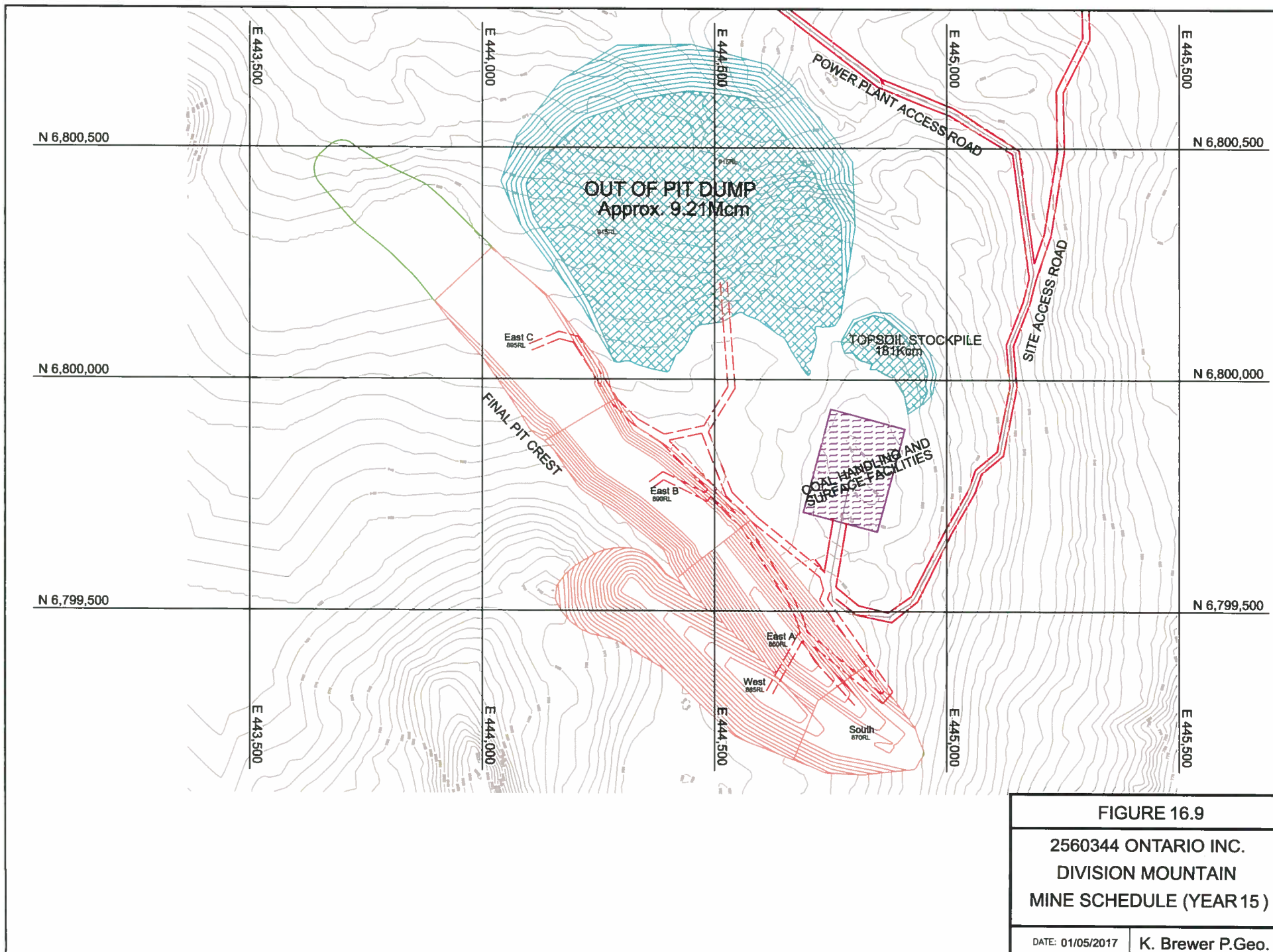


FIGURE 16.9

2560344 ONTARIO INC.
DIVISION MOUNTAIN
MINE SCHEDULE (YEAR 15)

DATE: 01/05/2017

K. Brewer P.Geo.

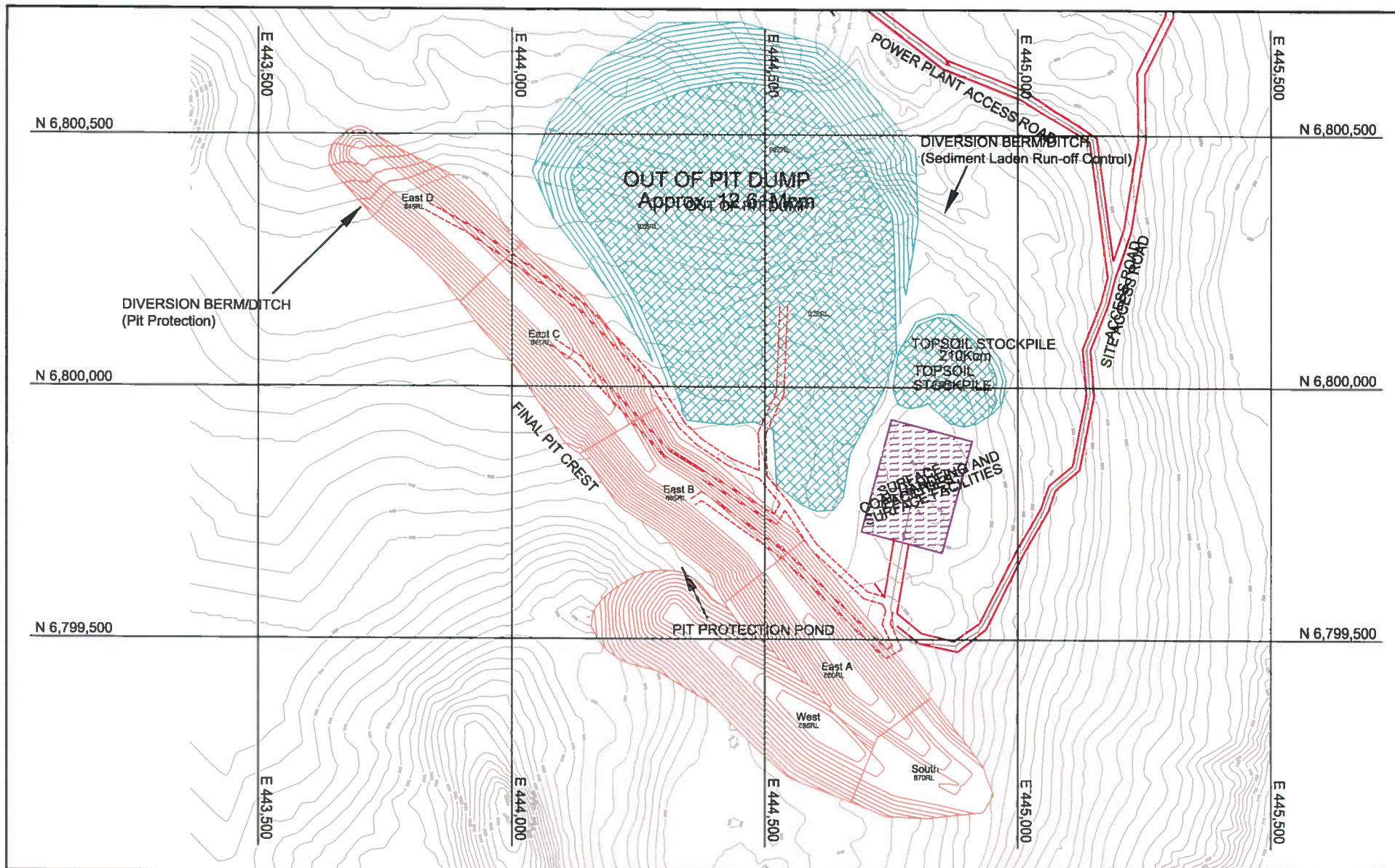


FIGURE 16.10

2560344 ONTARIO INC.
DIVISION MOUNTAIN
MINE SCHEDULE (YEAR 21)

DATE: 01/05/2017

K. Brewer P.Geo.

17 Recovery Methods

The only recovery issue is separating the coal from waste which can be conducted with the proposed mining methods outlined by Norwest (2008). Section 18 of this report discusses how the coal will be recovered and removed from the waste.

18 Project Infrastructure

18.1 Equipment Selection

Based on Norwest's experience with surface mining of complex and steeply dipping seams the equipment in the following sections was proposed (after Norwest, 2006).

18.2 Coal Handling Facilities

The material handling flowsheet and site plan proposed by Norwest (2008) is presented in Figures 18.1 and 18.2.

Trucks hauling coal from the mine will dump the raw coal into a load pocket or off load at a nearby stockpile. The load pocket will be approximately 12 meters long by 12 meters wide by 12 meters deep. A front end loader can be used to tram the coal into the load pocket from the nearby stockpile when trucks are not dumping.

Within the load pocket is a feeder breaker. The feeder breaker moves the raw coal from the load pocket and breaks the larger material to 100mm X 0 prior to transferring the material onto a 0.6 meter wide transfer conveyor (C-1) which discharges into the secondary crusher. The transfer conveyor is built using channel frame and truss structures. Bents are used to support each of the truss sections and the channel frame sections are supported on railroad ties. The truss sections are necessary to elevate to the discharge point of the conveyor to feed the secondary crusher. A grizzly to protect the downstream equipment from oversized lumps has not been included at the load pocket. It is noted that the coal is reportedly friable, in which case the feeder breaker should be able to handle some degree of oversize feed. However, care should be taken to address oversize lumps of coal in the field in field operations, either by crushing with the excavator bucket, running over with track dozer, etc.

The secondary crusher is used to further break the raw coal to 50mm X 0 prior to stockpiling. A tramp iron magnet is planned at the discharge of conveyor C-1. In the area of the magnet, the discharge chute will be made from stainless steel. The magnet will protect the roll crusher from ferric items lost during mining, such as bucket teeth, bits, etc. This will protect the crusher and reduce downtime. Non-ferric materials cannot be removed with a magnet. If non-magnetic alloys are used in the mine, a metal detector should be included to stop the belt and mark the stream.

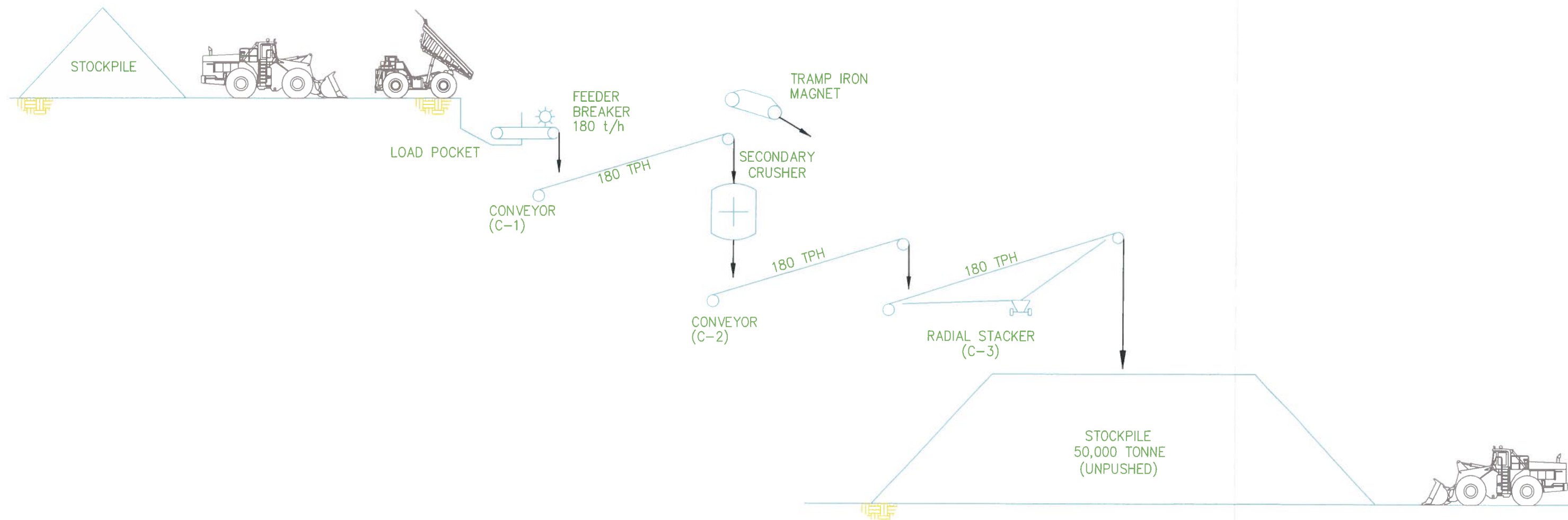


FIGURE 18.1

DIVISION MOUNTAIN PROJECT
MATERIALS HANDLING FLOWSHEET

DATE: 01/05/2017

K. Brewer P.Geo.

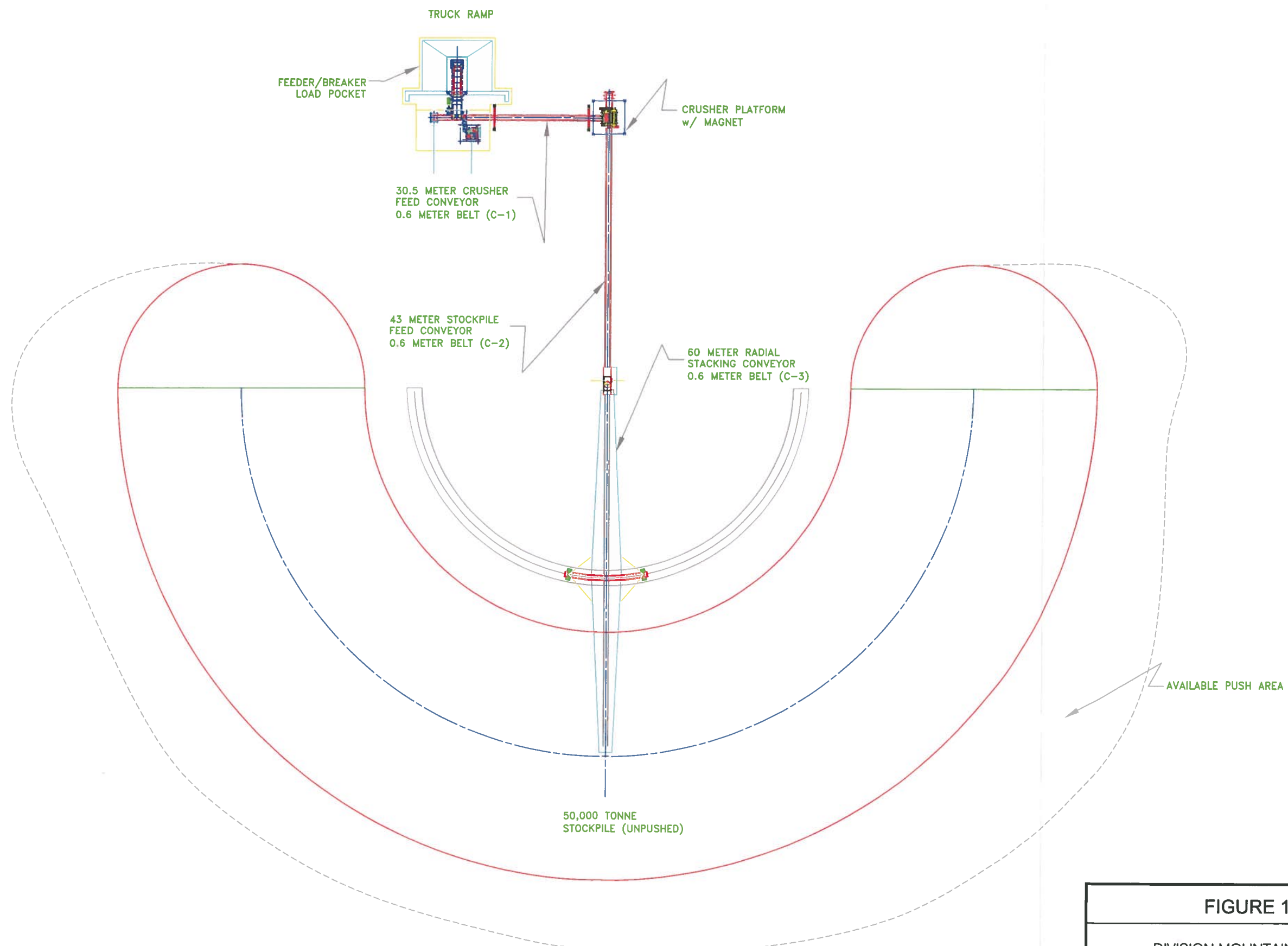


FIGURE 18.2

DIVISION MOUNTAIN PROJECT
MATERIALS HANDLING FLOWSHEET

DATE: 01/05/2017

K. Brewer P.Geo.

The sized coal will be stockpiled using a radial stacker. A 0.6 meter wide conveyor (C-2) is used to transfer the material from the secondary crusher to the radial stacker (C-3). A 60 meter long radial stacker with a 15° incline and a 180° rotation will produce a stockpile of approximately 50,000 tonnes. Depending on the site selection for the stockpile, the transfer conveyor (C-2) could be fabricated from channel stringers.

Cost analysis in the Norwest (2008) report assumed that the site works design is optimal for the stockpiling system. The 50,000 tonne amount is for an “un-pushed” stockpile. They noted that a larger stockpile capacity would be possible if a front end loader or dozer was used to help manage the pile. The same front end loader that is used at the load pocket could also be used to manage the stockpile. The front end loader was also planned to be utilized to load the coal onto trucks for transport to a processing or loadout facility.

Low cost sand and gravel conveyors were planned by Norwest (2008) to minimize the capital cost for this project. Well executed, high-standard maintenance procedures would be required to ensure that the conveyors run with minimal problems and provide adequate service. No dust control had been included for the conveyor system or transfers in the Norwest (2008) operations plan.

18.2.1 Surface Facilities

It was assumed by Norwest (2008) that the power plant would be adequately sized to provide administrative and employee facilities for the mine personnel.

The mine will require maintenance and supply facilities for its rolling stock and heavy equipment (Norwest, 2008). The recommended buildings for maintenance and storage purposes were the Sprung Instant Structures. These structures are insulated stressed membrane structures and can be quickly constructed and used for both temporary and semi-permanent applications. Norwest (2008) suggested that one ‘Sprung’ structure be used for a maintenance shop and the second structure be used for storage of supplies and fuel, as well as a weld shop. Sprung structures work well in northern climates such as Yukon. Both buildings could also be used to store equipment in the event the mine was shut down. A crane for one in the structures was included by Norwest (2008) to service the haul trucks. Site preparation would require some grading and the building could be placed on a gravel surface.

18.2.2 Mine Support Facilities

It was estimated by Norwest (2008) that 12,000 liters of diesel fuel would be needed on site each week to support the operations. A low cost alternative to a fuel depot was proposed by Norwest (2008). They proposed that a traditional fuel depot would not be used. Instead, their plan called for purchasing a used semi-truck and tanker trailer. However, the author of this report considers that it is highly unlikely that this would be approved by Yukon regulatory authorities. Any future plans should consider an estimation for a traditional fuel depot. An explosive storage building was also planned for the site. It would consist of a container with shelves. This facility would be locked placed in a remote and secure location. The plant has to be located at least one kilometer from the pit edge. The area around the building should be fenced and surrounded by earth berms.

Norwest (2008) proposed that power be brought into the mine site from the power plant via a 2.4 kilometer power line which would be constructed prior to start-up.

18.3 Waste Drilling

As mentioned above, it is proposed that angled drill holes be deployed in order to minimize the need for either decking drill holes or 'bumping' the coal seam together with the waste during one shot. A 350-400hp percussion hydraulic crawler drill with a rotating head (Atlas Copco ROC L7, or equivalent) capable of drilling 4 1/8 " - 5 1/2 " holes will be required (Norwest, 2008).

18.4 Waste Stripping

It was proposed (Norwest, 2008) that a 6m³-class backhoe excavator (Caterpillar 385B, or equivalent) be the primary loader of waste material. A backhoe-configured excavator has the versatility and maneuverability, making it well-suited for uncovering the multiple, thin seams that make up a significant portion of the reserve.

Waste may also be loaded by a 'highlift' 5.5m³-class (Caterpillar 980G or equivalent) front end loader (see Coal Transport, section 18.6). This will be better suited for areas in which a substantial quantity of waste has been pushed onto a flat bench. It will also serve as a substitute loader in the event that the backhoe excavator is not operational.

Norwest proposed that waste would then be hauled by a fleet of up to four 35 tonne-class mining trucks (Caterpillar 769D, or equivalent). These are well-matched to the 5.5-6m³-class loaders and ensure maximum productivity.

18.5 Coal Mining

The same 6m³-class backhoe excavator (Caterpillar 385, or equivalent) used for waste stripping support could additionally be used to load coal (Norwest, 2008). The 5.5m³-class (Caterpillar 980G, or equivalent) front end loader could also be used as a 'back-up' coal loader.

As in waste stripping, Norwest (2008) proposed that coal would be loaded into a 35 tonne-class mining truck (Caterpillar 769D, or equivalent). 'Combination boxes' would also be fitted to all mining trucks to increase the effective carrying capacity of each truck. The trucks could then be used interchangeably between coal and waste, increasing equipment flexibility. Norwest (2008) noted that the capital cost of an additional truck could be saved with the use of 'combination boxes'.

18.6 Coal Transport

Once broken and crushed, Norwest (2008) noted that the coal would be stockpiled. The 5.5m³-class (Caterpillar 980 or equivalent) front end loader would then be used to load from the stockpile. The coal would be loaded into a single 35 tonne-class mining truck (Caterpillar 769D, or equivalent) for the 2.4 kilometer haul to the power generating station.

18.7 Mining Support Equipment

Norwest (2008) noted that various pieces of additional equipment would be needed to construct and maintain haul and access roads, berms, water control structures etc., as well as support the primary stripping and mining equipment. These included:

- Track dozer (Caterpillar D8, or equivalent)
- Water truck
- Motor grader (Caterpillar 14H, or equivalent)
- Rough terrain crane
- Fuel/lube truck
- Bulk explosives truck
- Mechanics service truck
- Pick-up trucks
- Light plants.

The 230kW / 305hp class track dozer (Caterpillar D8, or equivalent) would be needed for various tasks including:

- Construction and maintenance of haul and access roads
- Maintenance of safety benches and berms
- Ripping and pushing of thin seam coal and overburden
- Loader and backhoe assist, as needed
- Regrading and reclamation

A 19,000 liter water truck would also be required for dust suppression of working areas as well as access and transportation routes.

The motor grader would be used for light construction projects, maintenance of haul, access and transportation routes, reclamation operations, and other miscellaneous tasks.

The rough terrain crane, fuel/lube, bulk explosives, mechanics and pick-up trucks would all be used for day to day maintenance and support of field operations and equipment.

19 Market Studies and Contracts

There have been limited market studies done to date for this project. McLoskey et al (2008) conducted studies on coal prices for the feasibility study for Norwest and Cash Minerals Ltd. However these studies are out of date and at the time were also designed to examine the coal export markets which was then later determined not to be an economic proposition for the Division Mountain coal project.

Future studies on coal pricing to a mine mouth located power generation facility will accompanied with detailed studies on the marketability of the electricity within Yukon's isolated electrical grid or for new industrial developments will need to be completed in the future in order to further determine the actual viability of any coal mine in the Division Mountain area.

20 Environmental Studies, Permitting and Social and Community Impacts

20.1 Environmental Setting

The Division Mountain project is located within the Boreal Cordillera ecozone which covers southern Yukon and Northern British Columbia.

The ecozone consists of several mountain ranges of the Northern Rockies, as well as several plateaus. Ice age glaciers covered virtually all the plateaus, which are heavily eroded and contain large deposits of glacial debris. The mountain ranges of the ecozone are generally lower than those of the coastal ranges.

Summers are brief and cool, winters typically long and cold. Mean annual temperatures are -0.7°C to -0.3°C , with the average temperature rising above 10°C from one to three months per year, depending on elevation. Mean annual precipitation is 460-700mm, with 30-65% falling as snow. Above treeline (1,000 – 1,400 meters) the weather may be considered alpine, with much cooler temperature and permanent ice and snow cover at high elevations.

Lower elevations are generally forested with White Spruce and lesser density of Pine and Aspen. Subalpine Fir becomes more abundant at progressively higher elevations, eventually giving way to deciduous shrubs such as scrub birch and willows. The highest elevations consist of alpine vegetation such as shrubs, herbs moss and lichen.

Species of wildlife include Elk, Moose, Caribou, mountain goats and sheep, bears, as well as several species of migratory and sedentary birds.

20.2 Permitting

The mining industry in Yukon is managed according to several key pieces of legislation. In general, The Yukon Environmental and Socio-economic Assessment Act (YESAA), Yukon Waters Act and Territorial Lands (Yukon) Act, and Yukon Coal Regulations must all be addressed prior to the issuance of any authorizations that would permit the Division Mountain Coal Project to proceed and/or exploration of the current licence holdings.

20.2.1 Permitting – Exploration Licence

In 2017, the initial stage of work for 2560344 Ontario Inc. is to renew the current exploration renewals so that exploration programs may be conducted as planned. 2560344 Ontario Inc. will have to file for an application for an exploration permit with the appointed Chief who is currently also the Chief of Mining Lands, Yukon Energy, Mines and Resources. A Form 1 application for a Class III permit will also have to be filed with the Whitehorse Designated Office of the Yukon Environmental and Assessment Board.

It is estimated that it will take approximately two weeks to prepare the applications and accompanying documents for review by regulatory authorities. As the work program is consistent with previous work programs conducted in the Division Mountain area it is projected that there will be few to no problems in obtaining the permit. It will also be important to meet and/or discuss with the First Nations who have traditional lands in the area. Typically the primary contact in this situation within the First Nations government is the Director of Lands (or equivalent title)

Assessments formerly undertaken by the Yukon government are now conducted by the arms-length Yukon Environmental and Socio-economic Assessment Board (YESAB) through one of its six Designated Offices in Yukon. In the instance of this project, the applicable designated office is located in Whitehorse, Yukon.

This arms-length agency operates under YESAA which stands for the Yukon Environmental and Socio-economic Assessment Act. This relatively new federal legislation is now fully in effect in the Yukon. It provides for a single environmental and socio-economic assessment process for projects under federal, territorial or First Nation jurisdiction. This assessment is part of the overall review and approval process that will apply to all exploration and development activities for resource and industrial sectors.

YESAA assessors must conduct their assessments within specific time lines. As part of the assessment, they seek input from government and First Nations and provide opportunities for the public to provide comments on proposed projects. The assessment process basically consists of identifying the environmental and socio-economic effects of a project and appropriate mitigation before providing a recommendation to the Decision Body (government) on whether a project should proceed. The YESAB has an on-line public registry that is accessible to anyone who has access to a computer with a connection to the internet. This registry contains all information related to YESAA assessments.

Once the Yukon government reviews the recommendations from the assessor, it will then decide whether to accept, reject or vary the assessment recommendation and state this decision in a Decision Document. The Yukon government continues to be the decision maker and to be responsible for regulating and enforcing permits and licenses for development projects which fall under its legislated authority.

In simple terms, the regulatory process is led by the regulator and generally begins with an application phase where the proponent applies for a permit or license to undertake a regulated activity. The regulator then reviews the application to see whether it is complete and meets certain regulatory requirements. The regulatory phase ends with the regulator either issuing the proponent a permit or license or rejecting the proponent's application. Steps on the left side of the flowcharts are part of the regulatory process.

In summary the following are the steps for an exploration permit:

1. The proponent contacts the Designated Office and fills out assessment Form 1.
2. The Designated Office conducts the assessment of the project proposal by seeking input from government agencies, First Nations, interested parties and the public. The time from the acceptance of the application by the assessor to the end of the public input period can take up to 30 days or be extended up to 86 days, if required.
3. The assessor concludes the assessment based on input received and produces an assessment report with the recommendation on whether the project should proceed. This process can take up to 14 days.
4. The Yukon government Decision Body issues a Decision Document accepting, varying or rejecting the assessor's recommendation within 30 days of receiving the recommendation.
5. If the Yukon government Decision Body determines that the project may proceed, the proponent receives the Decision Document and fills out a Class 3 notification form in conformity with the Decision Document and submits it to the appropriate Mining Lands district office of EMR. If the Decision Body determines that the project may not proceed, the project is rejected and the proponent is notified.
6. The Mining Lands Officer officially accepts the Class 3 notification and enters key information into the register.
7. Within 25 days, the Chief of Mining Lands makes a decision on whether to approve the Class 3 notification. If rejected, the proponent is notified. If the project is redirected to a Class 4 category, the proponent must resubmit the proposal.
8. If the Class 3 notification is approved, the proponent is notified and can proceed with the Class 3 exploration program.

20.2.2 Permitting – Mine Licence

A similar process is undertaken for a mine application except that the application and review process are far more extensive and comprehensive, the process flow chart is different, and the timelines are much longer.

In the Yukon a project like the Division Mountain Coal Project when moving to development and/or production activities will require a detailed environmental and socio-economic assessment and various regulatory approvals, including but not limited to a Type A or B Water License and a Coal Mining License along with a range of other permits. There are two distinct stages that a project goes through before mining activity can commence.

First, an assessment identifies environmental and socio-economic effects, their significance, and related mitigation measures. Secondly, there is the regulatory stage where regulators issue their respective permits, licenses or other authorizations as the case may be.

The following sections will provide a brief outline of the requirements and procedures for obtaining a Mining License (After Yukon EMR, 2017).

Most major mine development and production projects require a screening by the Executive Committee of YESAB, established under the YESAA.

Where the development and production level of a project does not meet the threshold for an Executive Committee level screening it will be assessed through the appropriate DO.

Step 1: Initial Consultation with the Regulatory Agencies and YESAB

Proponents are encouraged to first contact the regulators at EMR's Mineral Resources branch for preliminary discussions on regulatory requirements. The Yukon government works with the proponent and YESAB on the integration of the assessment and regulatory requirements. The proponent should also meet with YESAB to discuss the project and receive instructions on any YESAA requirements, processes, and timelines.

Step 2: Consultation with First Nations

YESAA also requires the proponent to consult with affected First Nations and communities prior to submitting their project proposal.

Step 3: Preparation of the Project Proposal

Based on the discussions with the regulatory agencies, YESAB, and First Nations and also on the project requirements, related socio-environmental data collected, and other relevant studies, the proponent will prepare the comprehensive project proposal. This is a major document and generally will take 6-18 months to prepare depending on the requirements outlined by the various agencies and related study and internal company processes and procedures.

Step 4: Proposal Submission, Project Scope, and Screening

Upon receipt of the proposal, the YESAB Executive Committee determines whether it is adequate or whether supplementary information is required from the proponent.

At the outset of its screening, the Executive Committee prepares a statement describing the scope of the project based on the information contained in the proposal. The scope of a project includes activities identified in the proposal and any other activity considered likely to be undertaken in relation to the project.

The scope of a project may be modified by the Executive Committee in the course of conducting its screening, as a result of supplementary information provided by the proponent, or other information available to or received by the Executive Committee relevant to the screening.

Step 5: The Review Process

The Executive Committee publishes a notice on the screening of the project and invites government agencies, interested persons and members of the public to submit views and information relevant to the screening in writing. Public meetings may also be held to seek views about the project and information relevant to the screening. The Executive Committee determines if it has sufficient information to prepare a draft screening report or if supplementary information from the proponent is required.

Upon completion of a draft screening report, government agencies, interested persons and members of the public are again invited to submit views or comments about the draft screening report in writing.

Step 6: Screening Report and Recommendation(s)

Upon completion of the screening, the Executive Committee prepares a final screening report which includes the recommendation stating whether the project can proceed, and if so, also any recommendations setting proposed terms and conditions. This report is submitted to the Decision Body(s).

Step 7: Project Decision

Once the Yukon government reviews the screening report from the Executive Committee, it decides whether to accept, reject or vary the recommendation and states this decision in a Decision Document. There may be a further referral back to the Executive Committee, prior to the final Decision Document being issued. After the Decision Document has been issued, government re-gulators may issue the required permits and licenses.

The following flow chart outlines this process undertaken and associated timelines.

Legislation that must be followed includes (but may not be limited to):

- Yukon Environment Act (Yukon Statute)
- Occupational Health and Safety Act (Yukon Statute)
- Waters Act (Yukon Statute)
- Transportation and Highways Act (Yukon Statute)
- Fisheries Act (Federal Statute)
- Canadian Environmental Protection Act (Federal Statute)
- Yukon Mine Site Reclamation and Closure Policy

20.2.3 Yukon Water Board

The Yukon Water Board (YWB) is an independent administrative tribunal established under the Waters Act. The Board is responsible for the issuance of Water Licences for the use of water and/or the deposit of waste into water.

The Board's mandate is stated as follows:

"The objects of the Board are to provide for the conservation, development and utilization of waters in a manner that will provide the optimum benefit from them for all Canadians and of the residents of the Yukon in particular." (Section 10, Waters Act)

Water Licence applications usually include a significant amount of technical information. The YWB has licensing officers and technical consultants to assist with gathering and presenting the required information.

The Waters Act states that public notice must be given regarding applications for licences, amendments to licences, and cancellation of licences by publication in a newspaper in general circulation in the area affected.

Section 19 of the Waters Act establishes the rules for when the YWB must hold a public hearing.

The YWB may also hold a public hearing if it is satisfied that it is in the public interest to do so. Public hearings are convened in accordance with the YWB's Rules of Procedure. This requires that parties who would be affected by the YWB's decision must be given adequate notice of the case before the YWB, and must be given an opportunity to present a response. Anyone wanting to make representations to the YWB can intervene by filing a written submission at the YWB's office, located in Whitehorse, before the deadline on the intent date. The intent date is usually 35 calendar days prior to the hearing.

As previously noted, water licences require an assessment under YESAA. The YWB cannot issue a Water Licence if the issuance of the licence is contrary to a Decision Document issued under YESAA, and a Water Licence cannot conflict with a Decision Document. They use this rationale to delay their assessment until the Decision Document related to the YESAA review is complete. Hence the extended timeline of 9-12 months for permitting.

In addition to the information requirements identified in the YWB package, the YWB also requires a completed YESAA project confirmation form after a Decision Document has been issued by the Yukon government. The form is available from the YWB office or on the YWB's website. After the project confirmation form has been received and the review for adequacy is complete, the YWB will provide a public notice. The proponent will receive a copy of any interventions in response to the public notice, and may respond to those interventions. The YWB will then consider the entire register, including the application, the interventions, responses to interventions and the Decision Document prior to making a decision on issuance of the licence.

20.2.4 Land Use Permit

Yukon Energy Mines and Resources Lands branch is responsible for Land Use permitting for a variety of off-mineral claim activities, including:

- site clearing or earth work
- constructing a new road, trail or access
- clearing or installing a utility right-of-way
- quarrying or extracting aggregate
- conducting geo-technical or hydrological studies
- temporarily using or occupying Yukon land (such as a construction camp)
- oil and gas and seismic activities.

Other types of activities which generally do not require a Land Use Permit include: trail cutting (less than 1.5 meters wide and less than 4 hectares); and short-term wilderness camping.

A Land Use Permit allows a person to do a specific activity over a specific period of time. A permit does not give any exclusive rights or tenure to the land. If a proponent wants to do work within a Yukon highway right-of-way, an application for a permit must be submitted to Transportation branch, Department of Highways and Public Works.

A Land Use Permit may be obtained by submitting a Land Use Permit application form and an application fee. The Lands branch will help verify land ownership and supply application forms. The Lands branch then conducts a review of applications for policy constraints and completeness, and determines if the application is subject to YESAA. If the application is subject to YESAA, the applicant is then directed to the appropriate YESAB DO to complete and submit a Form 1 and a copy of the Land Use Permit application form.

The YESAB DO notifies government agencies and other interested parties, receives comments, prepares an assessment report and forwards their recommendation to the Lands branch. The Lands branch issues a Decision Document on the project/application stating whether it can proceed, proceed with terms and conditions, or not proceed. If the project can proceed, the Lands branch then issues a Land Use Permit in conformity with the Decision Document. This completes the land use permitting process.

20.2.5 Lease Acquisition

It is proposed that as part of the permitting process for the 2017 exploration season, 2560344 Ontario Inc. also apply for a coal lease to cover the known resources in the southwestern portion of the Division Mountain deposit and it is also suggested that the lease cover additional prospective ground in this area. A lease provides more rights than an exploration licence. The lease application is sent to the Chief of Mining Lands in Yukon EMR for approval. The timelines associated with this application are not defined.

20.2.6 Environmental and Detailed Engineering Studies

As previously noted, there have been limited environmental studies conducted on the Division Mountain area, the proposed mine project and associated power generating facility. Preliminary engineering studies have been done but again are limited. Detailed studies will need to be conducted in order to fulfill the requirements for the project application as the findings of these studies will be incorporated into the document.

Examples of study areas include:

- Hydrology and hydrogeology
- Water management
- Climatological
- Wildlife
- Air emissions
- Dust control
- Geotechnical
- Waste dumps and dam design
- Access route design
- Preliminary design and site layout
- Infrastructure plans
- Detailed pit design
- Other

This list is provided not as a means to be comprehensive in nature but to provide a level of understanding of the types of studies that will need to be conducted either from the outset, or from the preliminary plans outlined by Norwest (2006, 2008) to prepare the project application. These will require a significant budget as the typical requirement for water quality studies alone is generally 24 months of contiguous sampling, monitoring and testing data. Generally the first step for the proponent is to prepare a detailed permitting plan and schedule that will include all of the required studies. Proponents then typically seek a range of expertise to complete the studies with the eventual objective being to complete the project application and to aid internal planning and project financing processes.

20.3 Environmental and Socio-Economic Impacts

Generally, once all studies are completed, the proponent will identify all of the environmental and socio-economic impacts arising from the project. This effort will also identify the cumulative project impacts arising from the project as certain impacts have a direct relationship with other impacts.

20.3.1 Impact and Risk Assessments

Risk assessments will also need to be determined on all of the environmental and socio-economic assessments and those assessments will include proposed mitigation (s) to eliminate or minimize the identified risk and potential impact.

20.3.2 First Nations Relations and Consultation

First Nations have demonstrated that they are willing to work with mining companies and support their projects in exchange for benefits to the local community. Many of these new partnerships are reflected in socio-economic agreements designed to foster more local benefits. Elements of these agreements include specialized training, scholarships, contracting opportunities, environmental monitoring, etc.

First Nation economic development corporations have already been eager to assist, on a competitive basis, in the construction and supply of existing mining operations and promising exploration programs. Recognition and protection of traditional lifestyles, employment and training opportunities, and equity participation, such as stock options, are some of the topics discussed in these negotiations.

Key considerations for consultation with First Nations that should be addressed by companies when researching and developing a project proposal for either exploration or licensing applications include (After Yukon EMR, 2017):

- identify nearby communities
- identify key contact people in nearby communities (e.g. chief, councillors, lands officer, administrators, mayor)
- identify issues and concerns of importance to the communities
- communicate the company's short and long term plans to the community
- be aware of local cultural differences and communication styles
- initiate meetings to exchange information between the company president and the chief
- director of lands and resources or other senior official(s)

The Yukon Chamber of Mineral Resources based in Whitehorse is also an excellent resource to aid companies in preparing for Permitting and First Nations Consultation processes.

20.3.3 General Public Relations

As previously noted public hearings are a requirement for any mine permitting process and occasionally also for exploration permits. The latter requirement is a determination of the Designated Officer within YESAA reviewing the exploration permit application.

There are many different interest groups in Yukon that actively attend and provide interventions at public meetings and/or hearings. It is important for any mining company planning to be active in Yukon to be fully aware of these groups and their advocacy efforts. It is also very important to fully understand the protocol and agenda of the meetings to ensure that fair process is conducted at all times. These sessions are recorded and can greatly influence recommendations arising from the YESAA process and also the Decision Document issued by Yukon EMR.

20.3.4 Yukon Mine Site and Reclamation Policy

The Yukon Mine Site Reclamation and Closure Policy guides hard rock mine developments in the Territory.

The policy and supporting guidelines are based on modern industry standards and they are consistent with national mine site reclamation policies. In addition to regulatory requirements, the Yukon government also follows a number of best management practices and technical guidelines to inform decision making.

The basis of the policy is that mine operators are responsible to plan, implement and fund mine reclamation and closure and they must provide financial security to contain the public risk for site reclamation and closure costs. The reclamation and closure plan must be prepared by the mine owner and submitted for review and approval by the government prior to receiving a Mining License. The reclamation and closure plan must be updated periodically throughout the operating mine life (minimum every five years).

21 Capital and Operating Costs

It is recognized that the Division Mountain project is a relatively small coal project, and will not benefit from the economies of scale enjoyed by a larger operation. In addition, high transport costs and current market conditions suggest that the resource is not suitable for export. It was therefore assumed that, for the purposes of this study, capital and operating costs would be kept to a minimum (Norwest, 2008).

Canadian dollars (\$CAN) are reported throughout. As previously noted, these cost estimates were prepared by Norwest for a feasibility study completed in 2008. They are now all out-of-date and are presented for background context for the project. The costs estimates are therefore considered historical in nature and cannot be relied upon. A complete update of all capital and operating costs will be required to further advance the Division Mountain Project and to appropriately determine its overall viability.

21.1 Capital Costs

Capital expenditure over the project life was projected by Norwest (2008) as shown in Figure 21.1. Norwest proposed to spread out capital expenditures as much as possible, over the life of the project. In the case of Division Mountain, however, production is low enough that there is very little equipment replacement or other capital costs once the project has started. For that reason, there is limited opportunity for spreading of the capital allocation and most of the capital expenditure is incurred prior to project start-up.

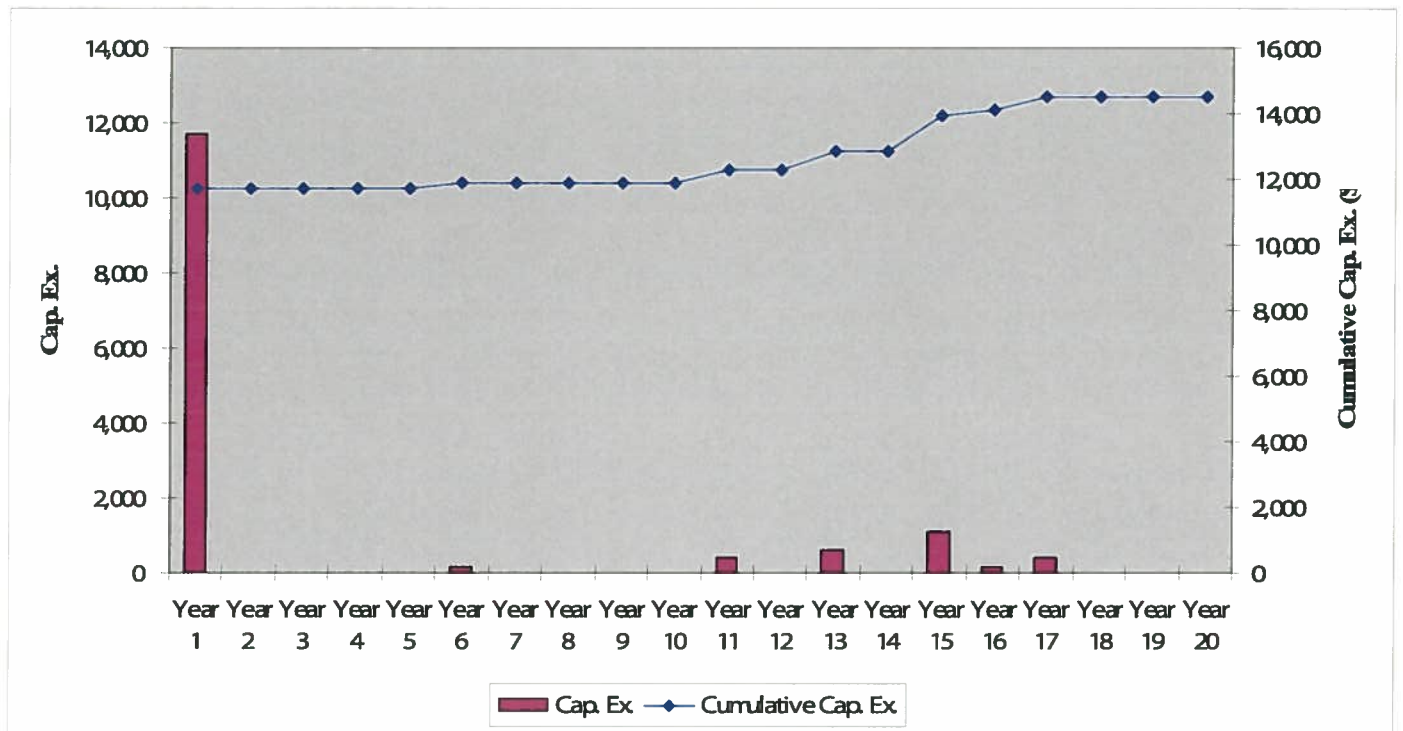


FIGURE 21.1

2560344 Ontario Inc.
DIVISION MOUNTAIN
CAPITAL EXPENDITURES

DATE: 01/05/2017

K. Brewer P.Geo.

21.1.1 Methodology

Capital expenditures may be grouped into three major categories (after Norwest, 2006):

- Mine Development: \$0.94M
- Infrastructure and Facilities: \$5.08M
- Mobile Equipment: \$8.49M

Norwest estimated total capital costs to be CDN\$14.51 million. In the case of mine development, infrastructure and facilities, equipment costs were based on budgetary quotations of available equipment for major items. Cost for minor equipment and unit costs for construction had been estimated by Norwest from previous projects. An allowance for incidentals had been included as a percentage of the total cost.

Equipment capital costs were based on quotations of used equipment from a Canadian distributor (see Equipment Selection, Section 18). Costs included transportation and erection. Equipment was chosen with enough used hours to warrant a significant capital savings, while retaining an adequate remaining life.

A 10% contingency had been added to all capital expenditures, to account for unforeseeable factors that may arise between this study and project start-up, including any rise in material costs.

Complete estimates of all capital expenditures and depreciation may be seen in Appendix 8. A summary of capital costs is shown in Table 21.1. All costs were in constant 2006 Canadian dollars.

21.1.2 Mine Development

Mine development costs included all capital costs associated with establishing the project, not including buildings and equipment.

Total mine development costs were estimated at \$0.94M (with a 10% contingency). These costs included (i) power line; (ii) water management and drainage infrastructure; (iii) access development; (iv) coal transportation corridor; and (v) contractor costs (Norwest, 2008).

21.1.3 Power Line

A preliminary estimate prepared by Norwest (2008) suggested that sourcing power from the pro-proposed power plant would be less expensive than self-generation of power. The capital cost of constructing a 2.4 kilometer long power line was included at \$419,000

Table 21.1 Capital Expenditure Summary

Mine Infrastructure Development Cost		Cost (\$000)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Total
Plant Facilities																								
Equipment		3,031	3,031																					3,031
Other		0	0																					0
Subtotal		3,031	3,031	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,031
Support Facilities																								
Buildings		1,590	1,590																					1,590
Other		0	0																					0
Subtotal		1,590	1,590	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,590
Other Development Costs																								
Power Line		419	419																					419
Drainage Infrastructure		50	50																					50
Access Development		150	150																					150
Haul Road (6km)		135	135																					135
Consultants		100	100																					100
Subtotal		854	854	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	854
Mine Infrastructure Development Contingency			10%	548	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	548
SUBTOTAL INFRASTRUCTURE/DEV (wo/cont.)			5,475	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,475
GRAND TOTAL INFRASTRUCTURE AND DEVELOPMENT			6,023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,023
Mobile Equipment Cost		Quantity	Cost/Unit (\$000)																					
Overburden Mining Equipment																								
6 CM Hoe (CAT 385B equiv)		1	580	580	0	0	0	0	0	0	0	0	0	0	0	0	0	580	0	0	0	0	0	1,159
35t End Dump Truck (Cat 769 equiuv)		4	429	1,717	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,717
365hp percussion drill (Atlas Copco ROCL7)		1	423	423	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	423
Coal Mining Equipment																								
6 CM Hoe (CAT 385B equiv)		1	580	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
35t End Dump Truck (Cat 769 equiuv)		1	429	429	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	429
5 cm Front End Loader (Cat 980 equiv)		1	243	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	243
35t End Dump Truck, Transport (Cat 769 equiuv)		1	429	429	0	0	0	0	0	0	0	0	0	0	0	0	0	429	0	0	0	0	0	859
Mining Support Equipment																								
230 kw Track Dozer (Cat D8 equiv)		1	354	354	0	0	0	0	0	0	0	0	0	0	354	0	0	0	354	0	0	0	0	1,062
5 cm Front End Loader (Cat 980 equiv)		1	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Water Truck		1	267	267	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	267
5 3m Motor Grader (Cat 14H equiv)		1	185	185	0	0	0	0	0	0	0	0	0	0	185	0	0	0	0	0	0	0	0	370
80 Ton Rough Terrain Crane			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
40 Ton Rough Terrain Crane		1	127	127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	127
Bulk Explosives Truck		1	41	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
Field Lube Truck		1	178	178	0	0	0	0	0	0	0	0	178	0	0	0	0	0	0	0	0	0	0	355
Mechanic Service Truck (per year)		1	122	122	0	0	0	0	122	0	0	0	122	0	0	0	0	122	0	0	0	0	0	487
Light Duty Truck - 3/4 Ton (per year)		1	28	28	0	0	0	0	28	0	0	0	28	0	0	0	0	28	0	0	0	0	0	111
Light Plants		2	17	35	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	70
Mining Equipment Contingency			10%	516	0	0	0	0	15	0	0	0	36	0	54	0	101	15	35	0	0	0	0	772
SUBTOTAL MINING EQUIPMENT (wo/cont.)			5,158	0	0	0	0	150	0	0	0	0	362	0	539	0	1,009	150	354	0	0	0	0	7,721
GRAND TOTAL MINING EQUIPMENT			5,674	0	0	0	0	165	0	0	0	0	398	0	593	0	1,110	165	389	0	0	0	0	8,493
GRAND TOTAL CAPITAL			11,696	0	0	0	0	165	0	0	0	0	398	0	593	0	1,110	165	389	0	0	0	0	14,516

TABLE 21.1

2560344 Ontario Inc.
DIVISION MOUNTAIN
CAPITAL EXPENDITURES
SUMMARY

DATE: 01/05/2017

K. Brewer P.Geo.

21.1.4 Water Management and Drainage Infrastructure

Norwest (2008) noted that all water draining from disturbed land including surface facilities, working pits and waste dumps would have to be treated in sediment settling ponds. In addition, drainage would also have to be controlled to prevent in-flow to the pit, maintain safe working conditions or damage to infrastructure. It was therefore assumed that construction of drainage control structures (ponds, berms, ditches, etc) would be required at a total cost of \$50,000.

21.1.5 Access Development

Included cost of leveling and grading ground for construction of surface facilities, as well as construction of minor access roads. This was estimated at \$150,000.

21.1.6 Coal Transportation Corridor

A 2.4 kilometer long coal transportation corridor between the project and proposed power generating plant would be constructed before production begins. This was estimated at \$135,000.

21.1.7 Contractors

This was a 'catch-all' cost that covered the costs of all additional permitting, mine planning, base-line studies, etc required before getting approval to begin operations. It is assumed that \$100,000 would be adequate.

21.1.8 Infrastructure and Facilities

This included the cost of purchasing and constructing all plant equipment and housing, as well as surface buildings. Items included:

- Feeder breaker, crusher, conveyor, stacker, coal load-out and associated housing
- 'Sprung' structures to house equipment and maintenance facilities
- Surface facilities for mine personnel.

Total capital costs for infrastructure and facilities were estimated to be \$5.08M.

21.1.9 Mobile Equipment

Major mobile equipment required at Division Mountain was planned by Norwest (2008) to include:

- One hydraulic backhoe excavator (6m³ class)
- One Front End Loader (5.5m³ class)
- Five mining trucks (35 tonne class)
- One angle-headed percussion crawler drill (365hp).

Support and ancillary equipment would also include:

- Track dozer
- Water truck
- Motor grader
- Rough terrain crane
- Bulk explosives truck
- Mechanics service truck
- Pick-up trucks
- Light plants

Quotes by Norwest in 2008 were tendered for used major mobile equipment in an effort to keep capital costs to a minimum. In many cases, the estimate of remaining hours of life on major equipment was thought to be sufficient to last through the project life without replacement.

Transport costs for used equipment were also included in the tender estimates. Light equipment such as pick-up trucks and light plants were assumed to be purchased new.

Total capital costs for mobile equipment were estimated by Norwest (2008) at \$8.49M.

