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**THIS CIRCULAR IS IMPORTANT AND REQUIRES YOUR IMMEDIATE ATTENTION**

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**If you are in doubt** as to any aspect of this circular, you should consult your stockbroker or other registered dealer in securities, bank manager, solicitor, professional accountant or other professional adviser.

**If you have sold** all your shares in Winsway Enterprises Holdings Limited you should at once hand this circular to the purchaser or to the bank, stockbroker or other agent through whom the sale was effected for transmission to the purchaser.

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**WINSWAY**<sup>®</sup>

**WINSWAY ENTERPRISES HOLDINGS LIMITED**

**永暉實業控股股份有限公司**

*(formerly known as “WINSWAY COKING COAL HOLDINGS LIMITED 永暉焦煤股份有限公司”)*

*(Incorporated in the British Virgin Islands with limited liability)*

**(Stock Code: 1733)**

**(1) MAJOR TRANSACTION  
DISPOSAL OF A 42.74% INTEREST IN GRANDE CACHE COAL  
CORPORATION AND GRANDE CACHE COAL LP  
(2) CLOSURE OF REGISTER OF MEMBERS  
AND  
(3) NOTICE OF EGM**

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A letter from the board of directors of the Company is set out on pages 8 to 32 of this circular. A notice convening the extraordinary general meeting of the Company to be held at Room 2, 10/F, United Centre, 95 Queensway, Admiralty, Hong Kong on 17 July 2015 at 2:00 p.m. is set out on pages N-1 to N-2 of this circular. Whether or not you are able to attend the meeting in person, you are requested to complete the accompanying form of proxy in accordance with the instructions printed thereon and return the same to the Company's registrar in Hong Kong, Computershare Hong Kong Investor Services Limited at 17M Floor, Hopewell Centre, 183 Queen's Road East, Wanchai, Hong Kong as soon as possible and in any event not less than 48 hours before the time appointed for the holding of the extraordinary general meeting of the Company or any adjournment thereof. Completion and return of the form of proxy shall not preclude you from attending and voting at the extraordinary general meeting of the Company or any adjournment of it should you so wish.

30 June 2015

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## DEFINITIONS

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*For the purpose of this circular, the following expressions have the following meanings unless the context requires otherwise:*

“2014 Annual Report”	means the annual report of the Company dated 2 April 2015 for the financial year ended 31 December 2014
“Act”	means the Business Corporations Act (Alberta) R.S.A. 2000, c. B-9, as amended and replaced from time to time
“Affiliate”	means in respect of any person, a person which directly or indirectly Controls, or is Controlled by, or is under common Control with, such person
“Amended and Restated Bridge Loan Agreement”	means the amended and restated bridge loan agreement entered into by the Purchaser, the Purchaser Guarantor, GCC, GCC LP, the Marubeni Seller and the Seller on 17 December 2014 as supplemented by letter agreements among the same parties dated 24 December 2014 and 12 May 2015, respectively, amending and restating the Bridge Loan Agreement dated 6 September 2014 as amended by the Amendment Agreement dated 2 December 2014
“Amended and Restated Partnership Agreement”	means an amended and restated limited partnership agreement finalised on 31 December 2014 and proposed to be entered into among GCC, the Seller and the Purchaser on or before the Completion Date setting out their respective rights and obligations in relation to GCC LP
“Amended and Restated USA” or “Amended and Restated Unanimous Shareholders Agreement”	means an amended and restated unanimous shareholders’ agreement finalised on 31 December 2014 and proposed to be entered into between, among others, the Seller and the Purchaser on or before the Completion Date setting out their respective rights and obligations in relation to GCC
“Amended Bridge Loan”	means the US\$50,000,000 facility under the Amended and Restated Bridge Loan Agreement entered into by the Purchaser, the Purchaser Guarantor, GCC, GCC LP, the Marubeni Seller and the Seller concurrently with the Interim Support Agreement and any other amendment, substitution or replacement, in whole or part, of such agreement
“Amendment Agreement”	means an amendment agreement dated 2 December 2014 entered into between the parties to the Bridge Loan Agreement
“April Announcements”	means the announcement of the Company dated 9 April 2015 and 15 April 2015, respectively in relation to, among other things, the satisfaction of certain condition and the extension of the Longstop Date
“ARC”	means an advance ruling certificate pursuant to Section 102 of the Competition Act
“Board”	means the board of Directors