21.2 Operating Costs

21.2.1 Methodology

The methodology followed for developing operating costs previously undertaken by Norwest (2008) were as follows:

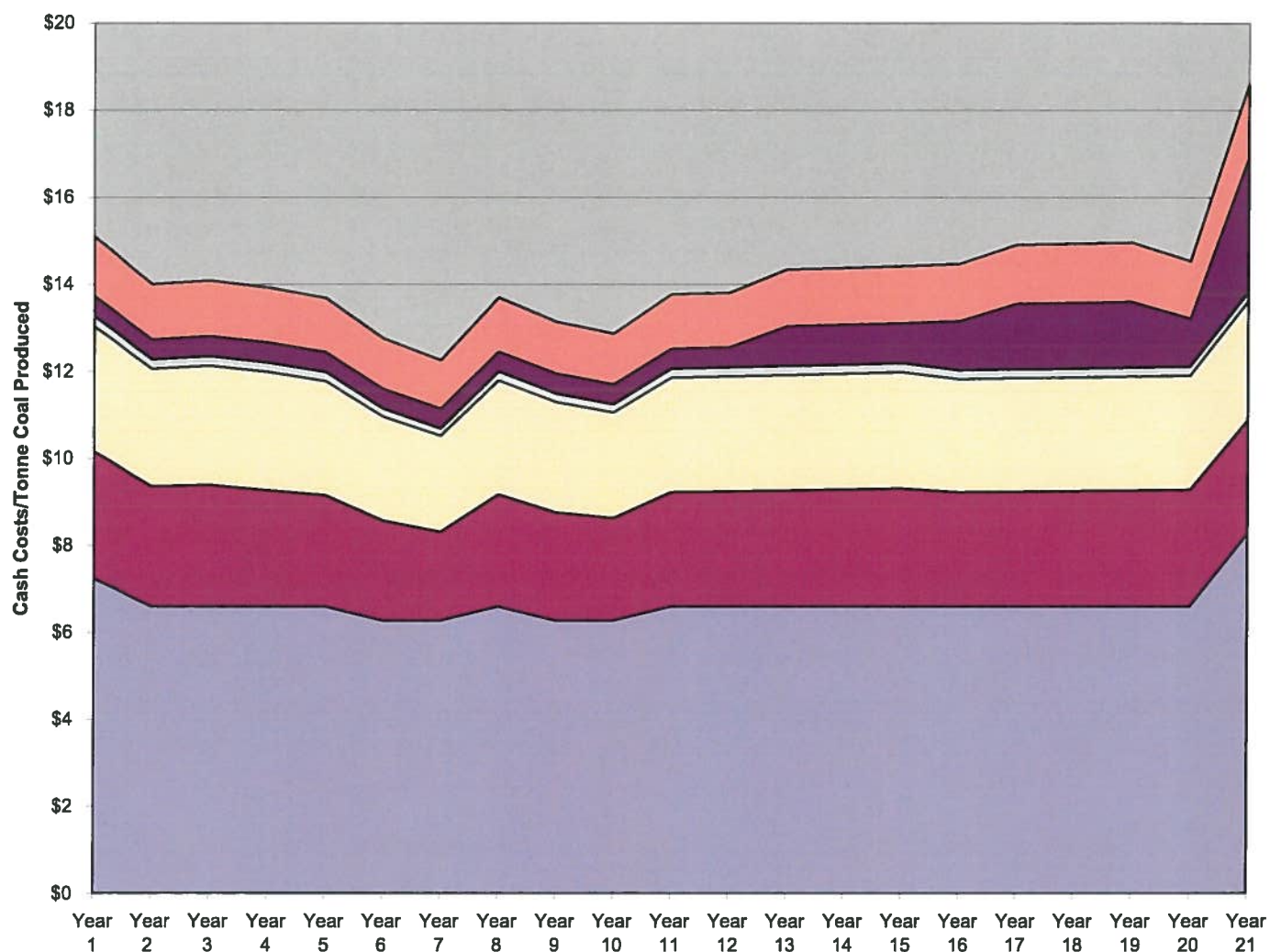
- In developing the mine plan, volumes of waste, coal and topsoil were derived from a computer-based model of the resource
- By applying estimated equipment productivities against those quantities, operating hours were generated
- Equipment operating costs were then estimated by applying operating hours against the estimated hourly operating cost of each piece of equipment
- Hourly operating costs are estimated based on adjusted industry standards, as well as Norwest's experience and database of mining costs
- Labor costs were then added to equipment operating costs to cover operators, maintenance personnel, salaried staff and laborers
- Finally, costs for materials, supplies, taxes and mining royalties were added to generate total cash operating costs.

Operating costs are summarized in Tables 21.2 and 21.3 and Figures 21.2 and 21.3. All costs were in constant 2006 Canadian dollars.

		Year 1	Year 1	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Total
COAL SHIPMENTS (tons)		248,800	248,000	240,900	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	182,836	4,982,836
Total Hourly		28	18	18	18	18	17	17	18	17	17	18	18	18	18	18	18	18	18	18	18	17	
Total Staff		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Total Workforce		22	20	20	20	20	19	19	20	19	19	20	20	20	20	20	20	20	20	20	20	19	
Annual Wage/Salary/Benefit																							
Hourly		\$1,143,914	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$970,286	\$970,286	\$1,028,162	\$970,286	\$970,286	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$970,286	
Staff		\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	
Benefits		\$440,910	\$401,554	\$401,554	\$401,554	\$401,554	\$381,876	\$381,876	\$401,554	\$381,876	\$381,876	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$381,876	
TOTAL LABOR		\$1,737,794	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$33,001,851
(Total Labor - \$/ton)		\$7.24	\$6.59	\$6.59	\$6.59	\$6.59	\$6.27	\$6.27	\$6.59	\$6.27	\$6.27	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$8.27	\$6.62
MATERIALS AND SUPPLIES COSTS																							
Equipment Operating Hour																							
Overburden Mining Equipment Operating Hour																							
6 CM Hoe (CAT 385B equiv)		1,857	1,598	1,670	1,750	1,628	1,311	1,146	1,583	1,480	1,357	1,574	1,574	1,574	1,574	1,574	1,490	1,490	1,490	1,490	1,490	1,130	
5 cm Front End Loader (Cat 980 equiv)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
35t End Dump Truck (Cat 769 equiv)		621	621	621	621	621	621	621	621	621	621	621	621	621	621	621	621	621	621	621	621	471	
365hp percussion drill (Atlas Copco ROCL7)		4,814	6,545	6,545	5,731	5,401	4,938	3,877	5,622	5,349	4,899	5,791	5,905	6,022	6,145	6,273	6,017	6,100	6,184	6,271	6,360	4,894	
Coal Mining Equipment Operating Hour		788	678	709	743	691	556	486	672	620	576	668	668	668	666	668	632	632	632	632	632	480	
6 CM Hoe (CAT 385B equiv)		433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	328	
35t End Dump Truck (Cat 769 equiv)		1,010	862	1,031	809	805	835	860	890	961	1,052	1,076	1										

Table 21.2 Operating Expenditures Summary

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Total
CONTRACTOR COSTS																							
Contract Maintenance																							
Overburden Mining Equipment \$/hour																							
6 CM Hoe (CAT 385B equiv)		\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03
35t End Dump Truck (Cat 769 equiv)		\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99
365hp percussion drill (Atlas Copco ROC17)		\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32	\$15.32
Coal Mining Equipment \$/hour																							
6 CM Hoe (CAT 385B equiv)		\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03
35t End Dump Truck (Cat 769 equiv)		\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99
35t End Dump Truck, Transport (Cat 769 equiv)		\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99	\$1.99
Mining Support Equipment \$/hour																							
230 kw Track Dozer (Cat D8 equiv)		\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86	\$3.86
5 cm Front End Loader (Cat 980 equiv)		\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84
Water Truck		\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50
5.3m Motor Grader (Cat 14H equiv)		\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64
40 Ton Rough Terrain Crane		\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29	\$0.29
Bulk Explosives Truck		\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33
Field Lube Truck		\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40
Mechanic Service Truck (per year)		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Light Duty Truck - 3/4 Ton (per year)		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total Contract Maintenance		\$8,961	\$7,239	\$8,146	\$6,993	\$4,835	\$8,947	\$4,255	\$4,734	\$3,698	\$8,037	\$5,298	\$5,573	\$5,858	\$6,154	\$6,465	\$6,635	\$6,816	\$6,999	\$7,189	\$7,383	\$7,568	\$927,867
Contract Laboratory	\$0.82	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	4,800	3,641
Contract Technical Services	10%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Camp Services	\$0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CONTRACTOR COSTS		\$55,761	\$52,839	\$53,946	\$51,793	\$49,635	\$43,747	\$39,855	\$49,534	\$47,498	\$44,837	\$50,898	\$50,373	\$50,458	\$50,954	\$51,265	\$49,435	\$49,616	\$49,799	\$49,989	\$50,183	\$50,391	\$1,027,580
(Contractor Costs \$/ton)		\$8.23	\$8.22	\$8.22	\$8.22	\$8.21	\$8.18	\$8.16	\$8.21	\$8.20	\$8.19	\$8.21	\$8.21	\$8.21	\$8.21	\$8.21	\$8.21	\$8.21	\$8.21	\$8.21	\$8.21	\$8.21	\$8.21
OTHER COSTS																							
General transportation to site	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000
Reclamation - Bond Premiums	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500	\$97,500
Reclamation - Work Performed	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Office and Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL OTHER COSTS		\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500
(Other Costs \$/ton)		\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46	\$8.46
SUMMARY																							
LABOR		\$1,737,704	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,505,042	\$1,505,042	\$1,582,596	\$1,505,042	\$1,505,042	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,505,042	\$33,001,851
MATERIALS AND SUPPLIES		\$1,391,941	\$1,311,127	\$1,329,010	\$1,294,466	\$1,244,508	\$1,125,322	\$1,020,051	\$1,247,075	\$1,205,101	\$1,148,831	\$1,263,130	\$1,270,441	\$1,278,021	\$1,285,922	\$1,294,186	\$1,255,488	\$1,260,288	\$1,265,180	\$1,270,236	\$1,275,396	\$973,729	\$26,009,448
CONTRACTOR		\$55,761	\$52,839	\$52,946	\$51,793	\$49,635	\$43,747	\$39,855	\$49,534	\$47,498	\$44,837	\$50,898	\$50,373	\$50,458	\$50,954	\$51,265	\$49,435	\$49,616	\$49,799	\$49,989	\$50,183	\$38,291	\$1,027,508
OTHER		\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$109,500	\$4,147,301
CONTINGENCY	10%	\$329,491	\$305,516	\$307,485	\$303,836	\$298,624	\$278,361	\$267,345	\$298,878	\$286,714	\$288,821	\$300,532	\$301,291	\$312,971	\$313,791	\$314,648	\$315,727	\$325,388	\$325,888	\$326,413	\$317,198	\$387,759	\$6,418,611
Contingency \$/ton		\$1.37	\$1.27	\$1.28	\$1.27	\$1.24	\$1.16	\$1.11	\$1.25	\$1.19	\$1.17	\$1.25	\$1.26	\$1.30	\$1.31	\$1.31	\$1.32	\$1.36	\$1.36	\$1.36	\$1.32	\$1.69	
TOTAL CASH DIRECT MINING COSTS		\$3,624,396	\$3,360,788	\$3,381,457	\$3,342,191	\$3,284,862	\$3,061,973	\$2,941,013	\$3,287,575	\$3,153,856	\$3,089,831	\$3,305,856	\$3,314,201	\$3,442,679	\$3,451,696	\$3,461,129	\$3,473,001	\$3,579,184	\$3,584,767	\$3,590,538	\$3,489,177	\$3,385,349	\$70,604,719
Total Cash Cost \$/ton		\$15.10	\$14.00	\$14.09	\$13.93	\$13.69	\$12.76	\$12.25	\$13.70	\$13.14	\$12.87	\$13.77	\$13.81	\$14.34	\$14.38	\$14.42	\$14.47	\$14.91	\$14.94	\$14.96	\$14.54	\$18.60	\$14.17



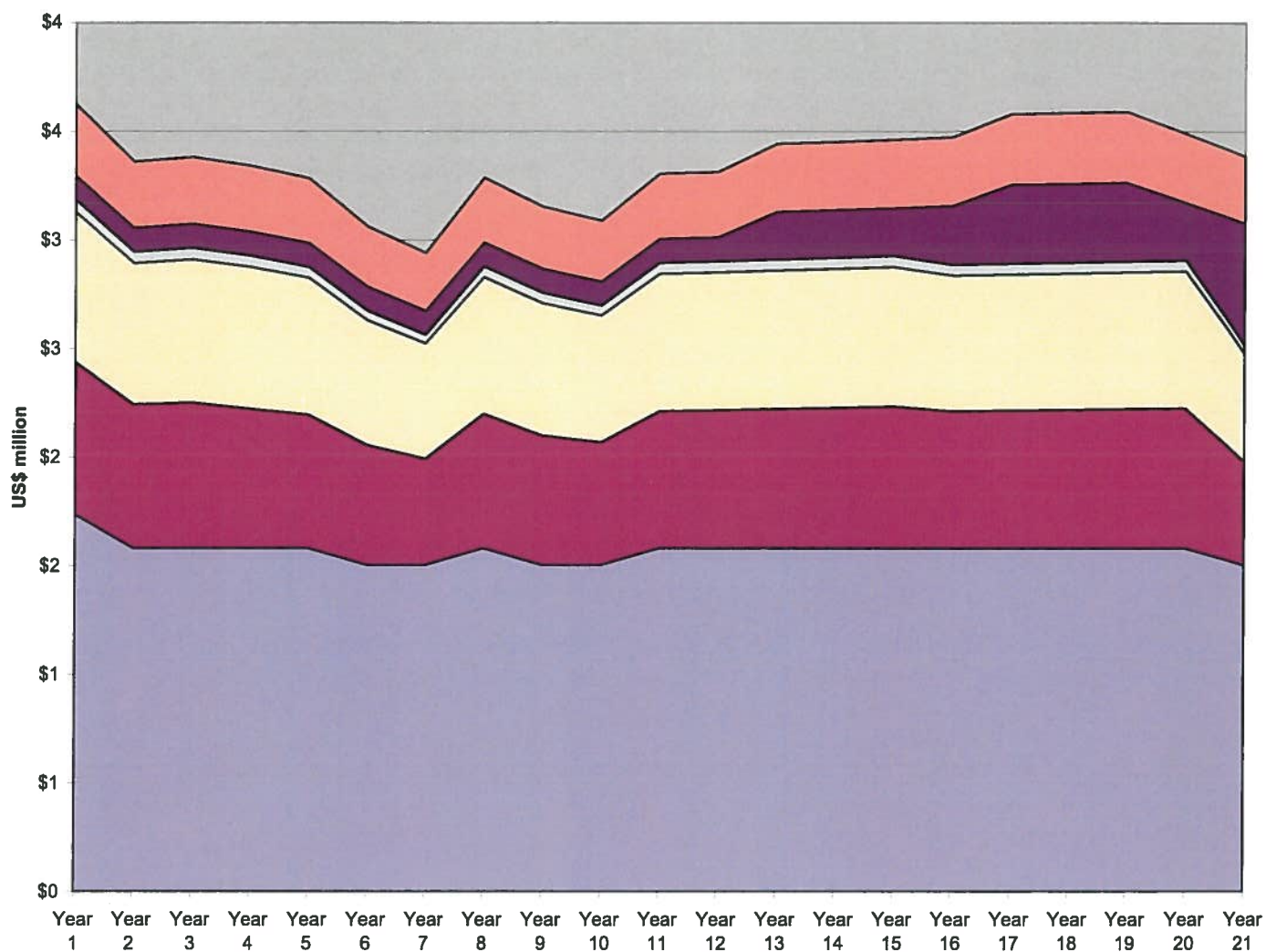
- CONTINGENCY
- OTHER COSTS
- CONTRACTOR COSTS
- MATERIALS AND SUPPLIES
- FUEL
- LABOR

FIGURE 21.2

2560344 Ontario Inc.
DIVISION MOUNTAIN
OPERATING CASH COST (\$/T)

DATE: 01/05/2017

K. Brewer P.Geo.



- CONTINGENCY
- OTHER
- CONTRACTOR
- MATERIALS AND SUPPLIES
- FUEL
- LABOR

FIGURE 21.3

2560344 Ontario Inc.
DIVISION MOUNTAIN
OPERATING CASH COST
(TOTAL \$)

DATE: 01/05/2017

K. Brewer P.Geo.

21.2.2 Unit Costs

Total projected cash operating costs were grouped by logical activity and divided by quantities in order to develop meaningful unit costs. These unit costs are summarized in Table 21.4. In Norwest's experience, these unit costs were in-line with what would be expected from an operation of the size and nature of Division Mountain.

Table 21.4 Operating Unit Cost Summary

Activity	Unit Cost
Waste stripping \$ /bcm*	\$3.47
Mining \$/t	\$0.60
Drilling and blasting \$/bcm	\$3.22
Coal handling \$/t	\$3.62
Other (G&A, contractors etc., (\$t	\$1.89
Total	\$14.17

(*Sub-total of waste stripping)

21.2.2.1 Waste Stripping

The unit cost for stripping was expressed by Norwest (2008) as the cash costs for all labor, maintenance parts, major overhauls, materials/supplies and fuel per bcm of waste stripped.

21.2.2.2 Drilling and Blasting

The unit cost for drilling and blasting was expressed as the cash costs for all labor, maintenance parts, major overhauls, materials/supplies, fuel and blasting product per bcm of waste blasted.

21.2.2.3 Mining

The unit cost for stripping was expressed as the cash costs for all labor, maintenance parts, major overhauls, materials/supplies and fuel per tonne of coal mined. Norwest (2008) included costs for coal mining as well as transportation to the power plant.

21.2.2.4 Coal Handling

The unit cost for stripping was expressed as the cash costs for all labor, maintenance parts, major overhauls, materials/supplies, fuel and electricity per tonne of coal mined, sized and stored. An annual, detailed breakdown of unit costs and operating expenditures estimated by Norwest (2008) are found in Appendix 8. Unit costs for equipment are summarized in Table 21.5. It is important to note that the costs for major repair items were assumed by Norwest (2008) to be covered by service contracts.

Table 21.5 Mining Equipment Costs

DESCRIPTION	CAPITAL			OPERATING COSTS							
	Capital Cost (\$1000's)	Life (Hours)	Life (Years)	Maint. Parts (\$/hr)	Lube (\$/hr)	Tires (\$/hr)	Wear Parts (\$/hr)	Adjustment for Yukon	Total Excluding Labor and Fuel/Power	Electricity (kwhr/hr)	Diesel (liter/hr)
Overburden Mining Equipment								15%			
6 CM Hoe (CAT 385B equiv)	580	25,000	13	13.44	9.66	-	4.39	2.67	30.16		47.65
36t End Dump Truck (Cat 769 eqiuv)	429	46,000	30	3.21	5.62	5.96	-	1.38	16.18		37.96
365hp percussion drill (Atlas Copco ROCL7)	423	28,000	44	26.10	9.94	-	10.32	5.46	51.81		61.58
Coal Mining Equipment											
6 CM Hoe (CAT 385B equiv)	580	25,000	58	13.44	9.66	-	4.39	2.67	30.16		47.65
36t End Dump Truck (Cat 769 eqiuv)	429	45,000	44	3.21	5.62	5.96	-	1.38	16.18		37.96
5 cm Front End Loader (Cat 980 equiv)	243	25,000	41	4.60	4.42	6.63	0.53	1.76	17.94		37.96
36t End Dump Truck, Transport (Cat 769 eqiuv)	429	25,000	15	3.21	5.62	5.96	-	1.38	16.18		37.96
Mining Support Equipment											
230 kw Track Dozer (Cat D8 equiv)	354	19,500	15	5.02	5.09	-	11.86	2.53	24.51		38.80
Water Truck	267		21	4.03	2.55	2.00	-	0.90	9.47		22.60
5.3m Motor Grader (Cat 14H equiv)	185	16,500	11	5.88	4.04	1.10	1.06	1.21	13.29		26.91
40 Ton Rough Terrain Crane	127		21	1.17	2.99	0.05	-	0.18	4.39		39.06
Bulk Explosives Truck	41		21	0.53	0.79	0.79	-	0.20	2.31		20.63
Field Lube Truck	178		10	3.75	1.67	1.22	-	0.74	7.38		9.61
Mechanic Service Truck (per year)	122		5	1,547	-	232	-	267	2,046		1,378
Light Duty Truck - 3/4 Ton (per year)	28		5	1,451	-	348	-	270	2,068		2,067
Light Plants	17		10								

21.2.3 Labor

As mentioned previously, total labor requirements were estimated by Norwest (2008) to fluctuate between 19 and 22 site personnel over the project life. Salaried personnel were fixed at two (2) people. The distribution of labor by department may be seen in Table 21.6.

Table 21.6 Summary of Wages and Salaries

Work Classification	\$/year
Non-skilled (hourly)	\$45,864
Skilled (hourly)	\$57,876
Skilled Maintenance	\$63,085
Supervisors	\$78,624
Professionals	\$74,256
Managers	\$107,016

Labor assumptions by Norwest (2008) were as follows:

- A 'burden' or benefits rate of 34% of wage
- Possible annual working hours of 2184 hours per calendar year

21.2.3.1 Hourly Personnel

Hourly wage rates were based by Norwest (2008) on industry standards for Western Canadian surface mines for 2005 compiled by Western Mine Engineering. In 2008, Norwest used hourly wage rates of \$21.00, \$26.50 and \$29.00 for unskilled, skilled laborers and maintenance personnel, respectively.

21.2.3.2 Salaried Personnel

Similarly, salaried wage rates were based by Norwest (2008) on industry standards for Western Canadian surface mines, as compiled by Western Mine Engineering.

A summary of these hourly and salaried wages appears in Tables 21.6 and 21.7.

Table 21.7 Labor Distribution

			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Labor Distribution																						
Hourly Workforce	Pay Grade	Annual Comp.																				
Stripping																						
Hydraulic Excavator Operator	Skilled	57,876	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Loader Operator	Skilled	57,876	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
OB Drill Operator	Skilled	57,876	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
OB Truck Operator	Skilled	57,876	4	4	4	4	4	4	3	3	4	3	3	4	4	4	4	4	4	4	4	4
Subtotal Stripping			8	7	7	7	7	6	6	7	6	6	7	7	7	7	7	7	7	7	7	7
Coal Operations																						
Hydraulic Excavator Operator	Skilled	57,876	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal Truck Operator	Skilled	57,876	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Subtotal Coal Operations			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Coal Handling Facility																						
Plant Operators	Skilled	57,876	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Laborers	Non-skilled	45,864	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Subtotal Coal Handling Facility			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Reclamation and Support Equipment																						
Track Dozer Operators	Skilled	57,876	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water Truck Operators	Skilled	57,876	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Grader Operators	Skilled	57,876	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Other Ancillary Equip	Skilled	57,876	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Subtotal Support Equipment			5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Maintenance Personnel																						
Mechanics	Skilled	63,085	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Electricians	Skilled	63,085	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Laborers	Non-skilled	45,864	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Subtotal Maintenance			3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Total Hourly			20	18	18	18	18	17	17	18	17	17	18	18	18	18	18	18	18	18	18	18
Staff & Support Workforce																						
Operations Management																						
Mine Superintendent	Manager	107,016	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Administration																						
Clerical and Camp Support	Non-skilled	45,864	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Staff & Support			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total Hourly			20	18	18	18	18	17	17	18	17	17	18	18	18	18	18	18	18	18	18	18
Total Staff			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total Workforce			22	20	20	20	20	19	19	20	19	19	20	20	20	20	20	20	20	20	20	20

21.2.4 Materials, Supplies and Services

Equipment materials costs were estimated based on operating hours applied against industry standard costs as reported in the “Mine & Mill Equipment Costs: An Estimator’s Guide”, 2005, published by Western Mine Engineering, Inc. Those benchmarked costs were thought by Norwest (2008) to be typical of surface mines in the western United States.

Norwest then escalated them to 2006 rates and also adjusted them according to the US/Canadian exchange rate, and further adjusted them by 15% to account for any extra costs associated with securing those supplies in the Yukon.

A summary of materials costs for major equipment may be seen in Tables 21.1 and 21.2.

“Wear Parts” included Ground Engaging Tools (GET) such as bucket teeth, cutting edges on track dozers and motor graders, drill bits and steel, wear parts on crushers and conveyors, etc.

“Maintenance Parts” included all non-GET parts that are replaced as part of a regular maintenance program. This does not include any maintenance done for major overhauls, which were assumed to be covered by maintenance service contracts with the equipment manufacturers.

Tire costs account for all costs of tires for rolling equipment only.

“Lube” included the costs for all lubricants, oil and grease for the crushing and conveying system as well as the mobile equipment.

“Blasting supplies” included explosives and detonating devices. ANFO was assumed to be \$0.50/kilogram, with supplies estimated to be 9% of blasting product cost.

Fuel costs for all mobile equipment were assumed to be \$0.97/liter for diesel fuel. Diesel fuel cost was assumed to be the price paid at the pump minus excise and road taxes. Hourly consumption rates for various pieces of mobile equipment were estimated from benchmarked industry standards (“Mine & Mill Equipment Costs” guide).

Electricity costs to operate coal handling, office and maintenance facilities were assumed to be \$0.09/kilowatt hour, with an annual draw of 240 kilowatts.

Materials and supplies cost for coal handling and storage were estimated at \$0.61/tonne, exclusive of labor.

Norwest noted that it was expected that groundwater would be encountered during mining operations. Pit water would need to be removed immediately to maintain safe, efficient working conditions. A cost for in-pit pumping of \$0.10/tonne was therefore included.

Laboratory services would be required to maintain quality control and ensure a consistent supply of coal to the power plant. It was assumed that lab services would be contracted out at \$0.02/tonne.

Transportation costs to carry mine personnel between the mine site and Whitehorse were assumed to be \$2000/month for 12 months.

It was assumed by Norwest (2008) that a reclamation bond would have to be posted before mining operations may commence. This is consistent with the current Mine Reclamation and Closure Policy of Yukon. The intent of the bond was noted to cover estimated potential expenditures by the Yukon Territory to reclaim the land on which the project is located in the event that mining operations unexpectedly cease and the owner are unable to meet their obligations. This is also consistent with the current policy. The bond amount estimated by Norwest (2008) was deemed as typically sufficient to cover the highest projected costs of any period during the project's life. That 'worst case' cost was estimated at \$6.5M. It was assumed that project proponent would pay a premium to a third-party bonding company of a flat 1.5% per year on \$6.5M.

Finally, a contingency of 10% was added by Norwest (2008) to the total cash operating costs. This was designed to account for unforeseeable factors that could arise between the timing of their project estimate and project start-up, and also included any rise in costs of materials and supplies, as well as any minor costs that may have not been taken into account in their estimation process.

22 Economic Analysis

22.1 Overview

A cash flow analysis of the project life was developed by Norwest (2008) as a means of estimating the economic value of the Division Mountain project. The analysis was based on a full recovery of capital and operating costs as well as a return on investment. As previously noted, these are to be considered as historical only, and are presented for background information only. With revised capital and operating costs that would be required for any project update for advancement of the Division Mountain project it would then be possible to prepare a revised economic analysis of the project.

Revenues were calculated by applying an assumed price to the quantity of coal produced, then subtracting mining royalties to the Yukon government. Cash operating costs were then combined with non-controllable costs (corporate overhead) to yield total cash costs. Total revenues less total cash costs yield earnings before interest and depreciation (EBITDA). An escalation of 2.5% has been added on revenues and cash costs, based on a Statistics Canada-generated annual Consumer Price Index (CPI), released June 2006.

Depreciation, provincial and federal taxes were subtracted from EBITDA to yield an after-tax net income. Finally, capital costs were subtracted to give net, after-tax, cash flow on an annual basis over the project life.

With a project cash flow, it was therefore possible to calculate the Net Present Value (NPV) of the project at various discount rates. In addition, the Internal Rate of Return (or 'break-even' rate) was estimated to give an alternate indication of the project's value.

Norwest (2008) noted that there are situations in which IRR can be an unreliable indicator of project feasibility. These include projects in which there is a long project life, or in which there is high variability in cash flows. While projected cash flows in this case are reasonably consistent, the project life is relatively long (compared to potential changes of discount rate over a similar period), and the IRR, in this case, may be a less reliable indicator than the NPV.

A summary of the results of the cash flow analysis may be found below in Table 22.1. The detailed cash flow analysis is shown in Table 22.2.

Table 22.1 Cash Flow Summary

Discount Rate (%)	5%	8%	10%	12%	15%	20%
Net Present Value (\$'000)	21,881	15,024	11,720	9,126	6,194	2,963
IRR (%)	28.5%					

22.2 Financial Assumptions

Key financial assumptions were made by Norwest (2006) with respect to the (i) cost analysis basis; (ii) coal price; and (iii) taxes and royalties. These are detailed (after Norwest, 2006) in the following sections.

22.2.1 Cost Analyses Basis

All costs are in constant, 2006 Canadian dollars. An exchange rate of \$1.1604 (\$CDN : \$US) was assumed. All NPV and IRR indicators are calculated on an after-tax basis.

22.2.2 Coal Price

A coal price of \$28/t was assumed for all coal, FOB power plant. Norwest based their price assumption on discussions with Cash Minerals Ltd. and did not conduct any detailed market studies. For the purpose of financial analysis of cash flow only, Norwest then escalated the coal price by 2.5% on an annual basis, which was also equivalent to the projected annual increase of all applicable project costs. Obviously for an accurate price to be determined f.o.b. power plant gate it will be necessary to conduct independent market studies of both atypical coal prices with other thermal generating plants in Canada and utilize that price in the project economic analysis for the thermal generating plant.

Table 22.2 Cash Flow Analysis

		Year -3	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21
PRODUCTION																									
Power Plant Tonnes Sold ('000)		0	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	182
Overburden (BCM, '000)		0	0	0	623	537	561	588	547	440	385	531	497	456	528	528	528	528	528	500	500	500	500	500	379
Strip Ratio		0.0	0.0	0.0	2.6	2.2	2.3	2.4	2.3	1.8	1.6	2.2	2.1	1.9	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1
REVENUE (\$'000)																									
Coal Sales Price (\$/tonne)	0%	28.00	28.00	28.00	28.00																				
Coal Price Escalator	2.5%				28.70	29.42	30.15	30.91	31.68	32.47	33.28	34.12	34.97	35.84	36.74	37.66	38.60	39.56	40.55	41.57	42.61	43.67	44.76	45.88	
Revenue from Power Plant Coal Sales		0	0	0	6,720	6,888	7,060	7,237	7,418	7,603	7,793	7,988	8,188	8,392	8,602	8,817	9,038	9,264	9,495	9,733	9,976	10,225	10,481	10,743	8,352
Total Revenue from Coal Sales		0	0	0	6,720	6,888	7,060	7,237	7,418	7,603	7,793	7,988	8,188	8,392	8,602	8,817	9,038	9,264	9,495	9,733	9,976	10,225	10,481	10,743	8,352
Gross Revenue		0	0	0	6,720	6,888	7,060	7,237	7,418	7,603	7,793	7,988	8,188	8,392	8,602	8,817	9,038	9,264	9,495	9,733	9,976	10,225	10,481	10,743	8,352
Less Yukon Royalties	\$1.10	0	0	0	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	201
Adjusted Gross Revenue		0	0	0	6,455	6,623	6,796	6,972	7,153	7,339	7,529	7,723	7,923	8,128	8,338	8,553	8,773	8,999	9,231	9,468	9,711	9,961	10,216	10,478	8,151
CASH PRODUCTION COSTS (\$ '000)																									
Labor (with Contingency)	10.0%	0	0	0	1,911	1,741	1,741	1,741	1,741	1,656	1,656	1,741	1,656	1,656	1,741	1,741	1,741	1,741	1,741	1,741	1,741	1,741	1,741	1,741	1,656
Materials and Supplies (with Contingency)	10.0%	0	0	0	1,531	1,442	1,462	1,424	1,369	1,238	1,122	1,372	1,326	1,264	1,389	1,397	1,406	1,415	1,424	1,381	1,386	1,392	1,397	1,403	1,071
Contractor (with Contingency)	10.0%	0	0	0	61	57	58	57	55	48	43	54	52	49	55	55	56	56	56	54	55	55	55	55	42
Other (With Contingency)	10.0%	0	0	0	120	120	120	120	120	120	120	120	120	120	120	120	240	240	240	297	397	397	397	290	617
Total Direct Mine Costs	0%	0	0	0	3,624	3,361	3,381	3,342	3,285	3,062	2,941	3,288	3,154	3,089	3,306	3,314	3,443	3,452	3,441	3,473	3,579	3,585	3,591	3,489	3,385
Direct Costs \$/ton		\$0.00	\$0.00	\$0.00	\$15.10	\$14.00	\$14.09	\$13.93	\$13.69	\$12.76	\$12.25	\$13.70	\$13.14	\$12.87	\$13.77	\$13.81	\$14.34	\$14.38	\$14.42	\$14.47	\$14.91	\$14.94	\$14.96	\$14.54	\$18.60
Direct Costs Escalator	2.5%	\$0	\$0	\$0	\$3,624	\$3,445	\$3,553	\$3,599	\$3,626	\$3,464	\$3,411	\$3,908	\$3,843	\$3,858	\$4,232	\$4,349	\$4,630	\$4,788	\$4,890	\$5,030	\$5,313	\$5,455	\$5,600	\$5,578	\$5,547
NON-CONTROLLABLE COSTS (\$ '000)																									
Corporate Overheads	200	0	0	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Property Tax	0.1%	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total Non-Controllable Costs		0	0	0	202	202	202	202	202	202	202	202	202	202	202	202	202	202	202	202	202	202	202	202	202
Non-Controllable Costs \$/ton		\$0.00	\$0.00	\$0.00	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$1.11
Non-Controllable Costs Escalator		\$0.00	\$0.00	\$0.00	\$202.19	\$207.24	\$212.42	\$217.73	\$223.18	\$228.76	\$234.47	\$240.34	\$246.34	\$252.50	\$258.82	\$265.29	\$271.92	\$278.72	\$285.80	\$292.83	\$300.15	\$307.65	\$315.34	\$323.23	\$331.31
TOTAL CASH COSTS (\$ '000)																									
Total Cash Costs \$/ton		\$0.00	\$0.00	\$0.00	\$15.94	\$15.22	\$15.69	\$15.90	\$16.04	\$15.39	\$15.19	\$17.28	\$17.04	\$17.13	\$18.71	\$19.22	\$20.42	\$20.99	\$21.57	\$22.18	\$23.39	\$24.01	\$24.65	\$24.59	\$32.29
EBITDA (\$'000)																									
EBITDA \$/ton		\$0.00	\$0.00	\$0.00	\$10.95	\$12.38	\$12.63	\$13.15	\$13.77	\$15.19	\$16.18	\$14.90	\$15.98	\$16.74	\$16.03	\$16.41	\$16.13	\$16.51	\$16.89	\$17.27	\$17.07	\$17.49	\$17.92	\$19.07	\$12.49
Interest Payments	-				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCOME TAXES (\$'000)																									
Territorial Depreciation		0	0	0	1,220	1,168	1,181	1,143	1,109	1,029	956	587	490	420	469	469	469	469	601	585	585	557	492	492	52
Territorial Income Taxes	13.7%	0	0	0	193	247	253	276	301	358	401	409	458	493	463	475	466	479	473	488	481	499	522	560	304
Federal Income Taxes		0	0	0	0	0	0	17	628	689	731	674	725	760	719	730	708	718	718	713	739	773	837	837	407
After-Tax Net Income		0	0	0	1,216	1,556	1,596	1,720	1,266	1,569	1,796	1,905	2,161	2,344	2,196	2,264	2,228	2,297	2,263	2,354	2,318	2,403	2,513	2,688	1,510
After-Tax Net Income \$/ton		\$0.00	\$0.00	\$0.00	\$5.07	\$6.48	\$6.65	\$7.17	\$5.28	\$6.54	\$7.48	\$7.94	\$9.00	\$9.77	\$9.15	\$9.43	\$9.28	\$9.57	\$9.43	\$9.81	\$9.66	\$10.01	\$10.47	\$11.20	\$8.29
CAPITAL (\$'000)																									
Capital		0	0	0	11,696	0	0	0	0	165	0	0	0	0	398	0	593	0	1,110	165	389	0	0	0	0
Total Capital	0%	0	0	0	11,696	0	0	0	0	165	0	0	0	0	398	0	593	0	1,110	165	389	0	0	0	0
Capital Escalator		0	0	0	11,696	0	0	0	0	186	0	0	0	0	518	0	797	0	1,560	238	578	0	0	0	0
NET AFTER-TAX CASH FLOW (\$ '000)																									
Cumulative Cash Flow (\$ '000)		0	0	0	(9,260)	2,724	2,777	2,862	2,376	2,434	2,751	2,492	2,651	2,764	2,267	2,733	2,104	2,766	1,754	2,775	2,514	2,960	3,006	3,181	1,561
Cash Flow \$/ton		\$0.00	\$0.00	\$0.00	(\$38.58)	\$11.35	\$11.57	\$11.93	\$9.90	\$10.14	\$11.46	\$10.38	\$11.05	\$11.52	\$9.44	\$11.39	\$8.77	\$11.52	\$7.31	\$11.56	\$10.48	\$12.33	\$12.52	\$13.25	\$8.58
NET PRESENT VALUE (\$'000)																									
Interest Rate		5%	8%	10%	12%	15%	20%																		
		21,881	15,024	11,720	9,126	6,194	2,963																		
IRR		28.5%																							

22.2.3 Taxes and Royalties

A Yukon coal mining royalty rate of \$1.10/tonne had been assumed by Norwest (2008). The author notes that this royalty rate may be high as the stated royalty rate in the Yukon Coal Regulations is \$0.10/tonne.

A provincial tax rate of 13.69% (including mining deductions) as well as a federal tax rate of 21.57% were also used by Norwest (2008). Capital expenditures were deducted according to the Capital Cost Allowance (CCA) tax code. Updated tax calculations will need to be completed in any future project economic analysis.

Under specific circumstances some exploration costs may be considered tax deductible, however for conservatism were not estimated by Norwest (2008).

22.3 Sensitivity Analysis

Sensitivity of project economics was analyzed with respect to variations in:

- Coal sales price
- Operating cash costs
- Capital costs

Project economics were found to be most sensitive to variations in coal price, with an approximate swing of 75% in base NPV with a change in coal price of + or – 20% (Figure 22.1).

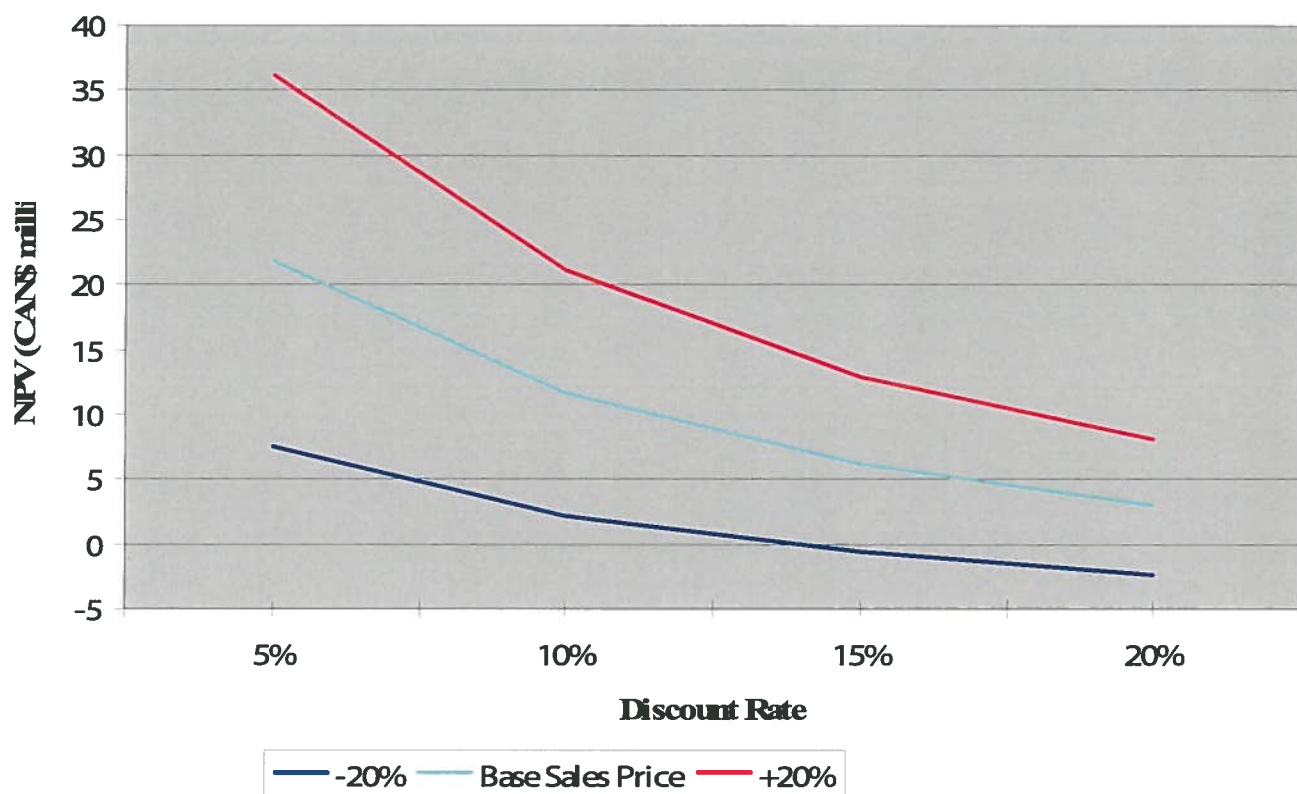


FIGURE 22.1

2560344 Ontario Inc.
DIVISION MOUNTAIN
SENSITIVITY TO COAL
SALES PRICE

DATE: 01/05/2017

K. Brewer P.Geo.

Project economics were less sensitive to variations in operating cost, with an approximate swing of 35% in base NPV from change in coal price of + or - 20%

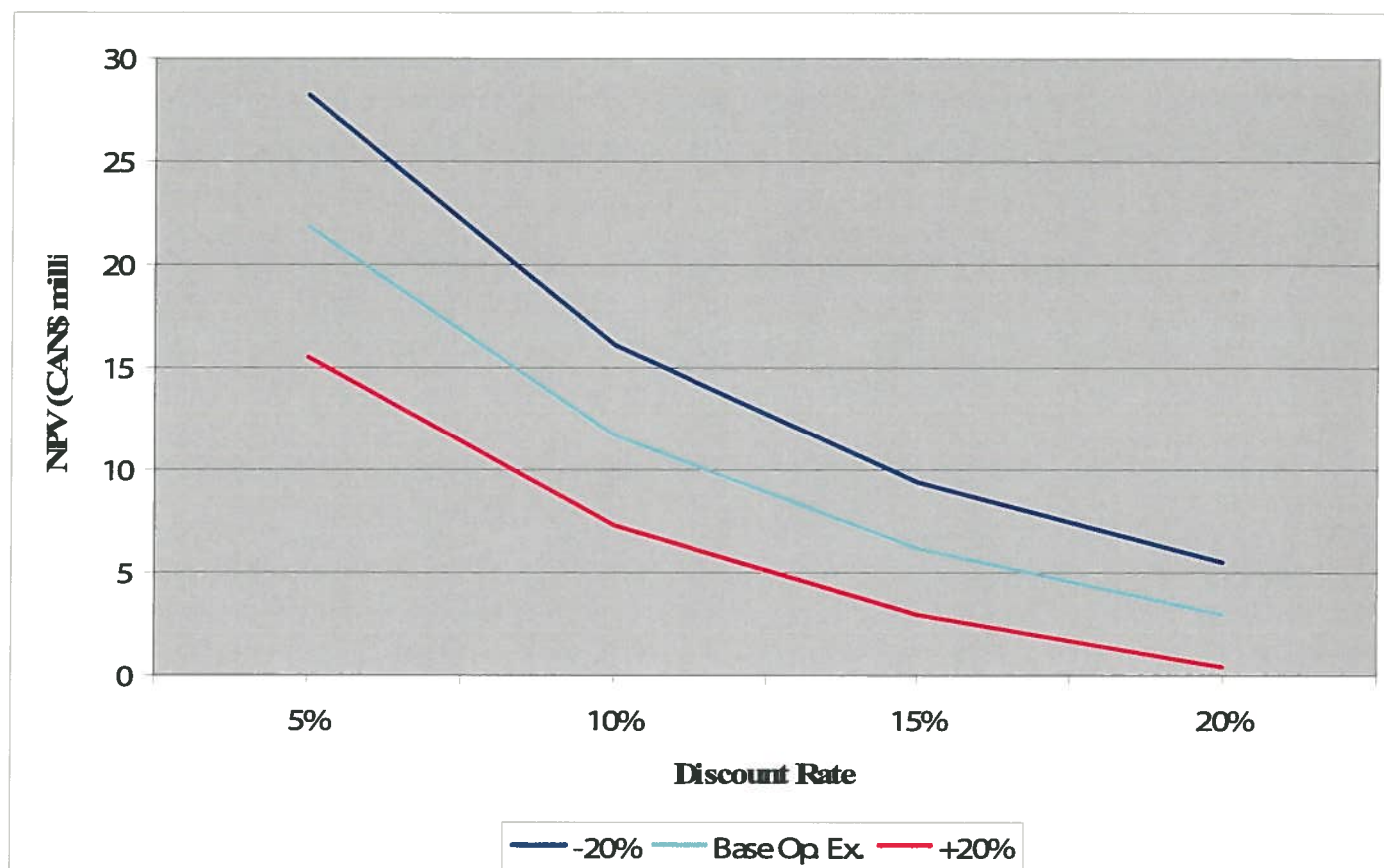


FIGURE 22.2

2560344 Ontario Inc.
DIVISION MOUNTAIN
SENSITIVITY TO OPERATING
EXPENDITURE

DATE: 01/05/2017

K. Brewer P.Geo.

The project economics were least sensitive to changes in capital cost. A change in capital expenditures of + or - 20% lead to a variation from base NPV of only 19%

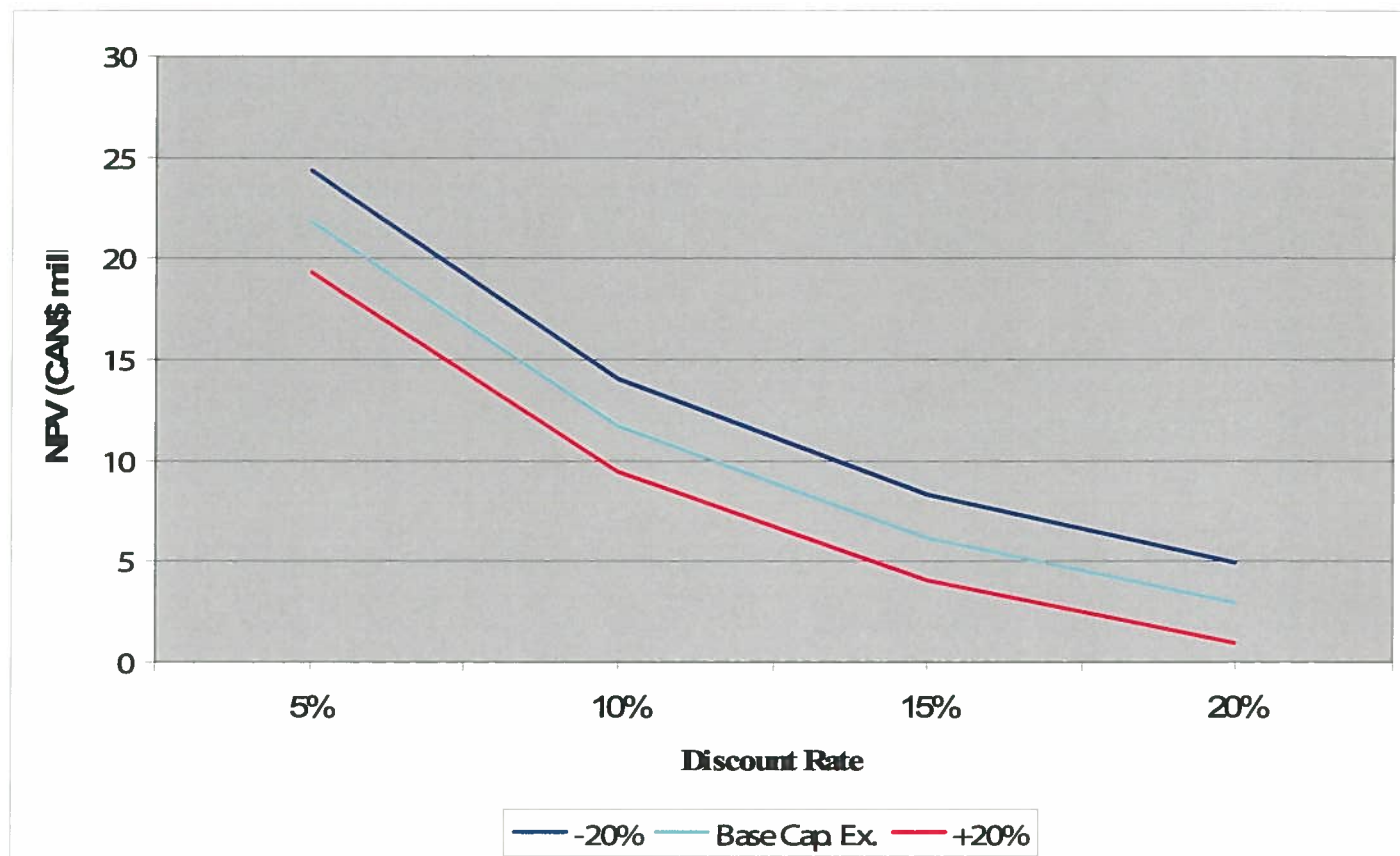


FIGURE 22.3

2560344 Ontario Inc.
DIVISION MOUNTAIN
SENSITIVITY TO CAPITAL
EXPENDITURE

DATE: 01/05/2017

K. Brewer P.Geo.

22.4 Debt Financing

Project economics were analyzed by Norwest (2008) to assume debt financing. Loans were assumed to be borrowed at an interest rate of 7%. They also assumed that the loan would be secured by the mine equipment, and that the loan period would be no longer than the worst-case remaining equipment life, which was assumed at 6 years. Debt was assumed to cover 75% of start-up capital, with equity financing covering the remainder of the start-up capital, as well as remaining project capital.

Table 22.3 Cash Flow Summary with and without Debt Financing

Interest Rate (%)	5%	8%	10%	12%	15%	20%
NPV (C\$'000) without debt	21,881	15,024	11,720	9,126	6,194	2,963
NPV (C\$'000) with debt	13,151	7,063	4,214	2,036	(340)	(2,788)

Under the above assumptions Norwest noted there were significant economic disadvantages to debt financing. They noted that it was due to the cash flow in the critical early years of the project being reduced by payback of the loan and interest payments.

22.5 Payback Period

The payback period, i.e., the period required for cash income to return the initial cash investment, is estimated at 4.4 years. This may be seen on Table 22.2, as well as on Figure 22.4.

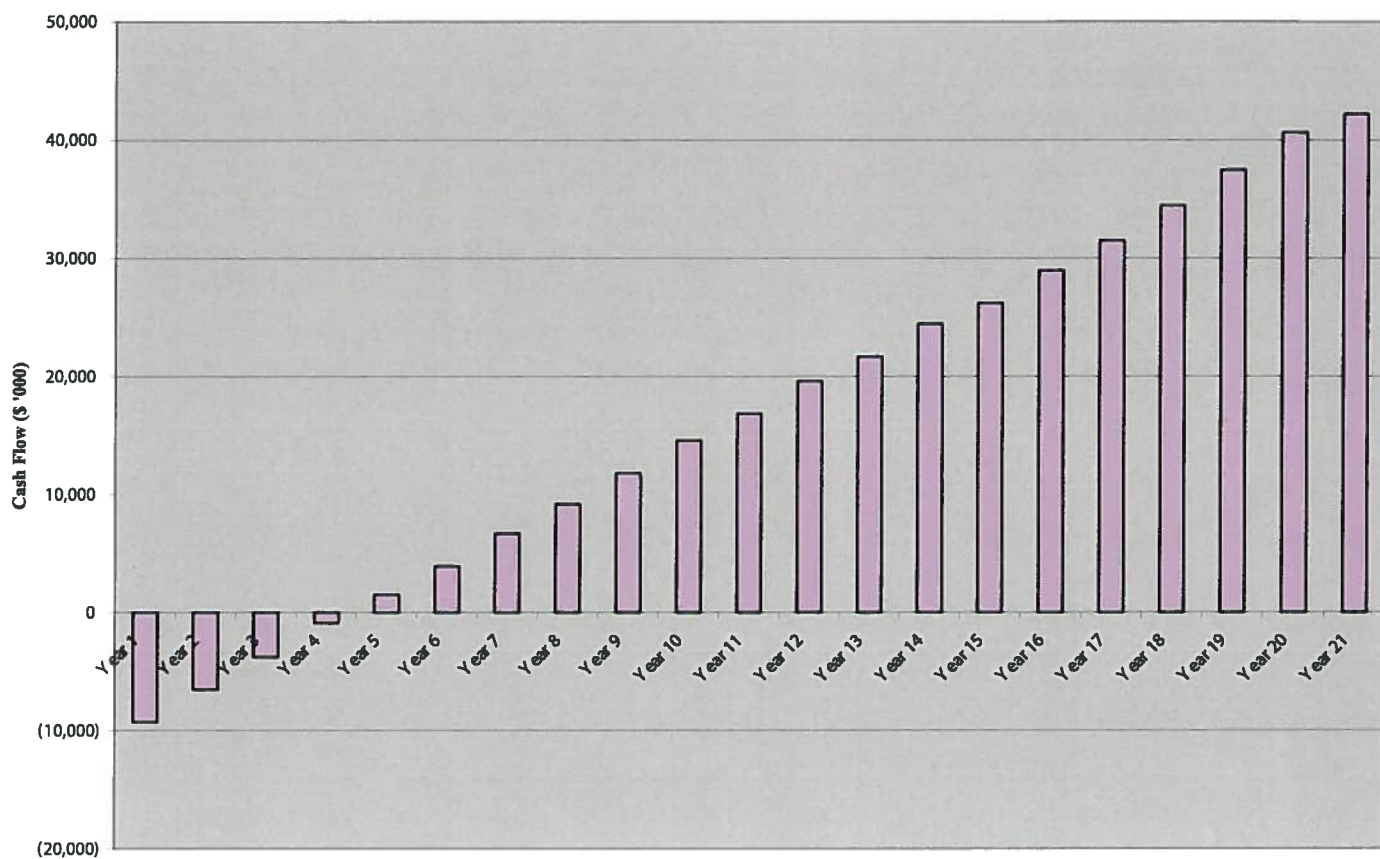


FIGURE 22.4

**2560344 Ontario Inc.
DIVISION MOUNTAIN
CUMULATIVE CASH &
PAYBACK PERIOD**

DATE: 01/05/2017

K. Brewer P.Geo.

Payback has been calculated on an undiscounted basis. The period is assumed to begin at the beginning of year 1 (see Project Development Schedule, Section 24).

23 Adjacent Properties

This technical report does not utilize any data and/or interpretations from adjacent properties. Nor are there any known adjacent coal properties to the knowledge of the author.

24 Other Relevant data and Information

24.1 Exploration Work Schedule – 2017

It is proposed that the exploration work in 2017 be conducted during the period late June – mid September. Work after that time can be problematic due to possible early fall/winter conditions. Division Mountain is in the lower elevations and as such will not be as exposed to early winter conditions as experienced in more mountainous areas.

24.2 Project Development Schedule - 2018 or Beyond

A preliminary project development schedule was prepared by Norwest (2006) and has been updated to reflect recent experiences of other mine permit processes in Yukon over the past five years and the permitting experiences of the author. It is based on the requirements related to:

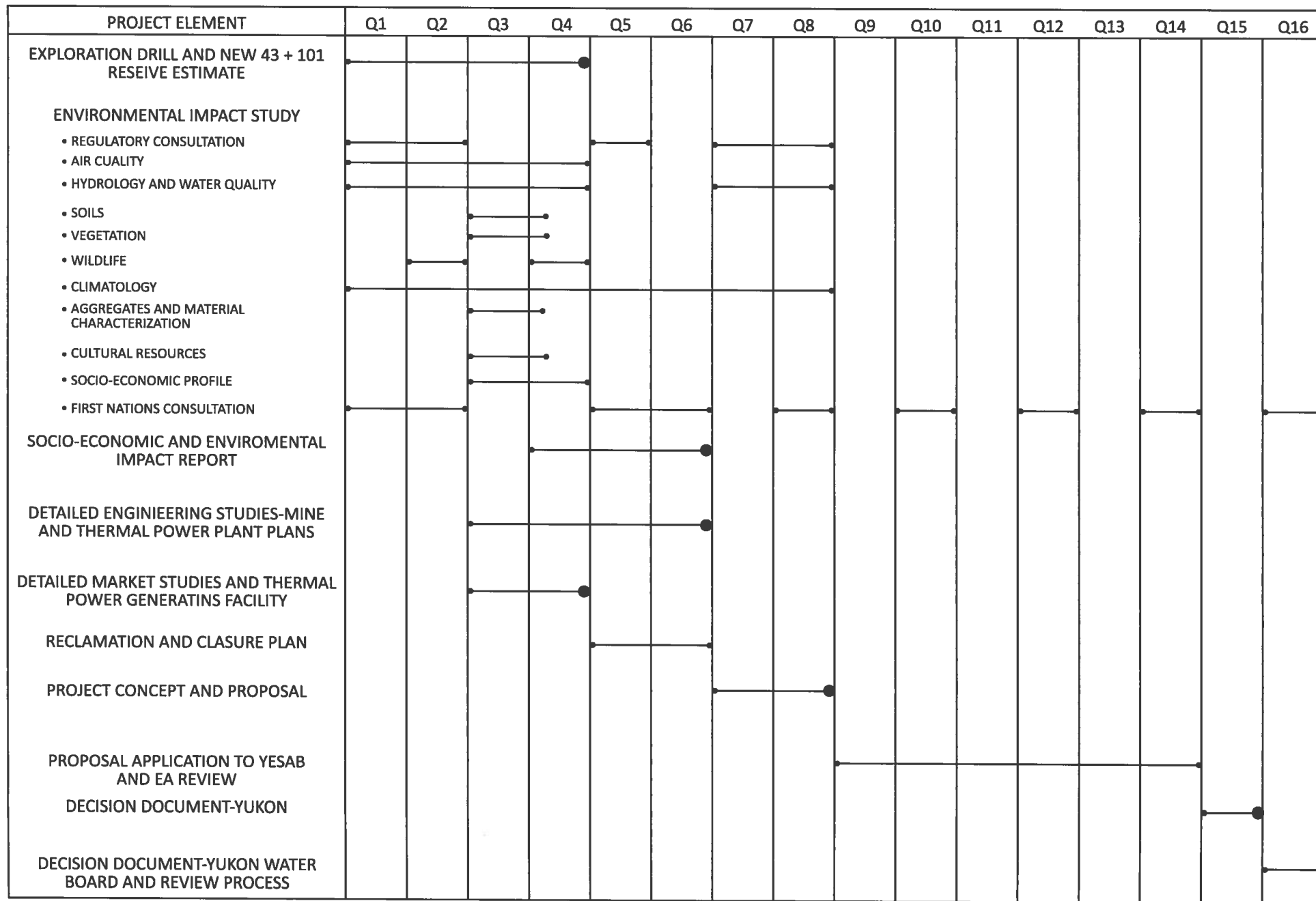
- Completion of baseline studies and Environmental Assessment report
- Submittal and approval of permits / licenses
- Construction of infrastructure
- Assumed completion date of the power plant
- Securing of equipment and workforce.

Assumptions concerning the sequence of events, necessary procedures and requirements for per-it submittal and regulatory approvals are based solely on those for the mine development and do not include the necessary environmental studies, plans, and permit processes related to the associated power plant as this is beyond the scope of this report. However as the project further advances towards a development decision it will be necessary for the mine proponent to be fully aware of the requirements associated with permitting of the power plant to ensure that the plans to advance both elements of the project (although they may be completed independently or singularly) are highly coordinated.

24.3 Environmental Assessment and Permitting Timelines

The environmental assessment and permitting timelines are detailed in Figure 24.2. Examining the experience of mine applications in Yukon in the past 5-7 years, the environmental assessment and permitting timelines can range from 24-48 months.

**Project Development Schedule - Division Mountain Coal Mine
and Mine-Mouth Thermal Generating Facility**



PROJECT ELEMENT	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24							
FIRST NATIONS CONSULTATION			■	■												
PROPOSAL APPLICATION TO YUKON																
WATER BOARD AND REVIEW PROCESS	■	■	■													
WATER LICENCE APPROVAL				■	■											
OTHER PROJECT APPROVALS					■	■	■									
PROJECT CONSTRUCTION AND PRE- PRODUCTION ACTIVITIES																
SITE PREPARATION	■	■														
FACILITIES CONSTRUCTION																
DETAILED DESIGN OF MINE AND POWER PLANT	■	■	■													
CONTRACTOR SELECTION		■	■													
SUPPORT FACILITIES			■	■												
ACCESS ROAD CONSTRUCTION			■	■	■											
COAL HANDLING FACILITY							■	■								
THERMAL POWER PLANT					■	■	■	■								
POWER LINE CONSTRUCTION					■	■										
OTHER CONSTRUCTION						■	■									
AQUIPMENT PROCUREMENT																
FINAL SPECIFICATIONS	■	■	■													
TENDER AND VENDOR SELECTION					■	■										
AQUIPMENT DELIVERY			■	■	■		■	■								
LABOUR FORCE																
CONSTRUCTION PLASE	■	■	■													
OPERATIONS PLASE					■	■	■									
PROJECT COMMISSIONING																
INITIAL MINE BOXCAT							■	■								
THERMAL POWER PLANT								■	■	■						
MINE OPERATIONS								■	■	■						
DECLARATION OF COMMERCIAL OPERATIONS									■	■						

The current process is extended by the fact that the Yukon Water Board does not start its own assessment until a Decision Document is issued by Yukon on the assessment conducted by YESAA. This extends the permitting timelines by 9-12 months.

Other key variable factors on the timelines of the assessment process include, but may not be limited to, the quality of the project application, the quality of environmental data (especially relating to water quality, water management, and environmental controls), and the complexity of the project in terms of projected cumulative impacts, project size, and the level of support for the project to proceed from First Nations, local communities, and advocacy groups.

24.3.1 Facilities and Infrastructure Construction

Immediately following a detailed mine plan, a detailed design of the coal processing facilities may begin. Once a design is complete, requests for bid proposals may be issued to contractors. A contractor would need to be selected by the beginning of summer (May) of Year -1. Surface preparation and construction of all mine maintenance and coal handling facilities would be completed in May through August of Year -1.

24.3.2 Purchase of Mobile Equipment

Immediately following a detailed mine plan (see above) equipment requirements may be reviewed and vendors approached with Requests for Proposals. It is assumed that these steps could be completed within two months (by late fall, Year -2). This would give 6 months to take delivery of all equipment by May of Year -1.

24.3.4 Human Resources

Job openings would be advertised in the local community by late spring of Year -1. This would give 4 summer months in which to interview, screen, hire and train a capable workforce.

24.3.5 Production Start-Up

An initial box-cut may begin in fall of Year -1. Some small amount of coal may be produced during the remainder of Year -1. Full production is assumed to be reached early in Year 1.

25 Interpretation and Conclusions

The Division Mountain property hosts significant tonnage of high volatile bituminous “B” coal. Most of the coal occurs in the Middle to Upper Jurassic Tanglefoot Formation, which was deposited in a complex fluvial-deltaic depositional environment.

The geology type is “moderate” according to the guidelines set forth in Geological Survey of Canada paper 88-21. Exploration has focused on a 6.5 kilometer long by 1.5 kilometer wide southeast trending area immediately adjacent to Division Mountain. Drilling has outlined an historic 52.5 million tonne resource of high volatile bituminous “B” coal.

The geologic information gathered in Division Mountain project area was adequate for Norwest 2008 to delineate mineable reserves of 26.4 Mt, which are also now deemed as a historic reserve.

The project defined an open pit operation that would provide coal to a thermal power generation facility that would be located in close proximity to the mine. The economics and demand for a 50 MW power facility have never been evaluated. As Yukon's power grid is isolated there would have to be significant new industrial demand for a project of this nature to be required in Yukon, as the territory is currently able to service all of its electrical demands and can add an additional LNG module to its current facility, if required.

The initial capital and operating cost estimates for the open pit coal operation for the first twenty years as described by Norwest (2008) indicated a marginally economic project at that time. Further analysis is obviously needed to help define areas of possible economic improvements to the project, identify and analyze project trade-offs, conduct detailed market studies, and update all cost estimates as they are also deemed historic.

2560344 Ontario Inc. has over 260,000 hectares of land within their current coal exploration licences all of which covers potential coal-bearing strata within the Whitehorse Trough region. These licence areas have had little to no exploration for coal conducted on them. Therefore there is the potential to identify new coal resources that may also be of better quality as compared to the coal at Division Mountain within the current licence holdings. Previous exploration efforts and recent Yukon government studies have also identified that the Division Mountain and Five Fingers Area have potential to host coal bed methane and conventional/unconventional petroleum resources. There has been no exploration for coal bed methane and/or hydrocarbons in the Whitehorse Trough to date.

26 Recommendations

The project recommendations reflect the current objective of 2560344 Ontario Inc. to further identify additional resources at Division Mountain and conduct some preliminary exploration efforts on some of the northernmost licences in an attempt to examine known coal occurrences, find new coal occurrences and seek higher quality coal resources as compared to Division Mountain.

The recommendations for 2017 are therefore as follows:

- **Permitting:** An application for an exploration licence will need to be filed with the designated Chief of Coal Regulations for various exploration activities to proceed in 2017-2018 field seasons. The application will be subject to review by the Yukon Environmental and Socio-Economic Assessment Board and the Yukon Water Board.
- **Exploration:** A comprehensive exploration program should be conducted in the Division Mountain area focusing on the unexplored portions of the property and in particular the East Limb of the Division Mountain Syncline. This will involve detailed prospecting and geological mapping at a 1:5000 scale and possibly trenching.

- **Exploration:** A preliminary regional scale exploration program should be conducted over the northernmost licences of the current land holdings. This area has potential for higher quality near surface coals as evidenced by the coal occurrences in Yukon Minfiles named Five Fingers, Andesite, Claire, Losch, Rink, Hlavay and others
- **Geophysics:** An assessment of the potential for geophysics to be a useful tool for exploration in the northern licences should be conducted. To date, geophysics has been of limited use in the Division Mountain area but the differing stratigraphy (i.e. areas without the interference of volcanic units) and possible existence of flatter lying coal beds in the northernmost licences may serve to enable for geophysical techniques to help in identifying the possible existence of coal deposits.
- **CBM and Hydrocarbon potential:** A summary report compiling all of the study results relating to the potential for conventional and unconventional hydrocarbons, including coal bed methane, should be compiled.

Proposed Budget

Project Permitting	\$5,000
Exploration – Division Mountain	\$69,500
Exploration – Other Licence Areas	\$20,600
Geophysics Assessment (included in exploration budget)	
Oil and Gas Study	\$4,900
Total	\$100,000

The proposed exploration budget is \$100,000.

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CERTIFICATION AND DATE

The effective date of publication of this Technical Report is July 7, 2017.

Dated this 7th day of July, 2017.

“ORIGINAL SIGNED AND SEALED BY AUTHOR” Kevin Brewer

Kevin J. Brewer, B.Sc (Hons), MBA, CMS, P. Geo

Following is the signed and dated Certificates of Qualification of the author involved in preparing this report.

CERTIFICATE OF QUALIFICATION

I, Kevin J. Brewer, of Whitehorse, Yukon do hereby certify that:

1. I am currently self-employed as a geologist
2. I graduated from Memorial University of Newfoundland in 1984 with a B.Sc. (Hons) in Geology and in 1990 with a Masters of Business Administration. In 2016 I also completed the Certificate of Mining Studies with the University of British Columbia.
3. I am a member of the Association of Professional Engineers and Geoscientists of British Columbia (Member #XXX).
4. From 1980 to current day I have been actively engaged in mineral exploration in Canada, Mexico, and Brazil.
5. 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 fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. I am familiar with the belt of rocks within which the property lies and the exploration model, I have worked on various aspects of the geology of this property since 2009. My last visit to the site was in 2011.
7. 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 report, non-disclosure of which would make this report misleading.
8. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.
9. I have read NI 43-101 and Form 43-101(F1), and the Technical Report has been prepared in compliance with that instrument and form.

Dated at Whitehorse, Yukon, this 7th day of July, 2017.

Respectively submitted,

“ORIGINAL SIGNED AND SEALED BY AUTHOR”

Kevin J. Brewer, B.Sc (Hons) MBA, CMS, P. Geo

Appendix 1

Cross Sections of Coal Measures

DRILL HOLE SURVEY DATA

Drill Hole	UTM Coordinates*		Elevation m	Grid Coordinates		Depth m	Azimuth degrees	Surface Dip	Final Dip
	Northing	Easting		Northing	Easting				
72-01	6,801,719	442,025	780	14+422	9872	182.88	40	50	-
72-02	6,801,692	442,270	795	14+223	10014	182.88	40	50	-
72-03	6,801,806	441,807	757	14+648	9803	182.88	40	50	-
72-04	6,801,758	441,649	732	14+739	9665	24.99	40	50	-
72-05	6,801,656	441,633	749	14+692	9585	306.33	40	50	-
72-06	6,802,025	441,694	726	14+877	9908	167.03	40	50	-
93-07	6,801,658	442,178	792	14+267	9927	97.84	40	50	-
93-08	6,801,889	441,974	772	14+572	9970	108.50	40	50	-
93-09	6,802,263	441,496	723	15+182	9970	73.46	40	50	-
93-10	6,801,633	442,158	792	14+267	9895	157.30	40	63	60
93-11	6,801,837	441,931	765	14+572	9910	92.66	40	50	55
93-12	6,801,407	442,368	850	13+962	9852	169.16	40	50	57
93-13	6,801,470	442,418	810	13+962	9932	74.37	40	50	54
93-14 ¹	6,801,254	442,624	810	13+658	9894	148.13	35	58	62
93-15	6,801,496	442,319	795	14+060	9887	82.60	34	50	54
93-16	6,801,975	441,809	734	14+747	9942	86.56	40	50	54
93-17	6,801,995	441,831	733	14+745	9972	48.77	46	50	53
93-18	6,801,910	441,751	739	14+745	9855	170.38	40	50	56
93-19	6,801,779	442,099	785	14+404	9968	84.10	40	50	-
93-20	6,801,798	441,900	750	14+572	9862	166.12	38	50	58
93-21	6,801,784	441,774	758	14+660	9764	61.87	154	75	78
93-22	6,801,453	442,254	777	14+087	9816	187.50	40	60	65
94-23	6,800,048	444,005	914	11+833	9820	160.02	40	50	46
94-24 ²	6,799,983	443,958	916	11+829	9740	133.81	40	50	48
94-25	6,799,780	444,226	937	11+496	9750	163.98	40	50	45
94-26	6,799,363	444,633	935	10+914	9675	164.90	40	50	50
94-27 ²	6,799,123	444,828	925	10+612	9620	26.52	40	50	-
94-28	6,799,125	444,830	925	10+609	9620	78.03	40	50	50
94-29	6,799,577	444,412	939	11+219	9710	188.37	40	50	49
94-30	6,800,250	443,786	906	12+134	9845	178.61	40	50	46
94-31	6,799,366	444,636	934	10+914	9680	178.92	40	70	72
94-32	6,800,187	443,737	898	12+134	9760	252.07	40	60	56
94-33	6,799,319	444,605	935	10+914	9630	109.73	220	50	52
94-34	6,799,254	444,780	930	10+725	9690	145.39	40	70	70
94-35	6,799,253	444,780	930	10+725	9690	129.23	220	50	51
94-36	6,800,417	443,521	887	12+438	9800	229.81	40	50	49
94-37	6,798,560	444,228	958	10+710	8800	206.04	40	50	53
94-38	6,799,580	444,410	940	11+219	9710	178.61	220	50	51
94-39	6,800,538	443,591	877	12+438	9920	117.95	40	50	50
94-40	6,799,579	444,409	940	11+219	9710	268.22	-	90	89

NORWEST
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05-3143 – GEOLOGICAL EVALUATION AND
RESOURCE CALCULATION ON THE DIVISION
MOUNTAIN PROPERTY

Drill	UTM Coordinates*		Elevation	Grid Coordinates		Depth	Azimuth	Surface	Final
Hole	Northing	Easting	m	Northing	Easting	m	degrees	Dip	Dip
94-41	6,800,684	443,350	890	12+754	9920	239.88	40	50	52
94-42	6,799,726	444,189	948	11+500	9680	273.10	40	70	69
94-43	6,800,862	443,102	876	13+048	9887	252.07	40	50	48
94-44	6,799,958	443,936	918	11+840	9706	215.49	220	50	48
94-45	6,799,728	444,190	947	11+500	9680	163.37	220	60	58
95-46	6,800,380	443,485	895	12+438	9750	306.32	220	50	53
95-47	6,801,040	442,860	883	13+353	9875	224.03	40	50	50
95-48	6,799,190	443,755	992	11+524	9000	274.32	40	50	53
95-49	6,800,945	442,785	840	13+353	9750	325.05	220	50	57
95-50	6,797,614	444,653	845	10+000	8400	100.58	40	50	53
95-51	6,800,500	442,420	929	13+353	9175	315.77	40	50	53
95-52	6,797,510	444,554	841	10+000	8250	245.67	40	50	53
95-53 ²	6,796,835	444,670		9+300	7725	68.28	40	50	-
95-54	6,798,800	443,720	918	12+025	9625	117.65	220	50	48
97-55 ¹	6,799,026	443,784	1,002	11+400	8892	175.26	40	55	54
97-56 ¹	6,798,970	443,744	1,000	11+400	8824	76.20	40	60	60
97-57 ¹	6,798,775	443,592	965	11+400	8570	182.88	40	55	55
97-58	6,798,089	444,681	903	10+305	8876	30.48	40	50	-
97-59	6,797,925	444,556	903	10+050	8580	128.63	40	50	50
97-60	6,797,837	444,467	900	10+050	8460	215.49	40	50	51
97-61	6,797,233	444,703	840	9+510	8141	255.73	40	50	50
97-62	6,797,307	444,766	838	9+510	8240	159.10	40	50	50
97-63	6,796,798	445,122	825	8+950	8040	293.22	40	50	50
97-64 ¹	6,796,916	445,222	825	8+950	8220	149.96	40	50	50
99-65 ^{1,3}	6,798,569	444,219	958	10+710	8800	148.13	40	50	-
99-66 ^{1,3}	6,799,453	444,589	935	10+954	9700	129.54	40	50	-
99-67 ^{1,3}	6,799,395	444,480	940	10+979N	9620	86.87	220	50	-
99-68 ^{1,2}	6,795,725	446,150				44.20	-	90	-
99-69 ^{1,2}	6,795,400	445,900				38.10	-	90	-
99-70 ^{1,2}	6,795,025	445,650				54.86	-	90	-
99-71 ^{1,2}	6,796,650	445,550				38.10	40	50	-
99-72 ^{1,2}	6,796,550	445,400				74.68	40	50	-
99-73 ¹	6,798,875	448,970				152.40	230	50	-
99-74 ¹	6,798,710	448,775				152.40	230	50	-
99-75 ¹	6,798,620	448,667				91.44	230	50	-
99-76 ¹	6,798,792	448,872				137.16	230	50	-
99-77 ¹	6,798,975	448,700				128.02	230	50	-
99-78 ¹	6,805,550	446,175				91.44	220	50	-
99-79 ¹	6,805,725	446,325				128.02	-	90	-
99-80 ¹	6,805,800	446,425				73.15	-	90	-
99-81 ¹	6,805,875	446,575				60.96	-	90	-

Drill Hole	UTM Coordinates*		Elevation m	Grid Coordinates		Depth m	Azimuth degrees	Surface Dip	Final Dip
	Northing	Easting		Northing	Easting				
99-82 ¹	6,805,550	446,975				42.67	270	50	-
99-83 ¹	6,805,550	446,925				97.54	270	50	-
99-84 ¹	6,805,550	446,875				99.06	270	50	-
05-85 ¹	6,799,363	444,633	937			154.44	40	82	85
05-86 ¹	6,799,983	443,958	916			278.58	40	80	79
05-87 ¹	6,799,771	444,233	942			220.68	220	70	72
05-88 ¹	6,798,264	444,368	942			232.87	40	80	79

* Datum: NAD 1983

¹ approximate UTM coordinates

² abandoned in bad ground

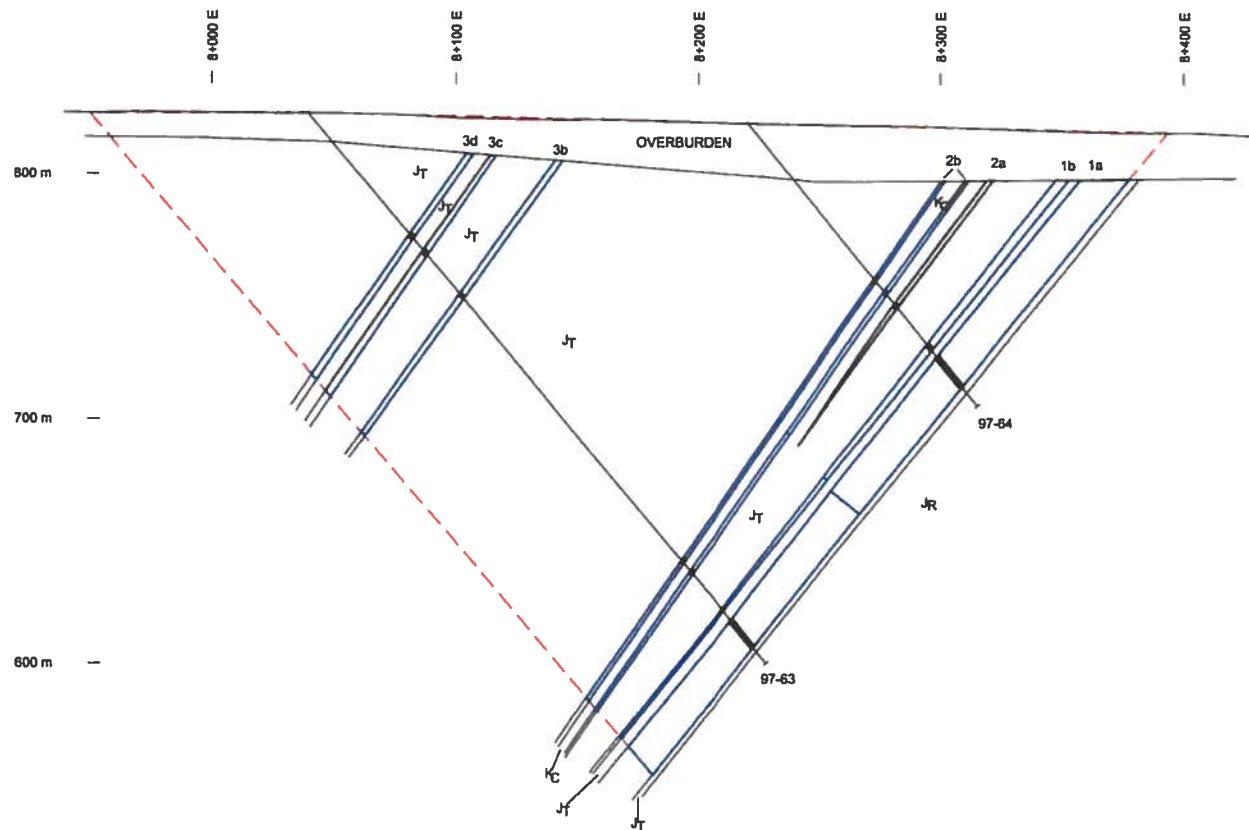
³ approximate grid coordinates

NORWEST
CORPORATION

05-3143 – GEOLOGICAL EVALUATION AND
RESOURCE CALCULATION ON THE DIVISION
MOUNTAIN PROPERTY

SW

NE



LEGEND

CARMACKS GROUP

K_c andesite sills and dykes

TANGLEFOOT FORMATION

$2a$ coal with seam number

J_t shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_r shale-sandstone couplets, sandstone



97-63

Diamond drill hole with hole number



Measured coal resource



Indicated coal resource



Proposed open pit

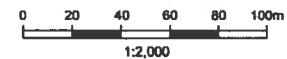


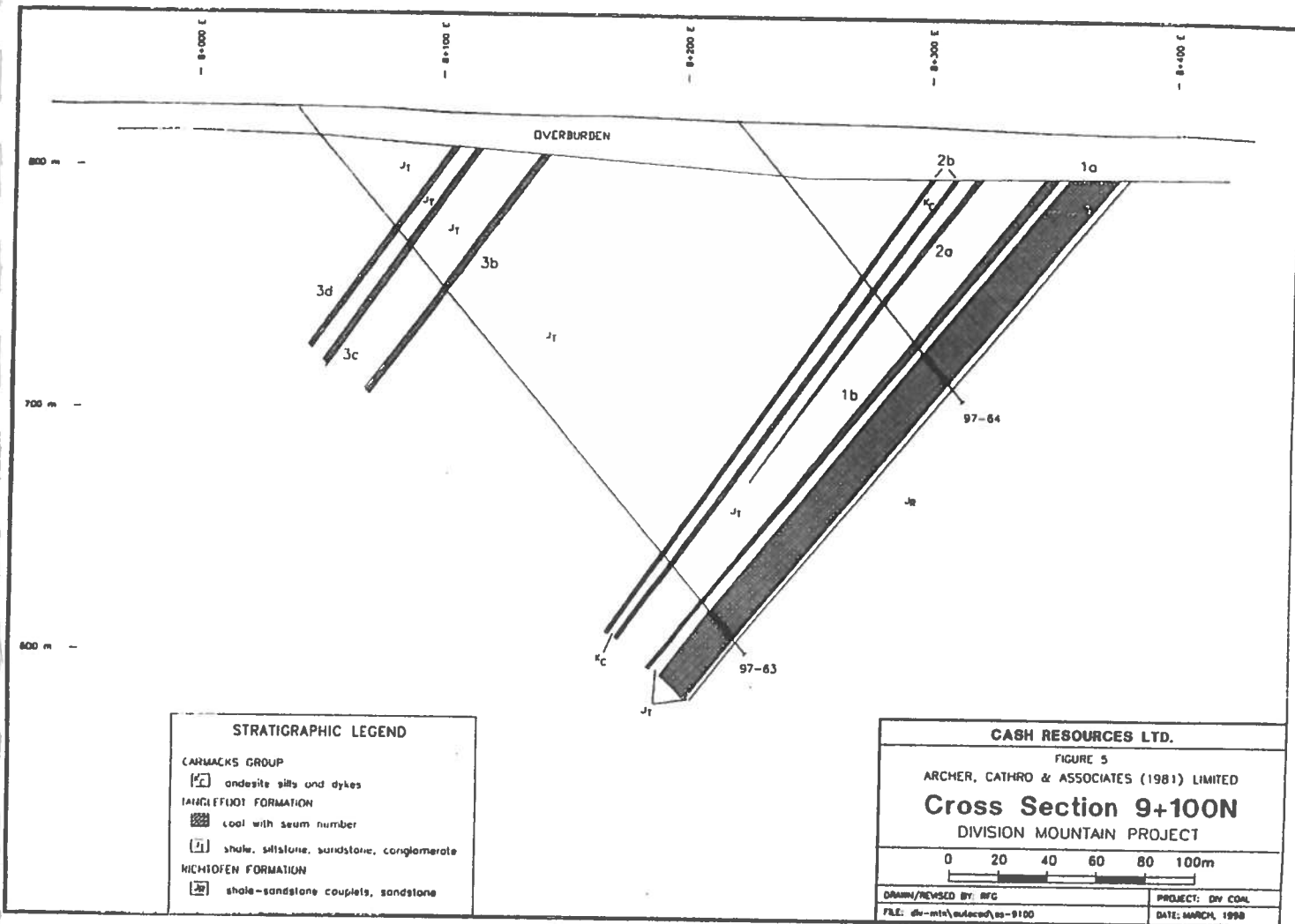
FIGURE 12.2

CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 8+950N

DATE: 03/07/2005
FILE: 3143-FIG-12.2

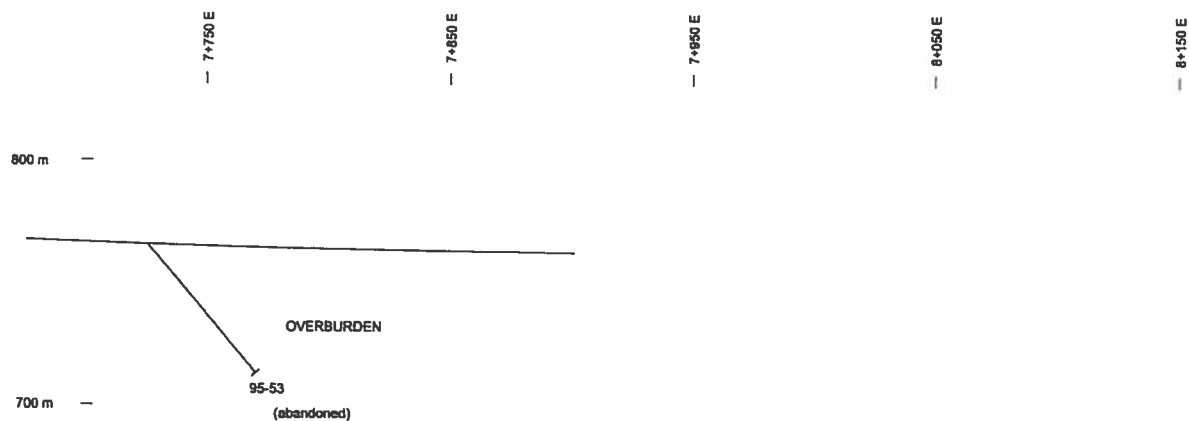
PROJECT:
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CARMACKS GROUP

K_C andesite sills and dykes

TANGLEFOOT FORMATION

#2m coal with seam number

J_T shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_R shale-sandstone couplets, sandstone



97-53 Diamond drill hole with hole number



Measured coal resource



Indicated coal resource



Proposed open pit

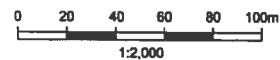


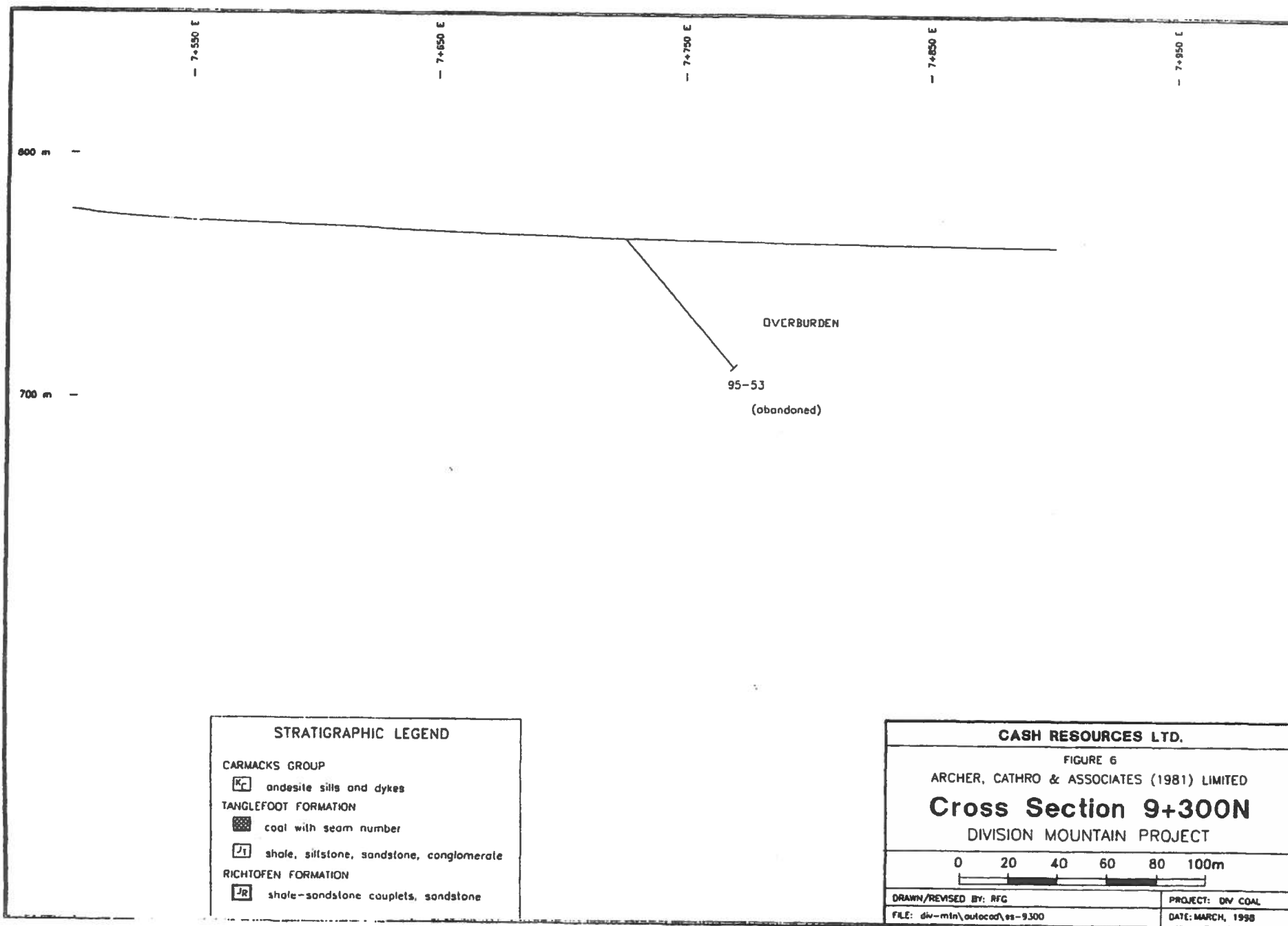
FIGURE 12.3

CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 9+270N

DATE: 03/07/2005
FILE: 3143-FIG-12.3

PROJECT:
3143

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STRATIGRAPHIC LEGEND

CARMACKS GROUP

K_r andesite sills and dykes

TANGLEFOOT FORMATION

J_t coal with seam number

J_r shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_r shale-sandstone couplets, sandstone

CASH RESOURCES LTD.

FIGURE 6

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

Cross Section 9+300N

DIVISION MOUNTAIN PROJECT

0 20 40 60 80 100m

DRAWN/REVISED BY: RFG

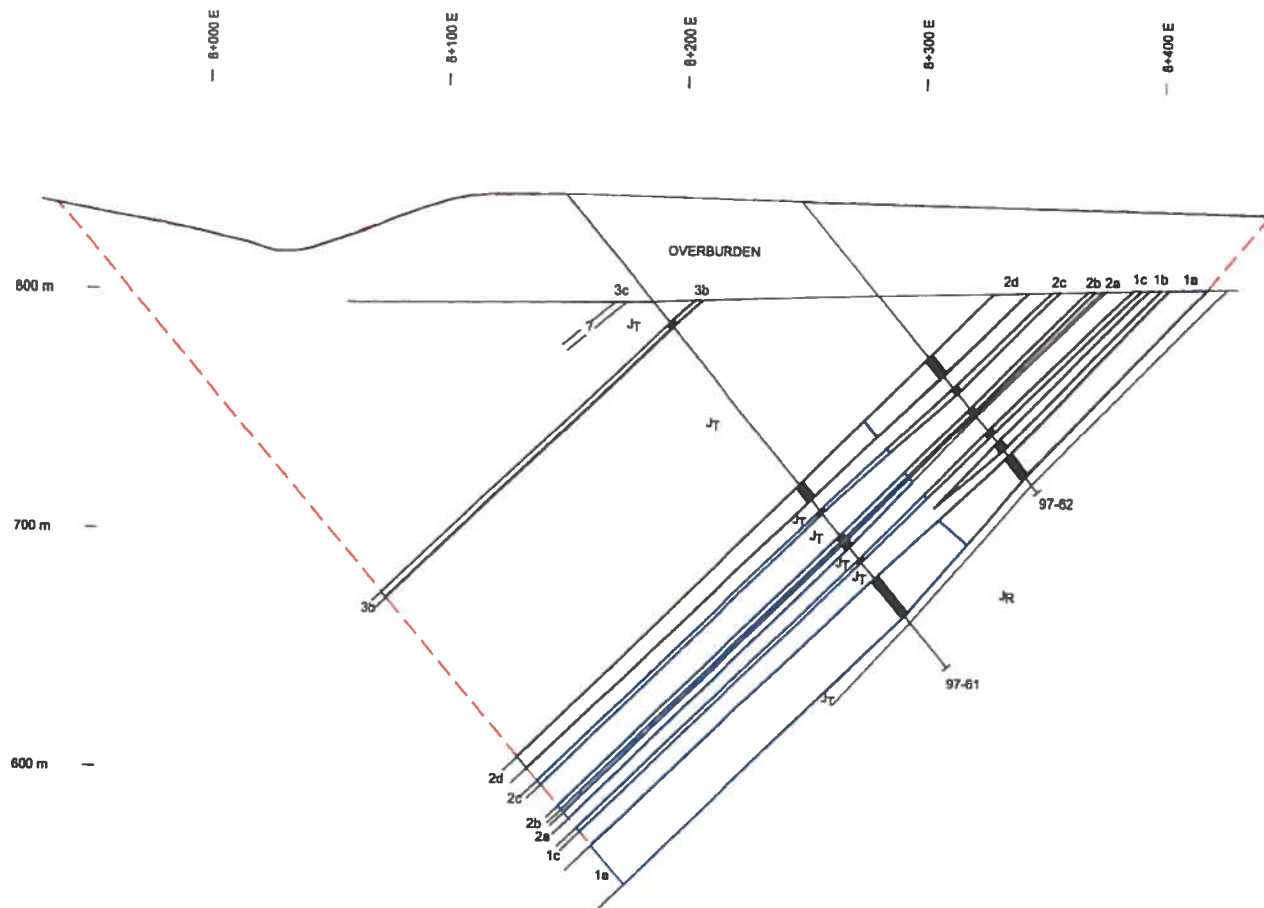
FILE: div-min\autocad\es-9300

PROJECT: DIV COAL

DATE: MARCH, 1998

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LEGEND

CARMACKS GROUP

K_c andesite sills and dykes

TANGLEFOOT FORMATION

J_{2a} coal with seam number

J_t shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_r shale-sandstone couplets, sandstone



97-63

Diamond drill hole with hole number



Measured coal resource



Indicated coal resource



Proposed open pit

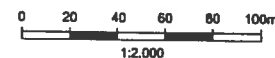


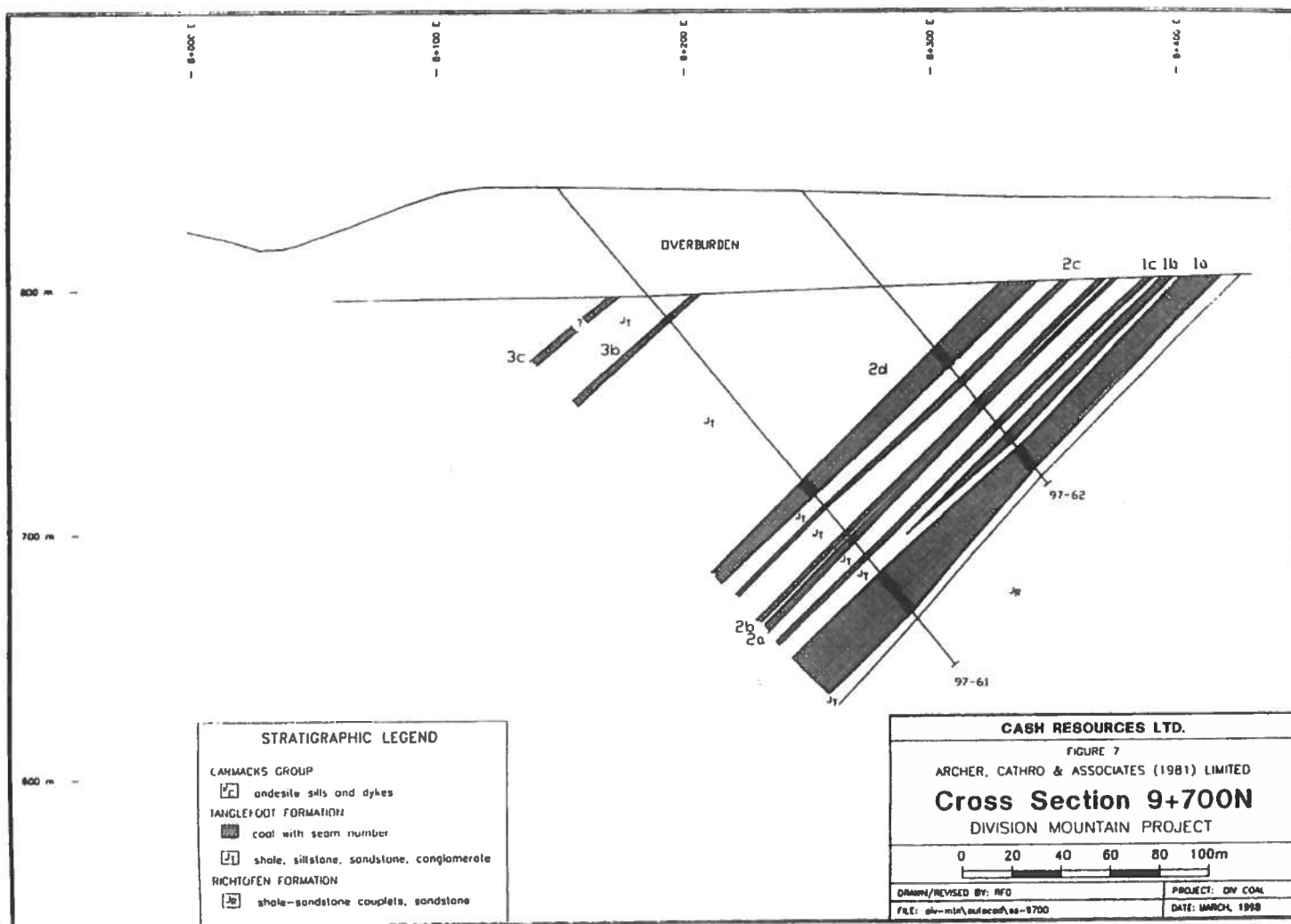
FIGURE 12.4

CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 9+510N

DATE: 03/07/2005
FILE: 3143-FIG-12.4

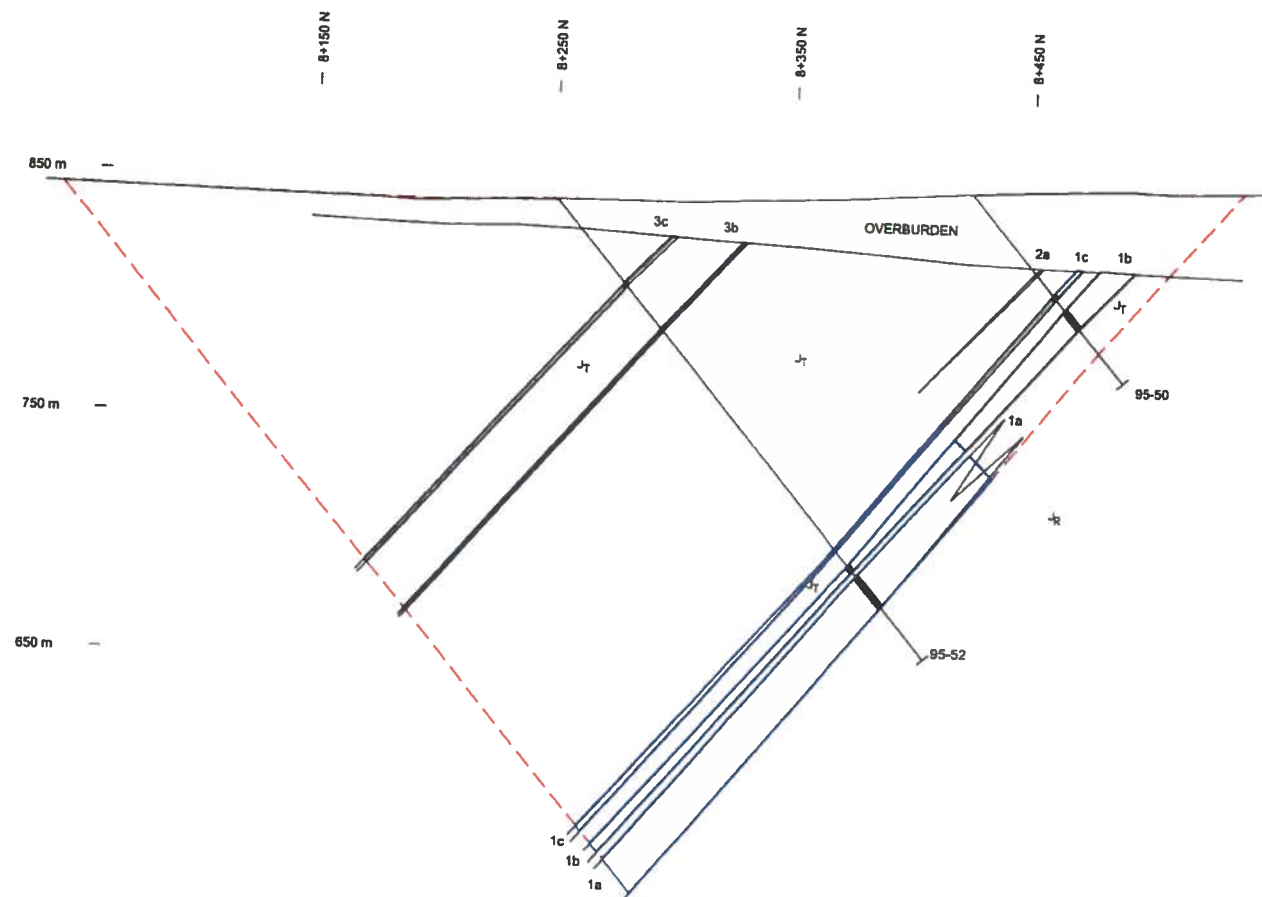
PROJECT:
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CARMACKS GROUP

K_C andesite sills and dykes

TANGLEFOOT FORMATION

J_{2a} coal with seam number

J_T shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_R shale-sandstone couplets, sandstone



97-53

Diamond drill hole with hole number



Measured coal resource



Indicated coal resource



Proposed open pit

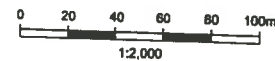


FIGURE 12.5

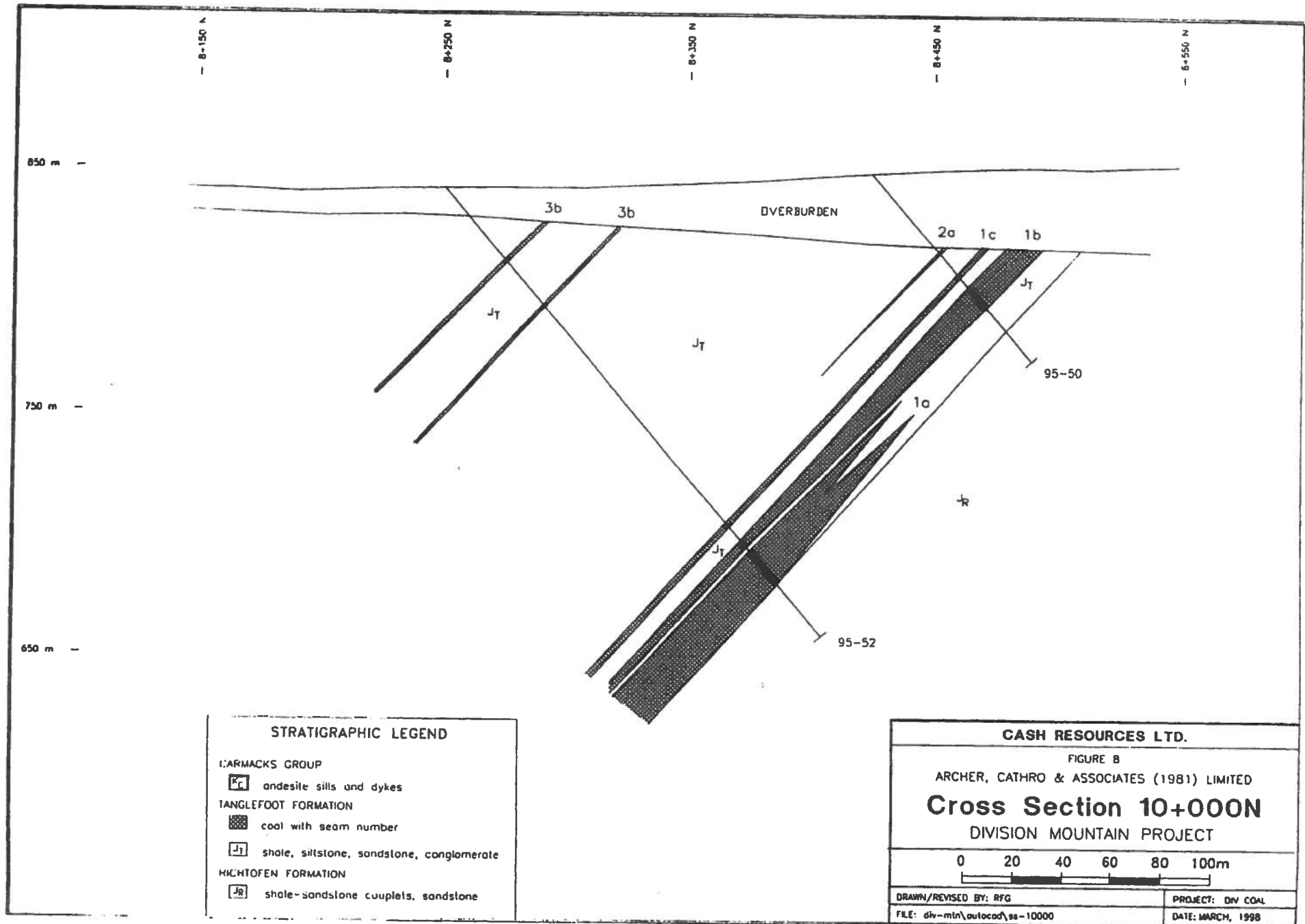
CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 9+800N