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## DEFINITIONS

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“Bondholders”	means holders of Senior Notes
“Bondholder Group”	means a committee of Bondholders formed for the purposes of facilitating discussions between Bondholders and the Company about the possible restructuring of the Senior Notes
“Bridge Loan”	means a bridge loan facility in the amount of US\$10,000,000 provided by the Purchaser Guarantor to GCC LP pursuant to a bridge loan agreement dated 6 September 2014, as amended by the Amendment Agreement, entered into between GCC LP, the Seller, Purchaser Guarantor and Marubeni Seller
“Bridge Loan Agreement”	means a bridge loan agreement dated 6 September 2014 entered into between GCC LP, the Seller, the Purchaser Guarantor and the Marubeni Seller in relation to the Bridge Loan
“Business Day”	means a day (other than a Saturday or Sunday) on which banks are open for general business in the City of Calgary, Alberta, Hong Kong and Beijing
“Buy-back Completion”	means completion of the sale and purchase of all the Transfer Buy-back Interests
“Buy-back Interests”	means collectively (a) the Buy-back Partnership Interest; and (b) the Buy-Back Shares
“Buy-back Partnership Interest”	means a Partnership Interest of up to 16.86%
“Buy-back Price”	means such sum as shall be determined in accordance with the provisions of the schedule of the Buy-back Right Agreement
“Buy-back Right”	means the irrevocable and unconditional right granted by the Purchaser to the Company to purchase the Buy-back Shares for the Buy-back Price
“Buy-back Right Agreement”	means a buy-back right agreement to be entered into between the Company, the Purchaser and the Purchaser Guarantor which the Purchaser grants a buy-back right in favour of the Company (or its wholly-owned Affiliate) to purchase up to a 16.86% Partnership Interest and a 16.86% shareholding in GCC
“Buy-back Shares”	means a number of ordinary shares in the capital of the GCC beneficially owned by and registered in the name of the Purchaser representing up to 16.86% of the total issued ordinary shares in the capital of GCC
“BVI”	the British Virgin Islands
“C\$”	means Canadian dollars, the lawful currency of Canada
“Commissioner”	means the Commissioner of Competition under the Competition Act

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## DEFINITIONS

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“Company”	Winsway Enterprises Holdings Limited, a company incorporated under the laws of the BVI with limited liability and the issued Shares of which are listed on the main board of the Stock Exchange (Stock Code: 1733)
“Competition Act”	means the Competition Act, R.S.C. 1985, c. C-34, as amended
“Competition Act Approval”	means that any one of the following shall have occurred (i) the Commissioner shall have issued an ARC pursuant to Section 102 of the Competition Act in respect of the transactions contemplated by the Sale and Purchase Agreement which ARC shall remain in force, unamended, at the date on which the last of the Conditions of the Sale and Purchase Agreement has been satisfied or waived (as applicable), (ii) if applicable, the waiting period under Section 123(1) of the Competition Act shall have expired or been earlier terminated or waived and the Commissioner shall have advised the Seller and the Purchaser that he does not, at that time, intend to make an application for an order under Section 92 of the Competition Act in respect of the transactions contemplated by the Sale and Purchase Agreement on terms and conditions satisfactory to the Purchaser, which advice shall not have been rescinded at the date on which the last of the Conditions has been satisfied or waived (as applicable), or (iii) the Commissioner shall have, pursuant to Section 113(c) of the Competition Act, waived the obligation of the Seller and the Purchaser to provide notice of the transactions contemplated by the Sale and Purchase Agreement pursuant to Section 114(1) of the Competition Act, and advised the Seller and the Purchaser that he does not, at that time, intend to make an application for an order under Section 92 of the Competition Act in respect of the transactions contemplated by the Sale and Purchase Agreement on terms and conditions satisfactory to the Purchaser, which advice shall not have been rescinded at the date on which the last of the Conditions has been satisfied or waived (as applicable)
“Competent Person”	Anthony Carl Pollastro, QP, MMSA, of Norwest Corporation, who prepared the Competent Person’s Report, has the meaning given to it under Rule 18.01(3) of the Listing Rules and satisfying the requirement of Rules 18.21 and 18.22 of the Listing Rules
“Competent Person’s Report” or “CPR”	has the meaning as defined in Chapter 18 of the Listing Rules and set out in Appendix II to this circular
“Completion”	means completion of the sale and purchase of the Sale Interests in accordance with the Sale and Purchase Agreement
“Completion Date”	means the date when Completion occurs
“Conditions”	means the conditions set out in the Sale and Purchase Agreement
“Consideration”	means US\$1 (1 US dollar)