DATE: 03/07/2005

PROJECT: 3143

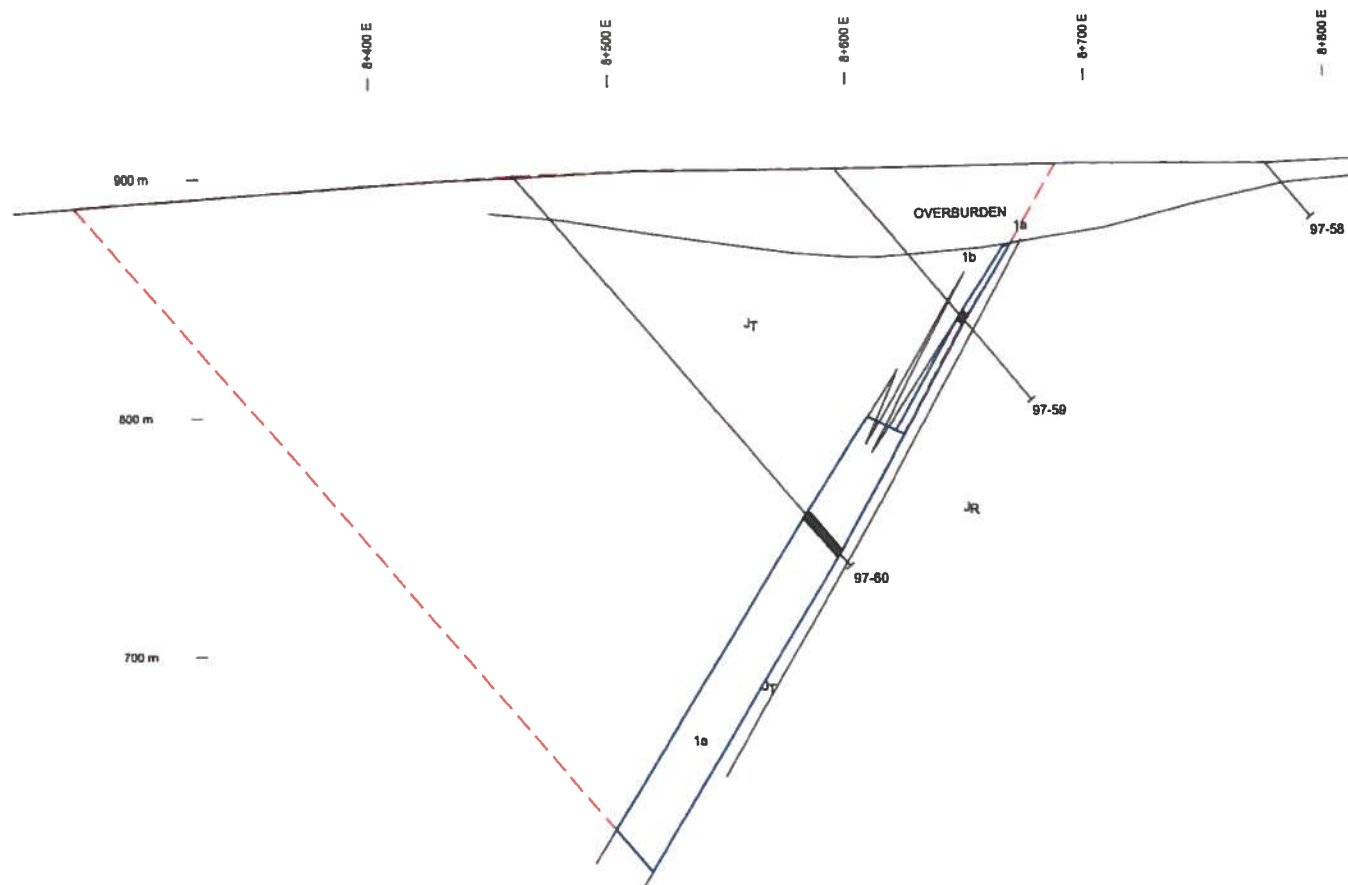
FILE: 3143-FG-12.5

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CARMACKS GROUP

K_C andesite sills and dykes

TANGLEFOOT FORMATION

J_{2a} coal with seam number

J_T shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_R shale-sandstone couplets, sandstone

$\bullet$ 97-63

Diamond drill hole with hole number

Measured coal resource

Indicated coal resource

Proposed open pit

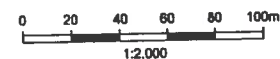


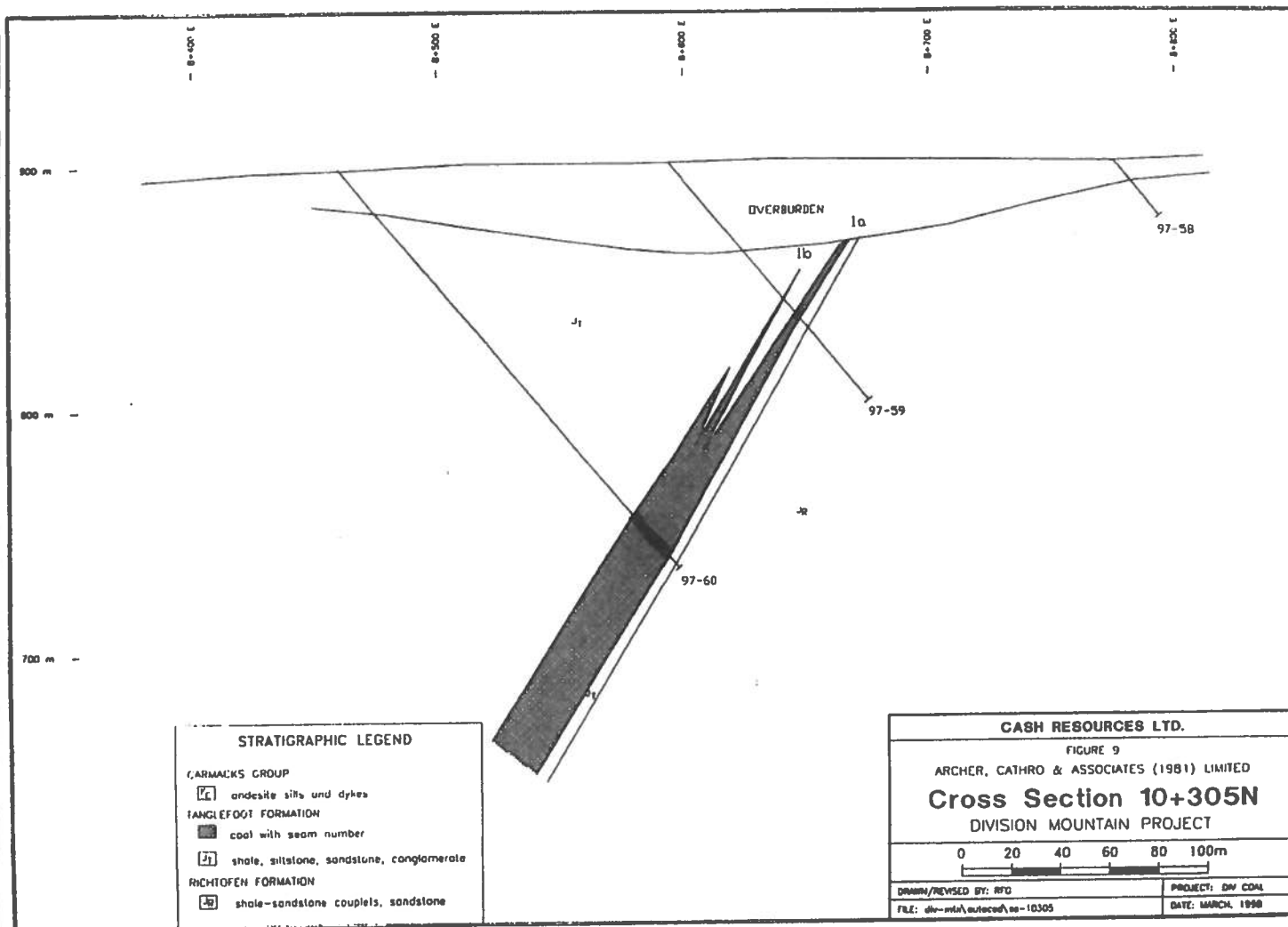
FIGURE 12.6

CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 10+050N

DATE: 03/07/2005
FILE: 3143-FIG-12.6

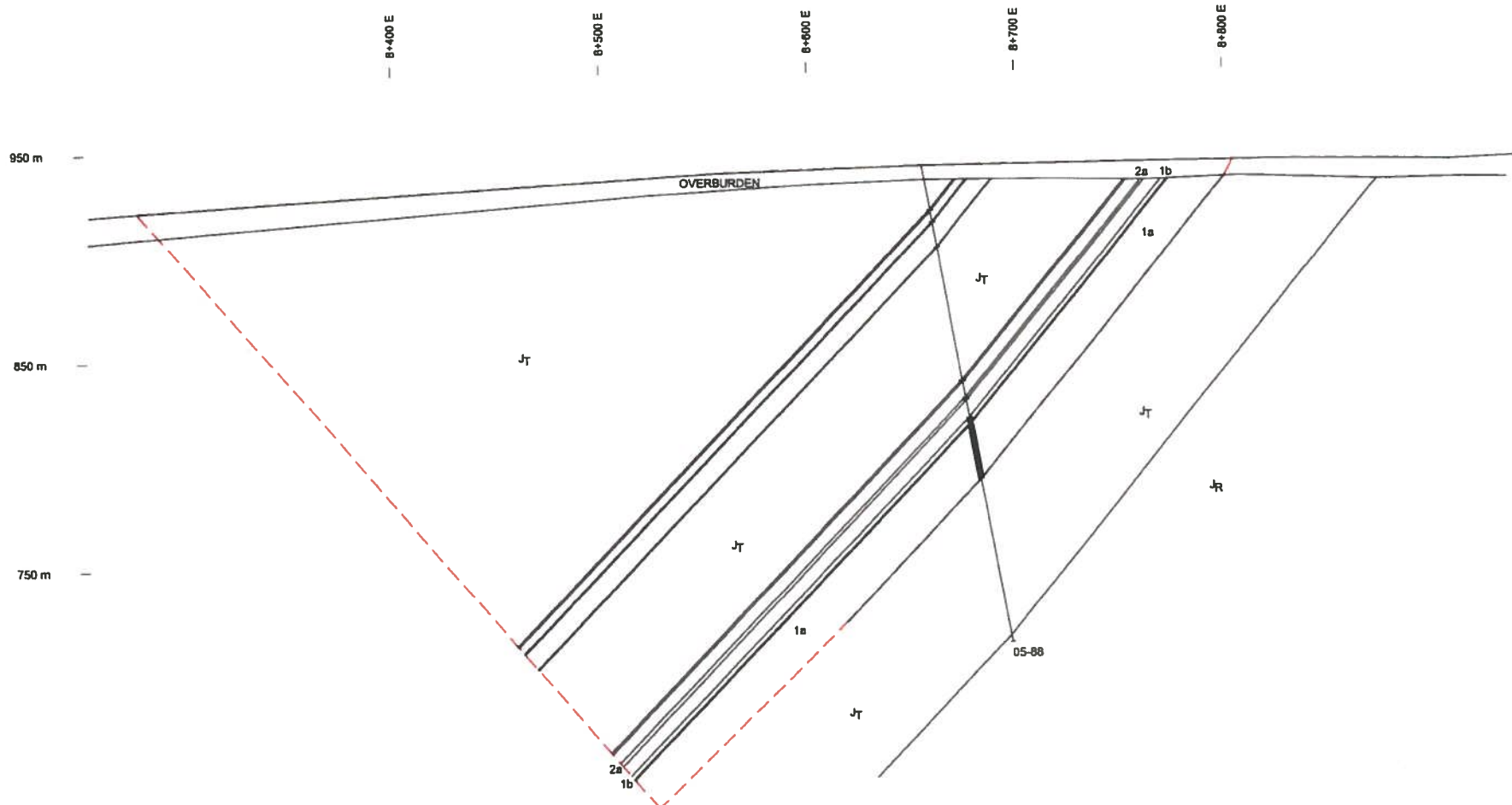
PROJECT:
3143

NORWEST
CORPORATION



SW

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**LEGEND****CARMACKS GROUP**

K_C andesite sills and dykes

TANGLEFOOT FORMATION

J_T coal with seam number

J_T shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_R shale-sandstone couplets, sandstone



97-63

Diamond drill hole with hole number



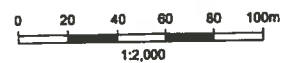
Measured coal resource



Indicated coal resource



Proposed open pit

**FIGURE 12.7**

CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 10+375N

DATE 09/04/2005
 FILE 3143-FIG-12.7

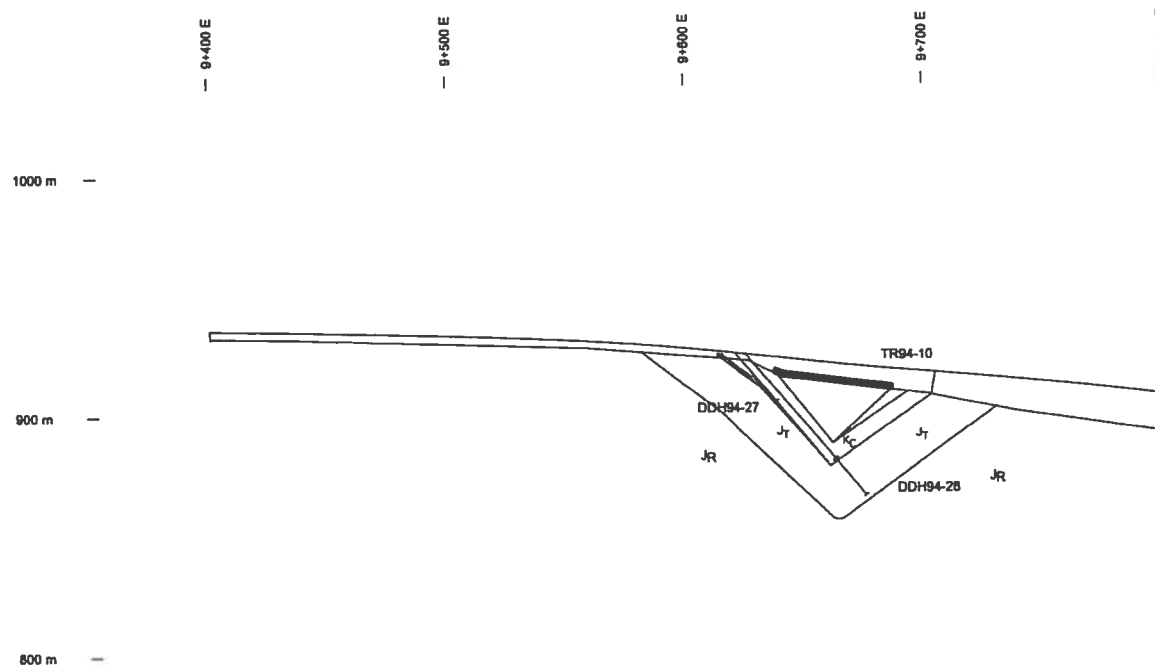
PROJECT
 3143

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 CORPORATION

143

SW

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LEGEND

CARMACKS GROUP

K_C andesite sills and dykes

TANGLEFOOT FORMATION

2# coal with seam number

J_T shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_R shale-sandstone couplets, sandstone

97-63

Diamond drill hole with hole number

Measured coal resource

Indicated coal resource

Proposed open pit

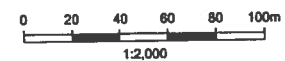


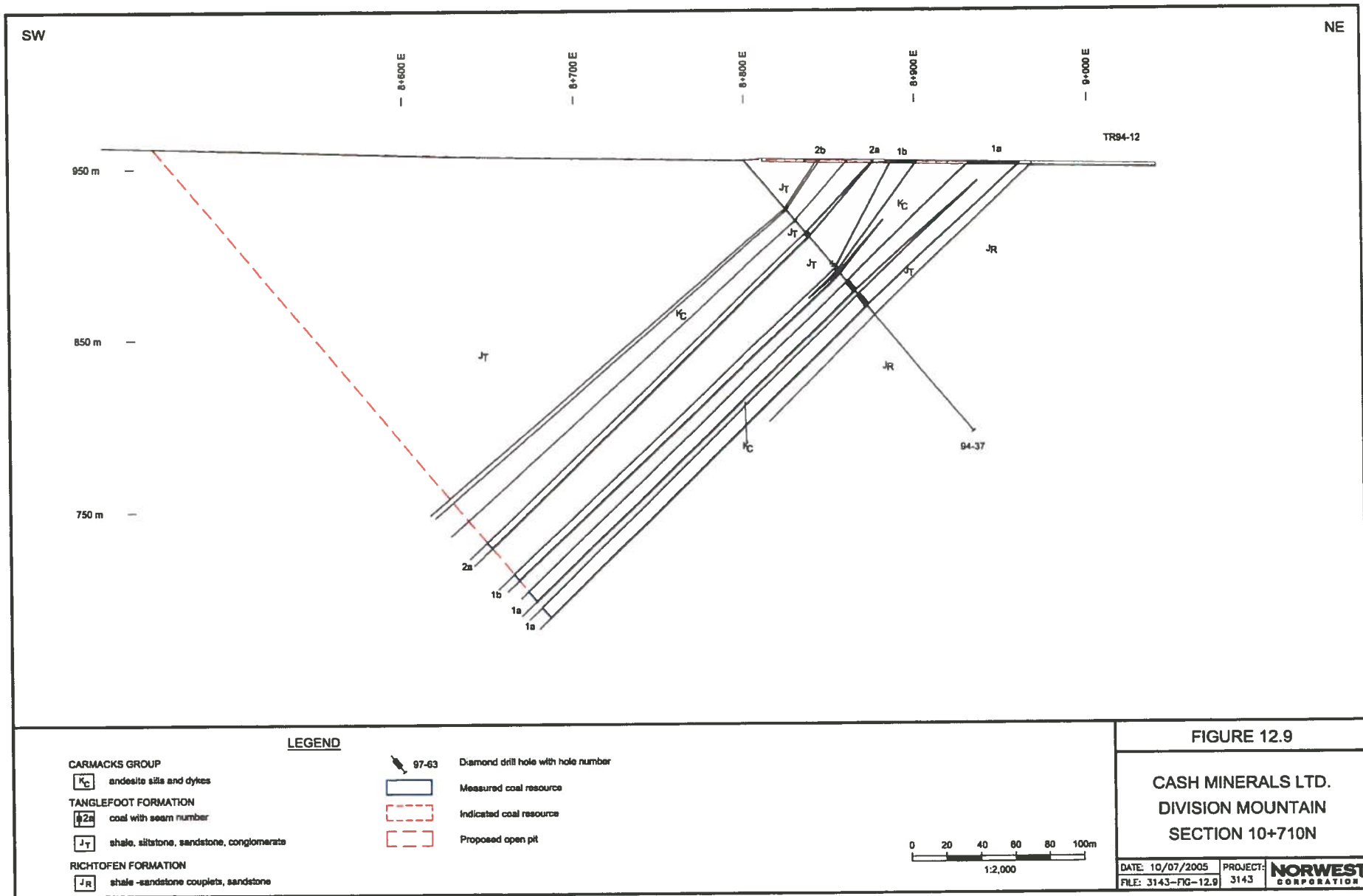
FIGURE 12.8

CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 10+610N

DATE: 10/07/2005
FILE: 3143-FIG-12.8

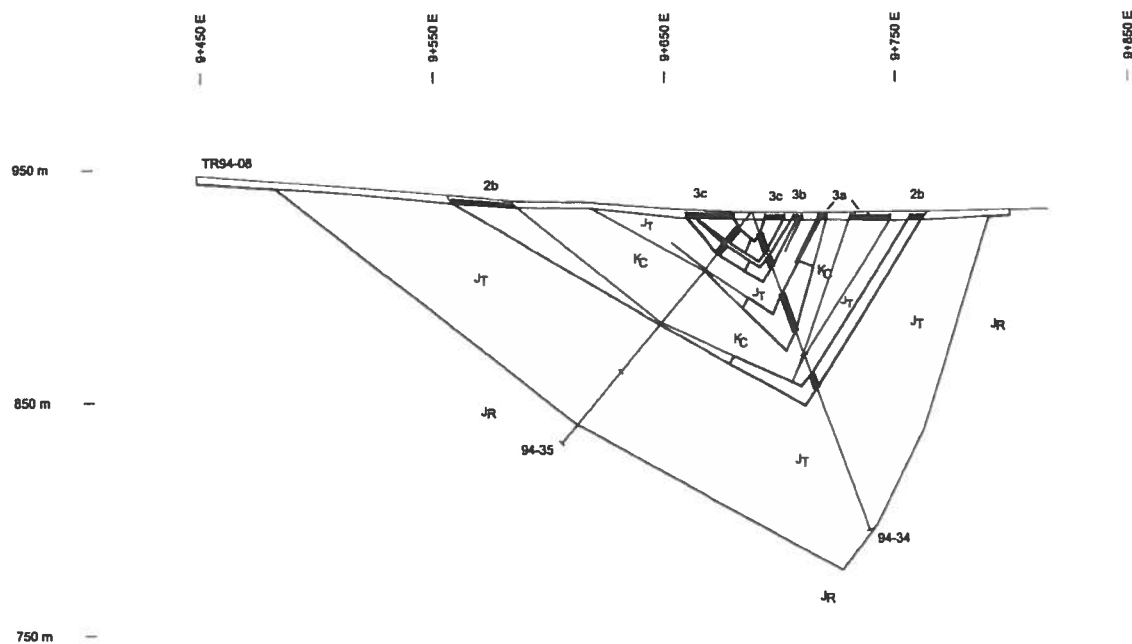
PROJECT:
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NE



LEGEND

CARMACKS GROUP

KC andesite sills and dykes

TANGLEFOOT FORMATION

JT coal with seam number

JR shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

JR shale-sandstone couplets, sandstone



97-63 Diamond drill hole with hole number



Measured coal resource



Indicated coal resource



Proposed open pit

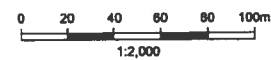


FIGURE 12.10

FORBES & MANHATTAN
DIVISION MOUNTAIN
SECTION 10+725N

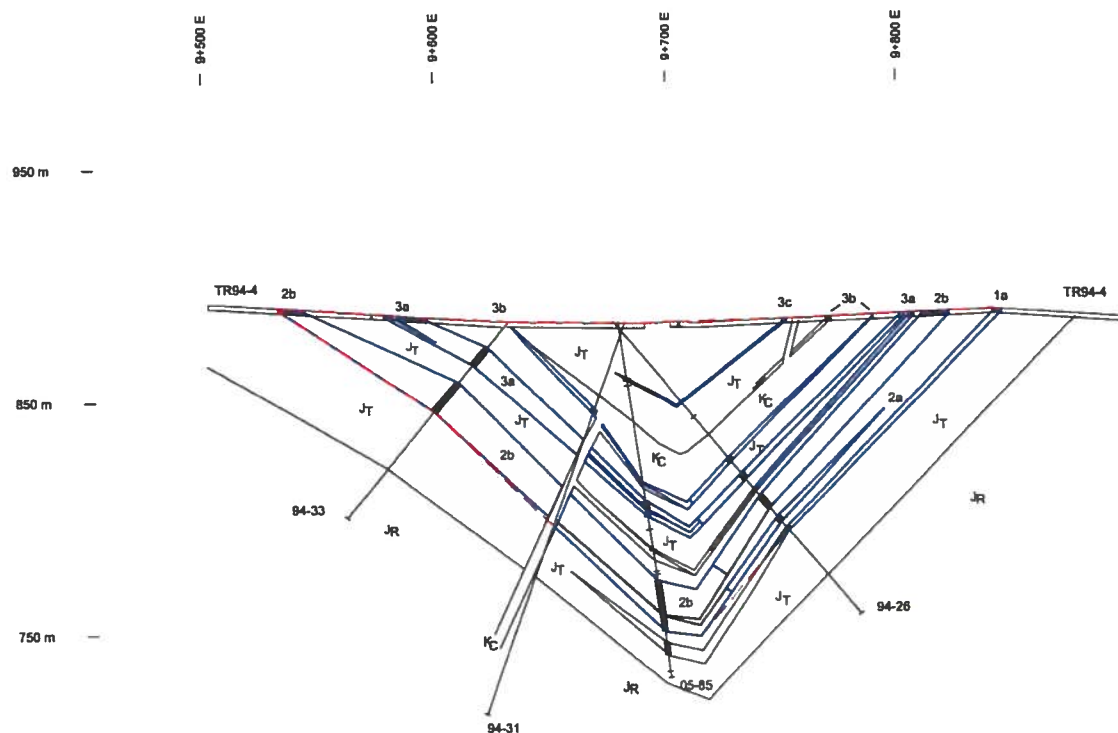
DATE: 03/10/2005
FILE: 3143-FIG-12.10

PROJECT:
3143

NORWEST
CORPORATION

SW

NE



LEGEND

CARMACKS GROUP

K_c andesite sills and dykes

TANGLEFOOT FORMATION

J_t coal with seam number

J_t shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_r shale-sandstone couplets, sandstone



97-63

Diamond drill hole with hole number



Measured coal resource



Indicated coal resource



Proposed open pit

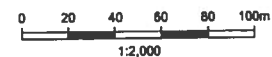


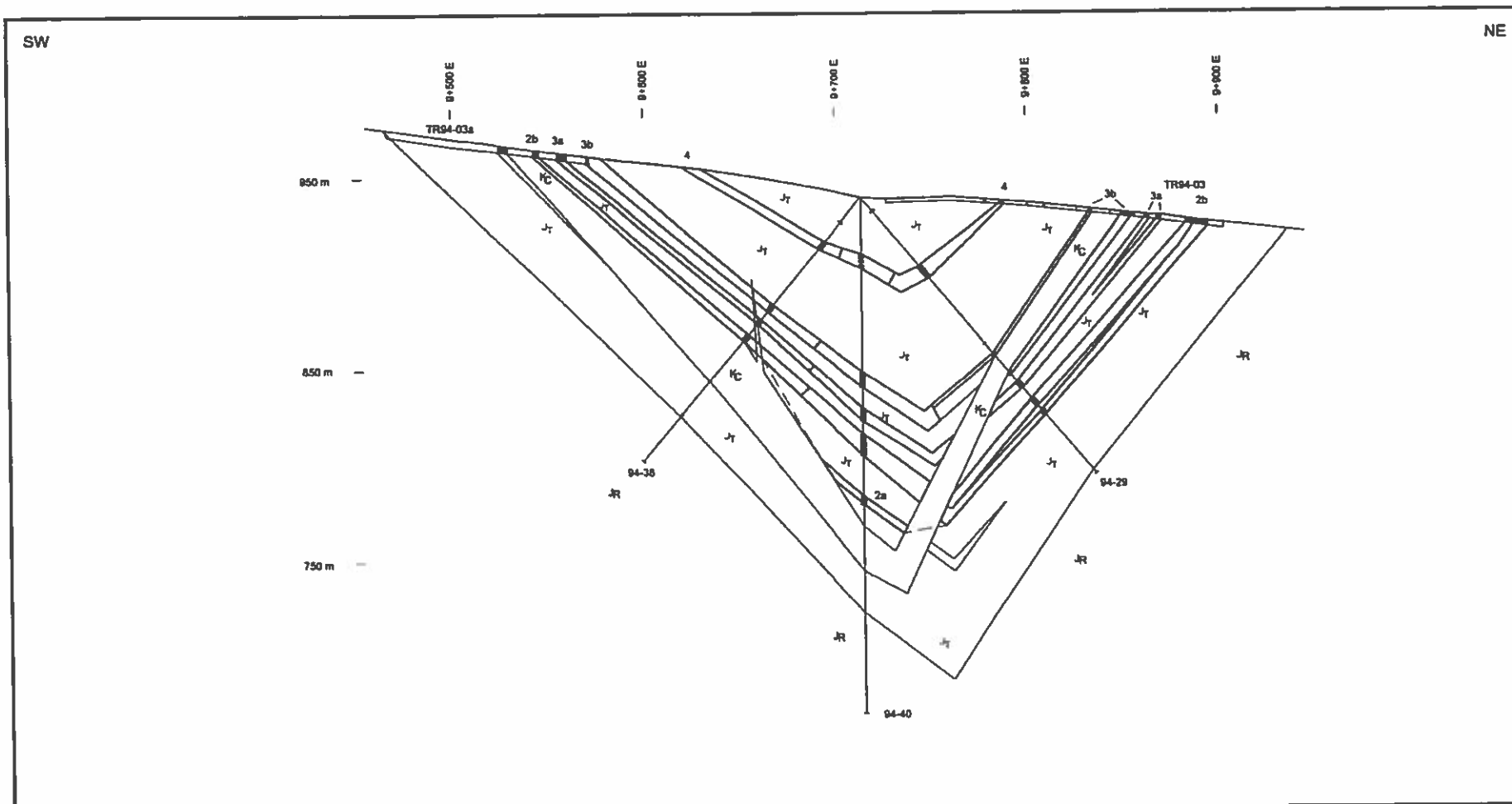
FIGURE 12.11

CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 10+914N

DATE: 10/07/2005
FILE: 3143-FG-12.1

PROJECT:
3143

NORWEST
CORPORATION



LEGEND

CARMACKS GROUP

K_c andesite sills and dykes

TANGLEFOOT FORMATION

2a coal with seam number

J_t shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_r shale-sandstone couplets, sandstone



97-83 Diamond drill hole with hole number



Measured coal resource



Indicated coal resource



Proposed open pit



FIGURE 12.12

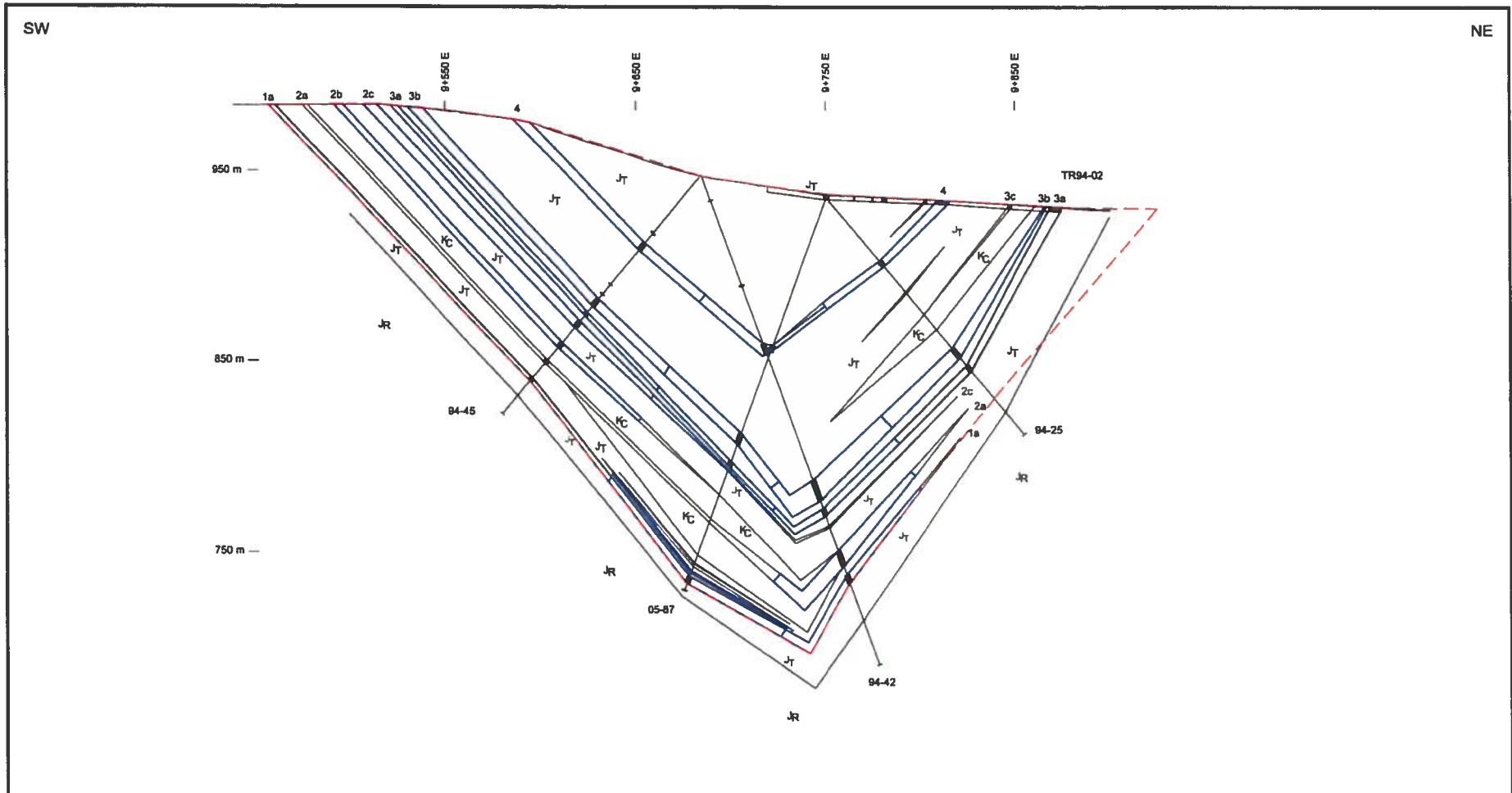
CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 11+244N

DATE: 10/07/2005
FILE: 3143-FIG-12.12

PROJECT:
3143

NORWEST
CORPORATION





LEGEND

CARMACKS GROUP

K_c andesite sills and dykes

TANGLEFOOT FORMATION

J_t coal with seam number

J_t shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_R shale-sandstone couplets, sandstone

97-63

Diamond drill hole with hole number

Measured coal resource

Indicated coal resource

Proposed open pit

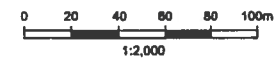


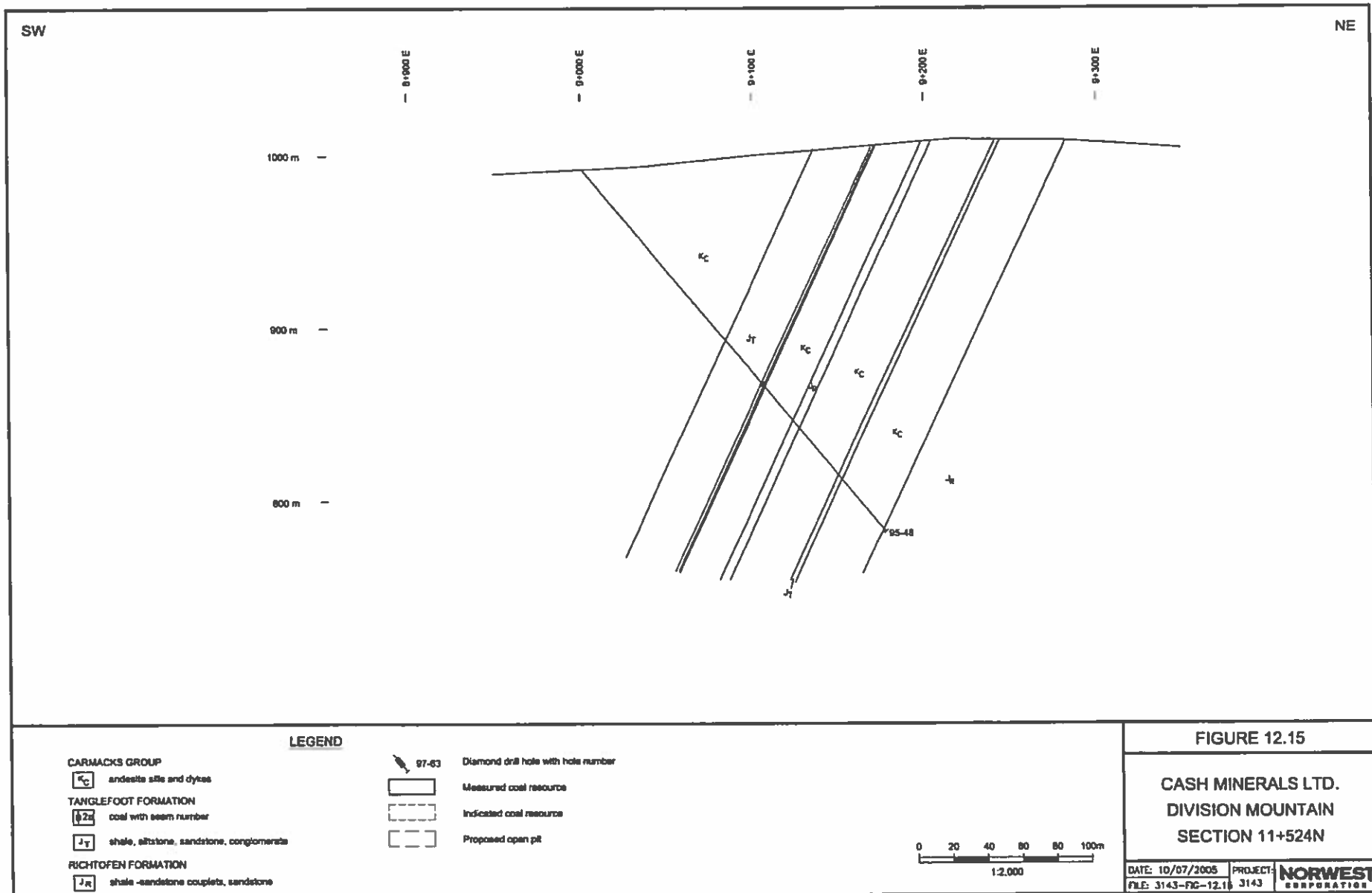
FIGURE 12.14

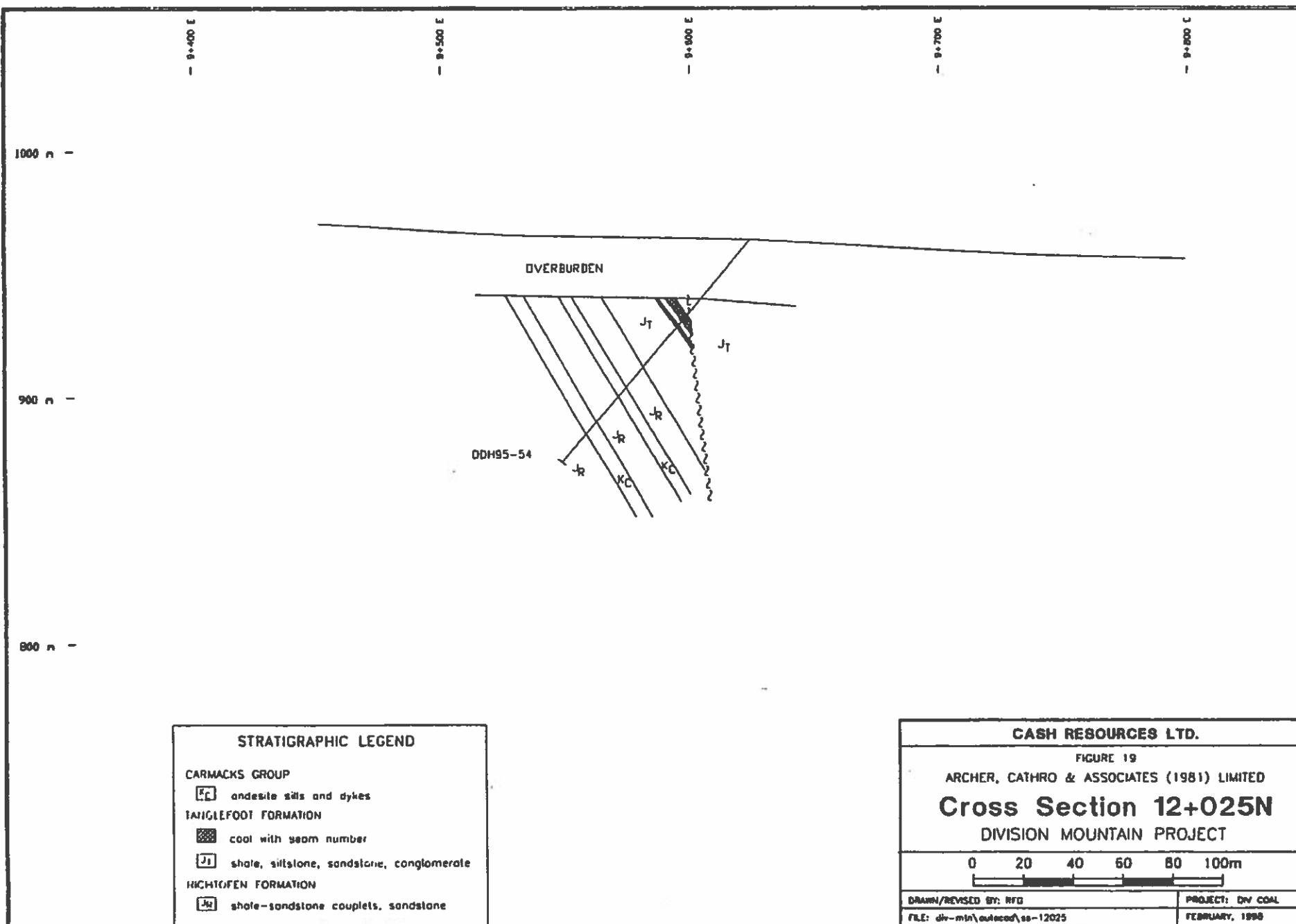
CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 11+500N

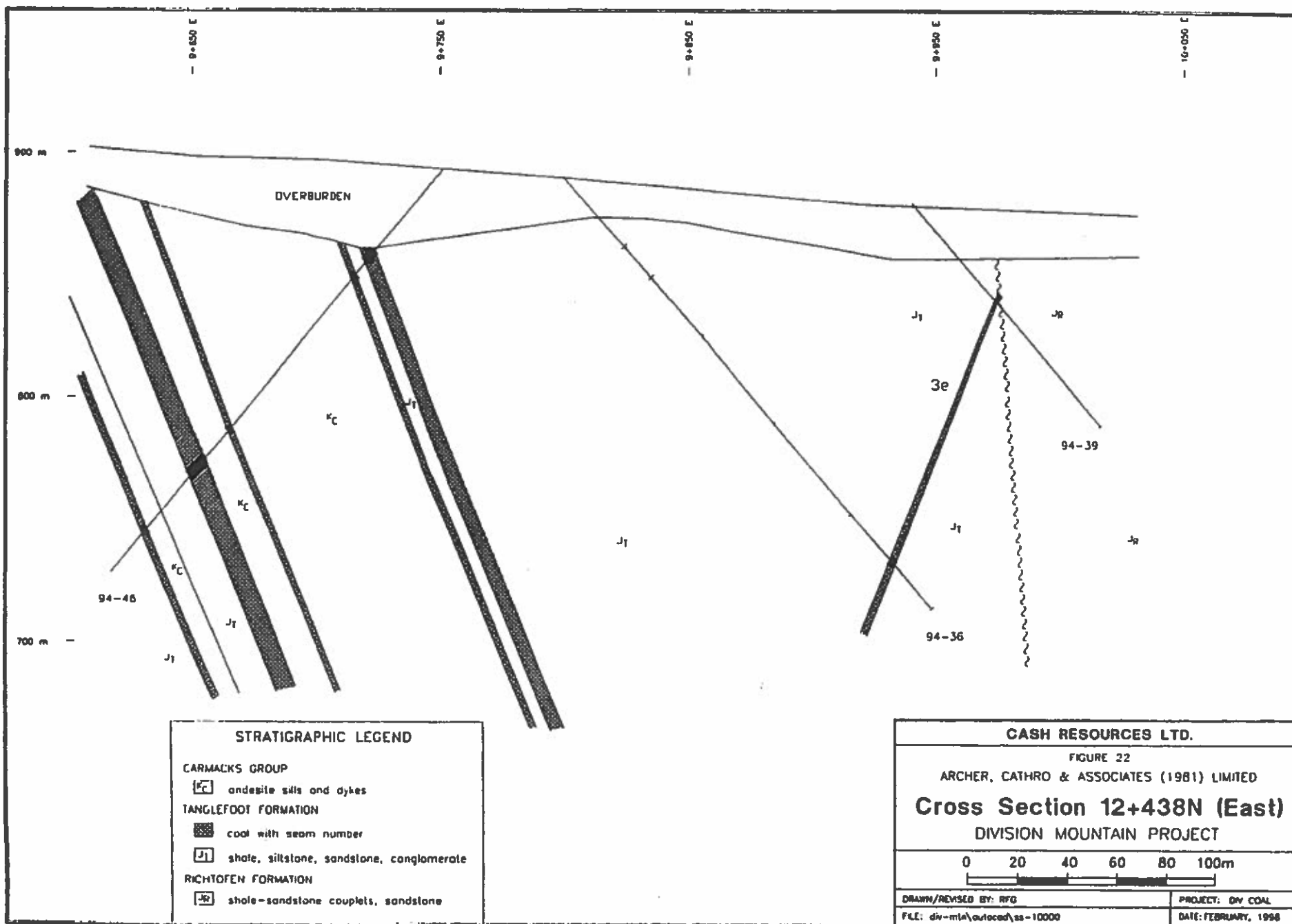
DATE: 10/07/2005
FILE: 3143-FG-12.14

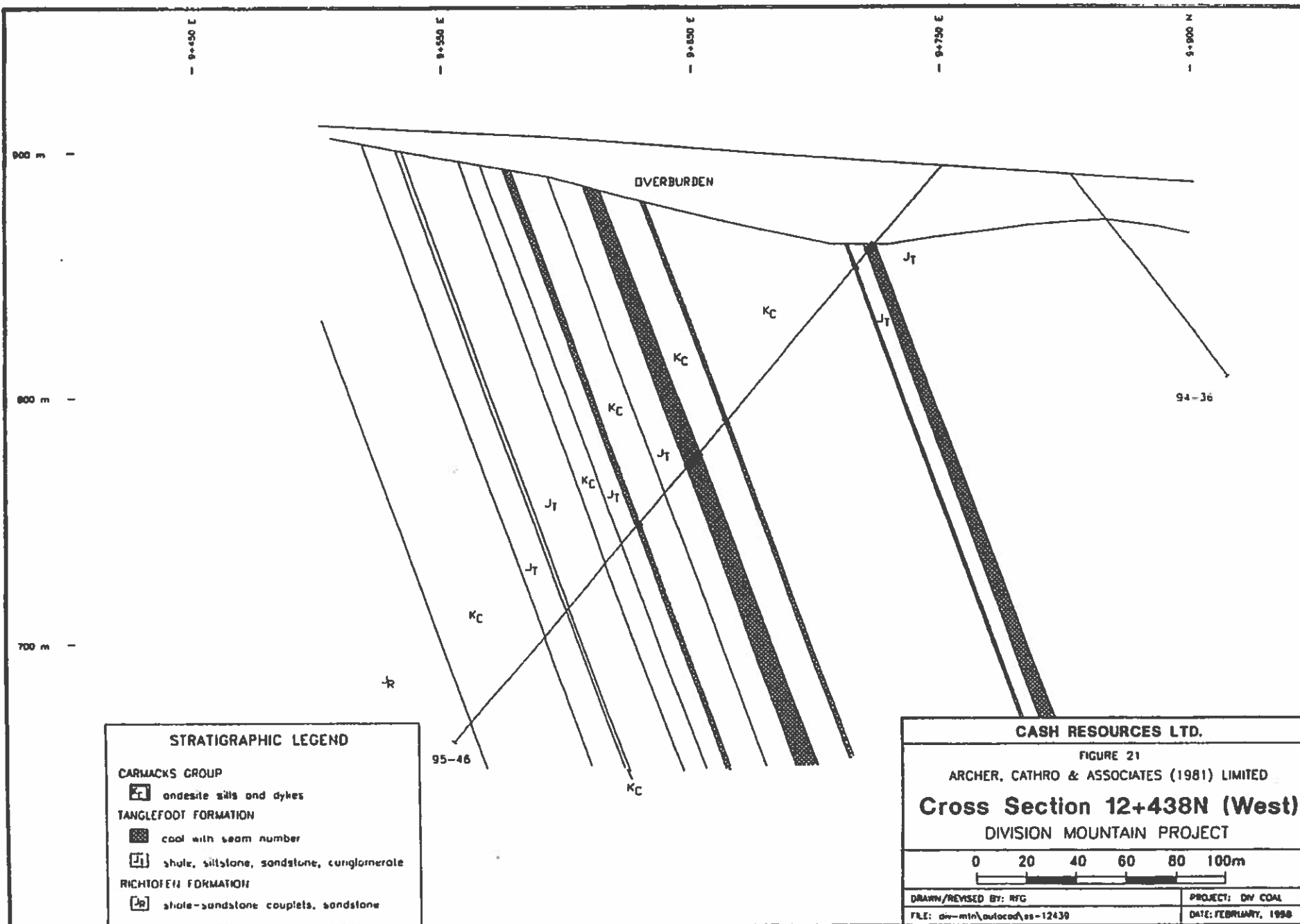
PROJECT:
3143

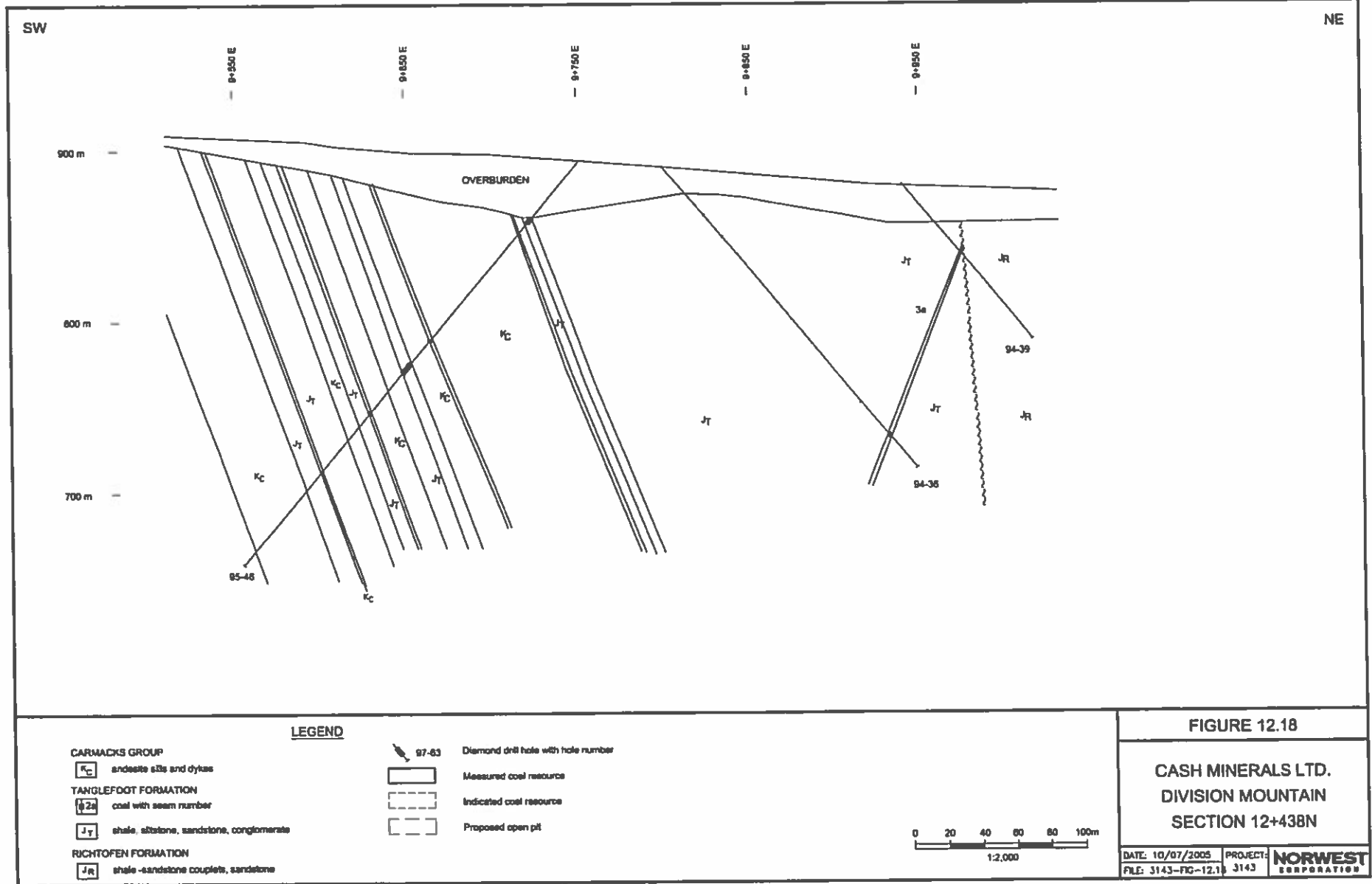
NORWEST
CORPORATION

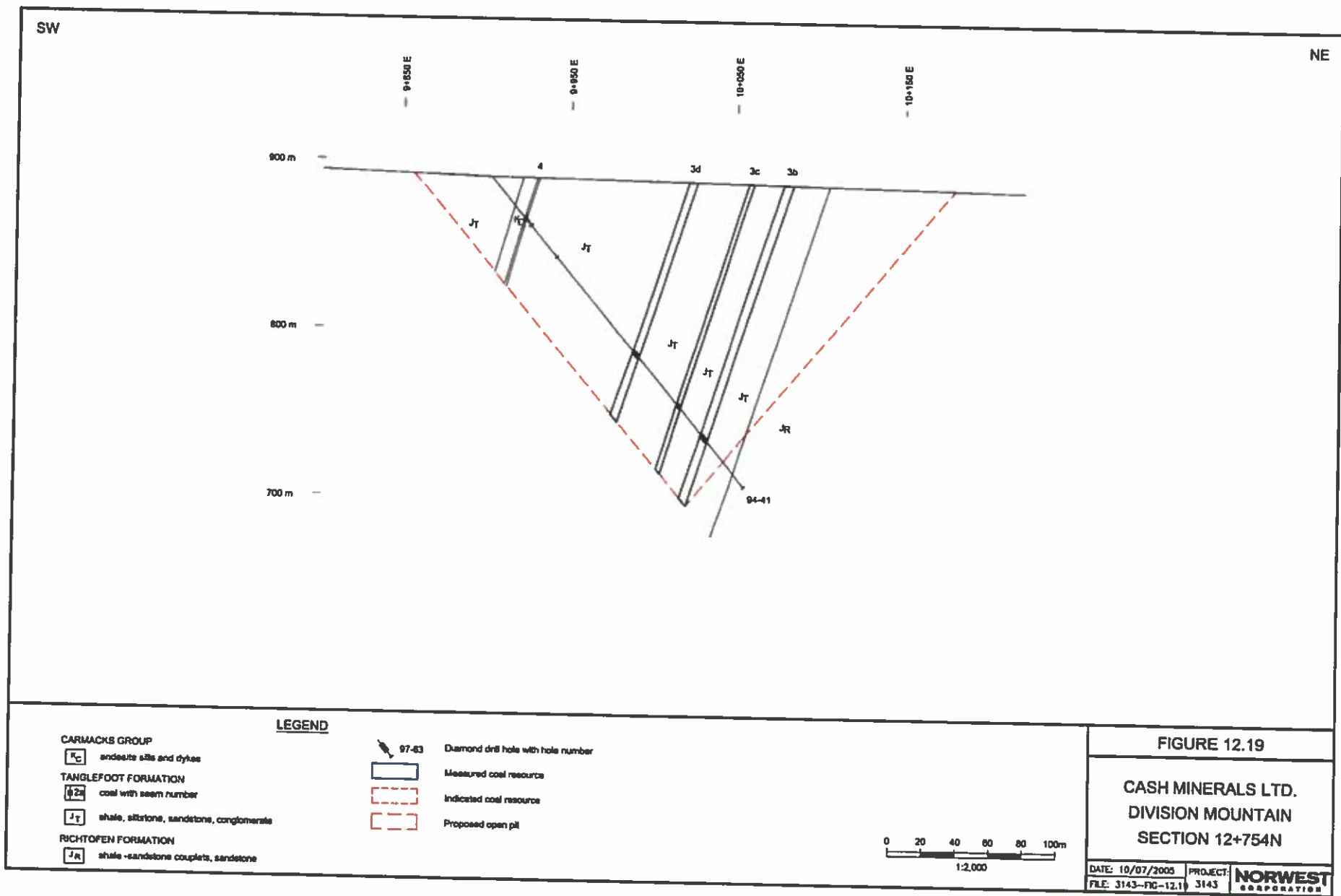


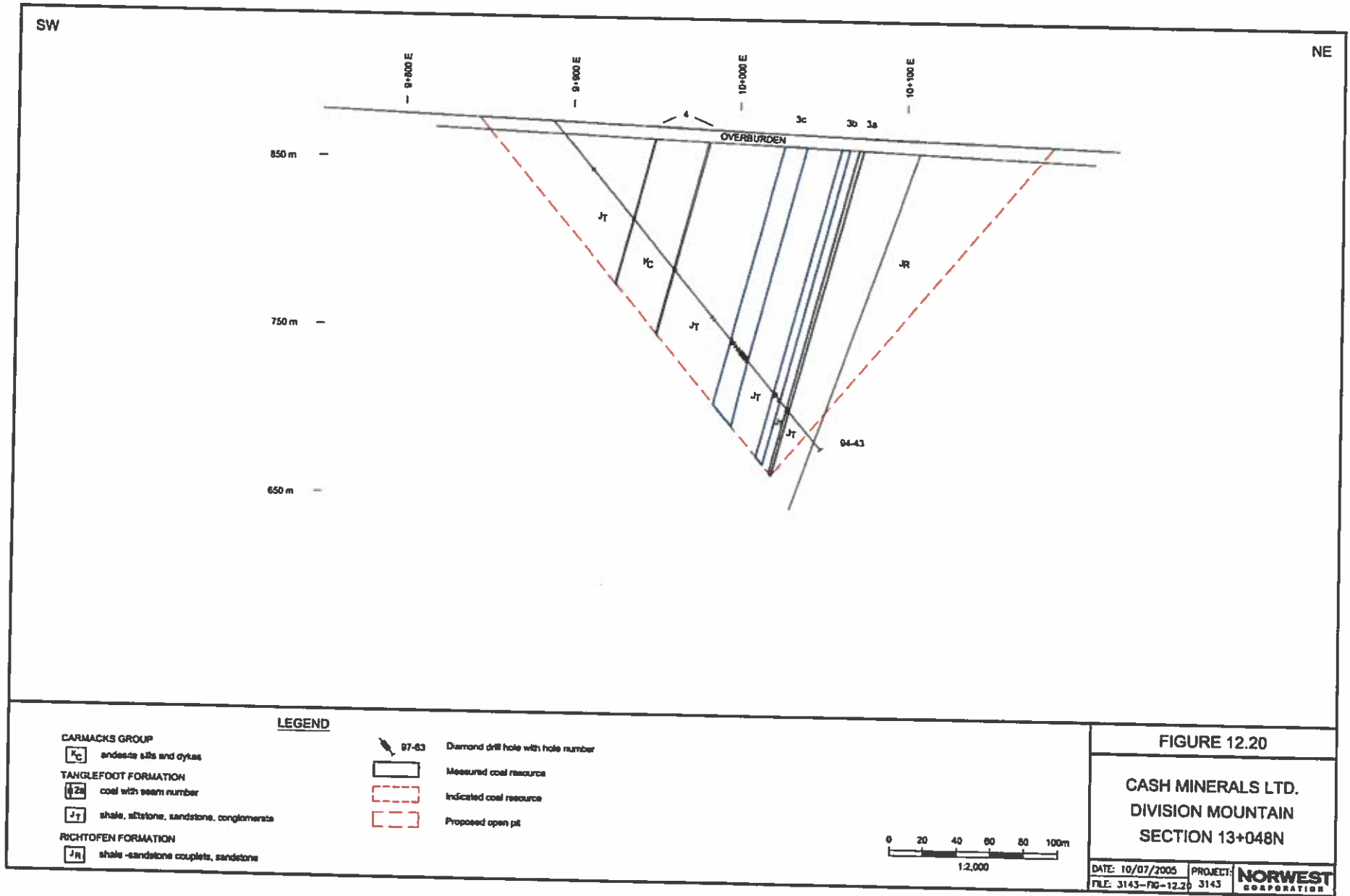


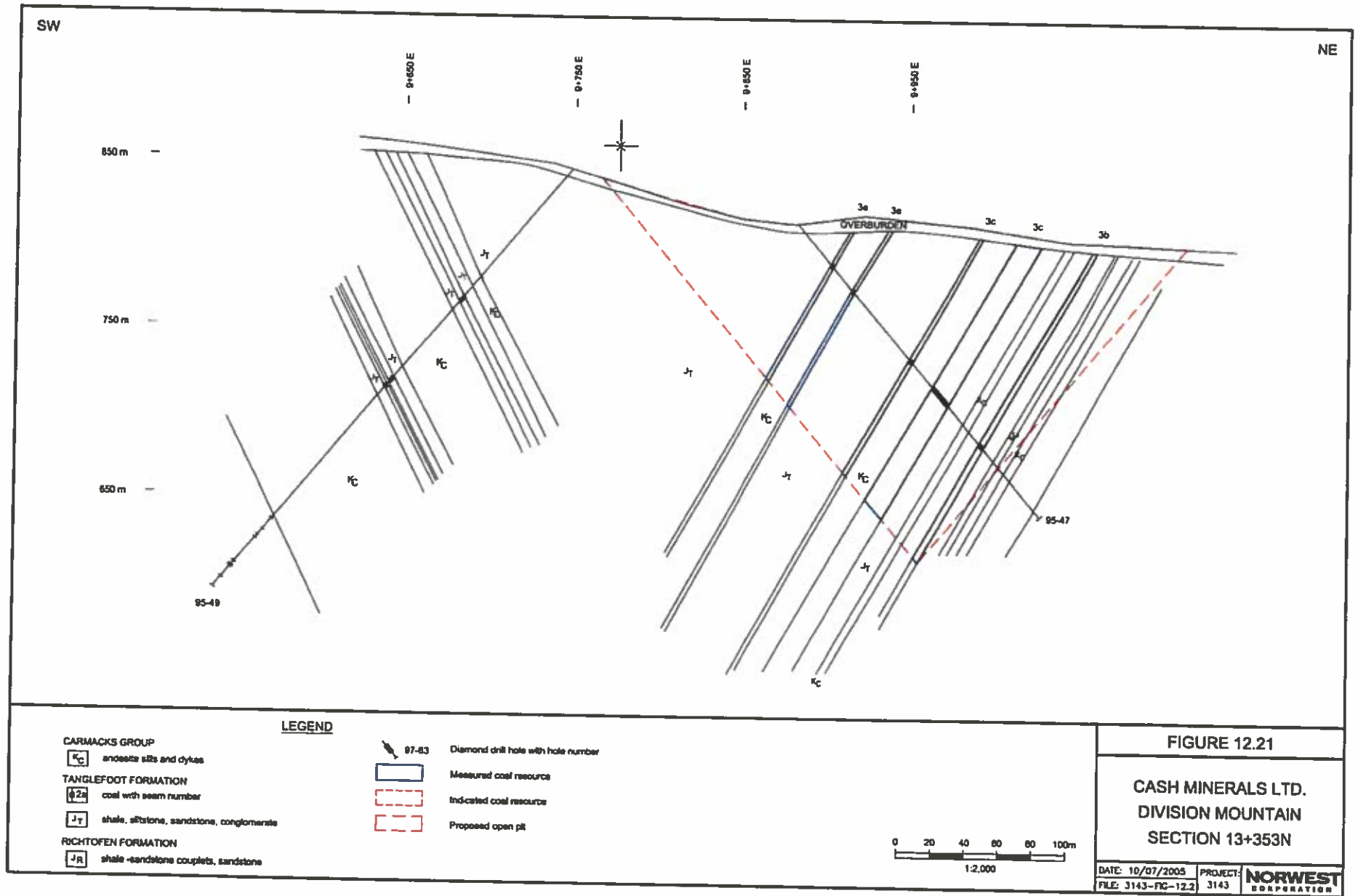


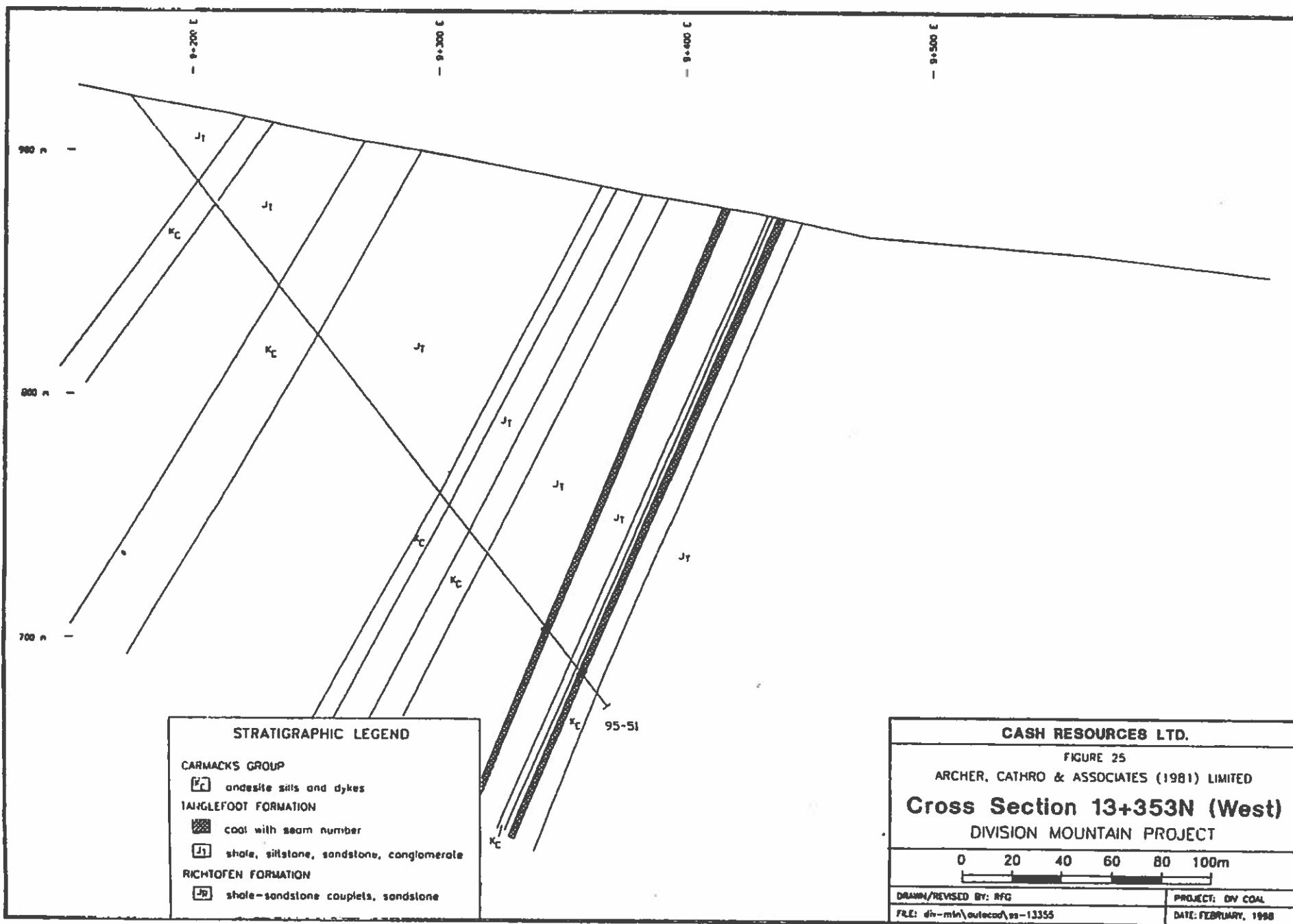


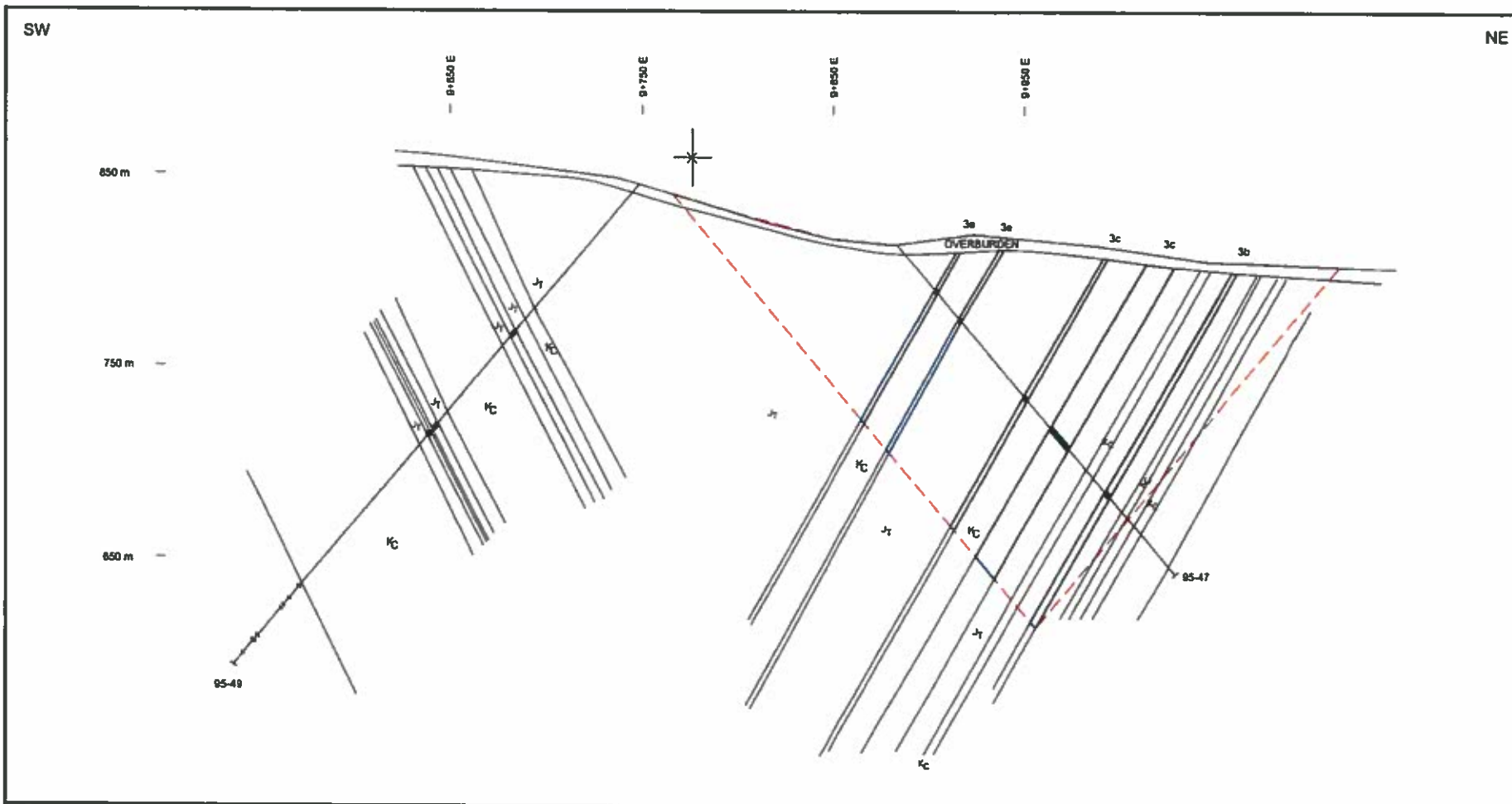












LEGEND

CARMACKS GROUP

K_c andesite sills and dykes

TANGLEFOOT FORMATION

J_{2a} coal with seam number

J_1 shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_R shale-sandstone couplets, sandstone



97-83 Diamond drill hole with hole number



Measured coal resource



Indicated coal resource



Proposed open pit



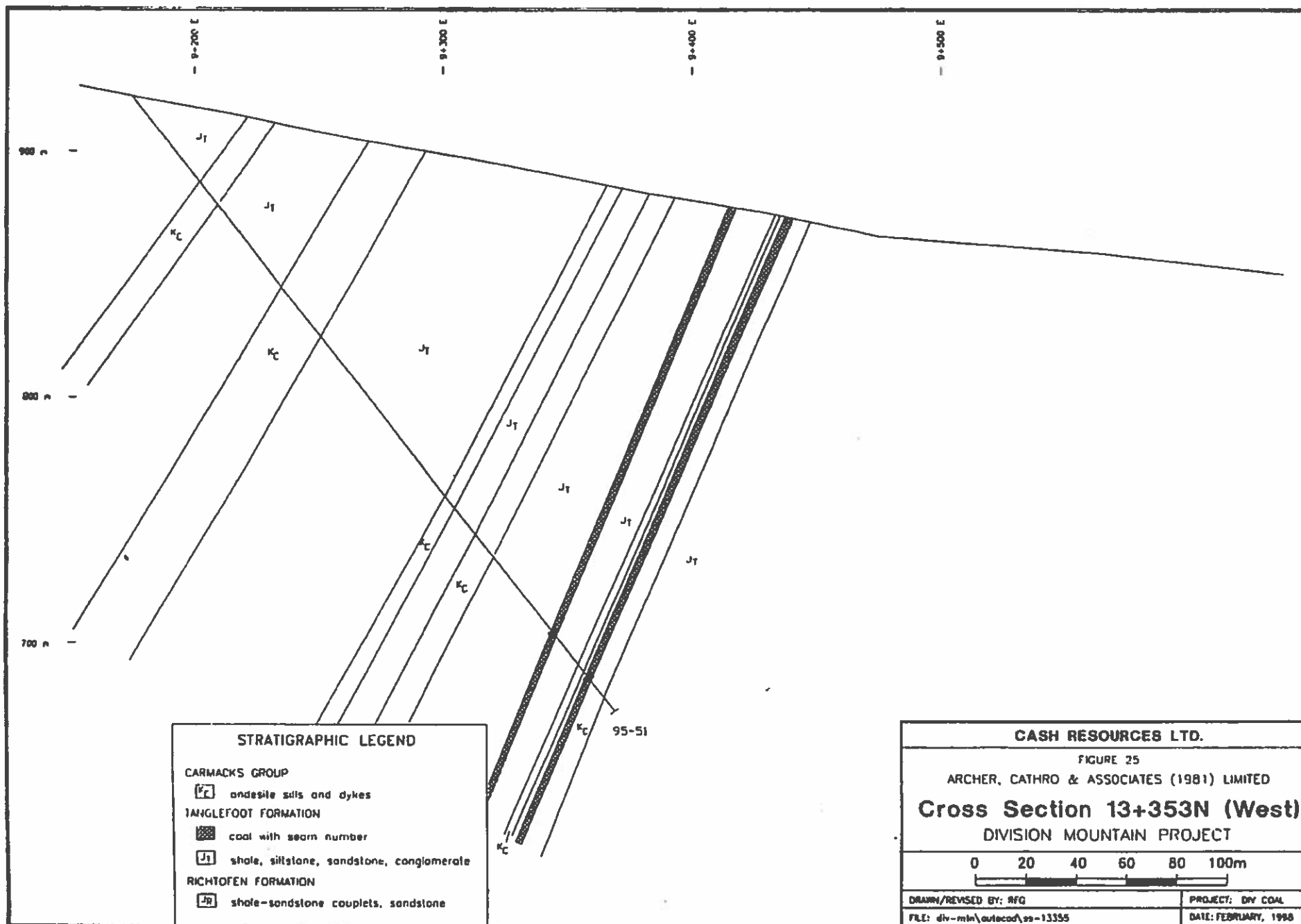
FIGURE 12.21

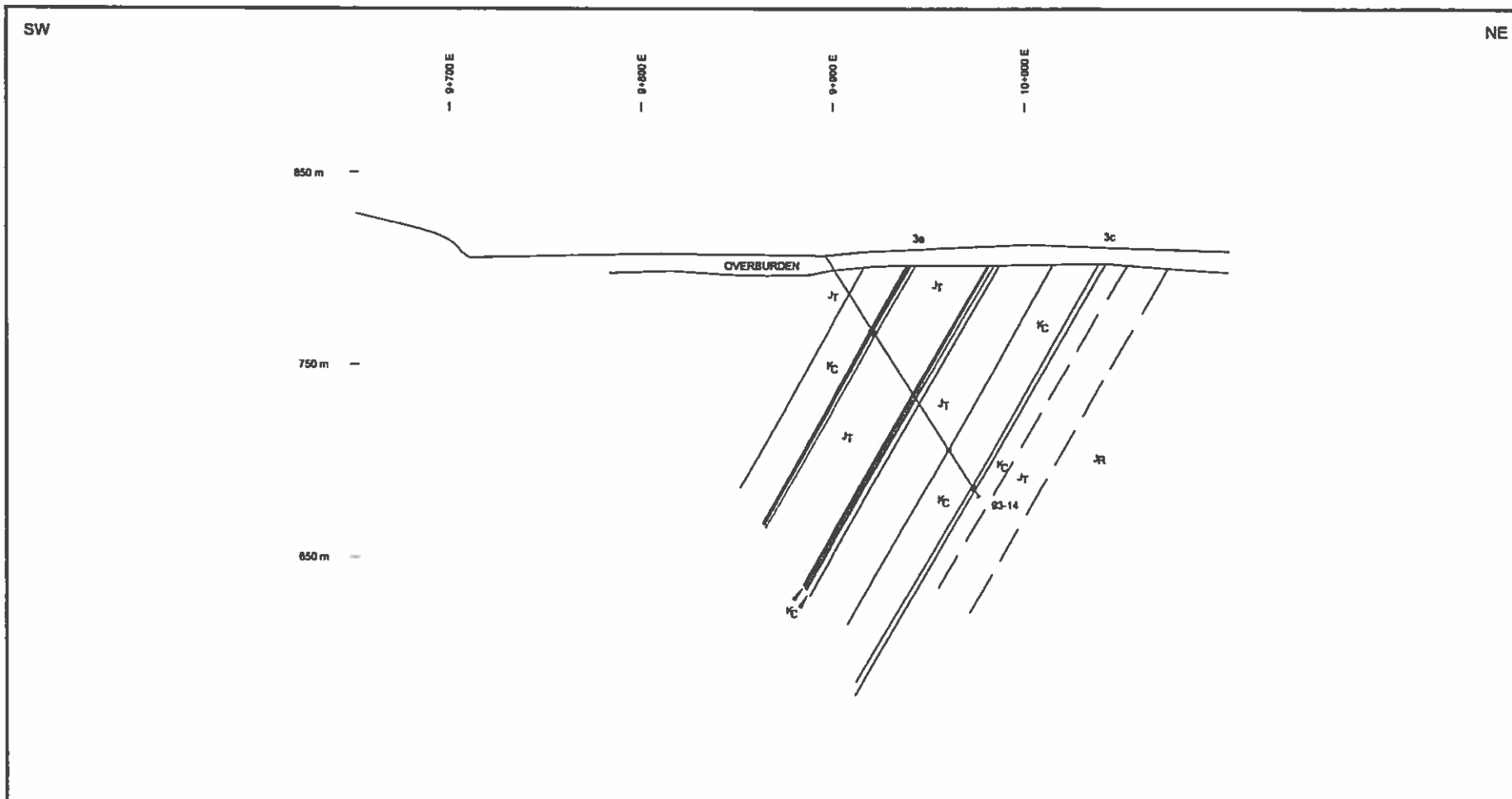
CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 13+353N

DATE: 10/07/2005
FILE: 3143-FIG-12.2

PROJECT:
3143

NORWEST
CORPORATION





LEGEND

CARMACKS GROUP

Jc andesite sills and dykes

TANGLEFOOT FORMATION

J2a coal with seam number

Jt shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

JR shale-sandstone couplets, sandstone

97-63

Diamond drill hole with hole number

Measured coal resource

Indicated coal resource

Proposed open pit



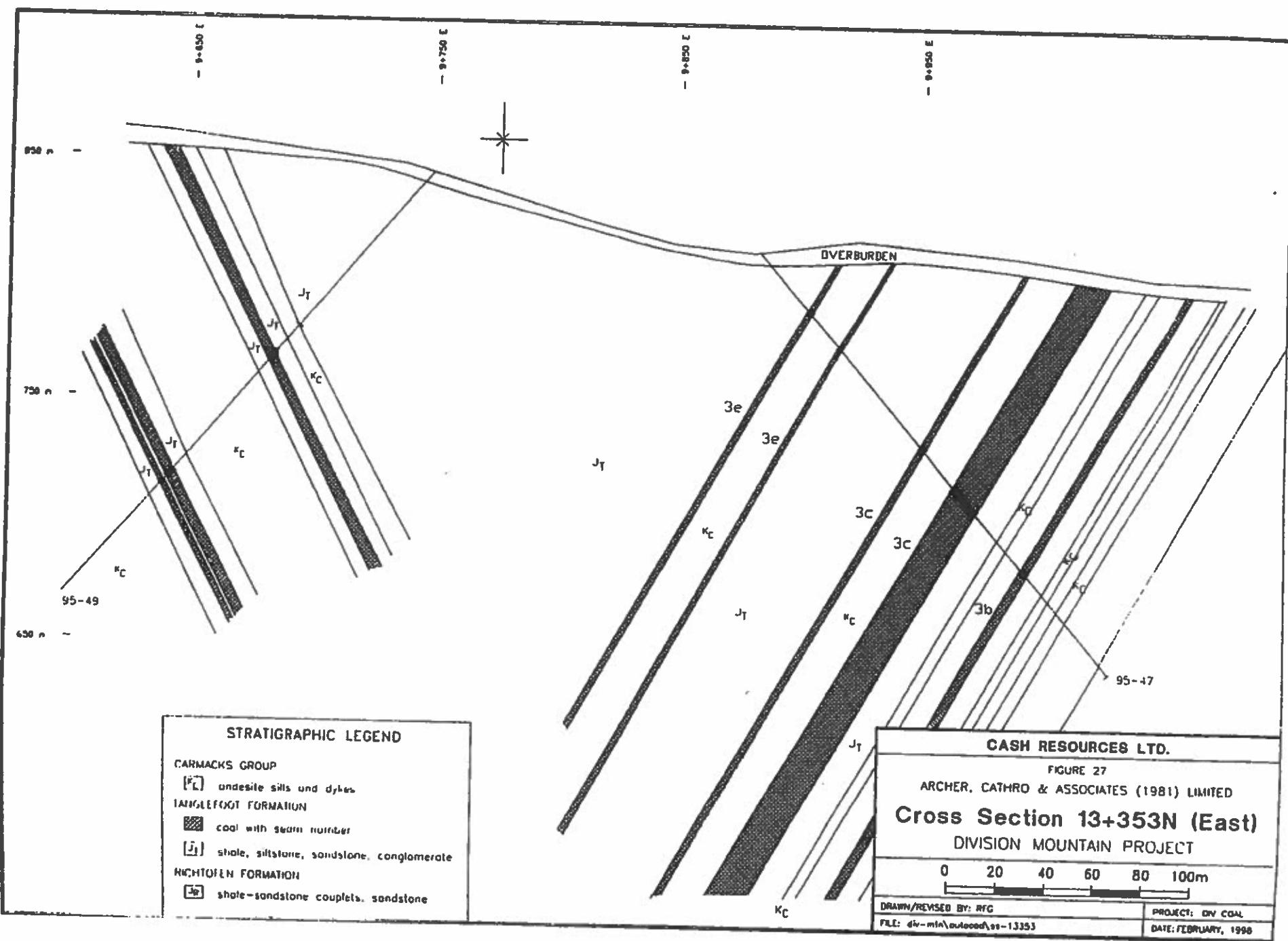
FIGURE 12.22

FORBES & MANHATTAN
DIVISION MOUNTAIN
SECTION 13+658N

DATE: 10/10/2005
FILE: 3143-FG-12.22

PROJECT: 3143

NORWEST
CORPORATION





LEGEND

CARMACKS GROUP

K_C andesite sills and dykes

TANGLEFOOT FORMATION

3e coal with seam number

J_T shale, siltstone, sandstone, conglomerate

RIGHTOFEN FORMATION

J_R shale-sandstone couplets, sandstone

97-53

Diamond drill hole with hole number

Measured coal resource

Indicated coal resource

Proposed open pit

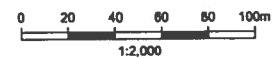


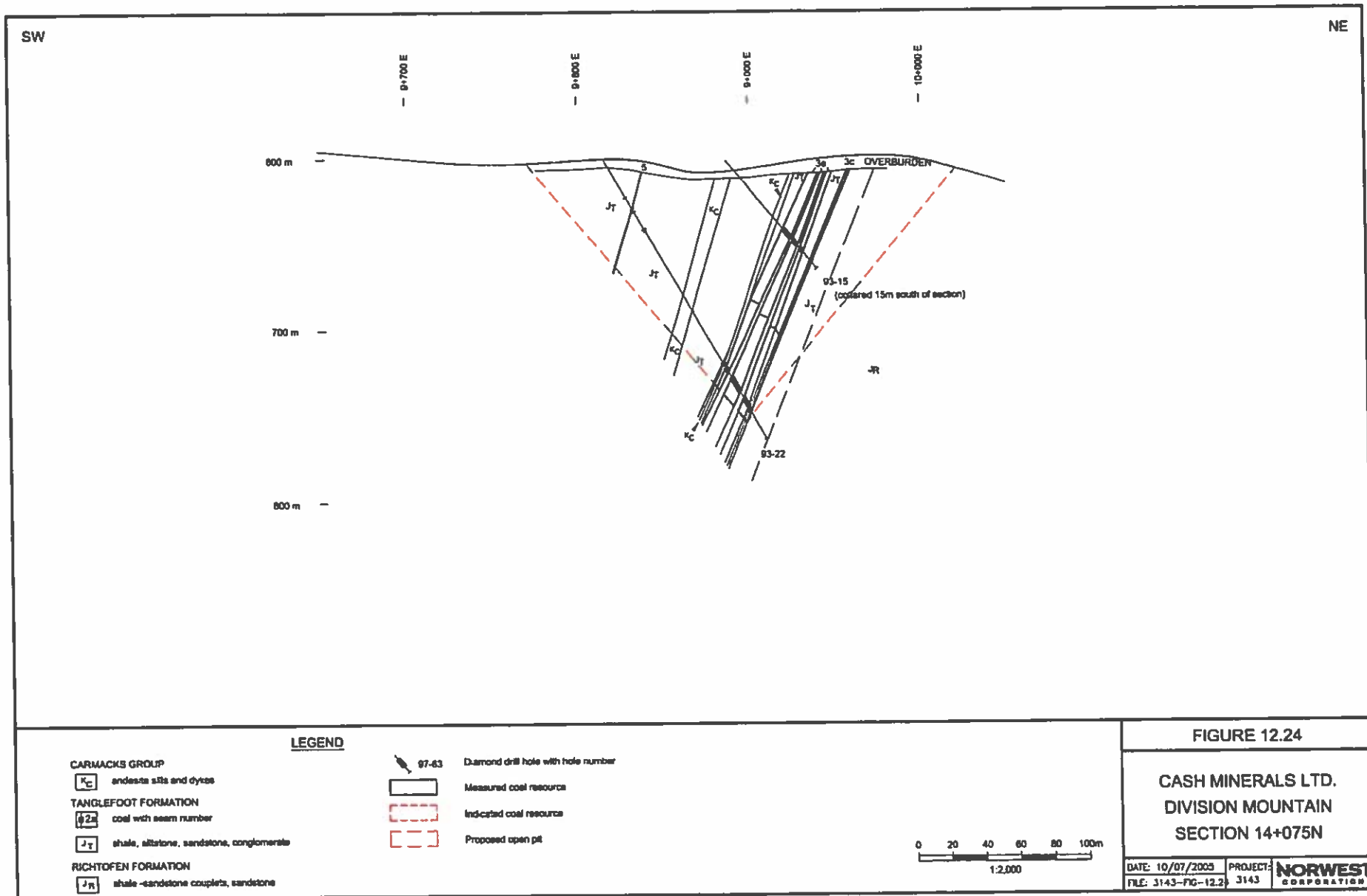
FIGURE 12.23

**CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 13+962N**

DATE: 10/07/2005
FILE: 3143-FG-12.23

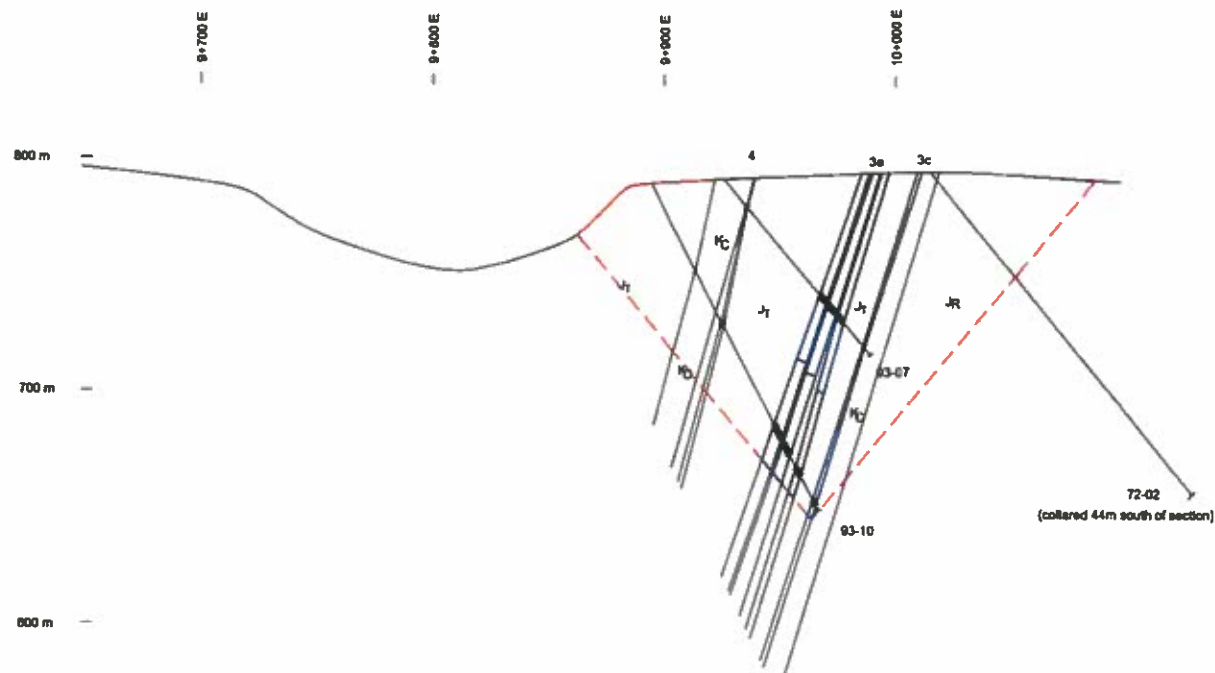
PROJECT:
3143

**NORWEST
CORPORATION**



SW

NE



LEGEND

CARMACKS GROUP

K_c andesite sills and dykes

TANGLEFOOT FORMATION

J_{2a} coal with seam number

J_1 shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

J_R shale-sandstone couplets, sandstone



97-03 Diamond drill hole with hole number



Measured coal resource



Indicated coal resource



Proposed open pit



FIGURE 12.25

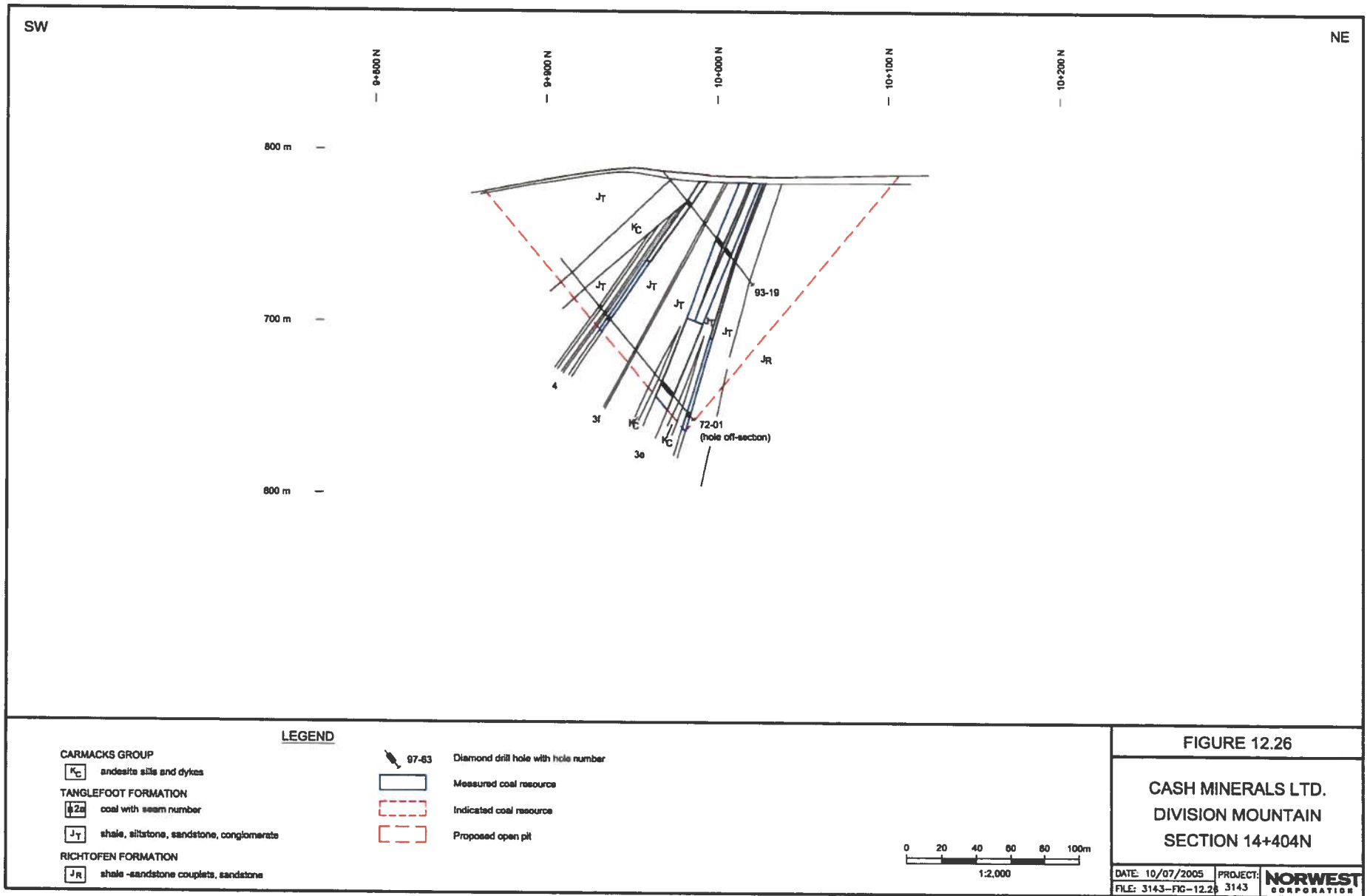
CASH MINERALS LTD.
DIVISION MOUNTAIN
SECTION 14+267N

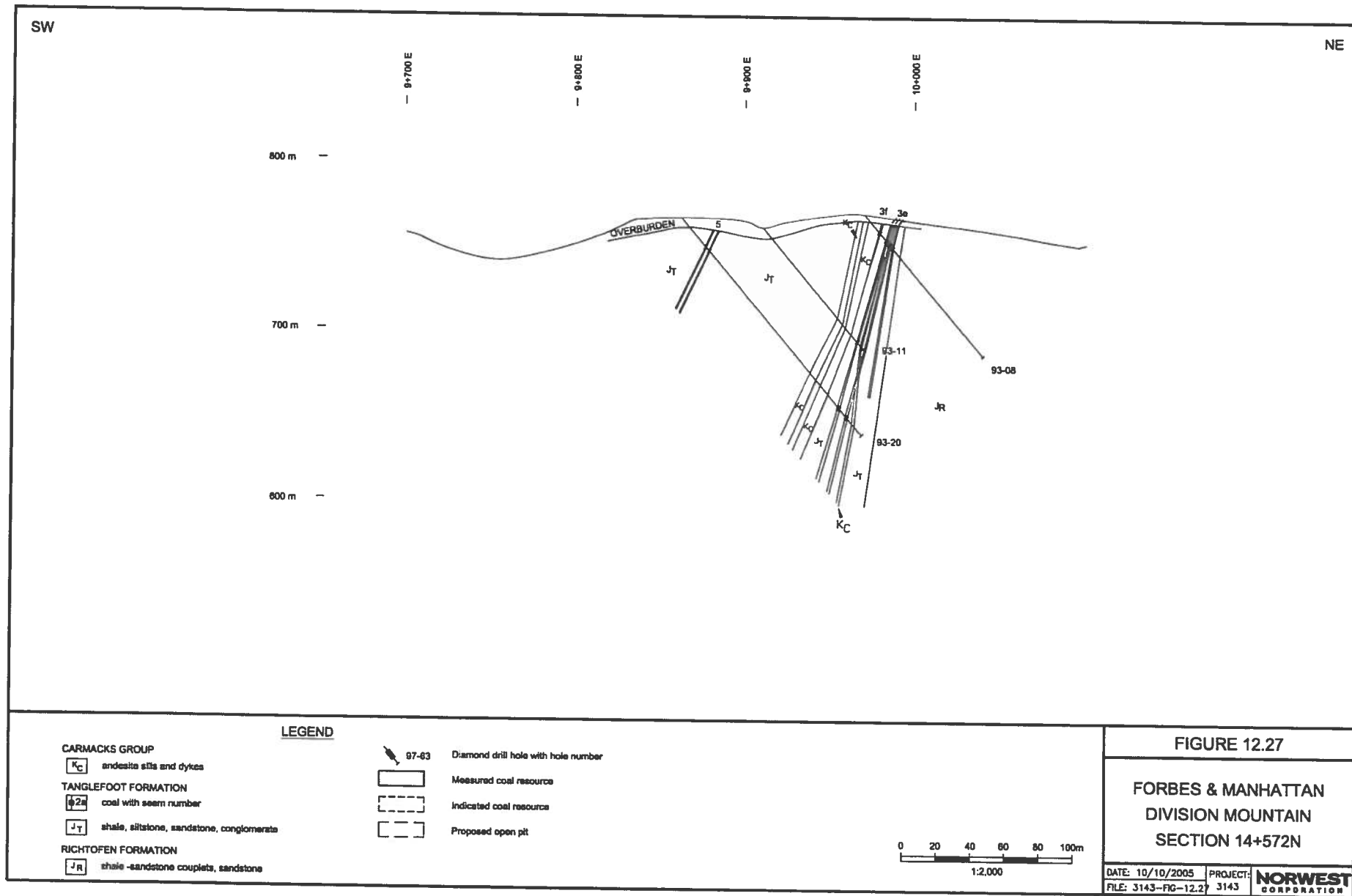
DATE: 10/07/2005

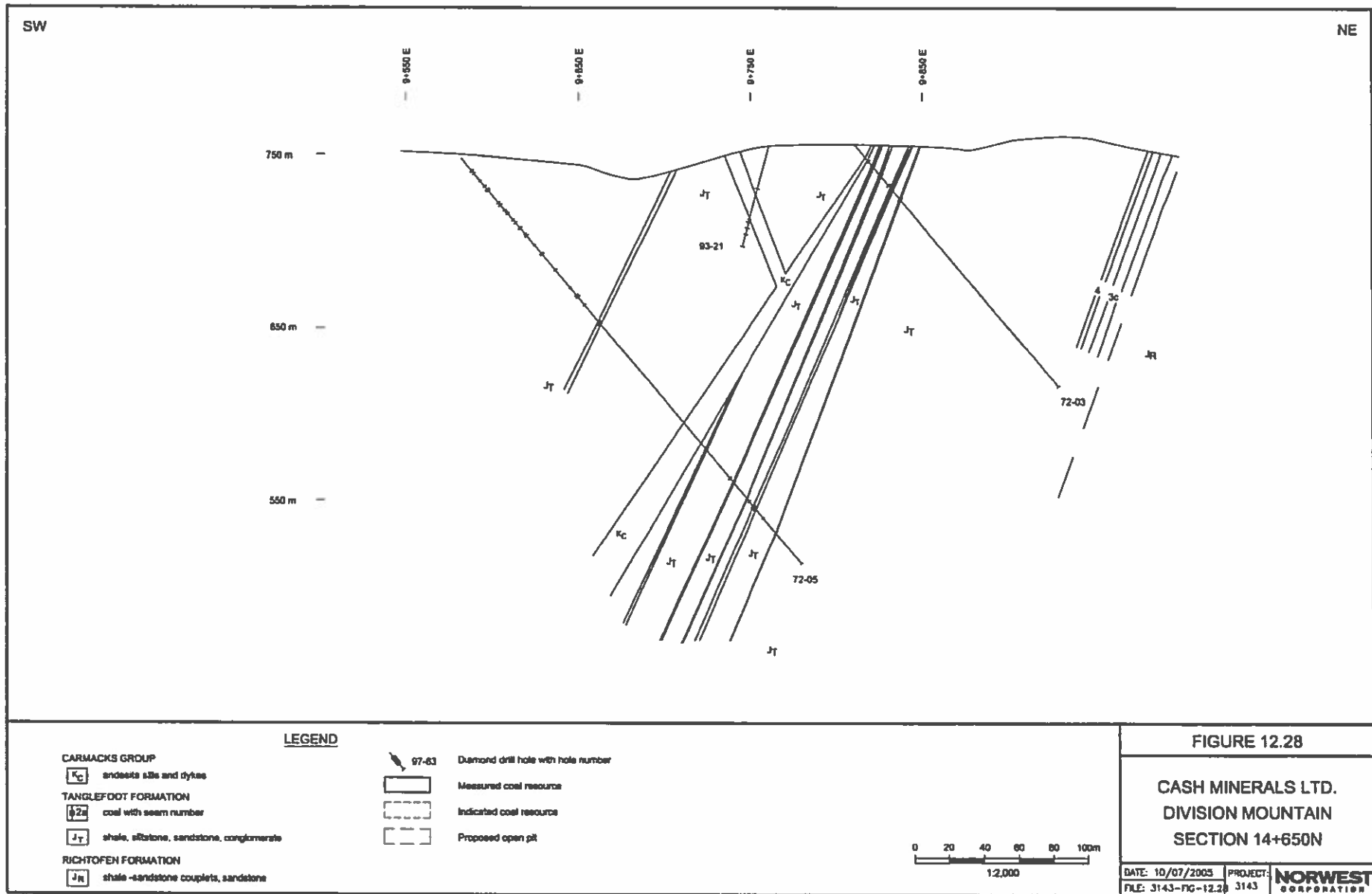
PROJECT: 3143

FILE: 3143-FIG-12.25

NORWEST
CORPORATION









8+750 E

8+850 E

9+000 E

10+000 E

750 m

650 m

550 m

Overburden

93-09

Coal Measure (?)

Jr (?)

STRATIGRAPHIC LEGEND

CARMACKS GROUP

 andesite sills and dykes

TANGLEFOOT FORMATION

 coal with seam number

 shale, siltstone, sandstone, conglomerate

RICHTOFEN FORMATION

 shale-sandstone couplets, sandstone

CASH RESOURCES LTD.

FIGURE 37

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

Cross Section 15+182N

DIVISION MOUNTAIN PROJECT

0 20 40 60 80 100m

DRAWN/REVISED BY: RFG

FILE: dr-min\autocad\as-18182

PROJECT: DIV COAL

DATE: FEBRUARY, 1988

Appendix 2
Minfiles

MINFILE DETAILS

Occurrence Number: 115H 002

Occurrence Name: ANDESITE

Occurrence Type: Hard-rock

Status: Prospect

Aliases: CREEK, MAY, PORTER

Deposit Type(s): Coal

Location(s): 61°52'57" N - -136°6'48" W

NTS Mapsheet(s): 115H16

Location Comments: 1.5 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1970	Other	

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC013186	Porter Mountain coal property examination - 115H-16		Property File Collection	Report
ARMC016664	Geology map - 115H/16 - Mount Morrison		Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC016663	Geochemistry map - 115H/16 - Mount Morrison		Property File Collection	Geochemical Map

Capsule

Work History

Staked by H.E. Porter in Oct/1900 as coal lease 1447, which was soon surrounded by at least twenty others. No record of early development exists.

Restaked as May cl (Y51874) in Apr/70 by P.F. Guder, and sampled by Teslin EL in 1970. The target was acquired in Jan/76 under Coal Exploration Licence 36 by Resoursex L, and was leased in Feb/81 (2988) by Fargo O Corp.

The Greek cl (YA74993) were staked one km to the south in Aug/82 by Uranerz E & Mg L in a joint venture with Central Electricity Generating Board of London, England and explored with radiometric surveys.

Capsule Geology

Thin seams (up to 41 cm) of anthracite occur in contorted beds of Upper Jurassic Tantalus Formation rocks near the contact of a syenite stock. An analysis by the Department of Mines in 1910 gave water 4.68%, fixed carbon 72.26%, ash 7.47% and non-coherent coke 79.73%. The Research Council of Alberta gives the gross calorific value as 15 700 to 16 000 G. BTU.

Bulldozing has exposed coal on the east side of the Klondike Highway at Mileposts 85.5 and 88.0. Samples taken by Teslin EL from 3 localities ranged from 8.0 to 19.3% water, 11.8 to 50.9% ash, 11.2 to 14.7% volatiles, 23.9 to 66.5% fixed carbon and 0.5 to 0.6% sulphur. Rank ranged from sub-bituminous A to sub-bituminous C and dry calorific value from 4750 to 10 340 BTU/b, all non-coking.

The Greek claims were staked to cover low grade uranium associated with clay altered shear zones.

References

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

GEOLOGICAL SURVEY OF CANADA Memoir 5, p. 49.

RESEARCH COUNCIL OF ALBERTA Report 66-6, p. 15.

RESOURCEX LTD, 1975. Assessment Report *#061357 by G.B. Allen.

TESLIN EXPLORATIONS LTD, May/71. Assessment Report by E.L. Speelman.

YUKON EXPLORATION AND GEOLOGY 1982, p. 197.

Map Location



MINFILE DETAILS

Occurrence Number: 105E 011

Occurrence Name: CLAIRE

Occurrence Type: Hard-rock

Status: Unknown

Deposit Type(s): Coal

Location(s): 61°55'37" N - -135°19'32" W

NTS Mapsheet(s): 105E14

Location Comments: 1.5 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1938	Geology	Reported by Geological Survey of Canada in Memoir 217.

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC014238	Claire Creek property examination - With air photo overlay		Property File Collection	Report

Capsule

Work History

Reported by the GSC but apparently never investigated.