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## DEFINITIONS

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“Control”	means the ownership of more than 50% of the voting shares or the ability to (directly or indirectly) direct the management, policies, affairs and matters and/or to control the composition of the board of directors, board of commissioners or equivalent body of a person, whether pursuant to shareholding, contract, arrangement or otherwise (and “Controlled by” and “under common Control” shall be construed accordingly)
“Debt Restructuring”	means a possible restructuring of the outstanding Senior Notes with cash, equity or other form of consideration offered at a discount to the principal amount
“December Announcements”	means the announcements of the Company dated 2 December 2014 and 8 December 2014 in relation to, among other things, the extension of the December Longstop Date
“December Longstop Date”	means 31 December 2014
“Director(s)”	means director(s) of the Company
“Disposal”	means the proposed disposal of a 42.74% interest in GCC and GCC LP pursuant to the terms and conditions of the Sale and Purchase Agreement
“EGM”	means the extraordinary general meeting of the Company to be held at 2:00 p.m. on 17 July 2015 at Room 2, 10/F, United Centre, 95 Queensway, Admiralty, Hong Kong to consider and, if thought fit, to approve the Sale and Purchase Agreement and transactions contemplated thereunder
“Equity Financing”	means the raising of new capital by the Company by carrying out fund raising activities including the issuance of new equity by the Company
“Fourth Amendment Deed”	means the fourth amendment deed to the Senior Facilities Agreement dated 1 October 2014 entered into between, among others, the Seller, GCC, GCC LP, Marubeni Seller, China Minsheng Bank Corp., Ltd. Shanghai Branch and China Minsheng Bank Corp., Ltd. Hong Kong Branch
“GCC”	Grande Cache Coal Corporation, a company amalgamated under the laws of the Province of Alberta, Canada, being a non-wholly owned subsidiary as to 60% indirectly owned by the Company as at the date of the Sale and Purchase Agreement, and the general partner of GCC LP
“GCC Group”	means GCC LP and its subsidiaries
“GCC LP”	Grande Cache Coal LP, a limited partnership established under the laws of the Province of Alberta, Canada, of which a 59.994% interest is indirectly owned by the Company as at the date of the Sale and Purchase Agreement

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## DEFINITIONS

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“Government Authority”	means (i) any court, judicial body, tribunal or arbitral body, (ii) any domestic or foreign government whether multinational, national, federal, provincial, territorial, state, municipal or local and any governmental agency, governmental authority, governmental tribunal or governmental commission of any kind whatever, (iii) any subdivision or authority of any of the foregoing, (iv) any quasi-governmental or private body exercising any regulatory, expropriation or taxing authority under or for the account of any of the above, (v) any supranational or regional body such as the World Trade Organization, having jurisdiction in the relevant circumstances and any person acting under the authority of any such government authority and for the avoidance of doubt Governmental Authority shall not include any Securities Exchange
“Great Start Development”	Great Start Development Limited, a company incorporated under the laws of the BVI with limited liability on 21 April 2010 and indirectly wholly-owned by Mr. Wang
“Group”	means the Company and its subsidiaries
“HCC Coal Benchmark Price”	means the quarterly agreed US\$ forward onboard price of a top-tier Australian hard coking coal for the Asian market, such as BMA’s Peak Downs or Anglo American’s German Creek, being published in the Platts’ “Coal Trader International” or “SBB Steel Markets daily” from time to time. If such quarterly benchmark price is not published for any reason, the spot price of the Platts Daily Metallurgical Coal Assessments under HCC Peak Downs Region forward onboard Australia shall apply
“HK\$”	means the lawful currency of Hong Kong
“Hong Kong”	means the Hong Kong Special Administrative Region of the PRC
“Independent Third Party(ies)”	means any person(s) or company(ies) and their respective ultimate beneficial owner(s) who are third parties independent of the Company and its connected persons
“Investment Canada Act”	means the Investment Canada Act, R.S.C. 1985, c.28 (1st Supp.), as amended
“Investment Canada Act Approval”	means either the Minister designated for the purposes of the Investment Canada Act shall have sent a notice pursuant to subsection 21(1) of the Investment Canada Act to the Purchaser, on terms and conditions satisfactory to the Purchaser and the Seller, each acting reasonably, stating that the Minister is satisfied that the transaction(s) contemplated in the Sale and Purchase Agreement is or are likely to be of net benefit to Canada, or alternatively, the time period provided for the giving of such notice pursuant to the Investment Canada Act (including any extensions) shall have expired such that the Minister shall be deemed, pursuant to subsection 21(9) of the Investment Canada Act, to be satisfied that the transaction(s) contemplated herein is or are of net benefit to Canada

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## DEFINITIONS

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“Interim Support Agreement” or “Management Services Agreement”	means the interim support agreement dated 17 December 2014 by the Purchaser, Marubeni Seller, GCC and Seller entered into which constitutes the management services agreement as referred to in the Sale and Purchase Agreement, as supplemented by letter agreements among the same parties dated 24 December 2014 and 12 May 2015, respectively, in respect of the Purchaser providing management services to GCC at any time prior to Completion
“January Announcement”	means the announcement of the Company dated 1 January 2015 in relation to, among other things, the Amended and Restated Partnership Agreement, Amended and Restated USA, Interim Support Agreement and Marketing Agency Agreement
“June Announcement”	means the announcement of the Company dated 30 June 2015 in relation to the extension of the Longstop Date
“Latest Practicable Date”	means 29 June 2015, being the latest practicable date prior to the printing of this circular for ascertaining certain information therein
“Listing Rules”	means the Rules Governing the Listing of Securities on the Stock Exchange
“Longstop Date”	means 20 July 2015 subject to amendment as provided in the Sale and Purchase Agreement
“Marketing Agency Agreement”	means a marketing agency agreement, finalised on 31 December 2014 proposed to be entered into between the Company, the Purchaser Guarantor and GCC on or before the Completion Date pursuant to which GCC shall grant certain marketing rights to the Company in respect of GCC’s coal products
“Marubeni Corporation”	Marubeni Corporation, a company incorporated under the laws of Japan
“Marubeni Group”	Marubeni Corporation and its Affiliates to which common shares of GCC were transferred
“Marubeni Seller”	Marubeni Coal Canada Ltd., a company incorporated under the laws of British Columbia, Canada, a wholly-owned subsidiary of Marubeni Corporation
“Marubeni SPA”	means the sale and purchase agreement dated 14 November 2014 between Marubeni Seller, the Purchaser and the Purchaser Guarantor in respect of the sale by Marubeni Seller of a 39.996% Partnership Interest in GCC LP and a 40% interest in the shares of GCC on terms substantially similar to the Sale and Purchase Agreement
“May Announcement”	means the announcement of the Company dated 13 May 2015 in relation to the extension of the Longstop Date
“Minister”	means such member of the Queen’s Privy Council for Canada as is designated by the Governor in Council as the Minister for the purposes of the Investment Canada Act



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## DEFINITIONS

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“Model Code”	means the Model Code for Securities Transactions by Directors of Listed Issuers set out in Appendix 10 to the Listing Rules
“MOU”	means the memorandum of understanding entered into between the Company and the Purchaser Guarantor dated 30 September 2014 in relation to the Disposal, as disclosed in the announcement of the Company dated 30 September 2014
“Mr. Wang”	Wang Xingchun (王興春先生), our chairman, Chief Executive Officer and the ultimate controlling shareholder of the Company
“November Announcement”	means the announcement of the Company dated 19 November 2014 in relation to, among other things, the Sale and Purchase Agreement and the transactions contemplated thereunder
“Partnership Interest”	means an interest in GCC LP
“Purchaser”	Up Energy Resources Company Limited, a company incorporated under the laws of the BVI and wholly-owned by the Purchaser Guarantor
“Purchaser Group”	means the Purchaser, the Purchaser Guarantor and any of their Affiliates to which common shares of GCC are transferred
“Purchaser Guarantor”	Up Energy Development Group Limited, a company incorporated under the laws of Bermuda with limited liability, and the issued shares of which are listed on the main board of the Stock Exchange (Stock Code: 307)
“Remaining Group”	means the Group excluding the Sale Interests after Completion
“Sale and Purchase Agreement”	means the sale and purchase agreement dated 14 November 2014, entered into between the Seller, the Purchaser and the Purchaser Guarantor in relation to the Disposal
“Sale Interests”	means the Sale Shares and the Sale Partnership Interest
“Sale Partnership Interest”	means a 42.74% Partnership Interest in GCC LP as at the date of the Sale and Purchase Agreement
“Sale Shares”	means 295,238,214 common shares in the capital of GCC registered in the name of the Seller, representing approximately 42.74% of all the issued and outstanding shares in the capital of GCC as at the date of the Sale and Purchase Agreement
“Seller”	means 0925165 B.C. Ltd, a company incorporated under the laws of British Columbia, Canada, and an indirect wholly-owned subsidiary of the Company
“Senior Facilities Agreement”	means the US\$430,000,000 senior facilities agreement dated 1 March 2012 (as subsequently amended and restated from time to time) entered into between, among others, GCC LP and China Minsheng Bank Corp., Ltd. Hong Kong Branch