Capsule Geology

Coal is reported to outcrop in Upper Jurassic Tantalus Formation rocks in the Claire Creek area.

References

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

GEOLOGICAL SURVEY OF CANADA Memoir 217, p. 16.

Map Location

MINFILE DETAILS

Occurrence Number: 105E 022

Occurrence Name: CORDUROY

Occurrence Type: Hard-rock

Status: Drilled Prospect

Deposit Type(s): Coal

Location(s): 61°17'55" N - -135°54'36" W

NTS Mapsheet(s): 105E05

Location Comments: 1 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1999	Drilling	Number of holes drilled: 5 Amount of work done: 478.5 METRES
12/31/1999	Geophysics	
12/31/1997	Trenching	Amount of work done: 360 METRES
12/31/1971	Other	Teslin Exploration Ltd could not locate float occurrence.
12/31/1970	Geology	Reconnaissance of three coal licences in the area.
12/31/1908	Geology	

Capsule

Work History

The GSC reported that coal occurs in gopher holes on the south slope of Corduroy Mountain. The area was explored in 1970 and 1971, while it was held as Coal Exploration Licence 12 by Teslin Exploration Ltd which carried out reconnaissance mapping and prospecting.

In Oct/92, Cash Resources Ltd acquired twenty-two Territorial Coal Licences, including Licence Y 408 which encompasses the Corduroy Mountain area. Cash carried out trenching on the west side of Corduroy Mountain in 1997. In Nov/98, Cash entered into an option agreement with Usibelli Coal Mine Inc of Healy, Alaska allowing the company to acquire a 50% interest in the Division Mountain Project subject to certain work conditions. The Division Mountain Project encompasses coal mining rights to the Division Mountain deposit (Minfile Occurrence # 115H 013) and coal exploration rights to the surrounding area under various Coal Exploration Licences. In Mar/99 Usibelli carried out reverse circulation drilling of 5 holes (478.5 m) to test the extent of the coal seams discovered during trenching in 1997. Down-hole geophysical logging was also completed on 2 of the holes. In May/99 Usibelli dropped its option, due to low world prices for thermal coal.

In May/2001, Cash Resources Ltd was renamed Cash Minerals Ltd.

Capsule Geology

The area is underlain by the Upper Jurassic to Lower Cretaceous Tantalus Formation (Upper Member) conglomerate and sandstone, near the contact with underlying Upper Jurassic Laberge Group rocks consisting of sandstone, siltstone, carbonaceous shales and coal seams of the Tanglefoot Formation (Upper Member). Trenching by Cash Resources in 1997, 4.25 km northwest of the float occurrence, uncovered 23 m of coal in 25 seams with the thickest seam being 3 m. Based on the 1999 drilling, which intersected coal in 3 holes, Usibelli projected an estimated 2.1 million short tons of run of mine coal at Corduroy Mountain.

References

ALLEN, T.L., AND WESTON, L.H., 2001. Preliminary map of Division Mountain area (NTS 105E/5 W1/2 & 115H/8 E1/2), central Yukon. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 2001-3.

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

CAIRNES, D.D., 1910. Lewes and Nordenskiöld Rivers Coal District, Yukon Territory. Geological Survey of Canada Memoir 5, 70 p.

CASH RESOURCES LTD, Mar/98. Assessment Report #093824 by R.F. Gish.

CASH RESOURCES LTD, Apr/2000. Assessment Report #094129 by R.F. Gish.

TESLIN EXPLORATION LTD, Aug/70. Assessment Report #060584 by R.J. Kirker.

TESLIN EXPLORATION LTD, Nov/71. Assessment Report #060582 by J.F. Hlavay.

YUKON EXPLORATION AND GEOLOGY 1997, p. 32-33; 1999, p. 26 and 177-198.

Map Location



MINFILE DETAILS

Occurrence Number: 105L 038

Occurrence Name: EUGENE

Occurrence Type: Hard-rock

Status: Unknown

Deposit Type(s): Coal

Location(s): 62°4'9" N - -135°54'36" W

NTS Mapsheet(s): 105L04

Location Comments: 1.5 Kilometres

Hand Samples Available: No

Last Reviewed:

Capsule

Work History

Staked as coal lease 12370 in Aug/04 by Eugene K. Mack and 13998 in Apr/05 by Cortland P. Mack.

Capsule Geology

The location is given as 'right limit of Lewes (Yukon) River opposite Eagle Rock, 17.6 km below Little Salmon'. The area is underlain by sedimentary rocks of the Lower Jurassic Laberge Group.

References

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

Map Location



MINFILE DETAILS

Occurrence Number: 115I 004

Occurrence Name: FIVE FINGERS

Occurrence Type: Hard-rock

Status: Past Producer

Aliases: MILLERS

Deposit Type(s): Coal

Location(s): 62°12'9" N - -136°20'25" W

NTS Mapsheet(s): 115I01

Location Comments: .5 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1975	Geology	
12/31/1973	Other	
12/31/1971	Drilling	Number of holes drilled: 1 Amount of work done: 57.3 METRES
12/31/1971	Geology	
12/31/1970	Other	
12/31/1908	Other	Mined a few hundred tons, then abandoned.
12/31/1907	Other	Amount of work done: 345 METRES Completed between 1905 and 1907.
12/31/1904	Other	Mined several hundred tons from surface by 1904.

Capsule

Work History

Coal was first noted here in 1887 by G.M. Dawson and first staked as coal lease 214 in Mar/98 by W.T. Edmonds. Restaked as leases 256 and 258 in Nov/99 by J. Cameron and C.E. Miller, who mined several hundred tonnes near surface by 1904. George J. Milton acquired the property in 1905 and formed the Five Fingers Coal CL, which attempted unsuccessfully to diamond drill and then drove two declines (a total of 345 m of development) by 1907. Only a few hundred tonnes were mined and the mine was abandoned in 1908 in favour of the seams at the Tantalus Mine.

The original leases were acquired by Yukon Coal CL and transferred in 1966 to Anvil Mg Corp. L. The surrounding area was acquired in Sep/70 as Coal Exploration Licence 16 by Teslin EL, which performed mapping, drilled one hole (57.3 m) about 1220 m south of the mine in 1971, and staked a coal lease in Nov/73 (2964). The original leases were transferred in 1975 to Cyprus Anvil Mg Corp, which explored with mapping in 1977.

Capsule Geology

Two seams 1.1 m and 1.4 m wide and separated by 7.6 m of rock strike north and dip 16°. The coal occurs within the Lower Jurassic Laberge Formation. A sample analysed by the Department of Mines in 1908 returned 5.29% water, 36.14% volatiles, 40.12% fixed carbon and 18.45% ash, and reportedly produced an excellent, firm, coherent coke. Gross calorific value was reported as 12 100-13 600 G.BTU.

A surface sample taken by Teslin EL from the 1.1 m seam in 1970 assayed 8.4% water, 16.7% ash, 32.8% volatiles, 42.1% fixed carbon and 0.2% sulphur. The coal was found to be non-coking and to have a High Volatile C rank with a dry calorific value of 10 740 BTU/lb.

References

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

ENGINEERING AND MINING JOURNAL, 11 Aug/06.

GEOLOGICAL SURVEY OF CANADA Annual Report 1887, Vol. III, Part B.

GEOLOGICAL SURVEY OF CANADA Memoir 5, p. 53-54.

GEOLOGICAL SURVEY OF CANADA Memoir 189, p. 62-63.

GEOLOGICAL SURVEY OF CANADA Summary Report, 1907, p. 22-23.

MINERAL INDUSTRY REPORT 1977, p. 73.

RESEARCH COUNCIL OF ALBERTA Report 66-6, p. 16.

TESLIN EXPLORATIONS LTD, Mar/71. Assessment Report by E.L. Speelman.

Map Location



MINFILE DETAILS

Occurrence Number: 1151 098

Occurrence Name: HLAVAY

Occurrence Type: Hard-rock

Status: Drilled Prospect

Deposit Type(s): Coal

Location(s): 62° 10' 10" N - -136° 14' 58" W

NTS Mapsheet(s): 115101

Location Comments: .5 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1973	Drilling	Number of holes drilled: 2 Amount of work done: 84 METRES
12/31/1970	Geology	
12/31/1970	Geophysics	

Capsule

Work History

The area northeast and northwest of the Tantalus Butte Mine was acquired in Sep/70 as Coal Exploration Licences 15 and 16 respectively by Teslin EL, which mapped and conducted test geophysics in 1970-72 and drilled 2 holes (84 m) in 1973. Two coal leases (2963 and 1966) were staked by Teslin EL in Nov/73.

The Cliffside Agate cl (YA86840) was staked 2 km west in Jun/85 by Whitehorse Gem and M Club. F. Dorward staked Coal Agate cl (YB6928) 2 km south of the 1985 claim in Aug/87 and performed prospecting and hand trenching on both claims in 1987-88.

Capsule Geology

The holes cut steep, westerly dipping Tantalus Formation on the west limb of a tight anticline. The holes cut narrow coal bands up to 9 cm thick. The known coal showings gave a slight EM-16 response but were not detectable with IP.

References

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

MINERAL INDUSTRY REPORT 1973, p. 120-121.

Map Location



MINFILE DETAILS

Occurrence Number: 105L 013

Occurrence Name: JUMPONT

Occurrence Type: Hard-rock

Status: Showing

Deposit Type(s): Coal

Location(s): 62°0'11" N - -134°55'49" W

NTS Mapsheet(s): 105L02

Location Comments: 1 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1970	Geology	

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC016524	Geochemical values map - Tantalus silt survey - Snowcap Mountain		Property File Collection	Geochemical Map

Capsule

Work History

Atlas EL acquired coal exploration licences in this area in 1969 and conducted a mapping program in 1970.

Capsule Geology

Coal was found both as float and outcropping in seams up to 5 cm thick intercalated with siltstone in either the Laberge or Tantalus Formation.

References

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

MINERAL INDUSTRY REPORT 1969-70, p. 156.

Map Location



MINFILE DETAILS

Occurrence Number: 105E 028

Occurrence Name: KLUSHA

Occurrence Type: Hard-rock

Status: Drilled Prospect

Deposit Type(s): Coal

Location(s): 61°22'5" N - 135°58'52" W

NTS Mapsheet(s): 105E05

Location Comments: .5 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1999	Drilling	Number of holes drilled: 7 Amount of work done: 592.8 METRES
12/31/1997	Trenching	Amount of work done: 30 METRES Located pockets of coal float.
12/31/1975	Geology	
12/31/1975	Other	

Capsule

Work History

Discovered during geological mapping and prospecting carried out by Resoursex Ltd in 1975, on its Coal Exploration Licence #35, which was issued in Jan/75. This area was previously held under Licence #13, issued to N.H. Ursel & Assoc. Ltd in Sep/70.

In Oct/92, Cash Resources Ltd acquired coal exploration rights to the area surrounding the occurrence under various Coal Exploration Licences (#479, #480, #486, #487) that also encompass the Division Mountain coal deposit (Minfile Occurrence #115H 013), 6 km to the southeast. In 1997, Cash carried out hand trenching in an area containing numerous patches of coal float, 3 km southwest of the occurrence. In Nov/98 Usibelli Coal Mine Inc optioned the exploration area from Cash and in Mar/99 carried out reverse circulation drilling of an area 2 km north of the occurrence. Usibelli subsequently dropped its option, due to low world prices for thermal coal.

In May/2001, Cash Resources Ltd was renamed Cash Minerals Ltd.

Capsule Geology

Coal float was found in gopher holes in an area underlain by Upper Jurassic to Lower Cretaceous Tantalus Formation clastic rocks and Upper Jurassic Tanglefoot Formation of the Laberge Group. The upper member of the Tanglefoot Formation consists of sandstone, siltstone, carbonaceous shales and coal seams, which occur approximately 210 to 240 m stratigraphically below the base of the overlying Tantalus Formation (Long, 1986).

Trenching on the south side of Cub Mountain, exposed Tanglefoot formation lithologies but apparently did not reach bedrock. Drilling north of Cub Mountain targeted a southeast plunging anticline, four holes were drilled across the crest of the anticline and three holes were drilled into the northeast limb. Two of the three holes drilled on the northeast limb intersected narrow coal seams interbedded with sandstones and carbonaceous shales.

References

ALLEN, T.L., AND WESTON, L.H., 2001. Preliminary map of Division Mountain area (NTS 105E/5 W1/2 & 115H/8 E1/2), central Yukon. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 2001-3.

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

CAIRNES, D.D., 1910. Lewes and Nordenskiold Rivers Coal District, Yukon Territory. Geological Survey of Canada Memoir 5, 70 p.

CASH RESOURCES LTD, Mar/98. Assessment Report #093824 by R.F. Gish.

CASH RESOURCES LTD, Apr/2000. Assessment report #094129 by R.F. Gish.

LONG, D.G.F., 1986. Coal in the Yukon. In: Mineral Deposits of Northern Cordillera, J.A. Morin (ed.), Canadian Institute of Mining and Metallurgy, Special Volume 37, p. 311-318.

NORMAN H. URSEL ASSOCIATES LTD, 1970. Assessment Report *#060897 by E.L. Speelman.

RESOURCEX LTD, Oct/75. Assessment Report #061356 by J.B. Allen.

YUKON EXPLORATION AND GEOLOGY 1997, p. 32-33; 1999, p. 26 and 177-198.

Map Location



MINFILE DETAILS

Occurrence Number: 115H 001

Occurrence Name: LOSCH

Occurrence Type: Hard-rock

Status: Prospect

Deposit Type(s): Coal

Location(s): 61°56'13" N - -136°9'44" W

NTS Mapsheet(s): 115H16

Location Comments: .5 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1959	Other	Amount of work done: 4.6 METRES Tunneling.

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC013185	Map of Mount Morrison with geology field markings for Porter Mountain coal		Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC016664	Geology map - 115H/16 - Mount Morrison		Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC016663	Geochemistry map - 115H/16 - Mount Morrison		Property File Collection	Geochemical Map

Capsule

Work History

Staked as coal lease 4096 in Jan/02 by H.E. Porter. Restaked as Losch cl (73811) in Sep/58 by D. Jennings and A. Roy, who drove a 4.6 m tunnel in 1959. The target was acquired in Jan/76 as part of Coal Exploration Licence 36 by Resoursex L, and was leased in Feb/81 by Fargo O Corp.

B. White staked the Sandra cl (YB27607) to the north in Jun/90.

Capsule Geology

This is probably the coal occurrence reported on Lone Pine Mountain by the GSC. It occurs in the Lower Jurassic Laberge Group and is largely obscured by overburden, but is reportedly 2.1 m thick, strikes 150° and dips steeply northeast.

References

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

GEOLOGICAL SURVEY OF CANADA Memoir 5, p. 49.

RESOURSEX LTD, 1975. Assessment Report *#061357 by G.B. Allen.

Map Location



MINFILE DETAILS

Occurrence Number: 1151 083

Occurrence Name: MEYERS

Occurrence Type: Hard-rock

Status: Unknown

Deposit Type(s): Unknown

Location(s): 62°4'0" N - -136°3'52" W

NTS Mapsheet(s): 115101

Location Comments: 1 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1987	Other	
12/31/1903	Other	

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC006371	Claim map showing Mount Daoust and Deadwood Mountain area		Property File Collection	Geoscience Map (General)

Capsule

Work History

Coal Lease 7923 was staked in this general vicinity in Jun/03 by J.C. Chute and restaked as Coal Lease 11905 in Jun/04 by S. Meyers. Restaked as Pel cl 1-8 (YA97105) in Mar/87 by Dominion Explorers Inc (Landmark Corporation) which carried out geochemical silt sampling later in the year.

Capsule Geology

The location for the coal leases was given as 10 or 11 miles (16 to 18 km) above Tantalus (Carmacks) and opposite Meyers woodcamp. This area is underlain by Lower Jurassic Laberge Group sedimentary rocks.

References

DOMINION EXPLORERS INC, Mar/88. Assessment Report *# 092118 by R. Edison.

Map Location



MINFILE DETAILS

Occurrence Number: 115I 092

Occurrence Name: RINK

Occurrence Type: Hard-rock

Status: Anomaly

Deposit Type(s): Coal

Location(s): 62°18'59" N - -136°22'32" W

NTS Mapsheet(s): 115I08

Location Comments: .5 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1900	Geology	

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC016616	Geology map - 115I/8 - Yukon Crossing		Property File Collection	Geoscience Map (Geological - Bedrock)

Capsule

Work History

Reported by the GSC but apparently never staked or investigated.

Capsule Geology

Coaly soil is present in an area underlain by Jurassic Laberge Group sedimentary rocks.

References

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

GEOLOGICAL SURVEY OF CANADA Summary Report 1900.

Map Location



MINFILE DETAILS

Occurrence Number: 115I 001

Occurrence Name: SOUTH TANTALUS

Occurrence Type: Hard-rock

Status: Deposit

Economic Commodities: coal

Deposit Type(s): Coal

Location(s): 62°4'49" N - -136°15'10" W

NTS Mapsheet(s): 115I01

Location Comments: .5 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1979	Drilling	Number of holes drilled: 32 Amount of work done: 3048 METRES
12/31/1977	Geophysics	
12/31/1976	Drilling	Number of holes drilled: 6 Amount of work done: 1524 METRES
12/31/1976	Geology	
12/31/1975	Other	
12/31/1973	Drilling	Number of holes drilled: 1 Amount of work done: 73.152 METRES
12/31/1971	Drilling	Number of holes drilled: 1 Amount of work done: 94.488 METRES
12/31/1970	Geology	
12/31/1970	Other	
12/31/1966	Other	
12/31/1966	Trenching	

Resource/Reserve

Year	Zone	Type	Commodity	Grade	Tonnage	Amount	Reported Amount	43-101 Compliant	Cut-off
1977	CARMACKS SOUTH (OPEN PIT)	Historical Estimate	Coal	22500 kJ/kg	780,633		No	No	Unknown

Coal varies widely in composition, rank and quality. Rank varies from High Volatile B Bituminous to meta-anthracite and ash content ranges from 1.5 to 65%.; CYPRUS ANVIL MINING CORPORATION, Feb/77. Assessment Report #092031 by R.P. Hill.

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC003591	Summary of exploration and development work - 1978 - Various claims		Property File Collection	Report
ARMC003596	Summary of exploration and development work - Tantalus Butte Mine		Property File Collection	Report

<u>ARMC008313</u>	Plan map showing underground control survey - Tantalus Butte coal mine	Property File Collection	Geoscience Map (General)
<u>ARMC008214</u>	Geological map of open pit area - Carmacks coal project- Tantalus Butte - Map 2	Property File Collection	Geoscience Map (Geological - Bedrock)
<u>ARMC008215</u>	1981 proposed mine plan map - Carmacks coal properties - Tantalus Butte mine - Map 1	Property File Collection	Geoscience Map (General)
<u>ARMC008216</u>	Cross-section no. 614.650 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008217</u>	Cross-section no. 613.000N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008218</u>	Cross-section no. - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008219</u>	Cross-section no. 613.250 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008220</u>	Cross-section no. 613.200N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008221</u>	Cross-section no. 613.350N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008222</u>	Cross-section no. 613.300N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008223</u>	Cross-section no. 613.450N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008224</u>	Cross-section no. 613.400N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008225</u>	Cross-section no. 613.550 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008226</u>	Cross-section no. 613.650 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008227</u>	Cross-section no. 613.500N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008228</u>	Cross-section no. 613.600N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008229</u>	Cross-section no. 613.700N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008230</u>	Cross-section no. 613.800N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008231</u>	Cross-section no. 613.900N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008232</u>	Cross-section no. 614.00N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008234</u>	Cross-section no. 614.200N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008235</u>	Cross-section no. 613.700N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008236</u>	Cross-section no. 613.750N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008237</u>	Cross-section no. 613.850N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008238</u>	Cross-section no. 613.950N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008239</u>	Cross-section no. 614.050N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)

ARMC008240	Cross-section no. 614.150N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008241	Cross-section no. 614.300N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008242	Cross-section no. 614.400N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008243	Cross-section no. 614.500N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008244	Cross-section no. 614.600N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008245	Cross-section no. 614.250N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008246	Cross-section no. 614.350N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008247	Cross-section no. 614.450N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008248	Cross-section no. 614.550N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008249	Geology map of Tantalus Basin west half - Appendix 1	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008250	Plan map showing surface and underground - Tantalus Butte mine - Drawing no. 175	Property File Collection	Geoscience Map (General)
ARMC008251	Geological map of open pit area - Tantalus Butte coal mine - Map 3	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008252	Geological map of open pit area - 2 of 2 - Carmacks coal project- Tantalus Butte - Map 3	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008253	Carmacks topographic map	Property File Collection	Geoscience Map (General)
ARMC008254	V.L.F. electromagnetic survey map - Contours of Fraser filtered in phase - Carmacks coal project	Property File Collection	Geophysical Map
ARMC008255	Reconnaissance map - Pencil manuscript - Sheet 1 of 1 - 76-67	Property File Collection	Geoscience Map (General)
ARMC008258	Composite section map showing working area - underground plans - Tantalus Butte coal mine - Carmacks coal - Drawing no. WB 172A	Property File Collection	Geoscience Map (General)
ARMC008259	Composite plan map - Tantalus Butte mine - Drawing no. 171	Property File Collection	Geoscience Map (General)
ARMC008260	Vertical N-S long. section map - Tantalus Butte mine - Drawing no. 172	Property File Collection	Geoscience Map (General)
ARMC008293	Open pit area map - 1977 - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008294	Topographic plan map - Tantalus Butte coal mine - Carmacks	Property File Collection	Geoscience Map (General)
ARMC008305	Reconnaissance map - pencil manuscript - Sheet 1 of 2 - 76-67 - Carmacks	Property File Collection	Geoscience Map (General)
ARMC008306	Reconnaissance map - pencil manuscript - Sheet 2 of 2 - 76-67 - Carmacks	Property File Collection	Geoscience Map (General)
ARMC008307	Carmacks topographic map - Job No. 77-114	Property File Collection	Geoscience Map (General)
ARMC008308	Preliminary plan map of Carmacks coal mine - Surface lots	Property File Collection	Geoscience Map (General)
ARMC008309	Reconnaissance map - Pencil manuscript - Drawing no. 72-210 - Tantalus Butte coal mine - Carmacks	Property File Collection	Geoscience Map (General)
ARMC008310	Geology map of Carmacks coal lease area, Yukon - Map no. 1	Property File Collection	Geoscience Map (Geological - Bedrock)

<u>ARMC008311</u>	Plan map of survey of lots 23 and 24, Group 10 - Carmacks	Property File Collection	Geoscience Map (General)
<u>ARMC008312</u>	Field notes of resurvey of certain boundaries of lots 23 and 24 - Group 10, Carmacks - Drawing #52087	Property File Collection	Miscellaneous Company Documents
<u>ARMC008233</u>	Cross-section no. 614.100N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008314</u>	Map - Coal leases in Carmacks area - Map No. 2	Property File Collection	Geoscience Map (General)
<u>ARMC008315</u>	Map 1 - Fall 1989 On-site inspection safety/reclamation - Carmacks Coal properties	Property File Collection	Geoscience Map (General)
<u>ARMC008316</u>	Plan map showing coal mining leases - Carmacks area	Property File Collection	Geoscience Map (General)
<u>ARMC008257</u>	Composite plan map of working area - Tantalus Butte coal mine - Drawing no. WB 171A	Property File Collection	Geoscience Map (General)
<u>ARMC007839</u>	Geological map of open pit area - Tantalus Butte coal mine - Carmacks	Property File Collection	Geoscience Map (Geological - Bedrock)
<u>ARMC007842</u>	Electromagnetic survey map - Contours of Fraser filtered in phase readings - Carmacks coal project	Property File Collection	Geophysical Map
<u>ARMC007843</u>	Electromagnetic survey map - profiles of in phase and quadrature readings - Carmacks coal project	Property File Collection	Geophysical Map
<u>ARMC007844</u>	Map 1 - 1981 proposed mine plan - Tantalus Butte mine	Property File Collection	Geoscience Map (General)
<u>ARMC018569</u>	Field notes - 1977 - Carmacks	Property File Collection	Miscellaneous Company Documents
<u>ARMC018570</u>	Field notes - 1977 drill logs - Carmacks Coal	Property File Collection	Miscellaneous Company Documents
<u>ARMC018571</u>	Field notes - 1976 - Carmacks	Property File Collection	Miscellaneous Company Documents
<u>ARMC018572</u>	Field notes - 1977 - Carmacks	Property File Collection	Miscellaneous Company Documents
<u>ARMC018599</u>	Field notes - Carmacks	Property File Collection	Miscellaneous Company Documents
<u>ARMC017927</u>	Air photos - NW 56777-14, 15, 34, 37, 38, 49, 50, 51, 55, 56, 89	Property File Collection	Geoscience Map (General)
<u>ARMC017928</u>	Air photo - NW 56777-33 with overlay	Property File Collection	Geoscience Map (General)

Capsule

Work History

A coal seam was exposed in two bulldozer trenches by Anvil Mg Corp L in Aug/66 on Lease 2949 staked earlier in the year. The discovery was made from geological projections from the main Tantalus deposit.

The adjoining area to the east was acquired in Sep/70 as Coal Exploration Licence 17 by Teslin EL, which did surface studies in 1970-71, drilled one 94.5 m hole in 1971 and one 73.2 m hole in 1973, and staked four coal leases in Nov/73.

The Anvil leases were transferred in 1975 to Cyprus Anvil Mg Corp, which optioned the Teslin EL leases and added five more leases to the southeast and explored with mapping and 6 holes (1524 m) in 1976, geophysical surveys in 1977, and 32 holes (3048 m) in 1979.

Control of Cyprus Anvil was sold to Hudson's Bay O & GL and subsequently to Dome Pet L in 1981. Dome's interest was sold in 1985 to Curragh Res L.

Acquired as Coal License CYW0062 in Sep/2003 by Archer, Cathro and Associates (1981) Ltd.

Capsule Geology

On the Anvil leases, a 9 m wide seam in the Upper Jurassic Tantalus formation strikes north-south and dips 60° east. An analysis by the Department of Mines showed the coal is non-coking with a dry composition of 14.8% ash, 26.0% volatile and 59.2% fixed carbon.

The 1973 Teslin drill hole cut 3.2 m of coal about 1200 m southeast of the Anvil trenches. The 1976 and 1979 drilling was confined to this southerly zone, where an inferred open pittable resource of 780 633 tonnes of High Volatile B Bituminous to meta-anthracite ranked coal was outlined in a shallow syncline with a stripping ratio of 10.7:1. About 900 m of strike length was tested to depth. Unfortunately, the coal proved to be of poor quality due to a high ash content, which was attributed to thermal alteration associated with felsic volcanics and/sills locally present within the sequence.

References

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

CYPRUS ANVIL MINING CORPORATION, 1976. Assessment Report * #092031 by T.J. Adamson, P. Hannigan and R.P. Hill.

CYPRUS ANVIL MINING CORPORATION, Feb/77. Assessment Report #092031 by R.P. Hill.

CYPRUS ANVIL MINING CORPORATION, Apr/78. Assessment Report * #092032 by R.P. Hill.

CYPRUS ANVIL MINING CORPORATION, 1981. Assessment Report * #090815 by T.J. Adamson.

CYPRUS ANVIL MINING CORPORATION, 1981. Assessment Report #092031 by R.P. Hill.

GEOLOGICAL SURVEY OF CANADA Paper 67-40, p. 89.

MINERAL INDUSTRY REPORT 1973, p. 120-121; 1977, p. 73.

TESLIN EXPLORATION LTD, 1972. Assessment Report * #019920 by J.F. Hlavay and R.J. Kirker.

Map Location



MINFILE DETAILS

Occurrence Number: 115I 003

Occurrence Name: TANTALUS BUTTE

Occurrence Type: Hard-rock

Status: Past Producer

Economic Commodities: coal

Deposit Type(s): Coal

Location(s): 62°7'25" N - -136°15'49" W

NTS Mapsheet(s): 115I01

Location Comments: .5 Kilometres

Hand Samples Available: Yes

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1978	Drilling	Number of holes drilled: 31 Amount of work done: 1535.887 METRES
12/31/1978	Other	Production shifts to surface pit until 1981.
12/31/1978	Trenching	
12/31/1977	Drilling	Number of holes drilled: 42 Amount of work done: 3476.854 METRES
12/31/1977	Geophysics	
12/31/1976	Drilling	Number of holes drilled: 10 Amount of work done: 1545.336 METRES
12/31/1976	Trenching	
12/31/1973	Drilling	Number of holes drilled: 6 Amount of work done: 294.437 METRES
12/31/1969	Other	Mining to 1976.
12/31/1948	Other	Mining until 1967.
12/31/1923	Other	
12/31/1923	Other	Drifting, 152.4 m adit, mining to 1938.
12/31/1906	Other	
12/31/1905	Other	

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC006363	Correspondence Re: Teslin Explorations coal leases at Carmacks		Property File Collection	Miscellaneous Company Documents
ARMC006365	Re: Visit to Carmacks Coal properties - Tantalus and Tantalus Butte		Property File Collection	Miscellaneous Company Documents
ARMC006366	Claim map - Schedule "B"		Property File Collection	Geoscience Map (General)
ARMC006367	Correspondence Re: Site tour of Carmacks Coal		Property File Collection	Miscellaneous Company Documents

<u>ARMC006368</u>	Correspondence Re: Carmacks rehabilitation program - 1992	Property File Collection	Miscellaneous Company Documents
<u>ARMC006369</u>	Claim map - Quarrying leases, coal mining leases, and lots and parcels	Property File Collection	Geoscience Map (General)
<u>ARMC006372</u>	Claim map showing Yukon River and coal mining lease	Property File Collection	Geoscience Map (General)
<u>ARMC006373</u>	Exploration drift map - 1972 - Tantalus Butte coal mine	Property File Collection	Geoscience Map (General)
<u>ARMC006374</u>	Correspondence Re: Curragh Resources Inc. and Little Salmon - Carmacks Indian Band	Property File Collection	Miscellaneous Company Documents
<u>ARMC006387</u>	Analysis of coal, air dried basis - Carmacks Coal	Property File Collection	Report
<u>ARMC003591</u>	Summary of exploration and development work - 1978 - Various claims	Property File Collection	Report
<u>ARMC003596</u>	Summary of exploration and development work - Tantalus Butte Mine	Property File Collection	Report
<u>ARMC009711</u>	Geological cross sections - Carmacks Coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008313</u>	Plan map showing underground control survey - Tantalus Butte coal mine	Property File Collection	Geoscience Map (General)
<u>ARMC008504</u>	Report on geophysical tests on Carmacks coal deposit	Property File Collection	Report
<u>ARMC008214</u>	Geological map of open pit area - Carmacks coal project- Tantalus Butte - Map 2	Property File Collection	Geoscience Map (Geological - Bedrock)
<u>ARMC008215</u>	1981 proposed mine plan map - Carmacks coal properties - Tantalus Butte mine - Map 1	Property File Collection	Geoscience Map (General)
<u>ARMC008216</u>	Cross-section no. 614.650 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008217</u>	Cross-section no. 613.000N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008218</u>	Cross-section no. - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008219</u>	Cross-section no. 613.250 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008220</u>	Cross-section no. 613.200N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008221</u>	Cross-section no. 613.350N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008222</u>	Cross-section no. 613.300N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008223</u>	Cross-section no. 613.450N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008224</u>	Cross-section no. 613.400N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008225</u>	Cross-section no. 613.550 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008226</u>	Cross-section no. 613.650 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008227</u>	Cross-section no. 613.500N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008228</u>	Cross-section no. 613.600N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)

ARMC008229	Cross-section no. 613.700N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008230	Cross-section no. 613.800N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008231	Cross-section no. 613.900N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008232	Cross-section no. 614.00N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008234	Cross-section no. 614.200N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008235	Cross-section no. 613.700N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008236	Cross-section no. 613.750N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008237	Cross-section no. 613.850N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008238	Cross-section no. 613.950N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008239	Cross-section no. 614.050N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008240	Cross-section no. 614.150N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008241	Cross-section no. 614.300N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008242	Cross-section no. 614.400N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008243	Cross-section no. 614.500N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008244	Cross-section no. 614.600N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008245	Cross-section no. 614.250N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008246	Cross-section no. 614.350N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008247	Cross-section no. 614.450N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008248	Cross-section no. 614.550N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008249	Geology map of Tantalus Basin west half - Appendix 1	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008250	Plan map showing surface and underground - Tantalus Butte mine - Drawing no. 175	Property File Collection	Geoscience Map (General)
ARMC008251	Geological map of open pit area - Tantalus Butte coal mine - Map 3	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008252	Geological map of open pit area - 2 of 2 - Carmacks coal project- Tantalus Butte - Map 3	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008253	Carmacks topographic map	Property File Collection	Geoscience Map (General)
ARMC008254	V.L.F. electromagnetic survey map - Contours of Fraser filtered in phase - Carmacks coal project	Property File Collection	Geophysical Map
ARMC008255	Reconnaissance map - Pencil manuscript - Sheet 1 of 1 - 76-67	Property File Collection	Geoscience Map (General)
ARMC008258	Composite section map showing working area - underground plans - Tantalus Butte coal mine - Carmacks coal - Drawing no. WB 172A	Property File Collection	Geoscience Map (General)

<u>ARMC008259</u>	Composite plan map - Tantalus Butte mine - Drawing no. 171	Property File Collection	Geoscience Map (General)
<u>ARMC008260</u>	Vertical N-S long. section map - Tantalus Butte mine - Drawing no. 172	Property File Collection	Geoscience Map (General)
<u>ARMC008292</u>	Carmacks extension map - 1151-6 - Job No. 80-157	Property File Collection	Geoscience Map (General)
<u>ARMC008293</u>	Open pit area map - 1977 - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008294</u>	Topographic plan map - Tantalus Butte coal mine - Carmacks	Property File Collection	Geoscience Map (General)
<u>ARMC008305</u>	Reconnaissance map - pencil manuscript - Sheet 1 of 2 - 76-67 - Carmacks	Property File Collection	Geoscience Map (General)
<u>ARMC008306</u>	Reconnaissance map - pencil manuscript - Sheet 2 of 2 - 76-67 - Carmacks	Property File Collection	Geoscience Map (General)
<u>ARMC008307</u>	Carmacks topographic map - Job No. 77-114	Property File Collection	Geoscience Map (General)
<u>ARMC008308</u>	Preliminary plan map of Carmacks coal mine - Surface lots	Property File Collection	Geoscience Map (General)
<u>ARMC008309</u>	Reconnaissance map - Pencil manuscript - Drawing no. 72-210 - Tantalus Butte coal mine - Carmacks	Property File Collection	Geoscience Map (General)
<u>ARMC008310</u>	Geology map of Carmacks coal lease area, Yukon - Map no. 1	Property File Collection	Geoscience Map (Geological - Bedrock)
<u>ARMC008311</u>	Plan map of survey of lots 23 and 24, Group 10 - Carmacks	Property File Collection	Geoscience Map (General)
<u>ARMC008312</u>	Field notes of resurvey of certain boundaries of lots 23 and 24 - Group 10, Carmacks - Drawing #52087	Property File Collection	Miscellaneous Company Documents
<u>ARMC008233</u>	Cross-section no. 614.100N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
<u>ARMC008314</u>	Map - Coal leases in Carmacks area - Map No. 2	Property File Collection	Geoscience Map (General)
<u>ARMC008315</u>	Map 1 - Fall 1989 On-site inspection safety/reclamation - Carmacks Coal properties	Property File Collection	Geoscience Map (General)
<u>ARMC008316</u>	Plan map showing coal mining leases - Carmacks area	Property File Collection	Geoscience Map (General)
<u>ARMC008257</u>	Composite plan map of working area - Tantalus Butte coal mine - Drawing no. WB 171A	Property File Collection	Geoscience Map (General)
<u>ARMC008692</u>	Correspondence Re: Carmack coal leases - Geophysics	Property File Collection	Miscellaneous Company Documents
<u>ARMC008694</u>	Correspondence Re: Carmacks coal - geophysical response	Property File Collection	Miscellaneous Company Documents
<u>ARMC008615</u>	Report on geophysical tests on Carmacks coal deposit	Property File Collection	Report
<u>ARMC007839</u>	Geological map of open pit area - Tantalus Butte coal mine - Carmacks	Property File Collection	Geoscience Map (Geological - Bedrock)
<u>ARMC007842</u>	Electromagnetic survey map - Contours of Fraser filtered in phase readings - Carmacks coal project	Property File Collection	Geophysical Map
<u>ARMC007843</u>	Electromagnetic survey map - profiles of in phase and quadrature readings - Carmacks coal project	Property File Collection	Geophysical Map
<u>ARMC007844</u>	Map 1 - 1981 proposed mine plan - Tantalus Butte mine	Property File Collection	Geoscience Map (General)

Capsule

Work History

Staked as coal lease 16536 in Oct/05 by C.E. Miller and adjacent lease 19203 to the west in Aug/06 by Miss E. Eisenbeiser. The first serious development commenced in 1923 when an adit was driven by Five Fingers Coal CL, and production averaged about 454 tonnes a year until 1938. The mine was reopened in 1948 by Yukon Coal CL (a Conwest subsidiary) and mined until 1967 to provide fuel for heating plants at United Keno Hill ML. Total production between 1948-1967 was approximately 118 000 tonnes, recovered by room and pillar mining above an adit about 900 m in length.

The mine was acquired by Anvil Mg Corp L in 1968, reopened in 1969 to supply fuel for plant heat and concentrate drying at the Faro Mine and to Cyprus Anvil Mg Corp in 1975. Cyprus Anvil mined about 109 770 tonnes from the underground mine between 1969 and the end of 1976, an additional 27 200 tonnes from the subcrop of the main seam about 520 m north of the portal in 1975-76, and explored extensions of the main seam with 6 underground holes (294.4 m) in 1973, bulldozer trenching and 10 surface holes (1545.3 m) in 1976, and 42 rotary percussion holes (3476.8 m) plus resistivity, IP, gravity and downhole EM surveys in 1977.

An underground fire in 1978 caused the mine to be sealed and production to be shifted to the surface mine, which produced 21 410 tonnes in 1978, 22 680 tonnes in 1979, about 18 140 tonnes in 1980, and 11 790 tonnes in 1981. Local exploration consisted of 1535.9 m of rotary percussion drilling (31 holes) and bulldozer trenching in 1978.

Capsule Geology

The coal occurs in the Upper Jurassic Tantalus Formation, striking north and dipping about 55° west. The seam is displaced by northeast-striking, southeast dipping faults. The main seam ranges from 2.4 to 6 m thick and is classified as a non-coking, high-volatile bituminous B coal. An average analysis is 14% ash, 35% volatile and 51% fixed carbon, with a gross calorific value between 11 000 and 12 700 BTU. The coal is agglomerating with a swelling index of 1 and is unsuitable for metallurgical coke.

The coal mined on surface had a lower calorific value, perhaps due to weathering. The 1977 drilling resulted in a large increase in proved reserves.

References

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BOYD, B.W., 1973. Coal Resources of the Carmacks Area, Yukon Territory. Department of Indian Affairs and Northern Development, 14 p. Filed as Assessment Report *#060110.

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HACQUEBARD, P.A., 1970. The correlation of the main seam in the Tantalus Butte coal mine at Carmacks, Yukon Territory. Department of Energy, Mines and Resources Canada, Topical Report No. 140, 21 p. Filed as Assessment Report *#061103.

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YUKON COAL COMPANY LTD, 1948. Assessment Report *#060734 by E. Swartzman.

YUKON COAL COMPANY LTD, 1948. Assessment Report *#060735 by E. Swartzman.

YUKON COAL COMPANY LTD, 1965. Assessment Report *#092073 by E.J. Wade.

YUKON COAL COMPANY LTD and UNITED KENO HILL MINES LTD, 1965. Assessment Report *#019918 by A.D. Oliver.

Map Location

MINFILE DETAILS

Occurrence Number: 115I 002

Occurrence Name: TANTALUS MINE

Occurrence Type: Hard-rock

Status: Past Producer

Economic Commodities: coal

Deposit Type(s): Coal

Location(s): 62°5'36" N - -136°15'50" W

NTS Mapsheet(s): 115I01

Location Comments: .5 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1970	Other	
12/31/1966	Other	
12/31/1922	Other	Sporadic production between 1910 and 1922.
12/31/1909	Other	Carried out between 1907 and 1909 by Five Fingers Coal Company Ltd.
12/31/1909	Other	Carried out between 1907 and 1909 by Five Fingers Coal Company Ltd.
12/31/1905	Other	
12/31/1903	Other	

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC006363	Correspondence Re: Teslin Explorations coal leases at Carmacks		Property File Collection	Miscellaneous Company Documents
ARMC006365	Re: Visit to Carmacks Coal properties - Tantalus and Tantalus Butte		Property File Collection	Miscellaneous Company Documents
ARMC006366	Claim map - Schedule "B"		Property File Collection	Geoscience Map (General)
ARMC006367	Correspondence Re: Site tour of Carmacks Coal		Property File Collection	Miscellaneous Company Documents
ARMC006368	Correspondence Re: Carmacks rehabilitation program - 1992		Property File Collection	Miscellaneous Company Documents
ARMC006369	Claim map - Quarrying leases, coal mining leases, and lots and parcels		Property File Collection	Geoscience Map (General)
ARMC006372	Claim map showing Yukon River and coal mining lease		Property File Collection	Geoscience Map (General)
ARMC006373	Exploration drift map - 1972 - Tantalus Butte coal mine		Property File Collection	Geoscience Map (General)
ARMC006374	Correspondence Re: Curragh Resources Inc. and Little Salmon - Carmacks Indian Band		Property File Collection	Miscellaneous Company Documents

ARMC006387	Analysis of coal, air dried basis - Carmacks Coal	Property File Collection	Report
ARMC003591	Summary of exploration and development work - 1978 - Various claims	Property File Collection	Report
ARMC003596	Summary of exploration and development work - Tantalus Butte Mine	Property File Collection	Report
ARMC009711	Geological cross sections - Carmacks Coal project	Property File Collection	Geoscience Map (General)
ARMC008313	Plan map showing underground control survey - Tantalus Butte coal mine	Property File Collection	Geoscience Map (General)
ARMC008504	Report on geophysical tests on Carmacks coal deposit	Property File Collection	Report
ARMC008214	Geological map of open pit area - Carmacks coal project- Tantalus Butte - Map 2	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008215	1981 proposed mine plan map - Carmacks coal properties - Tantalus Butte mine - Map 1	Property File Collection	Geoscience Map (General)
ARMC008216	Cross-section no. 614.650 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008217	Cross-section no. 613.000N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008218	Cross-section no. - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008219	Cross-section no. 613.250 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008220	Cross-section no. 613.200N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008221	Cross-section no. 613.350N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008222	Cross-section no. 613.300N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008223	Cross-section no. 613.450N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008224	Cross-section no. 613.400N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008225	Cross-section no. 613.550 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008226	Cross-section no. 613.650 - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008227	Cross-section no. 613.500N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008228	Cross-section no. 613.600N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008229	Cross-section no. 613.700N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008230	Cross-section no. 613.800N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008231	Cross-section no. 613.900N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008232	Cross-section no. 614.00N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008234	Cross-section no. 614.200N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008235	Cross-section no. 613.700N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)

ARMC008232	Cross-section no. 613.700N - 1981 mining plan - Carmacks coal project	Collection	(General)
ARMC008236	Cross-section no. 613.750N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008237	Cross-section no. 613.850N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008238	Cross-section no. 613.950N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008239	Cross-section no. 614.050N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008240	Cross-section no. 614.150N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008241	Cross-section no. 614.300N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008242	Cross-section no. 614.400N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008243	Cross-section no. 614.500N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008244	Cross-section no. 614.600N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008245	Cross-section no. 614.250N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008246	Cross-section no. 614.350N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008247	Cross-section no. 614.450N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008248	Cross-section no. 614.550N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008249	Geology map of Tantalus Basin west half - Appendix 1	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008250	Plan map showing surface and underground - Tantalus Butte mine - Drawing no. 175	Property File Collection	Geoscience Map (General)
ARMC008251	Geological map of open pit area - Tantalus Butte coal mine - Map 3	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008252	Geological map of open pit area - 2 of 2 - Carmacks coal project- Tantalus Butte - Map 3	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008253	Carmacks topographic map	Property File Collection	Geoscience Map (General)
ARMC008254	V.L.F. electromagnetic survey map - Contours of Fraser filtered in phase - Carmacks coal project	Property File Collection	Geophysical Map
ARMC008255	Reconnaissance map - Pencil manuscript - Sheet 1 of 1 - 76-67	Property File Collection	Geoscience Map (General)
ARMC008258	Composite section map showing working area - underground plans - Tantalus Butte coal mine - Carmacks coal - Drawing no. WB 172A	Property File Collection	Geoscience Map (General)
ARMC008259	Composite plan map - Tantalus Butte mine - Drawing no. 171	Property File Collection	Geoscience Map (General)
ARMC008260	Vertical N-S long. section map - Tantalus Butte mine - Drawing no. 172	Property File Collection	Geoscience Map (General)
ARMC008292	Carmacks extension map - 115I-6 - Job No. 80-157	Property File Collection	Geoscience Map (General)
ARMC008293	Open pit area map - 1977 - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008294	Topographic plan map - Tantalus Butte coal mine - Carmacks	Property File Collection	Geoscience Map (General)

ARMC008305	Reconnaissance map - pencil manuscript - Sheet 1 of 2 - 76-67 - Carmacks	Property File Collection	Geoscience Map (General)
ARMC008306	Reconnaissance map - pencil manuscript - Sheet 2 of 2 - 76-67 - Carmacks	Property File Collection	Geoscience Map (General)
ARMC008307	Carmacks topographic map - Job No. 77-114	Property File Collection	Geoscience Map (General)
ARMC008308	Preliminary plan map of Carmacks coal mine - Surface lots	Property File Collection	Geoscience Map (General)
ARMC008309	Reconnaissance map - Pencil manuscript - Drawing no. 72-210 - Tantalus Butte coal mine - Carmacks	Property File Collection	Geoscience Map (General)
ARMC008310	Geology map of Carmacks coal lease area, Yukon - Map no. 1	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC008311	Plan map of survey of lots 23 and 24, Group 10 - Carmacks	Property File Collection	Geoscience Map (General)
ARMC008312	Field notes of resurvey of certain boundaries of lots 23 and 24 - Group 10, Carmacks - Drawing #52087	Property File Collection	Miscellaneous Company Documents
ARMC008233	Cross-section no. 614.100N - 1981 mining plan - Carmacks coal project	Property File Collection	Geoscience Map (General)
ARMC008314	Map - Coal leases in Carmacks area - Map No. 2	Property File Collection	Geoscience Map (General)
ARMC008315	Map 1 - Fall 1989 On-site inspection safety/reclamation - Carmacks Coal properties	Property File Collection	Geoscience Map (General)
ARMC008316	Plan map showing coal mining leases - Carmacks area	Property File Collection	Geoscience Map (General)
ARMC008257	Composite plan map of working area - Tantalus Butte coal mine - Drawing no. WB 171A	Property File Collection	Geoscience Map (General)
ARMC008692	Correspondence Re: Carmack coal leases - Geophysics	Property File Collection	Miscellaneous Company Documents
ARMC008694	Correspondence Re: Carmacks coal - geophysical response	Property File Collection	Miscellaneous Company Documents
ARMC008615	Report on geophysical tests on Carmacks coal deposit	Property File Collection	Report
ARMC007839	Geological map of open pit area - Tantalus Butte coal mine - Carmacks	Property File Collection	Geoscience Map (Geological - Bedrock)
ARMC007842	Electromagnetic survey map - Contours of Fraser filtered in phase readings - Carmacks coal project	Property File Collection	Geophysical Map
ARMC007843	Electromagnetic survey map - profiles of in phase and quadrature readings - Carmacks coal project	Property File Collection	Geophysical Map
ARMC007844	Map 1 - 1981 proposed mine plan - Tantalus Butte mine	Property File Collection	Geoscience Map (General)
ARMC018569	Field notes - 1977 - Carmacks	Property File Collection	Miscellaneous Company Documents
ARMC018570	Field notes - 1977 drill logs - Carmacks Coal	Property File Collection	Miscellaneous Company Documents
ARMC018571	Field notes - 1976 - Carmacks	Property File Collection	Miscellaneous Company Documents
ARMC018572	Field notes - 1977 - Carmacks	Property File Collection	Miscellaneous Company Documents
ARMC018599	Field notes - Carmacks	Property File Collection	Miscellaneous Company Documents

Capsule

Work History

Staked as coal lease 7623 in Jun/03 by C.D. Miller, who mined about 2722 tonnes in 1905. Later acquired by Five Fingers Coal CL, which completed 548.6 m of drifting in two adits and mined more than 4536 tonnes annually in 1907-09 with room and pillar methods. Production continued at reduced rates until 1922. The adits are now caved and the mine is burning underground (possibly caused by a forest fire in 1950's). The old leases were acquired by Anvil Mg Corp. L about 1966 and the adjoining area to the east was acquired as Coal Exploration Licence 17 in Sep/70 by Teslin EL.

Capsule Geology

Three coal seams, striking southeast and dipping about 30° east, occur in the Upper Jurassic Tantalus Formation but only the two lower were developed. These are separated by 1.2 m of rock. Analyses of each seam by the Department of Mines in 1907 was:

	Bottom (2.3 m)	Middle (2.0 m)	Top (0.9 m)
Water (%)	0.75	0.76	0.82
Volatile (%)	23.61	24.74	25.12
Fixed Carbon (%)	55.21	58.60	66.03
Ash (%)	20.43	15.90	8.03
Coke (%)	75.64	74.56	74.06

Washed coal from the middle seam was stated to be a possible commercial coke and the bottom seam was stated to be a good commercial coke. Gross calorific value is about 10 100 G.BTU.

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EMJ, 28 Apr/06.

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GEOLOGICAL SURVEY OF CANADA Memoir 189, p. 58-59.

GEOLOGICAL SURVEY OF CANADA Summary Report, 1907, p. 21-22.

RESEARCH COUNCIL OF ALBERTA Report 66-6, p. 16.

Map Location



MINFILE DETAILS

Occurrence Number: 105E 012

Occurrence Name: WALSH

Occurrence Type: Hard-rock

Status: Showing

Deposit Type(s): Coal

Location(s): 61°57'33" N - -134°47'0" W

NTS Mapsheet(s): 105E15

Location Comments: .5 Kilometres

Hand Samples Available: No

Last Reviewed:

Work History

Date	Work Type	Comment
12/31/1970	Other	
12/31/1966	Other	
12/31/1938	Other	Coal float reported prior to 1938.

Related References

Number	Title	Page(s)	Reference Type	Document Type
ARMC008699	Correspondence Re: Walsh Creek area		Property File Collection	Miscellaneous Company Documents
ARMC008701	Correspondence Re: Preliminary study on the semi-regional geological structure of the coal seams bearing Tantalus formation near Walsh Creek, Yukon Territory		Property File Collection	Miscellaneous Company Documents

Capsule

Work History

Coal float was reported in Walsh Creek prior to 1938. Limited prospecting was done in the area by Anvil Mining Corporation Ltd in 1966.

Coal Exploration Licence 6 was issued to Atlas Exploration Ltd in 1969, which carried out prospecting in 1970.

In Nov/76, Coal Exploration Licence 59 (covering the NW quarter of claim map sheet 105E/15, including this occurrence) and Coal Exploration Licence 58 and 60 (covering the NE and SE quarters of 105E/15, respectively) were issued to Kerr Addison Mines Ltd. Kerr Addison carried out ground and airborne geophysical surveying and geological mapping in 1977.

Capsule Geology

Anvil located several seams of poor grade shaly coal less than 0.6 m thick in the Upper Jurassic Tantalus Fm. Coal float was found by Atlas for another 6.4 km further upstream but the source was not located. The float in Walsh Creek is probably derived from this area. The Tantalus Formation underlies more than 130 square kilometres in this area.

References

ATLAS EXPLORATIONS LTD, Nov/70. Assessment Report #060585 by J.F. George.

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon

Territorial Government, 169 p.

GEOLOGICAL SURVEY OF CANADA Memoir 217, p. 16.

KERR ADDISON MINES LTD, Dec/77. Assessment Report *#061630 by G.A. Noel.

KERR ADDISON MINES LTD, Dec/77. Assessment Report *#061631 by W.M. Srola.

KERR ADDISON MINES LTD, Dec/77. Assessment Report *#061632 by F. Chow.