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## DEFINITIONS

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“Senior Notes”	means the US\$500,000,000 8.5% senior notes issued by the Company on 8 April 2011 of which US\$309,310,000 in principal amount were outstanding as of the Latest Practicable Date that are due to mature on 8 April 2016
“SFC”	means the Securities and Futures Commission of Hong Kong
“SFO”	the Securities and Futures Ordinance (Chapter 571 of the Laws of Hong Kong) (as amended from time to time)
“Shareholder(s)”	means a shareholder(s) of the Company from time to time
“Shares”	means ordinary share(s) with no par value of the Company
“Standstill Agreement”	means a standstill agreement dated 8 May 2015 that has been entered into between the Company and certain Bondholders in relation to a significant percentage of the outstanding principal amount of the Senior Notes (and amended pursuant to letter agreements dated 29 May 2015, 15 June 2015 and 22 June 2015) with a termination date on 20 July 2015 (or such later date as may be agreed in writing by all of the parties before such time)
“Stock Exchange”	means The Stock Exchange of Hong Kong Limited
“Third Party Approvals”	means consents, waivers, permissions and approvals necessary to complete the transactions contemplated by the Sale and Purchase Agreement by or from relevant third parties (including GCC and GCC LP’s financiers, shareholder and partner (other than the Seller)) and Governmental Authorities and, for certainty, excludes the Competition Act Approval and the Investment Canada Act Approval
“Trigger Price Range”	means a price range determined in accordance with the Buy-back Right Agreement
“US\$”	means the lawful currency of the United States of America
“Winsway International Petroleum & Chemicals”	Winsway International Petroleum & Chemicals Limited, a company incorporated under the laws of the BVI with limited liability on 18 August 2005 and indirectly wholly-owned by Mr. Wang
“Winsway Resources Holdings”	Winsway Resources Holdings Limited, a company incorporated under the laws of the BVI with limited liability on 23 September 2008 and indirectly wholly-owned by Mr. Wang
“%”	means per cent

*For the purpose of illustration only, the amount denominated in US\$ has been translated into HK\$ at the exchange rate of US\$1 to HK\$7.80.*

# WINSWAY®

## WINSWAY ENTERPRISES HOLDINGS LIMITED

### 永暉實業控股股份有限公司

(formerly known as “WINSWAY COKING COAL HOLDINGS LIMITED 永暉焦煤股份有限公司”)

(Incorporated in the British Virgin Islands with limited liability)

(Stock Code: 1733)

*Directors:*

*Executive Directors:*

Wang Xingchun (*Chairman and Chief Executive Officer*)<sup>(Note)</sup>

Zhu Hongchan

Ma Li

Andreas Werner (*Chief Executive Officer Designate*)

Wang Changqing

*Non-executive Directors:*

Liu Qingchun

Lu Chuan

*Independent Non-executive Directors:*

James Downing

Ng Yuk Keung

Wang Wenfu

George Jay Hambro

*Registered Office:*

Akara Bldg.

24 De Castro Street

Wickhams Cay 1

Road Town, Tortola

British Virgin Islands

*Principal Place of Business in Hong Kong:*

Suites 2104–05

Hutchison House

10 Harcourt Road

Hong Kong

*Note: Mr. Wang Xingchun has been on extended leave from his board and management responsibilities due to health and personal reason.*

30 June 2015

*To the Shareholders*

*Dear Sir or Madam,*

**(1) MAJOR TRANSACTION  
DISPOSAL OF A 42.74% INTEREST IN GRANDE CACHE COAL  
CORPORATION AND GRANDE CACHE COAL LP  
(2) CLOSURE OF REGISTER OF MEMBERS  
AND  
(3) NOTICE OF EGM**

### INTRODUCTION

Reference is made to the November Announcement, December Announcements, January Announcement, April Announcements, May Announcement and June Announcement in relation to the

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## LETTER FROM THE BOARD

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Sale and Purchase Agreement entered into by the Seller, the Purchaser and the Purchaser Guarantor on 14 November 2014 pursuant to which the Purchaser has conditionally agreed to acquire and the Seller has conditionally agreed to sell the Sale Interests in accordance with the terms and conditions of the Sale and Purchase Agreement. The Disposal constitutes a major transaction of the Company under the Listing Rules.

The purpose of this circular is to provide you with, among other things, (i) further information on the details of the Sale and Purchase Agreement and the transactions contemplated thereunder; (ii) financial and other information of the Group; (iii) financial information of GCC and GCC LP; (iv) other information as required under the Listing Rules; (v) Competent Person's Report; and (vi) the notice of EGM.

### SALE AND PURCHASE AGREEMENT

The Sale and Purchase Agreement includes, among other things, the following major terms:

**Date:** 14 November 2014

**Parties:** (1) the Seller;  
(2) the Purchaser; and  
(3) the Purchaser Guarantor

(the "**Parties**", and each a "**Party**")

The Purchaser is a company incorporated under the laws of the BVI and wholly-owned by the Purchaser Guarantor. To the best knowledge of the Directors, information and belief after having made all reasonable enquiries, (i) the Purchaser and the Purchaser Guarantor are Independent Third Parties; and (ii) the Company and the Directors have no current or prior relationship and business arrangement with the Purchaser and the Purchaser Guarantor save for the entering into of the MOU, Sale and Purchase Agreement and other transaction documents contemplated or referred to under the Sale and Purchase Agreement including the agreement for the Amended Bridge Loan and the transactions arising from such documents. The purpose of the Amended Bridge Loan provided by the Purchaser Guarantor to GCC LP pursuant to the Amended and Restated Bridge Loan Agreement is to allow GCC LP to meet its day to day operational expenses. According to the Amended and Restated Bridge Loan Agreement, interest on the Amended Bridge Loan shall be payable by GCC LP irrespective of whether the Completion or completion of the Marubeni SPA occurs.

### Assets to be disposed

The Sale Interests consist of the Sale Shares, representing a 42.74% of the Seller's interest in the total issued share capital of GCC, and the Sale Partnership Interest, representing a 42.74% partnership interest in GCC LP, as at the date of the Sale and Purchase Agreement. Pursuant to the Fourth Amendment Deed, all shareholders of GCC were required to inject an aggregate of US\$69 million of capital into GCC to support its operations. The Company had, up to the date of the Fourth Amendment Deed, paid US\$11.909 million to GCC as advance payment for coal products. The Company and Purchaser Guarantor agreed that the Seller shall have the right to apply the entire amount of the outstanding advance payment for coal products against the Seller's proportional obligation to make such capital contribution. Therefore, the Company retains 17.26% of GCC, representing the percentage of the US\$11.909 million capitalisation over the aggregate amount of required capital of US\$69 million from all shareholders of GCC. As a result, the Company,

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## LETTER FROM THE BOARD

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originally holding 60% of GCC, decided to sell the remaining 42.74% of GCC. Upon completion of the Disposal, the Company will hold a 17.26% interest in the total issued share capital of GCC and a 17.2534% Partnership Interest in GCC LP as a result of the capitalisation of the outstanding advance payment for coal products in the amount of US\$11.909 million against the capital contribution obligation. Other than the above capital contribution as set out in the Fourth Amendment Deed, the Seller is not under any obligation to provide any capital contribution to GCC (either before or after the Completion). The proposed retention of a 17.26% interest in GCC and a 17.2534% Partnership Interest in GCC LP is because it wishes to retain the opportunity to benefit from any upturn in coking coal prices in the future which the Company believes an equity interest in GCC and GCC LP would provide in such circumstances. The Company determined the relevant percentage to be retained following negotiations with the Purchaser and based on the Company's expected ability to fund pro rata capital contributions to GCC LP assuming coking coal prices remain depressed in the short term.

### **Consideration**

The Consideration, which is the nominal amount of US\$1.00 (approximately HK\$7.80) is payable in cash upon Completion and was agreed after arm's-length negotiations and taking into account numerous factors, including the assets and liabilities of GCC LP and GCC, profitability, cash flows, earning, its stage of development and potential future capital requirements of GCC LP, the financial position of the Company and based on the financial information of GCC LP and GCC as disclosed in the section headed "Consolidated financial information of GCC Group". The Consideration did not take into account the Competent Person's valuation of C\$622 million (representing approximately US\$536 million as at 31 December 2014, based on the exchange rate of C\$1: US\$0.8617) in the Competent Person's Report. Norwest Corporation is an independent technical consultant and the assumptions they made in their Competent Person's Report are very different from the Company's valuation of GCC. The Company has limited financial resources and thus cannot implement the same business plan that is assumed by Norwest Corporation.

As mentioned in the paragraph headed "Financial Effects of the Disposal on the Group" below, the actual loss incurred from the Disposal on the Group HK\$424,000, was the resulting difference based on the calculation between (i) the sum of the net assets and the carrying amount of the non-controlling interest in GCC, and (ii) the total of the amounts previously recognised in other comprehensive income to be reclassified in profit or loss in connection with the Disposal and the estimated fair value of the Group's interest in GCC after the Disposal. The marginal difference shows that the price is fair and close to the Company's valuation results, i.e., using fair value less costs to sell to measure the value of the disposal group held for sale as disclosed in pages 150 to 153 of the 2014 Annual Report.

The Consideration was also referenced to the liabilities of GCC Group mainly comprising the outstanding banking facilities in the principal amount of US\$430 million pursuant to the Senior Facilities Agreement and other liabilities. The Purchaser Guarantor also committed to provide the Amended Bridge Loan to support GCC's operation during the interim period prior to the completion of the Sale and Purchase Agreement. Therefore, the Consideration was arrived following mutual negotiation and agreement considering the value of GCC Group's asset, assumption of its liabilities and the interim funding provided by the Purchaser Guarantor.