Map Location

Appendix 3

Coal Quality Data

TABLE 2
DIVISION MOUNTAIN COAL PROJECT
1994 COAL QUALITY ANALYSES (AIR DRIED)

SAMPLE NO.	SEAM	RESIDUAL MOISTURE (%)	ASH (%)	VOLATILE MATTER (%)	FIXED CARBON (%)	SULPHUR (%)	CALORIFIC VALUE (DRY)		True Width (m)
							Cal/g	BTU/lb (Cal/g/.56)	
<u>HOLE 94-023</u>	(11+829N)								
9423-1	5	1.60	28.68	22.65	47.07	0.37	5082	9075	4.20
9423-3	4	2.20	18.76	30.73	48.31	0.42	6135	10955	7.92
9423-4	3e	2.11	29.45	26.13	43.80	0.49	5273	9416	1.24
9423-5	3c	2.29	22.46	29.16	46.09	0.49	5854	10454	5.05
9423-6	3b	1.70	41.00	28.69	39.97	0.52	4157	7423	5.86
9423-7	3a	1.71	42.91	25.96	29.42	0.38	3924	7007	1.61
Weighted Average		1.97	28.14	28.14	44.40	0.45	5283	9433	25.88
Low Ash (<30%) Avg		2.08	22.76	28.16	47.11	0.43	5760	10285	18.41
<u>HOLE 94-025</u>	(11+500N)								
9425-1	4	2.98	19.29	30.03	47.70	0.39	5910	10554	3.63
9425-2	3c	3.11	20.90	29.75	46.24	0.41	5856	10457	6.17
9425-3	3b	2.07	28.24	31.24	38.45	0.50	5070	9054	3.81
Low Ash (<30%) Avg		2.78	22.52	30.24	44.45	0.43	5650	10089	13.61

SAMPLE NO.	SEAM	RESIDUAL MOISTURE (%)	ASH (%)	VOLATILE MATTER (%)	FIXED CARBON (%)	SULPHUR (%)	CALORIFIC VALUE (DRY)		True Width (m)
							Cal/g	BTU/lb (Cal/g/.56)	
<u>HOLE 94-028</u>	(10+914N)								
9428-1	4	2.46	28.16	26.81	42.57	0.73	5344	9543	1.00
9428-3	3d	7.97	35.02	8.11	48.90	0.50	4441	7930	1.94
9428-4	3c	3.42	20.02	28.85	47.71	0.48	6042	10789	3.01
9428-5	3b	3.04	18.57	32.10	46.29	0.64	5989	10695	1.39
9428-6	3a	3.04	18.81	29.84	48.31	0.39	6043	10791	6.98
9428-7	2	2.90	20.32	31.65	45.13	0.80	5924	10579	2.89
9428-8	1	2.02	47.98	23.49	26.51	0.54	3341	5966	1.67
Weighted Average Low Ash (<30%) Avg		3.46 3.05	23.96 19.92	27.17 29.99	45.41 47.03	0.50 0.49	5580 5970	9964 10660	18.88 15.27
<u>HOLE 94-029</u>	(11+219N)								
9429-1	4	2.99	32.19	26.69	38.13	0.36	4978	8889	7.63
9429-2	3c	4.83	27.44	21.85	45.88	0.30	5175	9241	1.71
9429-3	3c	5.54	23.99	7.63	62.84	0.28	5593	9988	1.23
9429-4	3b	2.23	25.65	28.03	44.09	0.62	5479	9784	3.37
9429-5	3a	2.67	28.15	28.01	41.17	0.36	5225	9330	3.83
9429-6	3a	2.48	20.58	31.40	45.54	0.62	5889	10516	2.90
Weighted Average Low Ash (<30%) Avg		3.04 3.07	27.87 25.33	26.28 26.04	42.82 45.56	0.43 0.47	5286 5466	9439 9761	20.67 13.04

SAMPLE NO.	SEAM	RESIDUAL MOISTURE (%)	ASH (%)	VOLATILE MATTER (%)	FIXED CARBON (%)	SULPHUR (%)	CALORIFIC VALUE (DRY)		True Width (m)
							Cal/g	BTU/lb (Cal/g/.56)	
<u>Hole 94-030</u>	(12+134N)								
9430-1	5	2.28	36.60	11.36	49.76	0.30	4305	7688	1.61
9430-2	5	2.31	27.97	10.56	59.16	0.44	5193	9273	1.56
9430-3	4	3.06	16.87	29.71	50.38	0.51	6259	11177	9.44
9430-4	3e	2.62	22.98	28.18	46.22	0.54	5733	10238	1.90
9430-5	3c	2.34	25.13	31.03	41.50	0.59	5620	10038	1.93
9430-6	3b	1.79	52.66	24.97	20.58	0.43	2913	5202	2.50
9430-7	3a	1.99	40.07	26.38	31.56	0.59	4197	7495	4.20
Weighted Average		2.53	25.75	26.01	43.20	0.51	5219	9320	23.14
Low Ash (<30%) Avg		2.83	19.89	27.67	49.60	0.52	5996	10707	14.83
<u>Hole 94-032</u>	(12+134N)								
9432-1	5	2.35	38.99	18.95	39.71	0.31	4421	7895	5.00
9432-2	4	2.60	19.82	29.12	48.46	0.43	6037	10780	11.25
9432-3	3e	1.49	47.53	24.01	26.97	0.38	3605	6438	0.98
9432-4	3c	1.91	23.08	30.32	44.69	0.62	5835	10420	1.03
9432-5	3c	1.80	31.75	28.59	37.86	0.51	4989	8909	1.02
9432-6	3b	1.57	27.00	30.98	40.45	0.54	5504	9829	1.44
9432-7	3a	1.46	46.85	24.44	27.25	0.36	3562	6361	4.97
Weighted Average		2.12	30.84	26.17	40.81	0.41	5071	9056	25.69
Low Ash (<30%) Avg		2.44	20.82	29.41	45.26	0.46	5966	10653	13.72

SAMPLE NO.	SEAM	RESIDUAL MOISTURE (%)	ASH (%)	VOLATILE MATTER (%)	FIXED CARBON (%)	SULPHUR (%)	CALORIFIC VALUE (DRY)		True Width (m)
							Cal/g	BTU/lb (Cal/g/.56)	
<u>HOLE 94-033</u>	(10+914N)								
9433-1	3d	1.79	18.94	24.86	54.41	0.67	5991	10699	9.00
9433-2	3	2.15	21.36	30.40	46.09	0.58	5491	9805	12.18
Low Ash (<30%) Avg		2.00	20.33	28.05	49.63	0.62	5703	10185	21.18
<u>HOLE 94-034</u>	(10+725N)								
9434-1	4b	2.70	20.47	29.44	47.39	0.40	5694	10168	6.00
9434-2	4a	1.89	40.88	24.01	33.22	0.40	4157	7423	3.80
9434-3	3c	2.95	39.12	17.84	40.09	0.38	4336	7743	12.70
9434-4	3a	1.63	41.27	25.04	32.06	0.68	4075	7277	5.20
Weighted Average Low Ash (<30%) Avg		2.50 2.70	35.73 20.47	22.55 29.44	39.22 47.39	0.44 0.40	4557 5694	8138 10168	27.70 6.00
<u>HOLE 94-035</u>	(10+725N)								
9435-1	4b	2.41	21.58	30.67	45.34	0.55	5796	10350	7.36
9435-2	4a	1.94	44.17	23.96	29.93	0.47	3754	6704	5.06
Weighted Average Low Ash (<30%) Avg		2.22 2.41	30.78 21.58	27.94 30.67	39.06 45.34	0.52 0.55	4964 5796	8971 10350	12.42 7.36
<u>HOLE 94-037</u>	(10+710N)								
9437-3		1.31	38.31	17.91	42.47	0.75	4392	7843	2.08
9437-4		2.23	27.07	23.95	46.75	0.34	5305	9473	6.79
9437-5		2.13	28.52	26.22	43.13	0.74	5172	9236	7.99
Weighted Average Low Ash (<30%) Avg		2.07 2.18	29.14 27.85	24.28 25.18	44.51 44.79	0.58 0.56	5129 5233	9160 9345	16.86 14.78

SAMPLE NO.	SEAM	RESIDUAL MOISTURE (%)	ASH (%)	VOLATILE MATTER (%)	FIXED CARBON (%)	SULPHUR (%)	CALORIFIC VALUE (DRY)		True Width (m)
							Cal/g	BTU/lb (Cal/g/.56)	
<u>HOLE 94-038</u>	(11+219N)								
9438-1	4	2.65	34.95	26.83	35.57	0.35	4577	8173	4.63
9438-2	3c	1.83	30.45	8.65	59.07	0.35	5554	9918	3.32
9438-3	3b	3.27	47.32	10.52	38.89	0.32	3484	6221	2.90
9438-4	3a	5.24	54.76	10.85	29.15	0.20	2172	3879	4.18
Weighted Average		3.31	41.85	15.22	39.61	0.30	3913	6987	15.03
<u>HOLE 94-040</u>	(11+219N)								
9440-1	4	3.45	21.13	29.84	45.58	0.45	5875	10489	4.27
9440-2	3c	3.33	17.99	30.86	47.82	0.46	6185	11045	6.13
9440-3	3b	3.37	18.68	29.22	48.73	0.48	6074	10857	3.32
9440-4	3b	2.44	43.71	25.12	28.73	0.45	3824	6829	1.68
9440-5	3a	2.62	28.58	27.79	41.01	0.43	5236	9350	8.71
9440-6	2	1.29	25.21	25.95	47.55	0.69	5747	10262	3.04
Weighted Average		2.84	24.43	28.61	44.18	0.48	5623	10042	27.15
Low Ash (<30%) Avg		2.87	23.16	28.84	45.20	0.48	5742	10254	25.47
<u>HOLE 94-041</u>	(12+754N)								
9441-2	4	2.45	32.04	26.93	38.58	0.35	5042	9004	4.55
9441-3	3b	7.02	34.00	7.49	51.49	0.31	4970	8875	2.26
9441-4	3a	2.59	31.99	26.55	38.87	0.72	5005	8938	5.11
Weighted Average		3.38	32.39	23.08	41.15	0.50	5012	8951	11.92

SAMPLE NO.	SEAM	RESIDUAL MOISTURE (%)	ASH (%)	VOLATILE MATTER (%)	FIXED CARBON (%)	SULPHUR (%)	CALORIFIC VALUE (DRY)		True Width (m)
							Cal/g	BTU/lb (Cal/g/.56)	
<u>HOLE 94-042</u>	(11+500N)								
9442-1	4	3.03	22.17	29.54	45.26	0.42	5902	10539	5.60
9442-3	3c	2.20	25.30	29.39	43.11	0.40	5523	9862	10.80
9442-4	3b	2.29	25.31	27.50	44.90	0.42	5576	9957	3.90
9442-5	2	2.14	25.82	28.93	43.11	0.42	5599	9998	7.70
9442-6	1	1.82	41.74	25.79	30.65	0.39	3999	7141	3.84
Weighted Average Low Ash (<30%) Avg		2.30	26.86	28.64	42.20	0.41	5430	9697	31.84
		2.36	24.82	29.03	43.79	0.41	5627	10048	28.00
<u>HOLE 94-043</u>	(13+048N)								
9443-2	3c	1.20	42.75	13.24	42.81	0.30	4069	7266	3.41
9443-3	3c	1.88	25.03	26.61	46.48	0.38	5659	10105	3.03
9443-4	3c	1.46	44.93	23.65	29.96	0.40	3860	6893	2.54
9443-5	3b	1.85	35.44	15.26	47.45	0.42	5060	9089	2.42
9443-6	3a	1.80	27.77	29.94	40.49	0.46	5433	9702	2.03
Weighted Average Low Ash (<30%) Avg		1.61	35.58	21.11	41.69	0.38	4773	8533	13.43
		1.85	26.13	27.95	44.08	0.41	5568	9943	5.06

SAMPLE NO.	SEAM	RESIDUAL MOISTURE (%)	ASH (%)	VOLATILE MATTER (%)	FIXED CARBON (%)	SULPHUR (%)	CALORIFIC VALUE (DRY)		True Width (m)
							Cal/g	BTU/lb (Cal/g/.56)	
<u>HOLE 94-044</u>	(11+829N)								
9444-1	4	3.35	29.62	28.22	38.81	0.43	5258	9389	4.68
9444-2	3c	3.35	18.32	31.34	46.99	0.46	6291	11234	5.78
9444-3	3c	3.02	24.80	27.92	44.26	0.47	5621	10038	4.29
9444-4	3b	2.15	25.08	28.62	44.15	0.57	5632	10057	2.62
9444-5	3a	2.56	26.28	28.93	44.23	0.49	5507	9834	4.10
Low Ash (<30%) Avg		2.99	24.42	29.16	43.79	0.45	5702	10182	21.47
<u>Hole 94-045</u>	(11+500N)								
9445-1	4	3.00	31.58	27.85	37.57	0.37	4871	8698	5.01
9445-2	3c	3.43	17.00	30.92	48.65	0.45	6327	11298	4.39
9445-3	3b	3.51	19.65	28.49	48.35	0.50	6039	10784	2.12
9445-4	3a	3.15	23.36	27.26	46.23	0.49	5743	10255	2.50
9445-5	3a	1.28	27.85	28.39	41.22	0.58	5217	9316	1.02
9445-6	2H	0.40	35.37	13.99	50.24	0.16	5268	9407	2.96
9445-7	1	2.75	21.21	31.11	44.93	0.55	5798	10354	1.85
Weighted Average		2.67	25.45	26.79	45.03	0.41	5591	9984	19.85
Low Ash (<30%) Avg		3.09	20.40	29.53	47.30	0.49	5975	10670	11.88
1993 Overall Average		2.86	26.99	25.05	45.11	0.47	5344	9561	11.34
1994 Overall Average		2.38	28.59	25.85	43.01	0.43	5205	9301	19.61
1993-1994 Average		2.42	28.45	25.79	43.18	0.43	5216	9328	18.94

Appendix 4

Resources Summary and Resources by Seam

CALCULATIONS FOR MEASURED RESOURCES

MEASURED RESOURCE BY SEAM

SEAM 5												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 94-23*	11+829N	320	50	4.0	5001	1.6	28.7	22.7	47.7	0.37	1.46	92,739
DDH 94-23*	11+829N	320	60	2.0	2597	1.04	54.3	17.0	27.7	0.28	1.72	64,727
DDH 94-30*	12+134N	348	65	1.5	4207	2.3	36.6	11.5	49.8	0.30	1.59	54,668
DDH 94-30*	12+134N	348	71	1.5	5073	2.3	28.0	10.6	59.2	0.44	1.51	54,844
DDH 94-32*	12+134N	348	80	4.9	4317	2.4	39.0	19.0	39.7	0.31	1.63	222,358
DDH 94-32*	12+134N	174	144	4.9	4317	2.4	39.0	19.0	39.7	0.31	1.63	200,122
				3.1	4252	2.0	37.6	16.6	44.0	0.34	1.59	689,459

SEAM 4												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 94-29	11+244N	287	72	8.3	4829	3.0	32.2	26.7	38.1	0.36	1.54	264,127
DDH 94-40	11+244N	287	30	7.0	5673	3.5	21.1	29.8	45.6	0.45	1.46	87,994
DDH 94-38	11+244N	287	89	4.7	4456	2.7	35.0	26.8	35.6	0.35	1.58	189,682
DDH 94-25	11+500N	303	83	3.7	5734	3.0	19.3	30.0	47.7	0.39	1.44	133,994
DDH 05-87	11+500N	303	38	2.3	5938	6.9	19.1	30.0	48.2	0.41	1.50	39,594
DDH 94-42	11+500N	303	44	6.0	5723	3.0	22.2	29.5	45.3	0.42	1.47	117,588
DDH 94-45	11+500N	303	132	5.0	4725	3.0	31.6	27.9	37.6	0.37	1.55	309,969
DDH 94-23	11+829N	320	141	7.5	6000	2.2	18.8	30.7	48.3	0.42	1.44	487,296
DDH 05-86	11+829N	320	136	5.2	5489	3.8	22.5	30.1	45.2	0.49	1.51	342,302
DDH 94-44	11+829N	320	172	4.7	5082	3.4	29.6	28.2	38.8	0.43	1.54	398,380
DDH 94-30	12+134N	348	112	8.9	6067	3.1	16.9	29.7	50.4	0.51	1.43	496,048
DDH 94-32	12+134N	348	79	12.9	5879	2.6	19.8	29.1	48.5	0.43	1.45	513,839
DDH 94-32	12+134N	174	176	12.9	5879	2.6	19.8	29.1	48.5	0.43	1.45	572,378
DDH 93-19	14+404N	158	56	1.9	3301	10.0	41.1	6.3	42.6	0.19	1.65	27,738
DDH 72-01	14+404N	158	49	1.7	6082	1.3	22.9	16.7	59.1	0.46	1.49	19,610
				6.2	5390	3.6	24.8	26.7	45.3	0.41	1.50	4,000,541

SEAM 3e												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 94-23	11+829N	320	153	1.2	5161	2.1	29.5	26.1	43.8	0.49	1.53	88,392
DDH 94-30	12+134N	348	124	1.8	5583	2.6	23.0	28.2	46.2	0.54	1.48	114,957
DDH 94-32	12+134N	348	82	1.2	3552	1.5	47.5	24.0	27.0	0.38	1.71	58,556
DDH 95-47*	13+353N	303	102	2.1	3137	6	47.9	6.5	39.6	0.19	1.71	110,455
DDH 95-47*	13+353N	304	121	1.4	2858	5.4	49.7	6.1	38.8	0.23	1.74	87,686
DDH 93-15	14+075N	150	83	6.6	5769	2.6	21.0	29.2	47.2	0.47	1.47	120,245
DDH 93-15	14+075N	150	91	3.7	5664	2.9	21.9	28.2	47.0	0.42	1.47	74,499
DDH 93-15	14+075N	150	97	2.6	5300	2.6	26.2	29.2	42.1	0.44	1.49	55,831
DDH 93-22	14+075N	150	54	5.4	5443	3.5	26.4	9.5	60.6	0.45	1.49	65,414
DDH 93-22	14+075N	150	53	8.6	5651	2.7	22.0	28.9	46.4	0.40	1.46	100,052
DDH 93-07	14+267N	175	84	3.7	5856	2.9	19.3	30.2	47.6	0.42	1.49	81,041
DDH 93-07	14+267N	175	91	4.6	4977	2.7	28.3	28.4	40.6	0.44	1.50	109,883
DDH 93-07	14+267N	175	98	3.4	5540	2.7	22.5	29.8	45.0	0.52	1.46	85,133
DDH 93-10	14+267N	175	47	5.3	5938	2.8	17.9	31.4	47.9	0.42	1.43	62,337
DDH 93-10	14+267N	175	47	4.3	5657	2.5	22.1	28.4	47.0	0.45	1.47	51,990
DDH 93-10	14+267N	175	47	2.6	5540	2.7	22.5	29.8	45.0	0.52	1.46	31,222
DDH 93-19	14+404N	158	86	4.2	5908	3.2	17.9	30.3	48.7	0.41	1.43	81,610
DDH 93-19	14+404N	158	88	4.2	5520	2.8	23.1	29.4	44.7	0.48	1.48	86,427
DDH 72-01*	14+404N	158	52	8.1	5891	2.3	30.2	17.6	49.9	0.55	1.54	102,486
				3.9	5208	3.0	27.3	24.8	45.0	0.43	1.52	1,568,216

SEAM 3d												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 97-63	8+950N	519	112	3.5	6775	3.3	8.7	31.9	56.2	0.48	1.36	276,689
DDH 94-32	12+134N	348	76	1.2	5724	1.9	23.1	30.3	44.7	0.62	1.48	46,972
DDH 94-41	12+754N	298	148	4.5	4919	2.5	32.0	26.9	38.6	0.35	1.55	307,625
				3.1	5806	2.6	21.3	29.7	46.5	0.48	1.46	631,286

SEAM 3c												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 97-63	8+950N	519	119	1.5	4473	2.2	35.9	25.9	36.0	0.54	1.57	145,447
DDH 95-52	9+800N	303	188	1.6	6756	4.4	8.2	31.2	56.2	0.40	1.35	123,042
DDH 94-34	10+725N	150	20	6.4	5540	2.7	20.5	29.4	47.4	0.40	1.46	28,032
DDH 94-35	10+725N	110	18	7.5	5656	2.4	21.6	30.7	45.3	0.55	1.46	21,681
DDH 94-26	10+914N	248	70.1	1.0	5212	2.5	28.2	26.8	42.6	0.73	1.52	26,425
DDH 05-85	10+914N	248	19	0.5	4978	3.8	31.0	26.9	39.9	0.63	1.54	3,918
DDH 94-23	11+829N	320	167	4.8	5720	2.3	22.5	29.2	46.1	0.49	1.47	377,073
DDH 94-30	12+134N	348	145	1.8	5489	2.3	25.1	31.0	41.5	0.59	1.50	136,242
DDH 94-32	12+134N	348	78	1.2	5724	1.9	23.1	30.3	44.7	0.62	1.47	47,882
DDH 94-32	12+134N	348	78	1.2	4899	1.8	31.8	28.6	37.9	0.51	1.50	48,859
DDH 94-32	12+134N	174	202	1.2	4899	1.8	31.8	28.6	37.9	0.51	1.50	63,266
DDH 94-41	12+754N	298	178	2.7	4621	7.0	34.0	7.5	51.5	0.31	1.57	224,854
DDH 94-43	13+048N	303	164	12.0	4328	1.4	39.2	18.7	40.6	0.34	1.62	966,012
DDH 95-47 ^a	13+353N	304	182	13.3	5425	2.2	26.2	27.7	43.9	0.47	1.50	1,102,134
DDH 95-47 ^a	13+353N	304	162	3.1	4708	1.7	33.3	27.8	37.3	0.38	1.56	236,627
DDH 93-15	14+075N	150	104	1.4	5615	2.5	23.9	28.5	45.1	0.52	1.48	32,323
DDH 93-22	14+075N	152	53	7.9	5362	3.1	24.8	27.5	44.7	0.41	1.49	94,707
DDH 93-07	14+267N	175	115	2.0	5423	2.5	25.2	31.3	41.0	0.62	1.49	59,973
DDH 93-10	14+267N	175	41	2.8	4851	2.4	31.5	28.6	37.5	0.54	1.54	30,939
DDH 93-19	14+404N	158	96	1.2	5402	3.0	22.8	31.1	43.1	0.72	1.48	26,938
DDH 72-01	14+404N	158	56	2.4	5800	1.6	24.2	28.4	45.9	0.52	1.48	31,428
				3.7	5280	2.6	26.9	27.4	43.1	0.51	1.50	3,827,802

SEAM 3b												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 97-63	8+950N	519	139	2.0	5719	3.2	18.1	29.0	49.8	0.38	1.43	206,323
DDH 97-61	9+510N	449	180	1.8	6854	3.0	8.2	30.9	57.8	0.39	1.35	196,393
DDH 95-52	9+800N	303	208	1.2	4934	3.7	27.2	26.2	43.0	0.37	1.51	114,199
DDH 94-34	10+725N	150	35	3.4	4078	1.9	40.9	24.0	33.2	0.40	1.65	29,453
DDH 94-35	10+725N	150	32	0.9	3681	1.9	44.2	24.0	29.9	0.47	1.69	7,301
DDH 94-26*	10+914N	248	112	1.9	4087	8.0	35.0	8.1	48.9	0.50	1.58	83,384
DDH 05-85*	10+914N	248	54	0.5	4109	6.0	37.9	11.0	48.9	0.78	1.87	13,499
DDH 94-31*	10+914N	248	51.6	2.1	3056	9.1	41.9	12.6	36.4	0.77	1.64	44,702
DDH 94-29*	11+244N	287	131	1.7	4925	4.8	27.4	21.9	45.9	0.30	1.50	95,872
DDH 94-29*	11+244N	287	103	1.2	5283	5.5	24.0	7.6	62.8	0.28	1.49	53,736
DDH 94-40	11+244N	287	75	6.4	5979	3.3	18.0	30.9	47.8	0.46	1.43	196,997
DDH 94-38	11+244N	287	153	3.3	5452	1.8	30.5	8.7	59.1	0.35	1.54	223,156
DDH 94-25	11+500N	303	140	6.5	5674	3.1	20.9	29.8	46.2	0.41	1.46	402,566
DDH 94-42	11+500N	303	80	10.9	5401	2.2	25.3	29.4	43.1	0.40	1.49	393,682
DDH 05-87	11+500N	303	83	5.3	5902	7.1	18.6	30.4	48.0	0.41	1.52	202,957
DDH 94-45	11+500N	303	191	4.9	6110	3.4	17.0	30.9	48.7	0.45	1.43	405,516
DDH 94-23	11+829N	320	189	5.8	4086	1.7	41.0	28.7	40.0	0.52	1.64	575,286
DDH 05-86	11+829N	320	169	1.2	5500	4.0	23.8	26.0	48.6	0.64	1.49	94,240
DDH 94-44	11+829N	260	244	5.6	6080	3.4	18.3	31.3	47.0	0.46	1.43	508,028
DDH 94-30	12+134N	348	156	2.3	2861	1.8	52.7	25.0	20.6	0.43	1.77	221,006
DDH 94-32	12+134N	348	76	1.6	5417	1.6	27.0	31.0	40.5	0.54	1.50	63,475
DDH 94-32	12+134N	174	203	1.6	5417	1.6	27.0	31.0	40.5	0.54	1.50	84,773
DDH 94-41	12+754N	298	198	5.1	4876	2.6	32.0	26.6	38.9	0.72	1.55	466,427
DDH 94-43	13+048N	303	192	4.8	4967	1.9	35.4	15.3	47.5	0.42	1.58	441,207
DDH 95-47	13+353N	304	211	3.1	4708	1.7	33.3	27.8	37.2	0.38	1.56	310,200
				3.4	5006	3.5	29.0	23.9	44.4	0.47	1.54	5,434,376

SEAM 3a												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 94-34	10+725N	150	48	13.8	4208	3.0	39.1	17.8	40.1	0.38	1.63	161,957
DDH 94-26	10+914N	248	125	3.3	5836	3.4	20.0	28.9	47.7	0.48	1.45	146,537
DDH 94-26	10+914N	248	133	1.4	5807	3.0	18.6	32.1	46.3	0.64	1.44	66,021
DDH 05-85	10+914N	248	61	2.1	5848	4.0	20.3	29.0	48.3	0.50	1.39	43,947
DDH 05-85	10+914N	248	63	1.7	6338	3.9	15.4	30.1	52.0	0.59	1.27	33,626
DDH 94-33	10+914N	248	93	10.0	5884	1.8	18.9	24.9	54.4	0.67	1.44	332,122
DDH 94-29	11+244N	287	129	4.2	5357	2.2	25.7	28.0	41.2	0.36	1.50	233,245
DDH 94-40	11+244N	287	87	5.2	5172	3.1	27.2	27.9	42.1	0.47	1.51	196,057
DDH 94-38*	11+244N	287	168	2.9	3370	3.3	47.3	10.5	38.9	0.32	1.71	239,103
DDH 94-25	11+500N	303	148	3.9	4965	2.1	28.2	31.2	38.5	0.50	1.52	265,835
DDH 94-42	11+500N	303	87	3.8	5448	2.3	25.3	27.5	44.9	0.42	1.50	150,258
DDH 05-87	11+500N	303	87	2.6	5698	5.8	22.4	28.1	47.1	0.45	1.54	105,636
DDH 94-45	11+500N	303	202	2.4	5826	3.5	19.6	28.5	48.4	0.50	1.45	212,997
DDH 94-23	11+829N	320	197	2.4	3857	1.7	42.9	26.0	29.4	0.38	1.65	249,638
DDH 05-86	11+829N	320	172	4.2	5327	4.8	25.8	28.2	43.4	0.40	1.54	358,572
DDH 94-44	11+829N	241	257	5.0	5451	3.0	24.8	27.9	44.3	0.47	1.49	461,431
DDH 94-30	12+134N	348	134	4.2	4114	2.0	40.1	26.4	31.6	0.59	1.64	321,201
DDH 94-32	12+134N	348	78	7.5	3510	1.5	46.9	24.4	27.3	0.36	1.68	342,926
DDH 94-32	12+134N	174	215	7.5	3510	1.5	46.9	24.4	27.3	0.36	1.68	472,623
DDH 94-43	13+048N	303	201	1.8	5335	1.8	27.8	29.9	40.5	0.46	1.52	166,631
				4.5	5043	2.9	29.2	26.6	41.7	0.47	1.53	4,560,362

SEAM 2d												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 97-62	9+510N	449	82	10.0	5197	2.1	27.0	28.9	42.1	0.39	1.51	555,952
DDH 97-61	9+510N	449	202	5.4	5424	1.7	24.0	30.4	43.9	0.38	1.48	724,858
				7.7	5311	1.9	25.5	29.7	43.0	0.39	1.50	1,280,810

SEAM 2c												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 97-62	9+510N	449	96	2.0	6458	2.1	13.0	31.4	53.5	0.51	1.39	119,829
DDH 97-61	9+510N	449	202	0.6	6458	2.1	13.0	31.4	53.5	0.51	1.39	75,642
DDH 05-87	11+500N	303	91	0.7	5491	4.9	23.7	30.9	42.9	0.65	1.56	27,959
DDH 94-45	11+500N	303	259	4.1	5417	2.6	24.6	27.6	44.5	0.52	1.49	479,416
DDH 05-86	11+829N	320	110	3.3	5949	5.0	19.1	27.9	50.0	0.47	1.49	174,684
DDH 94-44	11+829N	228	266	2.6	5510	2.2	25.1	28.6	44.2	0.57	1.49	234,950
				2.2	5881	3.2	19.8	29.6	48.1	0.54	1.47	1,112,480

SEAM 2b												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 97-63*	8+950N	519	138	1.9	3942	4.6	37.4	7.0	51.0	0.37	1.61	219,092
DDH 97-64*	8+950N	519	120	2.0	3190	1.0	50.0	13.5	35.5	0.27	1.75	217,980
DDH 97-62	9+510N	449	108	1.5	5745	2.2	20.6	30.9	46.3	0.41	1.46	106,197
DDH 97-61	9+510N	449	202	1.0	6617	1.9	12.3	33.7	52.2	0.65	1.39	126,070
DDH 94-34	10+725N	150	124	5.2	4008	1.6	41.3	25.0	32.1	0.68	1.65	159,588
DDH 94-26	10+914N	248	143.3	7.0	5859	3.0	18.8	29.8	48.3	0.39	1.44	358,227
DDH 05-85	10+914N	248	90.7	12.7	5595	3.7	23.0	28.6	46.0	0.36	1.49	426,305
DDH 94-33	10+914N	248	141	16.4	5373	2.2	21.4	30.4	46.1	0.58	1.47	843,009
DDH 94-29	11+244N	287	191	4.2	5086	2.7	28.2	28.0	41.2	0.36	1.51	347,649
DDH 94-29	11+244N	287	205	2.9	5743	2.5	20.6	31.4	45.5	0.62	1.45	245,695
DDH 94-40	11+244N	287	81	9.1	5099	2.6	28.6	27.8	41.0	0.43	1.52	321,553
DDH 94-38*	11+244N	287	185	4.2	2059	5.2	54.8	10.9	29.2	0.20	1.76	392,478
DDH 94-45*	11+500N	303	230	3.4	4251	0.4	35.4	14.0	50.2	0.16	1.58	374,375
DDH 94-44	11+829N	214	234	4.1	5366	2.6	26.3	28.9	42.2	0.49	1.50	307,967
				5.4	4852	2.6	29.9	24.3	43.3	0.43	1.54	4,446,186

SEAM 2a												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 97-64	8+950N	519	133	2.2	6360	2.2	50.0	33.1	14.7	0.49	1.74	264,235
DDH 97-61	9+510N	449	202	2.9	5159	1.6	28.0	28.2	42.2	0.41	1.51	397,167
DDH 05-88	10+375N	315	378	1.4	5916	12.7	20.0	28.7	48.7	0.57	1.51	243,989
DDH 94-37*	10+710N	450	316	3.0	3060	1.5	50.2	10.6	37.7	0.57	1.75	746,550
DDH 94-26	10+914N	248	103	2.9	5752	2.9	20.3	31.7	45.1	0.60	1.45	107,413
DDH 05-85	10+914N	248	100	5.5	5689	3.3	22.4	32.0	43.4	0.51	1.45	198,424
DDH 94-40	11+244N	287	143	3.2	5672	1.3	25.2	26.0	47.6	0.69	1.50	196,997
DDH 94-42	11+500N	303	104	8.0	5479	2.1	25.8	28.9	43.1	0.42	1.50	378,144
				3.6	5386	3.5	30.2	27.4	40.3	0.53	1.55	2,532,918

SEAM 1c												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 97-62	9+510N	449	123	1.6	4648	1.8	31.4	28.9	37.9	0.45	1.54	136,079
DDH 97-61	9+510N	449	202	1.0	4648	1.8	31.4	28.9	37.9	0.45	1.54	139,675
DDH 95-50	9+800N	303	85	1.5	5538	2.5	23.4	28.7	45.4	0.49	1.50	57,949
DDH 95-52*	9+800N	303	229	1.3	2625	2.1	43.1	21.2	33.6	0.32	1.66	143,978
				1.3	4365	2.1	32.3	26.9	38.7	0.43	1.56	477,681

SEAM 1b												
DATA POINT	SECTION	LENGTH metres	WIDTH metres	THICK. metres	CV cal/g	RM %	ASH %	VM %	FC %	S %	S. G. g/cc	TONNES
DDH 97-64	8+950N	519	156	2.0	5356	2.3	14.3	28.9	54.5	0.51	1.40	226,699
DDH 97-63	8+950N	519	135	1.2	5497	1.8	23.9	30.3	44.1	0.44	1.49	125,276
DDH 97-62	9+510N	449	129	3.2	5513	1.8	23.7	30.5	44.1	0.40	1.48	274,314
DDH 95-50	9+800N	303	97	9.2	5731	2.1	21.3	30.6	45.9	0.39	1.46	394,780
DDH 95-52	9+800N	303	229	3.0	5927	2.8	17.3	35.0	45.0	0.56	1.43	297,670
DDH 05-88	10+375N	315	386	2.2	5599	6.8	21.6	31.9	43.9	0.48	1.55	404,395
DDH 94-37	10+710N	450	337	2.2	4335	1.3	38.3	17.9	42.5	0.75	1.62	538,024
				3.3	5423	2.7	22.9	29.3	45.7	0.50	1.49	2,261,158

SEAM 1a												
DATA	SECTION	LENGTH	WIDTH	THICK.	CV	RM	ASH	VM	FC	S	S. G.	TONNES
POINT		metres	metres	metres	cal/g	%	%	%	%	%	g/cc	
DDH 97-63	8+950N	519	135	14.5	5451	1.6	22.7	30.6	45.2	0.37	1.48	1,503,595
DDH 97-64	8+950N	519	168	16.1	5819	1.5	25.2	30.6	42.8	0.36	1.49	2,091,649
DDH 97-61	9+510N	449	201	17.3	5545	1.7	23.3	29.7	54.4	0.32	1.48	2,310,735
DDH 97-62	9+510N	449	140	10.1	5749	2.4	20.7	29.9	47.0	0.34	1.46	926,934
DDH 95-52	9+800N	303	230	16.0	5542	2.2	23.0	31.7	43.0	0.36	1.48	1,650,259
DDH 97-59	10+050N	376	91	1.7	4950	1.7	30.5	25.2	42.5	0.47	1.54	89,577
DDH 97-60	10+050N	376	208	16.8	4581	1.3	35.1	18.8	44.7	0.41	1.58	2,075,953
DDH 05-88	10+375N	315	396	21.5	5478	6.3	24.1	29.8	43.8	0.41	1.57	4,200,684
DDH 94-37*	10+710N	450	367	15.5	5129	2.1	27.9	25.2	44.9	0.56	1.51	3,865,336
DDH 94-26	10+914N	248	140	1.7	3274	2.0	48.0	23.5	26.5	0.54	1.74	102,702
DDH 94-42	11+500N	303	117	4.2	3927	1.8	41.7	25.8	30.7	0.39	1.65	245,675
DDH 05-87	11+500N	303	123	1.0	5051	9.4	33.1	15.3	50.5	0.66	1.75	65,221
DDH 05-87	11+500N	303	127	3.6	4192	12.9	41.2	12.6	44.3	0.44	1.87	259,874
DDH 94-45	11+500N	303	321	2.0	5639	2.8	21.2	31.1	44.9	0.55	1.45	282,063
				10.1	5023	3.5	29.8	25.7	43.2	0.44	1.57	19,670,257

* coal quality may be affected by proximity to andesite intrusion

STRIPPING RATIOS FOR RESOURCES BY SECTION

SECTION	TONNES COAL	VOLUME COAL	AREA X-SECTION	LENGTH m	VOLUME X-SECTION	VOLUME WASTE	TONNES WASTE	STRIP	RATIO
		m ³	m ²		m ³	m ³		tw/tc*	bcm/tc*
8+950N	5,276,986	3,471,701	59,828	381	22,794,468	19,322,767	51,205,332	9.7	3.7
9+510N	6,089,845	4,006,477	72,662	380	27,611,560	23,605,083	62,553,469	10.3	3.9
9+800N	2,781,878	1,830,183	71,205	303	21,575,115	19,744,932	52,324,070	18.8	7.1
10+050N	2,165,531	1,424,691	60,714	376	22,828,464	21,403,773	56,719,998	26.2	9.9
10+375N	4,849,068	3,190,176	82,773	315	26,073,495	22,883,319	60,640,794	12.5	4.7
10+710N	5,149,910	3,388,098	67,287	450	30,279,150	26,891,052	71,261,287	13.8	5.2
10+725N	408,011	268,428	8,798	150	1,319,700	1,051,272	2,785,870	6.8	2.6
10+914N	2,830,259	1,862,013	20,797	248	5,157,656	3,295,643	8,733,455	3.1	1.2
11+244N	3,284,341	2,160,751	32,285	287	9,265,795	7,105,044	18,828,367	5.7	2.2
11+500N	4,853,319	3,192,973	59,592	303	18,056,376	14,863,403	39,388,017	8.1	3.1
11+829N	4,815,704	3,168,226	63,014	320	20,164,480	16,996,254	45,040,072	9.4	3.5
12+134N	4,136,997	2,721,708	89,874	348	31,276,152	28,554,444	75,669,276	18.3	6.9
12+754N	998,906	657,175	31,169	298	9,288,362	8,631,187	22,872,646	22.9	8.6
13+048N	1,573,850	1,035,428	34,958	303	10,592,274	9,556,846	25,325,643	16.1	6.1
13+353N	1,847,102	1,215,198	33,653	303	10,196,859	8,981,661	23,801,401	12.9	4.9
14+075N	543,072	357,284	19,193	150	2,878,950	2,521,666	6,682,415	12.3	4.6
14+267N	512,517	337,182	17,477	175	3,058,475	2,721,293	7,211,426	14.1	5.3
14+404N	376,239	247,525	18,536	158	2,928,688	2,681,163	7,105,081	18.9	7.1
	52,493,533					240,810,800	638,148,620	13.3	5.0

*tw/tc tonnes waste (rock) per tonne of raw coal

*bcm/tc bank cubic metres of waste (rock) per tonne of raw coal

Appendix 5

Geotechnical Report – Division Mountain

MEMORANDUM

NORWEST

CORPORATION

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Date:	July 21, 2006	Job #: 05-2761
To:	Mr. Basil Botha, Cash Minerals	
From:	Sean Ennis, Steve Bundrock	
Subject:	Division Mountain Coal Geotechnical Report for Feasibility Study	

1.0 INTRODUCTION

This report presents results of the geotechnical stability analysis of pit walls for Pits 1 and 4 at Cash Mineral's Division Mountain coal property in the Yukon Territory. The report includes background information on the site, describes the site investigation and data obtained, and details the development of cross-sections, rock strength estimates, and failure mode analysis. Finally, the report provides recommendations for overall wall angles, benching parameters, and groundwater management as well describing additional work required to support on-going project development.

2.0 BACKGROUND

The Division Mountain coal project is located approximately 90 kms northwest of Whitehorse in the Yukon Territory at Latitude 62 degrees 30 minutes (North) and longitude 136 degrees 13 minutes (West). The property is owned 100% by Cash Minerals and consists of five coal leases and twenty-two territorial coal exploration licenses with an exploration area covering 4,017 square kilometers.

A scoping study completed by Norwest Corporation showed measured and indicated resources of 51.5 million tonnes. Four additional diamond drill holes were drilled and sampled in July of 2005, with the intent to add information on coal quality variation within each seam, increase drill hole density (holes within 450 m of one another), and to provide data for a geotechnical study of proposed pit walls. Proposed pit locations and drillhole locations are shown on Figure 1. Norwest Corporation was engaged by Cash Minerals to provide stability analysis and pit wall recommendations for geotechnical data obtained in this program. Drilling/logging/sampling were supervised by Archer-Cathro Consultants site geologists with on-site assistance from EBA Engineering from Whitehorse and technical support and review from Norwest.

3.0 SITE INVESTIGATION

Four HQ diameter boreholes completed to depths of range 150 m to 280 meters were drilled and logged between July 16 and July 29, 2005 by geologists from Archer-Cathro. Initial core logging methods for holes 05-85 and 05-86 provided data that was deemed insufficient to complete reliable geotechnical analysis. In particular, detailed data relevant to fracture/discontinuity spacing, condition of fractures, field hardness and lithology was needed. Subsequent core logging for holes 05-87 and 05-88 was carried out to specifications outlined by Norwest personnel. Drillhole locations are shown in plan on Figure 1. The location of the new coreholes provided geotechnical data limited to Pits 1 and 4.

Archer-Cathro site personnel collected samples of drill core based on Norwest recommendations and provided these samples for point load strength index testing by EBA Engineering. In addition, EBA calculated Rock Quality Designation values (RQD) for each corehole log with assistance from Cash Minerals on-site personnel. All test results and calculations were provided to the Norwest Corporation's Vancouver office.

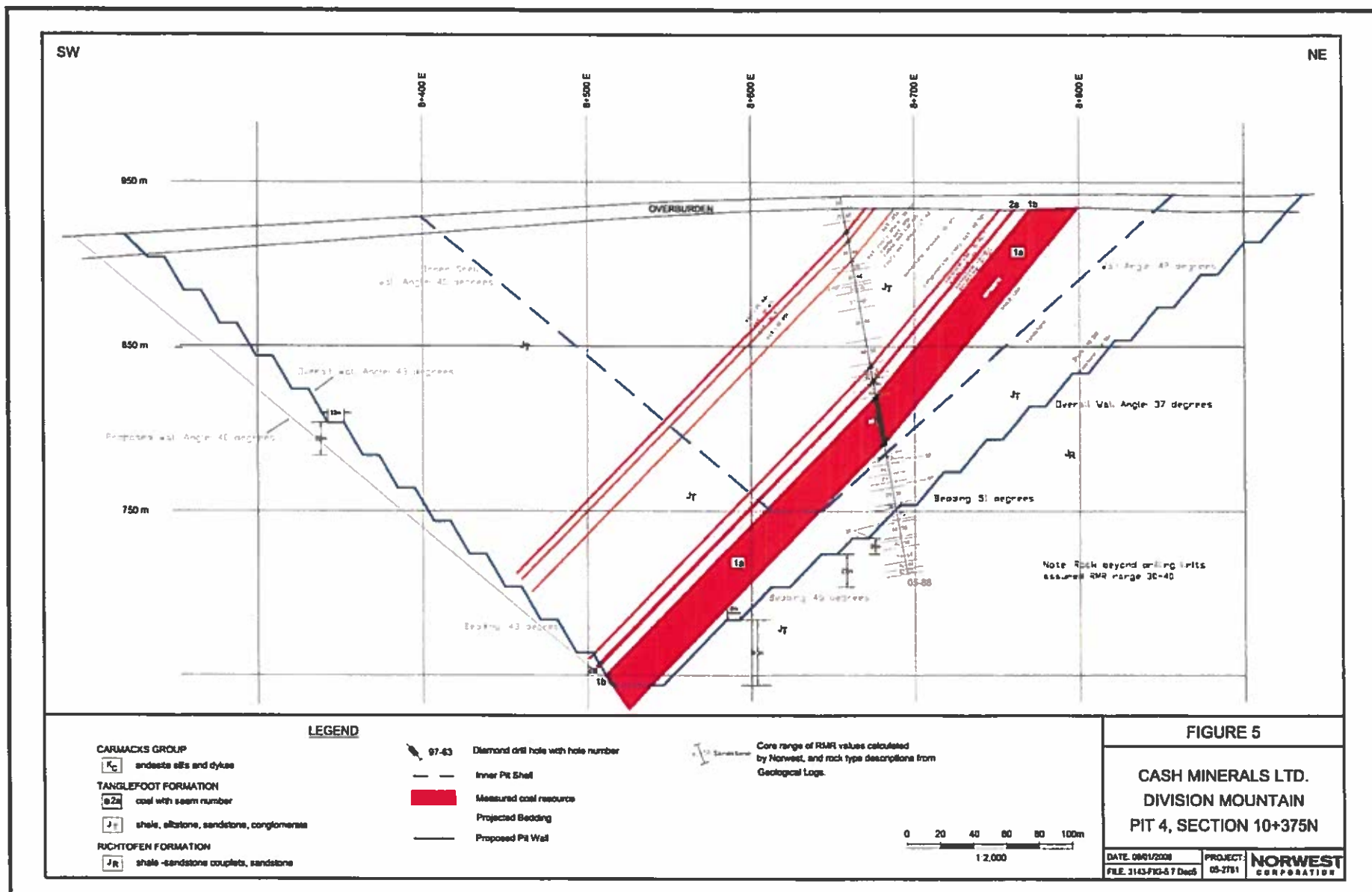
Drilling data and corehole logs were compiled and provided to Norwest's Salt Lake City office. Norwest completed cross-sections showing coal seams, major formation designations, proposed pit shells, benching parameters and preliminary overall wall angles for Pits 1 and 4.

RMR (Rock Mass Ratings) were calculated by Norwest for strata in each of the coreholes using RQD, and other core data taken from geotechnical core logs. Where data was not available in the geotechnical logs, some assumptions were made to calculate RMR values. The parameters required some assumptions for RMR calculation included:

- Fracture frequency – some fracture frequency data was omitted – an average of existing values was taken and used to assign a base value of 5 on the RMR scale representing a fracture spacing of <60mm.
- Fracture condition – no fracture condition data was available and a median value of 10 indicated was assumed representing smooth-slickensided surfaces or separations of 1-5mm between surfaces.
- Groundwater conditions – no water data was available and a median value of 10 was assumed representing damp conditions.

The assumed values are representative of lower RMR value rock which is highly fractured and disturbed insitu and were based on the available qualitative data from the drillhole logs. Additional data obtained in the future may show that rock mass parameters are better than those currently assumed.

Cross-sections detailing individual rock strata based on RMR values and corehole lithology were prepared using the modeled coal seams as representative of overall bedding dip for all strata. Cross-sections through the Division Mountain Pit 1 and Pit 4 are shown in Figures 1 - 4. Cross-sections through the other pit areas were not prepared due to lack of geotechnical data for these areas.



4.0 IDENTIFICATION OF FAILURE MODES

Development of pit wall angles required the identification of potential failure modes for the given pit configurations. Primary failure modes were evaluated individually to identify failure potential. The failure modes of concern for a pit in bedded geology such as Division Mountain include the following:

- **Toppling Failures:** Toppling failures were judged as low probability based on the geometry of the pit walls and bedding which limit kinematic potential for failure.
- **Wedge Failures:** In order to limit the potential for wedge failures along weak bedding planes, the pit designs had been completed with pit walls oriented parallel to bedding structure without undercutting and daylighting of strata bedding. Additional data will be required as part of detailed engineering and design to evaluate potential for wedge failures along cross structures such as cross jointing or faulting.
- **Planar Failures:** Planar failures along weak bedding planes typically represent the highest potential for footwall slope failures. Evaluation of the pit stability included analyses of failures due to planar failure modes.
- **Circular Failure Through Rock Mass:** Circular failures through the jointed and fractured rock mass affecting overall wall stability were also considered a significant potential failure mode. Deep-seated circular failures may occur in walls of any geometry or structure if stable wall angles are exceeded. This report evaluates the range of overall wall angles which show acceptable stability for the proposed pits.

5.0 DATA ANALYSIS

Data related to the pit geotechnical characteristics was gathered from a variety of sources including:

- a) Geological cross-sections showing the interpreted geological structure in the pit areas.
- b) Geotechnical core logging of diamond drillhole cores from four holes. (Logs in Appendix A)
- c) Laboratory testing of representative core samples (point load tests) (summary results in Table 1). (Data Tables in Appendix B)
- d) Rock mass classification (RMR) of strata based on geotechnical core logs (results see Table 2). (RMR Logs in Appendix C)

TABLE 1
SUMMARY OF LABORATORY STRENGTH TESTING RESULTS

Rock Type	UCS Range (MPa)			Point Load (Isc) Range (MPa)		
	Max	Average	Min	Max	Average	Min
Andesite	163.2	66	50.4	6.8	2.75	2.1
Arkose	146.4	94.8	33.6	6.1	3.95	1.4
Coal and coaly shale	4.8	4.8	4.8	0.2	0.2	0.2
Conglomerate	127.2	108	88.8	5.3	4.5	3.7
Sandstone	182.4	63.36	2.4	7.6	2.64	0.1
Shale	129.6	90	50.4	5.4	3.75	2.1

The rock strength values shown in Table 2 are based on Hoek-Brown (1987) criterion. Rock strength parameters were estimated based on the ranges of RMR values, using the Hoek-Brown relationship to estimate Mohr-Coulomb cohesion and friction angle (ϕ) parameters. Based on this evaluation initial values were selected as "base case" which represented a lower range rock strength for use in limit equilibrium slope stability analysis software (SLOPE/W). Selection of the lower range values for use as base case was deemed prudent based on the limited rock mass data available for regions of the pit walls as can be observed in the cross-sections. Additional stability evaluation was completed based selected rock strength values which were somewhat higher than the base case values and intended to represent an "improved" insitu rock strength that fell within the mid-range of the calculated rock strength values.

Table 2 also summarizes the RMR values calculated for each of the rock types, and their respective converted ϕ and cohesion values. The point load data in Table 1 was used to identify the range of rock strengths. Based on the range of measured and observed rock strengths, RMR values, and Hoek-Brown parameters, Mohr-Coulomb values representing an "improved" rock strength condition were calculated. These were used in a sensitivity analysis of slope stability to determine the potential for steeper slope angles if future site work shows rock quality to be better than the current base case.

TABLE 2
SUMMARY OF ROCK STRENGTH PARAMETERS

Rock Type	RMR		Mohr-Coulomb Values from Hoek-Brown		"Improved" Mohr-Coulomb Values from Hoek-Brown	
	Min	Max	ϕ (°)	c' (kPa)	ϕ (°)	c' (kPa)
Clay-Siltstone-Weak Sandstone	29	43	24	223	24	223
Coal-Shale	28	51	23	0	23	0
Mudstone	44	47	24	275	26	281
Sandstone-Arkose-Conglomerate-Grit	27	64	24	223	24	223

6.0 FAILURE MODES AND STABILITY

As described in Section 4, pit wall stability in moderately dipping bedded rock formations such as those at the Division Mountain property can be governed by any one of several mechanisms.

- Circular failure through the overall wall
- Planar failures along bedding
- Bench scale failures (toppling, wedge)
- Wedge failure along weak strata/faults

Based on the configuration of the pits and the level of detail of the existing data, this report only considers the first two failure modes. Stability analyses was completed for these two failure modes as discussed below.

Planar bilinear slab failure involves sliding parallel to bedding in combination with sliding along a secondary surface dipping out of the slope (Dawson and Barron, 1989). The secondary surface may be a persistent discontinuity surface or, if unfavourably oriented discontinuities are not present, a shear zone developed through the rock mass. The potential for planar failures was evaluated using bilinear planar analysis using bedding angles of existing structures (critical wall angles), calculated RMR and an assumed average slab thickness. Circular failure through the overall wall stability was examined based upon modeled cross-sections and using limit equilibrium analysis of the overall rock mass.

Experience with bedded pit walls in western Canadian coal mines has led to the development of a substantial database of material properties and behaviours which have allowed for the successful design of pit walls in a variety of conditions. Given competent rock strata below the coal seam, pit designs including unbenched walls have been successfully mined to depths in excess of 100m. The limiting factors for the height of unbenched pit walls which can be maintained include:

- Intact pit wall rock strength and jointing
- Dip of the pit wall
- Thickness of bedding

The rock strata below primary coal seams in each cross-section were studied to determine the potential to excavate an unbenched pit wall to some height to minimize the overall pit strip ratio. Review of the core logs and RMR data showed that the strata below wall coal seams consist of moderate thickness (2-10m) of relatively competent (30-50 RMR) shale and sandstone zones which are subsequently underlain by weaker layers of coal or shale.

The initial pit shell designs focused on the economic excavation of major coal seams with frequent benching and pit slopes which parallel bedding structures. Preliminary analyses showed that based on the pit wall rock strength and thickness, an unbenched pit wall in the range of 25-50m height would meet stability criteria for the pit design. Pit cross-sections were developed as shown in Figures 2 - 5 with the unbenched pit wall running from the pit floor to its maximum height. The remaining portion of the pit wall would be benched to surface with bench face angles determined by bedding dip on footwalls or cut at 65 degrees on highwalls. Berms between benches were set at a minimum width of 8m as per regulatory requirements.

7.0 PIT ONE - WEST PIT WALL STABILITY

The bedding of the rock strata are moderately dipping at a comparatively constant dip for the full height of the west wall. Based on this bedding configuration, typical practice in western Canadian coal mines is followed with fully benched pit walls where bench heights and berm widths are dependent on variations in rock strength and bedding dip. Changes in bedding dips necessitate fluctuations in pit wall bench and berm design. Bilinear planar failure of the pit wall is the failure mode of greatest concern for initial pit wall design. The

stratigraphic units in the pit wall vary from the weak coal layers with an RMR of 25 to conglomerates with an RMR of 60.