### **Conditions precedent**

Completion is conditional upon the following conditions being satisfied on or before: (i) in respect of Conditions (a) to (l) (inclusive), the Longstop Date; and (ii) in respect of Conditions (m) to (r) (inclusive),

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## LETTER FROM THE BOARD

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the December Longstop Date, or on or before such later date as the Parties may agree pursuant to the Sale and Purchase Agreement:

- (a) delivery by each of the Purchaser Guarantor and the Purchaser to the Seller of relevant minutes of a meeting of the directors of the Purchaser Guarantor and the Purchaser, respectively, authorising the Purchaser Guarantor and the Purchaser, respectively, to enter into and perform its obligations under the Sale and Purchase Agreement;
- (b) delivery by the Seller to the Purchaser of relevant minutes of a meeting of the directors of the Seller authorising the Seller to enter into and perform its obligations under the Sale and Purchase Agreement;
- (c) all Third Party Approvals, meaning consents, waivers, permissions and approvals necessary to complete the Sale and Purchase Agreement by or from relevant third parties and Governmental Authorities, having been obtained;
- (d) Competition Act Approval, meaning an advance ruling certificate or a no-action letter issued by the Commissioner pursuant to the Competition Act in respect of the transactions contemplated by the Sale and Purchase Agreement, having been obtained;
- (e) Investment Canada Act Approval, meaning the satisfaction or deemed satisfaction by the Minister under the Investment Canada Act that the Sale and Purchase Agreement is likely to be of net benefit to Canada for purposes of the Investment Canada Act, having been obtained;
- (f) (i) approval from shareholders of the Purchaser Guarantor at a general meeting; and (ii) all consents, waivers, permissions and approvals in relation to the transactions contemplated under the Sale and Purchase Agreement from the Stock Exchange and from the SFC required by the Purchaser Guarantor, having been obtained;
- (g) GCC shall have obtained for the benefit of GCC LP all necessary approvals to start development of No. 4 in No. 12 South B2 Area;
- (h) the conditions precedent (other than any condition requiring the Sale and Purchase Agreement to have become unconditional) in the Marubeni SPA (the sale and purchase agreement dated 14 November 2014 entered into between Marubeni Seller, the Purchaser and the Purchaser Guarantor in respect of the sale by Marubeni Coal Canada Ltd. (as Marubeni Seller) of a 39.66% Partnership Interest in GCC LP and a 40% interest in shares of GCC on terms substantially similar to the Sale and Purchase Agreement) having being satisfied or waived (as applicable);
- (i) (i) approval from shareholders of the Company at a general meeting and (ii) all consents, waivers, permissions and approvals in relation to the transactions contemplated under the Sale and Purchase Agreement, from the Stock Exchange and from the SFC required by the Company have been obtained;
- (j) the agreement and execution of a supplemental agreement to the Fourth Amendment Deed which will amend the funding contributions as set out in clause 4.1 thereof, by the parties to the Fourth Amendment Deed;
- (k) the Seller having received confirmation in writing of Marubeni Seller's consent to complete the transactions contemplated by the Sale and Purchase Agreement and an agreed termination letter, on terms and conditions satisfactory to the parties to such letter;

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## LETTER FROM THE BOARD

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- (l) the agreement by the Purchaser, the Purchaser Guarantor and the Seller for the sale and purchase of any rights, reliefs and benefits accrued by the Seller from its holding of the Sale Interests;
- (m) the Purchaser, Marubeni Seller, GCC and the Seller shall have agreed and executed the Management Services Agreement;
- (n) the Amended and Restated Partnership Agreement having been agreed by all parties to that agreement;
- (o) the Amended and Restated USA having been agreed by all of the parties to that agreement;
- (p) the Purchaser shall having provided written notification to the Seller that the Purchaser has completed its due diligence investigation into the operation of GCC and GCC LP to its satisfaction and the results of which shall be satisfactory to the Purchaser;
- (q) the provision by China Minsheng Banking Corporation of a waiver in respect of the funding contributions scheduled for December 2014 as set out in clause 4.1 of the Fourth Amendment Deed (such waiver waives GCC LP's obligation in procuring the Purchaser Guarantor and the Seller to, in proportion to their partnership interest in in GCC LP, to fund US\$69,000,000, the December capital contribution amount into GCC LP); and
- (r) the agreement by GCC, the Purchaser Guarantor and the Company of an agreed form Marketing Agency Agreement which grants certain marketing rights to the Company in respect of the product produced from the Grande Cache coal project (such marketing rights means the exclusive sale, promotion and marketing rights for GCC products in the PRC as described in the Sale and Purchase Agreement).

Subject to mutual agreement of all parties to the Sale and Purchase Agreement, any Condition may be waived in whole or in part at any time on or before the Longstop Date or the December Longstop Date (as the case may be).

As at the Latest Practicable Date, conditions (a), (d), (e), (g), (j) and (l) to (r) of the Sale and Purchase Agreement have been satisfied. Save as disclosed above, no other Conditions have been satisfied or waived as at the Latest Practicable Date. A summary of the principal terms of the Interim Support Agreement, Amended and Restated Partnership Agreement, Amended and Restated USA and Marketing Agency Agreement are set out in the sub-paragraphs below headed, "Interim Support Agreement", "Amended and Restated Partnership Agreement", "Amended and Restated USA" and "Marketing Agency Agreement", respectively.