Factors of safety were calculated for the overall pit wall using pit shells developed by Norwest mining engineers which represented a maximum pit size based on pit economic evaluations. Initial calculations were completed using a base case value of cohesion=275kPa and phi=23 degrees for the primary pit wall rock unit (mudstone). All values are calculated with the water table drawn down to 150 meters from the surface which assumes groundwater drawdown by deep pumps. The analyses showed that cross-sections 10+914 and 11+829 met the minimum FOS criteria (FOS > 1.2) as shown in Table 3. Cross-section 11+500 did not meet the minimum criteria and therefore was also evaluated using the "improved" strength values of cohesion=281kPa and phi=26 degrees. The west wall on this section was still below the minimum FOS indicating that a wall angle of less than 37 degrees was required or additional data is required to determine if insitu rock strength is higher than current estimates which would allow steeper wall angles.

TABLE 3
PIT ONE FULL SCALE PIT WEST WALL – CIRCULAR FAILURE

Cross Section	Wall Angle (°)	Base Case FOS	Improved FOS	Stripping Ratio
10+914	32	1.56	NA	1.73
11+500	37	1.10	1.17	4.35
11+829	32	1.26	NA	3.56

In addition to the stability analyses for the circular failure for the full pit wall, pit wall designs were evaluated for bilinear planar failure at a minimum FOS = 1.2 along the footwall strata. This evaluation was carried out to determine if the wall angles suitable for overall circular failure mode were compatible with the bilinear failure mode. The maximum bed thickness for planar failure evaluation was 2 meters which is relatively conservative based on the geotechnical data. The biplanar failure mode analyses returned overall pit wall angles equal to the pit wall angles for circular failure mode with the exception of section 11+829. The analyses show that Section 11+829 could be steepened to 35 degrees if planar failure were the dominant mechanism with a corresponding decrease in strip ratio. Limiting overall wall angles for the planar failure mechanism are shown in Table 4.

TABLE 4.
PIT ONE FULL SCALE PIT WEST WALL – PLANAR FAILURE

Cross Section	Wall Angle (°)	Stripping Ratio
10+914	32	NC
11+500	37	NC
11+829	35	2.89

In order to examine the sensitivity of the pit wall angles to overall pit depth, additional evaluation of pit walls was completed for shallower pits with lower overall strip ratios. Evaluation was completed based on using bilinear planar failure as the dominant failure mechanism with a minimum FOS = 1.2. Table 5 highlights the overall wall angles and stripping ratios for the smaller pit shells examined. These shells are outlined on the cross-sections in Figures 2 – 4. The wall angles in Table 5 are intended to be used for pit optimization to examine the economics and potential coal tonnage in shallower pits, lower strip ratio pits. Once an optimal pit shell is defined, a stability analysis examining both planar and circular failure modes would be completed.

TABLE 5.
PIT ONE FULL LIMITED PIT WEST WALL – PLANAR FAILURE

Cross Section	Wall Angle (°)	Stripping Ratio
10+914	32	NA
11+500	41	3.11
11+829*	39	3.60

* Note: Section 11+829 strip ratio is based on a non-optimal pit shell.

8.0 PIT ONE EAST PIT WALL STABILITY

The geology of the Pit 1 east pit wall can be described in general terms as having moderately dipping bedding at a relatively constant dip for the full height of the east wall as shown in Figures 2 - 4. Stability analyses for the east wall mirrored analyses completed for the Pit 1 west wall. Pit walls were analysed with consideration to circular wall failure and bilinear planar failure mechanisms.

Factors of safety were calculated for circular failure of the overall pit wall with a base case value of cohesion 275 and phi 23 assigned to the primary rock unit. Section 11+500 was also evaluated using “improved” values of cohesion 281 and phi 26. All values were calculated with the groundwater table drawn down to 150 meters from the surface. Similar to the Pit 1 west wall, sections 10+914 and 11+829 met the minimum FOS = 1.2 criteria while section 11+500 required the improved case strength properties to meet the minimum FOS criteria. The FOS values and overall wall angles are summarized in Table 6.

TABLE 6
PIT ONE FULL SCALE PIT EAST WALL – CIRCULAR FAILURE

Cross Section	Wall Angle (°)	Base Case FOS	Improved FOS	Stripping Ratio
10+914	37	1.45	NA	1.73
11+500	41	1.04	1.21	4.35
11+829	36	1.26	NA	3.56

In addition to the stability analyses for the circular failure for the full pit wall, pit wall designs were evaluated for bilinear planar failure at a minimum FOS = 1.2 along the footwall strata. This evaluation was carried out to determine if the wall angles suitable for overall circular failure mode were compatible with the bilinear failure mode. The analyses showed that the planar failure mechanism wall angles are compatible with the circular failure pit walls. Stripping ratios and overall wall angles derived from this evaluation are summarized in Table 7.

TABLE 7
PIT ONE FULL SCALE PIT EAST WALL – PLANAR FAILURE

Cross Section	Wall Angle (°)	Stripping Ratio
10+914	37	NC
11+500	41	NC
11+829	36	2.89

In order to examine the sensitivity of the pit wall angles to overall pit depth, additional evaluation of pit walls was completed for shallower pits with lower overall strip ratios. Evaluation was completed based on using bilinear planar failure as the dominant failure mechanism with a minimum FOS = 1.2. Table 8 highlights the overall wall angles and stripping ratios for the smaller pit shells examined. These shells are outlined on the cross-sections in Figures 2 – 4. The wall angles in Table 8 are intended to be used for pit optimization to examine the economics and potential coal tonnage in shallower pits, lower strip ratio pits. Once an optimal pit shell is defined, a stability analysis examining both planar and circular failure modes would be completed.

Table 8
Pit One PIT ONE LIMITED EAST WALL – PLANAR FAILURE

Cross-Section	Wall Angle (°)	Stripping Ratio
10+914	37	NA
11+500	45	3.11
11+829	40	3.60

9.0 PIT FOUR WEST PIT WALL STABILITY

The current Pit 4 design mines only the eastern limb of the syncline as shown in the cross-section in Figure 5. As a result, the west side of Pit 4 is a highwall composed of strata which dips into the pit wall at a relatively steep angle. The constant bedding dip allows that pit wall bench and berm design parameters should be relatively similar for the height of the wall unless significant changes in rock mass strength properties are encountered. The stratigraphic units in the Pit 4 west wall vary from the weak coal layers with an RMR of 25 to conglomerates with an RMR of 60.

The full scale pit shown in Figure 5 and evaluated for stability was based on a pit shell developed by Norwest mining engineers which represented a maximum pit size based on pit economic evaluations. Calculations were completed using a base case value of cohesion 275 and phi 23 as well as "improved" values of cohesion 281 and phi 26 for assignment to the primary rock unit. All values are calculated with the groundwater table drawn down to 150 meters from the surface. This returned factors of safety for the west wall which are listed in Table 9. The stability analyses FOS values show the 43 degree wall angle to be less than the minimum FOS criteria even with the improved case rock strength parameters. Therefore wall angles of less than 43 degrees would be recommended for the west wall of Pit 4.

Table 9
PIT FOUR FULL SCALE PIT WEST WALL – CIRCULAR FAILURE

Cross Section	Wall Angle (°)	Base Case FOS	Improved FOS	Stripping Ratio
10+375	43	0.84	1.05	6.07

Planar failure analyses showed overall wall angles in the range of 40 degrees could be achieved before planar failure became the limiting mechanism. In light of the results of the circular and planar failure mechanism stability evaluation, a maximum overall wall angle of 40 degrees is recommended for use in further evaluation of the west wall of the large pit shell.

As with Pit 1, additional evaluation of pit walls was completed for shallower pits with lower overall strip ratios using bilinear planar failure as the dominant failure mechanism. Table 10 identifies overall wall angle and stripping ratios for a smaller pit shell which could be used for further pit optimization simulations examining the feasibility of smaller lower strip ratio pits. The wall angle agrees with the 40 degree angle proposed for the large pit shell.

Table 10
PIT FOUR LIMITED PIT WEST WALL -- PLANAR FAILURE

Cross Section	Wall Angle (°)	Stripping Ratio
10+375	40	4.15

10.0 PIT FOUR EAST PIT WALL STABILITY

The bedding of the rock strata in Pit 4 are moderately dipping at a comparatively constant dip for the full height of the east wall or footwall. Changes in bedding dips necessitate fluctuations in bench face angles and berm design. Analysis for the east wall mirrored analysis efforts for the west wall.

The evaluation of stability of the wall for circular failure was calculated using a base case value of cohesion=275kPa and phi=23 degrees and an "improved" values of cohesion=281kPa and phi=26 degrees assigned to the primary rock unit. All values were calculated with the water table drawn down to 150 meters from the surface. This returned factors of safety for the east wall which are listed below in Table 11. The analyses show that an overall wall angle of 37 degrees meet minimum FOS criteria for the improved strength case.

TABLE 11
PIT FOUR FULL SCALE PIT EAST WALL -- CIRCULAR FAILURE

Cross Section	Wall Angle (°)	Base Case FOS	Improved Case FOS	Stripping Ratio
10+375	37	1.14	1.22	6.07

Evaluating stability with bilinear planar failure as the dominant mechanism showed maximum wall angles equal to the circular failure case. Examining smaller pit shells and considering only planar failure mechanisms showed that overall wall angles of up to 42 degrees could be obtained while still meeting minimum FOS criteria. The results of this evaluation are summarized in Table 12. Pit optimization work for smaller pit shells should use 42 degrees as a maximum wall angle for the Pit 4 footwall for future evaluations.

TABLE 12
PIT FOUR LIMITED PIT EAST WALL – PLANAR FAILURE

Cross Section	Wall Angle (°)	Stripping Ratio
10+375	42	4.15

11.0 RECOMMENDATIONS

Based on Norwest's geotechnical evaluation of Pits 1 and 4 at the Division Mountain property initial recommendations can be made for maximum overall wall angles to guide on-going mine engineering and economic analyses. Stability evaluations for the pit walls were based on a target minimum factor of safety of 1.2. Using the available data and estimating "base" case and "improved" case rock strength parameters, stability evaluation of the pit walls was completed focusing on the two failure mechanisms deemed most important in terms of overall pit configuration, specifically circular failure and planar failure. Four cross-sections were evaluated, three in Pit 1 and one in Pit 4. The sections were located along strike aligned with the locations of the 2005 coreholes.

The initial stability analyses were carried out on a large pit shells developed by the mine planners which represented a maximum economic strip ratio pit. The geotechnical evaluation showed that although the majority of pit wall cross-sections met the minimum criteria under base case assumptions certain cross-sections did not meet minimum FOS without assuming "improved" case strengths (Pit 1 11-500 East & West (marginal), Pit 4 10+375 East). In one case, minimum FOS criteria could not be met even with improved strength conditions for Pit 4 10+375 west wall and therefore the overall wall angle would have to be reduced from the initial design case. Table 13 summarizes the current recommended pit wall angles for the large pit shell design. Note that wall angles obtained using the "improved" case rock strength parameters are shown in *italics*.

TABLE 13
LARGE PIT SHELL RECOMMENDATIONS

Pit	Cross Section	Wall Angle West (°)	Wall Angle East (°)
Pit One	10+914 (base)	32	37
	11+500	37	<i>41</i>
	11+829 (base)	32	36
Pit Four	10+375*	<43	37

Note: Factor of Safety of 1.2 cannot be achieved

Given the higher strip ratio of the maximum pit shell and based on discussions with Cash Mineral personnel it was decided to examine the pit wall angles that could be achieved for smaller pit shells. Norwest carried out an initial evaluation of the potential wall angles based on the assumption of planar failure as the dominant failure mechanism. Table 14 summarizes the pit wall angles for each cross-section that are recommended for future pit optimization work.

TABLE 14
SMALL PIT SHELL RECOMMENDATIONS

Pit	Cross Section	Wall Angle West (°)	Wall Angle East (°)
Pit One	10+914	32	37
	11+500	41	45
	11+829	39	40
Pit Four	10+375	40	42

It is important to note that the data available for geotechnical evaluation of the proposed pits is quite limited based on the size and depth of the proposed pits. Prior to further detailed engineering and design work, it is strongly recommended that additional geotechnical and hydrogeological data be collected to confirm current assumptions of rock mass quality, structural geology and hydrogeological conditions. There is upside potential in terms of overall project economics that further investigation will allow for overall pit wall angles to be increased from the current estimates.

Appendix 6

Caterpillar FPC Report

OB / YEAR8COAL_W Efficiency

Total Material Qty 100,000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency% Mismatch	Hauler Efficiency% Bunching	Hauler Efficiency% Combined	BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tkph Front*	Normal Tkph Rear*	Normal Tkph Trail*
1	0.41	100	100	100	100	213	213	1.167	122	97	
2	0.83	100	100	90	90	427	382	0.91	109	87	
3	1.24	100	80	94	75	640	483	0.926	92	73	
4	1.66	100	60	100	60	854	513	1.065	73	58	
5	2.07	100	48	100	48	1.067	515	1.252	59	47	
6	2.49	100	40	100	40	1.281	515	1.445	49	39	

OB / YEAR8COAL_W Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kJoes
 Payload 35.88 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	140	4	-3.8			75.91	40.15	40.15	0.32	0.5
2	340	3.5	7.4			14.34	40.15	14.34	1.52	2.47
3	175	3	0			48.56	33.89	0	1.95	3.01

OB / YEAR8COAL_W Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kJoes
 Payload 35.88 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	175	3	0			71.97	47.12	47.12	0.33	0.52
2	340	3.5	-7.4		78.25	77.86	77.86	77.86	0.63	0.84
3	140	4	3.6			37.73	77.86	0	0.84	0.85

OB / YEAR8COAL_E_A Efficiency

Total Material Qty 100,000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency% Mismatch	Hauler Efficiency% Bunching	Hauler Efficiency% Combined	BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tkph Front*	Normal Tkph Rear*	Normal Tkph Trail*
1	0.42	100	100	99	99	218	218	1.144	98	78	
2	0.85	100	100	89	89	435	388	0.897	87	69	
3	1.27	100	79	94	74	653	485	0.921	73	58	
4	1.69	100	59	100	59	871	515	1.081	58	46	
5	2.11	100	47	100	47	1.088	515	1.252	46	37	
6	2.54	100	39	100	39	1.306	515	1.445	39	31	

OB / YEAR8COAL_E_A Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kJoes
 Payload 35.88 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	340	3.5	7.4			14.34	14.34	14.34	1.48	2.43
2	175	3	0			48.56	33.89	0	1.91	2.58

OB / YEAR8COAL_E_A Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kJoes
 Payload 35.88 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	175	3	0			71.97	47.12	47.12	0.33	0.52
2	340	3.5	-7.4		78.25	77.86	78.14	0	0.75	0.83

OB / YEAR8COAL_E_B Efficiency

Total Material Qty 100,000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency%			BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tlph		
			Mismatch	Bunching	Combined				Front*	Normal Tlph Rear*	Normal Tlph Trail*
1	0.46	100	100	96	98	239	239	1.042	142	112	
2	0.93	100	100	87	87	478	417	0.835	124	98	
3	1.39	100	72	97	70	717	409	0.897	99	78	
4	1.86	100	54	100	54	956	515	1.06	76	61	
5	2.32	100	43	100	43	1,195	515	1.252	61	48	
6	2.78	100	36	100	36	1,434	515	1.445	51	40	

OB / YEAR8COAL_E_B Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 ktons
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	115	4	0			37.24	26.3	26.3	0.34	0.54
2	185	3.5	-8.1		78.28	77.86	55.81	55.81	0.57	0.8
3	260	3	0			48.56	55.81	52.91	0.86	1.33
4	140	3	0			48.56	52.91	0	1.09	1.47

OB / YEAR8COAL_E_B Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 ktons
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	140	3	0			71.97	44.07	44.07	0.20	0.45
2	260	3	0			71.97	58.44	58.44	0.59	0.92
3	165	3.5	8.1			31.68	58.44	44.41	0.78	1.23
4	115	4	0			67.45	48.18	0	0.99	1.37

OB / YEAR9COAL_W Efficiency

Total Material Qty 100,000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency%			BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tlph		
			Mismatch	Bunching	Combined				Front*	Normal Tlph Rear*	Normal Tlph Trail*
1	0.4	100	100	100	100	208	208	1.197	113	90	
2	0.81	100	100	90	90	416	374	0.93	102	81	
3	1.21	100	83	93	77	624	479	0.933	87	68	
4	1.62	100	62	99	61	832	511	1.068	70	55	
5	2.02	100	50	100	50	1,040	515	1.252	56	45	
6	2.42	100	41	100	41	1,248	515	1.445	47	37	

OB / YEAR9COAL_W Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 ktons
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	185	4	0			37.24	31.01	31.01	0.48	0.75
2	205	3.5	9.4			11.31	31.01	11.31	1.71	2.67
3	175	3	0			48.56	33.67	0	2.15	3.13

OB / YEAR9COAL_W Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 ktons
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	175	3	0			71.97	47.12	47.12	0.33	0.52
2	265	3.5	-9.4		78.28	77.86	77.86	77.86	0.57	0.78
3	185	4	0			67.45	77.86	0	0.81	0.83

OB / YEAR9COAL_S Efficiency

Total Material Qty 100 000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 5 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency% Mismatch	Hauler Efficiency% Bunching	Hauler Efficiency% Combined	BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tkph Front*	Normal Tkph Rear*	Normal Tkph Trail*
1	0.39	100	100	100	100	200	200	1.244	95	76	
2	0.78	100	100	91	91	400	363	0.959	86	69	
3	1.17	100	85	91	76	600	470	0.95	75	59	
4	1.55	100	64	90	63	801	508	1.074	60	48	
5	1.94	100	51	100	51	1,001	515	1.252	49	39	
6	2.33	100	43	100	43	1,201	515	1.445	41	32	

OB / YEAR9COAL_S Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kN
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	370	3.5	9.5			11.23	11.23	11.23	2.01	3.35
2	175	3	0			48.58	33.68	0	2.48	3.91

OB / YEAR9COAL_S Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kN
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	175	3	0			71.97	47.12	47.12	0.33	0.52
2	370	3.5	-9.5		78.28	77.86	77.86	0	0.77	0.77

OB / YEAR9COAL_E_B Efficiency

Total Material Qty 100 000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 5 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency% Mismatch	Hauler Efficiency% Bunching	Hauler Efficiency% Combined	BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tkph Front*	Normal Tkph Rear*	Normal Tkph Trail*
1	0.47	100	100	98	98	240	240	1.036	135	107	
2	0.93	100	100	87	87	481	418	0.833	118	93	
3	1.4	100	71	97	69	721	499	0.897	93	74	
4	1.87	100	54	100	54	961	515	1.06	72	56	
5	2.33	100	43	100	43	1,201	515	1.252	58	46	
6	2.8	100	36	100	36	1,442	515	1.445	48	38	

OB / YEAR9COAL_E_B Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kN
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	105	4	0			37.24	27.84	27.84	0.32	0.5
2	145	3.5	-3.5			78.92	45.96	45.96	0.55	0.87
3	265	3	0			48.58	47.03	47.03	0.68	1.41
4	140	3	0			48.58	47.29	0	1.12	1.61

OB / YEAR9COAL_E_B Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kN
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	140	3	0			71.97	44.07	44.07	0.29	0.45
2	265	3	0			71.97	58.26	58.26	0.58	0.91
3	145	3.5	3.5			42.53	58.26	52.56	0.74	1.15
4	105	4	0			67.45	53.69	0	0.92	1.22

OB / YEAR10COAL_W Efficiency

Total Material Qty 100,000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency%			BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tkph		
			Mismatch	Bunching	Combined				Front*	Normal Tkph Rear*	Normal Tkph Trail*
1	0.34	100	100	100	100	173	173	1.437	107		65
2	0.67	100	100	93	93	347	323	1.079	99		79
3	1.01	100	99	85	84	520	438	1.021	90		71
4	1.35	100	74	86	71	693	494	1.105	76		60
5	1.68	100	59	100	59	867	514	1.255	63		50
6	2.02	100	50	100	50	1,040	515	1.445	53		42

OB / YEAR10COAL_W Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kIbs
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	155	4	-3.2			74.48	40.27	40.27	0.35	0.55
2	150	3.5	9.5			11.23	40.27	5	0.86	1.32
3	40	3.5	9.5	5		11.23	5	5	1.34	1.72
4	180	3.5	9.5			11.23	11.23	11.23	2.33	3.35
5	180	3	0			48.56	33.9	0	2.78	3.93

OB / YEAR10COAL_W Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kIbs
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	180	3	0			71.97	47.53	47.53	0.34	0.53
2	180	3.5	-9.5			78.26	63.85	5	0.6	0.86
3	40	3.5	9.5	5		78.26	77.86	5	1.08	0.86
4	150	3.5	-9.5			78.26	77.86	65.27	1.32	1.02
5	155	4	3.2			40.61	65.27	0	1.54	1.14

OB / YEAR10COAL_E_A Efficiency

Total Material Qty 100,000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency%			BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tkph		
			Mismatch	Bunching	Combined				Front*	Normal Tkph Rear*	Normal Tkph Trail*
1	0.34	100	100	100	100	174	174	1.432	93		74
2	0.68	100	100	93	93	348	324	1.075	87		69
3	1.01	100	99	85	84	522	440	1.018	78		62
4	1.35	100	74	86	71	695	495	1.103	66		53
5	1.69	100	59	100	59	869	514	1.255	55		44
6	2.03	100	49	100	49	1,043	515	1.445	46		37

OB / YEAR10COAL_E_A Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kIbs
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	65	4	0			37.24	24.71	24.71	0.23	0.35
2	150	3.5	9.5			11.23	24.71	5	0.92	1.42
3	40	3.5	9.5	5		11.23	5	5	1.4	1.81
4	180	3.5	9.5			11.23	11.23	11.23	2.39	3.45
5	180	3	0			48.56	33.9	0	2.84	4.03

OB / YEAR10COAL_E_A Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kIbs
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	180	3	0			71.97	47.53	47.53	0.34	0.53
2	180	3.5	-9.5			78.26	63.85	5	0.6	0.86
3	40	3.5	-9.5	5		78.26	77.86	5	1.08	0.86
4	150	3.5	-9.5			78.26	77.86	61.71	1.32	0.99

OB / YEAR10COAL_E_B Efficiency

Total Material Qty 100 000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 789D Availability 100%

From 1 To 6 763Q Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency% Mismatch	Hauler Efficiency% Bunching	Hauler Efficiency% Combined	BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tph Front*	Normal Tph Rear*	Normal Tph Trail*
1	0.46	100	100	98	98	239	239	1.041	128	102	
2	0.93	100	100	87	87	478	417	0.834	112	89	
3	1.39	100	72	97	70	717	499	0.697	89	71	
4	1.86	100	54	100	54	957	515	1.08	69	55	
5	2.32	100	43	100	43	1.198	515	1.252	55	44	
6	2.79	100	36	100	36	1.435	515	1.445	40	37	

OB / YEAR10COAL_E_B Haul

Model 789D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35.338 ktons
 Payload 35.88 Mtons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	90	3.5	3.3			22.49	20.82	20.82	0.34	0.53
2	135	3	-1.8			73.03	41.27	41.27	0.82	0.98
3	370	3	0			48.56	45.22	0	1.19	1.7

OB / YEAR10COAL_E_B Return

Model 789D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35.338 ktons
 Payload 35.88 Mtons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	370	3	0			71.97	57.31	57.31	0.56	0.87
2	155	3	1.9			58.36	57.52	57.52	0.72	1.12
3	90	3.5	-3.3			77.22	59	0	0.88	1.15

OB / YEAR11_15COAL_W Efficiency

Total Material Qty 100.000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 789D Availability 100%

From 1 To 6 789D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency% Mismatch	Hauler Efficiency% Bunching	Hauler Efficiency% Combined	BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tph Front*	Normal Tph Rear*	Normal Tph Trail*
1	0.31	100	100	100	100	181	181	1.544	113	89	
2	0.63	100	100	94	94	323	304	1.144	106	84	
3	0.94	100	100	87	87	484	421	1.063	89	78	
4	1.25	100	80	94	75	645	484	1.128	84	67	
5	1.57	100	64	98	83	806	509	1.268	71	56	
6	1.88	100	53	100	53	968	515	1.445	60	48	

OB / YEAR11_15COAL_W Haul

Model 789D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35.338 ktons
 Payload 35.88 Mtons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	155	4	-3.2			74.48	40.27	40.27	0.35	0.55
2	200	3.5	9.6			11.21	40.27	5	1.14	1.78
3	40	3.5	9.6	5		11.21	5	5	1.02	2.17
4	230	3.5	9.6			11.21	11.21	11.21	2.87	4.26
5	175	3	0			48.56	33.66	0	3.31	4.83

OB / YEAR11_15COAL_W Return

Model 789D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35.338 ktons
 Payload 35.88 Mtons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	175	3	0			71.97	47.12	47.12	0.33	0.52
2	230	3.5	-9.6		78.28	77.86	62.1	5	0.64	0.7
3	40	3.5	-9.6	5	78.28	77.86	5	5	1.12	0.7
4	200	3.5	-9.6		78.28	77.86	73.31	73.31	1.4	1.13
5	155	4	3.2			49.81	73.31	0	1.82	1.2

OB / YEAR11_15COAL_S Efficiency

Total Material Qty 100,000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency% Mismatch	Hauler Efficiency% Bunching	Hauler Efficiency% Combined	BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tph Front*	Normal Tph Rear*	Normal Tph Trail*
1	0.3	100	100	100	100	156	156	1.558	115	91	85
2	0.61	100	100	95	95	312	296	1.177	109	80	70
3	0.91	100	100	88	88	467	410	1.069	101	75	59
4	1.21	100	83	93	77	623	479	1.14	88	75	50
5	1.51	100	65	98	65	770	508	1.274	63	50	42
6	1.82	100	55	100	55	935	515	1.445	52	42	35

OB / YEAR11_15COAL_S Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kJals
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Mn	Cumulative Fuel
1	200	4	0			37.24	31.52	31.52	0.33	0.79
2	200	3.5	0.6			11.21	31.52	5	1.41	2.21
3	40	3.5	0.6	5		11.21	5	5	1.69	2.61
4	230	3.5	0.6			11.21	11.21	11.21	3.14	4.7
5	175	3	0			48.56	33.66	0	3.59	5.26

OB / YEAR11_15COAL_S Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kJals
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Mn	Cumulative Fuel
1	175	3	0			71.97	47.12	47.12	0.33	0.52
2	200	3.5	-0.6		78.26	77.66	69.1	5	0.64	0.7
3	40	3.5	-0.6	5	78.26	77.66	5	5	1.12	0.7
4	200	3.5	-0.6		78.26	77.66	73.31	73.31	1.4	1.13
5	200	4	0			67.45	73.31	0	1.65	1.25

OB / YEAR11_15COAL_E_A Efficiency

Total Material Qty 100,000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency% Mismatch	Hauler Efficiency% Bunching	Hauler Efficiency% Combined	BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tph Front*	Normal Tph Rear*	Normal Tph Trail*
1	0.31	100	100	100	100	162	162	1.537	88	70	74
2	0.63	100	100	94	94	324	306	1.139	93	65	59
3	0.94	100	100	87	87	486	421	1.061	86	59	49
4	1.26	100	79	94	75	648	484	1.128	74	49	42
5	1.57	100	64	99	63	810	509	1.266	62	49	42
6	1.89	100	53	100	53	972	515	1.445	52	42	35

OB / YEAR11_15COAL_E_A Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kJals
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Mn	Cumulative Fuel
1	55	4	0			37.24	23.58	23.58	0.21	0.31
2	200	3.5	0.6			11.21	23.58	5	1.16	1.67
3	40	3.5	0.6	5		11.21	5	5	1.68	2.27
4	230	3.5	0.6			11.21	11.21	11.21	2.92	4.36
5	175	3	0			48.56	33.66	0	3.36	4.92

OB / YEAR11_15COAL_E_A Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kJals
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Mn	Cumulative Fuel
1	175	3	0			71.97	47.12	47.12	0.33	0.52
2	230	3.5	-0.6		78.26	77.66	69.1	5	0.64	0.7
3	40	3.5	-0.6	5	78.26	77.66	5	5	1.12	0.7
4	200	3.5	-0.6		78.26	77.66	66.08	51.08	1.4	1.66

OB / YEAR11_15COAL_E_B Efficiency

Total Material Qty 100,000 BCM
 Loader 1 365B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency%			BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tkph		
			Mismatch	Bunching	Combined				Front*	Normal Tkph Rear*	Normal Tkph Trail*
1	0.34	100	100	100	100	175	175	1.422	110		87
2	0.68	100	100	93	93	350	326	1.068	102		81
3	1.02	100	98	85	84	525	440	1.016	92		73
4	1.36	100	74	96	71	700	495	1.103	78		62
5	1.7	100	59	100	59	875	515	1.253	65		51
6	2.04	100	49	100	49	1,050	515	1.445	54		43

OB / YEAR11_15COAL_E_B Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kN
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	35	4	0			37.24	20.83	20.83	0.15	0.23
2	80	3.5	9.4			11.31	20.83	5	0.5	0.75
3	40	3.5	9.4	5		11.31	5	5	0.98	1.15
4	70	3.5	9.4	9.4		11.31	9.4	9.4	1.44	1.74
5	130	3	-2.3			75.21	38.84	38.84	1.73	2.2
6	365	3	0			48.56	43.94	0	2.31	2.91

OB / YEAR11_15COAL_E_B Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kN
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	365	3	0			71.97	57.1	57.1	0.55	0.86
2	130	3	2.3			52.79	57.1	9.4	0.74	0.97
3	70	3.5	-9.4	9.4	78.26	77.86	9.4	5	1.19	0.87
4	40	3.5	-9.4	5	78.26	77.86	5	5	1.67	0.97
5	80	3.5	-9.4		78.26	77.86	40.68	40.73	1.83	1.19
6	35	4	0			87.45	40.73	0	1.83	1.36

OB / YEAR11_15COAL_E_C Efficiency

Total Material Qty 100,000 BCM
 Loader 1 365B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency%			BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tkph		
			Mismatch	Bunching	Combined				Front*	Normal Tkph Rear*	Normal Tkph Trail*
1	0.37	100	100	100	100	190	190	1.313	158		125
2	0.74	100	100	82	82	379	347	1.002	145		115
3	1.1	100	91	69	81	569	458	0.975	127		101
4	1.47	100	68	98	68	758	504	1.084	105		83
5	1.84	100	54	100	54	948	515	1.252	86		68
6	2.21	100	45	100	45	1,138	515	1.445	72		57

OB / YEAR11_15COAL_E_C Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kN
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	80	4	0			37.24	26.11	26.11	0.27	0.41
2	280	3.5	8.2			13.31	26.11	13.31	1.44	2.3
3	100	3	0			48.56	30.49	30.49	1.69	2.7
4	130	3	-2.3			75.21	43.91	43.91	1.9	3.02
5	365	3	0			48.56	48.15	0	2.44	3.71

OB / YEAR11_15COAL_E_C Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18.00R33
 Empty Weight 35,338 kN
 Payload 35.68 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	365	3	0			71.97	57.1	57.1	0.55	0.86
2	130	3	2.3			52.79	57.1	58.53	0.69	1.07

OB / YEAR16_20COAL_E_D Efficiency

Total Material Qty 100,000 BCM
 Loader 1 385B L Availability 100%
 Haulers 5 769D Availability 100%

From 1 To 6 769D Haulers
 100 % Operator Efficiency
 12 Sched Hours per Shift
 AVG Bunching

Qty	Fleet Match	Fleet Avail	Hauler Efficiency%			BCM per 60 min Hour	BCM per Sched Hour	\$ per BCM	Normal Tlph		
			Mismatch	Bunching	Combined				Front*	Normal Tlph Rear*	Normal Tlph Trail*
1	0.3	100	100	100	100	153	155	1 009	182		144
2	0.5	100	100	95	95	310	294	1 185	172		137
3	0.9	100	100	88	88	464	408	1 090	159		127
4	1.2	100	83	93	77	619	478	1 143	140		111
5	1.5	100	67	98	65	774	506	1 275	119		94
6	1.8	100	55	100	55	929	515	1 445	101		80

OB / YEAR16_20COAL_E_D Haul

Model 769D
 ID
 Tire Type E4
 Tire Size 18 00R33
 Empty Weight 35,338 kJals
 Payload 35 88 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	100	4	0			37.24	27.57	27.57	0.31	0.49
2	465	3.5	8			13.59	27.57	13.59	2.26	3.66
3	305	3	2.6			27.52	27.41	27.41	3.02	4.9
4	475	3	0			48.56	42.63	0	3.84	6

OB / YEAR16_20COAL_E_D Return

Model 769D
 ID
 Tire Type E4
 Tire Size 18 00R33
 Empty Weight 35,338 kJals
 Payload 35 88 MTons

	Distance in meters	% Rolling Resistance	% Grade	kph Limit	Retarding Speed	Potential Speed	Segment Max	Speed at End	Cumulative Min	Cumulative Fuel
1	475	3	0			71.97	61.05	61.05	0.08	1.04
2	305	3	-2.6			77.09	75.64	75.64	0.82	1.45
3	465	3.5	-8		78.26	77.86	77.86	68.85	1.28	1.47
4	100	4	0			67.45	68.85	0	1.46	1.47

Appendix 7

Detailed Calculation of Equipment Hours

TASK: OB/IB Stripping
EQUIP: Backhoe
NOTES: (w/ 38mT CAT 769)

Bucket Load	
Swell Factor:	1.3
Bucket Fill Factor:	100%
Bucket Capacity (m ³):	5.93
Bucket Load (bcm):	4.6
Number of Passes	3.16
Truck Payload (bcm)	
	13.7
Cycle Time	
Cycle Time/Load (s):	24
Spot Time (s):	25
Total Load Time (min)	1.6
Production	
Loads/Op-hr:	37.1
bcm/Op-hr:	508
Loader Efficiency:	87%
Truck Efficiency:	85%
Productivity (bcm/Op-hr)	
	376

TASK: OB/IB Stripping
EQUIP: Cat. 980 FEL
NOTES: (w/ 38mT CAT 769)

Bucket Load	
Swell Factor:	1.3
Bucket Fill Factor:	90%
Bucket Capacity (m ³):	5.73
Bucket Load (bcm):	4.0
Number of Passes	4.03
Truck Payload (bcm)	
	15.9
Cycle Time	
Cycle Time/Load (s):	30
Spot Time (s):	25
Total Load Time (min)	2.4
Production	
Loads/Op-hr:	24.8
bcm/Op-hr:	394
Loader Efficiency:	87%
Truck Efficiency:	85%
Productivity (bcm/Op-hr)	
	291

TASK: Coal Mining
EQUIP: Backhoe
NOTES: (w/ 38mT CAT 769)

Bucket Load	
Swell Factor:	1.3
Bucket Fill Factor:	95%
Bucket Capacity (m ³):	5.93
Bucket Load (tonnes):	6.8
Number of Passes	4.59
Truck Payload (tonnes)	
	33.8
Cycle Time	
Cycle Time/Load (s):	24
Spot Time (s):	25
Total Load Time (min)	2.4
Production	
Loads/Op-hr:	24.8
tonnes/Op-hr:	839
Loader Efficiency:	87%
Truck Efficiency:	85%
Productivity (tonnes/Op-hr)	
	621

TASK: Coal Stockpile
EQUIP: Cat. 980 FEL
NOTES: (w/ 38mT CAT 769)

Bucket Load	
Swell Factor:	1.3
Bucket Fill Factor:	90%
Bucket Capacity (m ³):	5.73
Bucket Load (tonnes):	6.2
Number of Passes	5.01
Truck Payload (tonnes)	
	30.9
Cycle Time	
Cycle Time/Load (s):	30
Spot Time (s):	25
Total Load Time (min)	2.9
Production	
Loads/Op-hr:	20.6
tonnes/Op-hr:	637
Loader Efficiency:	85%
Truck Efficiency:	80%
Productivity (tonnes/Op-hr)	
	433

Appendix 8

Capital Expenditures and Depreciation

TOTAL NUMBER OF UNITS PURCHASED			Year -3	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Total
Overburden Mining Equipment																											
6 CM Hoe (CAT 385B equiv)			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
6 CM Hoe (CAT 385B equiv)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
5 cm Front End Loader (Cat 980 equiv)			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
36t End Dump Truck (Cat 769 equiv)			0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
365hp percussion drill (Atlas Copco ROCL7)			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Coal Mining Equipment																											
6 CM Hoe (CAT 385B equiv)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
36t End Dump Truck (Cat 769 equiv)			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
5 cm Front End Loader (Cat 980 equiv)			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
36t End Dump Truck, Transport (Cat 769 equiv)			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mining Support Equipment																											2
230 kw Track Dozer (Cat D8 equiv)			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	3
5 cm Front End Loader (Cat 980 equiv)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Scraper			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Water Truck			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5.3m Motor Grader (Cat 14H equiv)			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	-
Cat D8 Track Dozer			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Cat D6R Series II Track Dozer			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Cat 345 Backhoe			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Case 680 Backhoe/Loader			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
80 Ton Rough Terrain Crane			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
40 Ton Rough Terrain Crane			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Bulk Explosives Truck			0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
100 Ton Lowboy			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Field Lube Truck			0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	-
Mechanic Service Truck (per year)			0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
Light Duty Truck - 3/4 Ton (per year)			0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	4
Light Plants			0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	4

NORWEST
CORPORATION

CAPITAL INVESTMENT																										
Mine Infrastructure Development Cost	Cost (\$000)	Year -3	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Total
Plant and Support Facilities																										
Equipment	3,031				3,031																					3,031
Other	0				0																					-
Subtotal	3,031				3,031	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,031
Support Facilities																										
Buildings	1,590				1,590																					1,590
Other	0				0																					-
Subtotal	1,590				1,590	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,590
Other Development Costs																										
Power Line	419				419																					419
Drainage Infrastructure	50				50																					50
Access Development	150				150																					150
Haul Road (3km)	135				135																					135
Consultants	100				100																					100
Subtotal	854				854	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	854
Mine Infrastructure Development Contingency		10%	0	0	0	548	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	548
SUBTOTAL INFRASTRUCTURE AND DEVELOPMENT			0	0	0	5,478	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,478
GRAND TOTAL INFRASTRUCTURE AND DEVELOPMENT			0	0	0	5,523	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,523
Overburden Mining Equipment	Cost/Unit (\$000)																									
6 CM Hoe (CAT 385B equiv)	580		0	0	0	580	0	0	0	0	0	0	0	0	0	0	0	0	580	0	0	0	0	0	0	1,160
6 CM Hoe (CAT 385B equiv)	580		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
36t End Dump Truck (Cat 769 equiv)	429		0	0	0	1,717	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,717
365hp percussion drill (Atlas Copco ROCL7)	423		0	0	0	423	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	423
Coal Mining Equipment																										
6 CM Hoe (CAT 385B equiv)	580		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
36t End Dump Truck (Cat 769 equiv)	429		0	0	0	429	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	429
5 cm Front End Loader (Cat 980 equiv)	243		0	0	0	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	243
36t End Dump Truck, Transport (Cat 769 equiv)	429		0	0	0	429	0	0	0	0	0	0	0	0	0	0	0	0	429	0	0	0	0	0	0	858
Mining Support Equipment																										
230 kw Track Dozer (Cat D8 equiv)	354		0	0	0	354	0	0	0	0	0	0	0	0	0	0	354	0	0	0	354	0	0	0	0	1,062
5 cm Front End Loader (Cat 980 equiv)	243		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Scraper	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Water Truck	267		0	0	0	267	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	267
5.3m Motor Grader (Cat 14H equiv)	185		0	0	0	185	0	0	0	0	0	0	0	0	0	0	185	0	0	0	0	0	0	0	0	370
Cat D8 Track Dozer	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Cat D6R Series II Track Dozer	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Cat 345 Backhoe	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Case 680 Backhoe/Loader	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
80 Ton Rough Terrain Crane	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
40 Ton Rough Terrain Crane	127		0	0	0	127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	127
Bulk Explosives Truck	41		0	0	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
100 Ton Lowboy	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Field Lube Truck	178		0	0	0	178	0	0	0	0	0	0	0	0	0	178	0	0	0	0	0	0	0	0	0	356
Mechanic Service Truck (per year)	122		0	0	0	122	0	0	0	0	122	0	0	0	0	122	0	0	0	122	0	0	0	0	0	487
Light Duty Truck - 3/4 Ton (per year)	28		0	0	0	28	0	0	0	0	28	0	0	0	0	28	0	0	0	28	0	0	0	0	0	111
Light Plants	17		0	0	0	35	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	70
Mining Equipment Contingency		10%	0	0	0	516	0	0	0	0	15	0	0	0	36	0	54	0	101	15	35	0	0	0	0	772
SUBTOTAL MINING EQUIPMENT			0	0	0	5,974	0	0	0	0	165	0	0	0	396	0	593	0	1,116	165	389	0	0	0	0	8,493
GRAND TOTAL CAPITAL			0	0	0	11,497	0	0	0	0	165	0	0	0	396	0	593	0	1,116	165	389	0	0	0	0	14,916

Table 6.1 Capital Expenditure Summary
3143 Base Model 0706 completed.xls

TERRITORIAL DEPRECIATION	Dep. Life	Annual Dep.	\$/hr Dep.	Year -3	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Total	
Mine Infrastructure Development Cost																													
Plant Facilities	20						152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	3,631	
Support Facilities	20						80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	1,590	
Other Development Costs	20						43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	854	
Overburden Mining Equipment																													
6 CM Hoe (CAT 385B equiv)	7	0.143	0.043	0	0	0	98	87	90	93	88	74	67	66							88	82	82	82	82	82	82	0	1,177
6 CM Hoe (CAT 385B equiv)	7	0.143	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
36t End Dump Truck (Cat 769 equiv)	7	0.143	0.040	0	0	0	274	272	283	231	217	199	158															1,613	
365hp percussion drill (Atlas Copco ROCL7)	7	0.143	0.094	0	0	0	74	64	67	70	65	52	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	437	
Coal Mining Equipment																													
6 CM Hoe (CAT 385B equiv)	7	0.143	0.194	0	0	0	6																					-	
36t End Dump Truck (Cat 769 equiv)	7	0.143	0.059	0	0	0	60	51	61	48	48	50	51	53	57	0	0	0	0	0	0	0	0	0	0	0	0	479	
5 cm Front End Loader (Cat 980 equiv)	7	0.143	0.057	0	0	0	35	35	35	35	35	35	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	248	
36t End Dump Truck, Transport (Cat 769 equiv)	7	0.143	0.036	0	0	0	62	62	62	62	62	62	62								62	62	62	62	62	62	47	654	
Mining Support Equipment																													
230 kw Track Dozer (Cat D6 equiv)	7	0.143	0.040	0	0	0	74	63	66	70	65	52	45	63	59	54	63	63	63	63	63	59	59	59	0	0	0	1,101	
5 cm Front End Loader (Cat 980 equiv)	7	0.143	0.057	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Scraper	7	0.143	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Water Truck	7	0.143	0.060	0	0	0	43	40	41	42	40	35	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	273	
5.3m Motor Grader (Cat 14H equiv)	7	0.143	0.018	0	0	0	29	28	29	29	29	23	20	28	26	24	28	28	28	28	28	0	0	0	0	0	0	376	
Cat D8 Track Dozer	7	0.143	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Cat D8R Series II Track Dozer	7	Annual/unit	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Cat 345 Backhoe	7	Annual/unit	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Case 680 Backhoe/Loader	7	Annual/unit	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
80 Ton Rough Terrain Crane	7	Annual/unit	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
40 Ton Rough Terrain Crane	7	Annual/unit	18.15	0	0	0	18	18	18	18	18	18	18								0	0	0	0	0	0	0	127	
Bulk Explosives Truck	7	Annual/unit	5.80	0	0	0	6	6	6	6	6	6	6								0	0	0	0	0	0	0	41	
100 Ton Lowboy	7	Annual/unit	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Field Lube Truck	7	Annual/unit	25.36	0	0	0	25	25	25	25	25	25	25								25	25	25	25	25	25	25	355	
Mechanic Service Truck (per year)	5	Annual/unit	24.37	0	0	0	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	487	
Light Duty Truck - 3/4 Ton (per year)	5	Annual/unit	5.57	0	0	0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	111	
Light Plants	5	Annual/unit	3.48	0	0	0	7	7	7	7	7	7	7								7	7	7	7	7	7	7	70	
Capital Contingency Depreciation			10.94	0	0	0	111	106	107	104	101	94	87	53	45	38	43	43	43	43	55	63	53	51	45	45	5	1,322	
TOTAL DEPRECIATION				8	8	9	1,228	1,168	1,181	1,143	1,109	1,029	956	987	490	420	468	468	488	488	661	845	585	567	492	492	52	14,544	

Table 6.1 Capital Expenditure Summary
3143 Base Model 0706 completed.xls

Cumulative

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0	98	184	274	367	454	529	596	652	682	682	682	682	682	682	767	849	931	1,013	1,095	1,177	1,177	1,177	1,177	1,177	1,177
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	274	546	810	1,041	1,258	1,457	1,613	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813	1,813
0	74	138	204	274	339	392	437	437	437	437	437	437	437	437	437	437	437	437	437	437	437	437	437	437	437
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	60	111	172	220	268	318	369	422	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479
0	35	70	105	141	178	211	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246
0	62	124	186	248	310	372	434	434	434	434	434	434	434	434	496	558	620	683	745	807	854	854	854	854	854
0	74	137	204	273	338	390	435	498	557	611	673	736	798	861	923	982	1,042	1,101	1,101	1,101	1,101	1,101	1,101	1,101	1,101
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	43	83	124	165	205	241	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273
0	29	57	86	114	143	168	187	215	241	265	292	320	348	376	376	376	376	376	376	376	376	376	376	376	376
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6.1 Capital Expenditure Summary
3143 Base Model 0706 completed.xls

Appendix 9

Operating Expenditures

		Year -3	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Total
COAL SHIPMENTS (tons)		0	0	0	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	182,038	0	4,982,038
LABOR COSTS																											
Hourly Workforce		Pay Grade	Annual Comp.																								
Stripping																											
Hydraulic Excavator Operator		Skilled	\$7,878	0	0	0	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Loader Operator		Skilled	\$7,878	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
OB Drill Operator		Skilled	\$7,878	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
OB Truck Operator		Skilled	\$7,878	0	0	0	4	4	4	4	4	4	3	3	4	3	4	4	4	4	4	4	4	4	4	4	3
Subtotal Stripping				0	0	0	8	7	7	7	7	6	8	7	8	7	7	7	7	7	7	7	7	7	7	7	6
Coal Operations																											
Hydraulic Excavator Operator		Skilled	\$7,878	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal Truck Operator		Skilled	\$7,878	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Subtotal Coal Operations				0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Coal Handling Facility																											
Plant Operators		Skilled	\$7,878	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Laborers		Non-skilled	\$5,864	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Subtotal Coal Handling Facility				0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Reclamation and Support Equipment																											
Track Dozer Operators		Skilled	\$7,878	0	0	0	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water Truck Operators		Skilled	\$7,878	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Grader Operators		Skilled	\$7,878	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Other Ancillary Equip		Skilled	\$7,878	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Subtotal Support Equipment				0	0	0	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Maintenance Personnel																											
Mechanics		Skilled	\$3,085	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Electricians		Skilled	\$3,085	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Laborers		Non-skilled	\$5,864	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Subtotal Maintenance				0	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Total Hourly				0	0	0	20	18	18	18	17	17	18	17	17	18	18	18	18	18	18	18	18	18	17	0	
Staff & Support Workforce																											
Operations Management		Annual Comp.																									
Mine Superintendent		Manager	197,816			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Administration																											
Clerical and Camp Support		Non-skilled	\$5,864			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Staff & Support				0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	
Total Hourly				0	0	0	20	18	18	18	17	17	18	17	17	18	18	18	18	18	18	18	18	18	17	0	
Total Staff				0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	
Total Workforce				0	0	0	22	20	20	20	19	19	20	19	19	20	20	20	20	20	20	20	20	20	19	0	
Annual Wage/Salary/Benefits																											
Hourly			\$0	\$0	\$0	\$1,143,914	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$970,288	\$970,288	\$1,028,162	\$970,288	\$970,288	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$1,028,162	\$970,288	\$0
Staff			\$0	\$0	\$0	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$152,880	\$0
Benefits			\$0	\$0	\$0	\$440,910	\$401,554	\$401,554	\$401,554	\$401,554	\$381,876	\$381,876	\$401,554	\$381,876	\$381,876	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$401,554	\$381,876	\$0
TOTAL LABOR			\$0	\$0	\$0	\$1,737,704	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,505,042	\$1,505,042	\$1,582,596	\$1,505,042	\$1,505,042	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,582,596	\$1,505,042	\$0
(Total Labor - \$/ton)			\$0.00	\$0.00	\$0.00	\$7.24	\$6.59	\$6.59	\$6.59	\$6.59	\$6.27	\$6.27	\$6.59	\$6.27	\$6.27	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59	\$6.27	\$0.00	\$6.82

		Year-3	Year-2	Year-1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Total
MATERIALS AND SUPPLIES COSTS																											
Equipment Operating Hours																											
Overburden Mining Equipment Operating Hours																											
6 CM Hoe (CAT 385B equiv)	0	0	0	1,857	1,598	1,870	1,750	1,828	1,311	1,146	1,583	1,480	1,357	1,574	1,574	1,574	1,574	1,574	1,490	1,490	1,490	1,490	1,490	1,130	0	0	
6 CM Hoe (CAT 385B equiv)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5 cm Front End Loader (Cat 980 equiv)	0	0	0	821	821	821	821	821	821	821	821	821	821	821	821	821	821	821	821	821	821	821	821	821	471	0	
38t End Dump Truck (Cat 789 equiv)	0	0	0	8,814	8,781	8,545	5,731	5,401	4,936	3,877	5,822	5,349	4,899	5,791	5,905	6,022	6,145	6,273	6,017	6,100	6,184	6,271	6,380	4,894	0	0	
385hp percussion drill (Atlas Copco ROCL7)	0	0	0	788	678	709	743	691	586	486	672	628	578	668	668	668	668	668	632	632	632	632	632	480	0	0	
Coal Mining Equipment Operating Hours																											
6 CM Hoe (CAT 385B equiv)	0	0	0	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	328	0	
38t End Dump Truck (Cat 789 equiv)	0	0	0	1,010	862	1,031	809	805	835	860	890	961	1,052	1,078	1,100	1,125	1,152	1,180	1,188	1,196	1,204	1,213	1,221	933	0	0	
38t End Dump Truck, Transport (Cat 789 equiv)	0	0	0	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,734	1,315	0	0	
Mining Support Equipment Operating Hours																											
230 kw Track Dozer (Cat D8 equiv)	0	0	0	1,857	1,598	1,870	1,750	1,828	1,311	1,146	1,583	1,480	1,357	1,574	1,574	1,574	1,574	1,574	1,490	1,490	1,490	1,490	1,490	1,130	0	0	
Water Truck	0	0	0	728	663	701	670	650	501	430	650	550	470	550	550	550	550	550	550	550	550	550	550	482	0	0	
5.3m Motor Grader (Cat 14H equiv)	0	0	0	1,826	1,598	1,826	1,826	1,826	1,311	1,146	1,583	1,480	1,357	1,574	1,574	1,574	1,574	1,574	1,490	1,490	1,490	1,490	1,490	1,130	0	0	
40 Ton Rough Terrain Crane	0	0	0	190	190	190	190	190	172	181	188	183	175	188	188	188	188	188	183	183	183	183	183	180	0	0	
Bulk Explosives Truck	0	0	0	357	331	338	347	334	300	280	330	318	305	329	329	329	329	329	329	329	329	329	329	279	0	0	
Field Lube Truck	0	0	0	487	418	438	397	383	344	322	378	368	350	377	377	377	377	377	367	367	367	367	367	319	0	0	
Mechanic Service Truck (per year)	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	
Light Duty Truck - 3/4 Ton (per year)	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	
Maintenance Parts, Lube, and Tires																											
Overburden Mining Equipment \$/hour																											
6 CM Hoe (CAT 385B equiv)	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	
6 CM Hoe (CAT 385B equiv)	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	
5 cm Front End Loader (Cat 980 equiv)	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	
38t End Dump Truck (Cat 789 equiv)	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	
385hp percussion drill (Atlas Copco ROCL7)	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	\$51.81	
Coal Mining Equipment \$/hour																											
6 CM Hoe (CAT 385B equiv)	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	\$30.16	
38t End Dump Truck (Cat 789 equiv)	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	
38t End Dump Truck, Transport (Cat 789 equiv)	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	\$16.18	
Mining Support Equipment \$/hour																											
230 kw Track Dozer (Cat D8 equiv)	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	\$24.51	
5 cm Front End Loader (Cat 980 equiv)	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	\$17.94	
Scrapper	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
Water Truck	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	\$9.47	
5.3m Motor Grader (Cat 14H equiv)	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	\$13.29	
40 Ton Rough Terrain Crane	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	
100 Ton Lowboy	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
Field Lube Truck	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	\$7.38	
Mechanic Service Truck (per year)	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	\$2,048	
Light Duty Truck - 3/4 Ton (per year)	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	\$2,068	
Total Cost	\$0	\$0	\$0	\$399,132	\$334,400	\$339,899	\$329,187	\$313,971	\$277,276	\$244,968	\$314,718	\$301,800	\$284,498	\$319,818	\$321,853	\$324,179	\$326,584	\$329,111	\$317,210	\$316,677	\$32>\$						