### **Conduct of business before Completion**

#### *Normal course*

From the date of the Sale and Purchase Agreement and subject to the Management Services Agreement, the Seller has agreed to use its reasonable endeavours, amongst other things:

- (a) to procure that GCC and GCC LP continue to carry on business in the normal course in substantially the same manner as its business has been carried on before the date of the Sale and Purchase Agreement; and

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## LETTER FROM THE BOARD

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- (b) to procure that each of GCC and GCC LP takes all reasonable steps to preserve and protect its business and assets.

### *Purchaser's obligations*

From the execution of the Management Services Agreement until Completion, the Purchaser shall:

- (a) ensure that GCC and GCC LP have sufficient funds to meet all payment obligations, including their operational and financing requirements until Completion by operating under the plan and estimates stipulated in the Interim Support Agreement in the form of the Amended Bridge Loan;
- (b) provide management and personnel resources to support the operations of GCC and GCC LP in accordance with the Interim Support Agreement; and
- (c) provide funding to GCC LP as and when required to satisfy all payment obligations arising under and in accordance with the terms of the Senior Facilities Agreement.

### **Completion**

Unless otherwise agreed in writing by the Parties, Completion shall take place on the fifth (5th) Business Day following the satisfaction, or (if capable of waiver) waiver, of all the Conditions of the Sale and Purchase Agreement.

### **Guarantees**

The Purchaser Guarantor has agreed to guarantee the performance of the obligations of the Purchaser under the Sale and Purchase Agreement.

### **Shareholding Structure**

The charts below set forth the shareholding structure of GCC Group immediately before and after Completion.

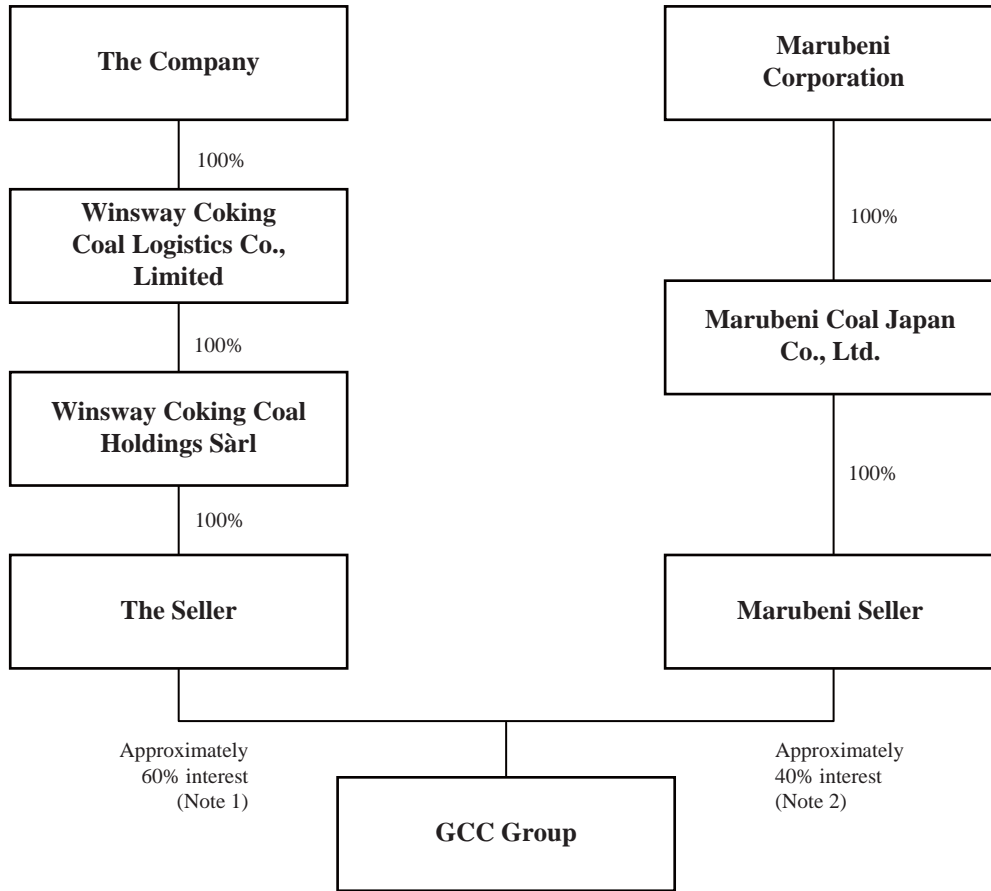


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## LETTER FROM THE BOARD

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### Shareholding Structure Immediately before Completion



Note 1: The Company's interest in GCC Group immediately before Completion include a 60% shareholding interest in GCC and a 59.994% partnership interest in GCC LP.

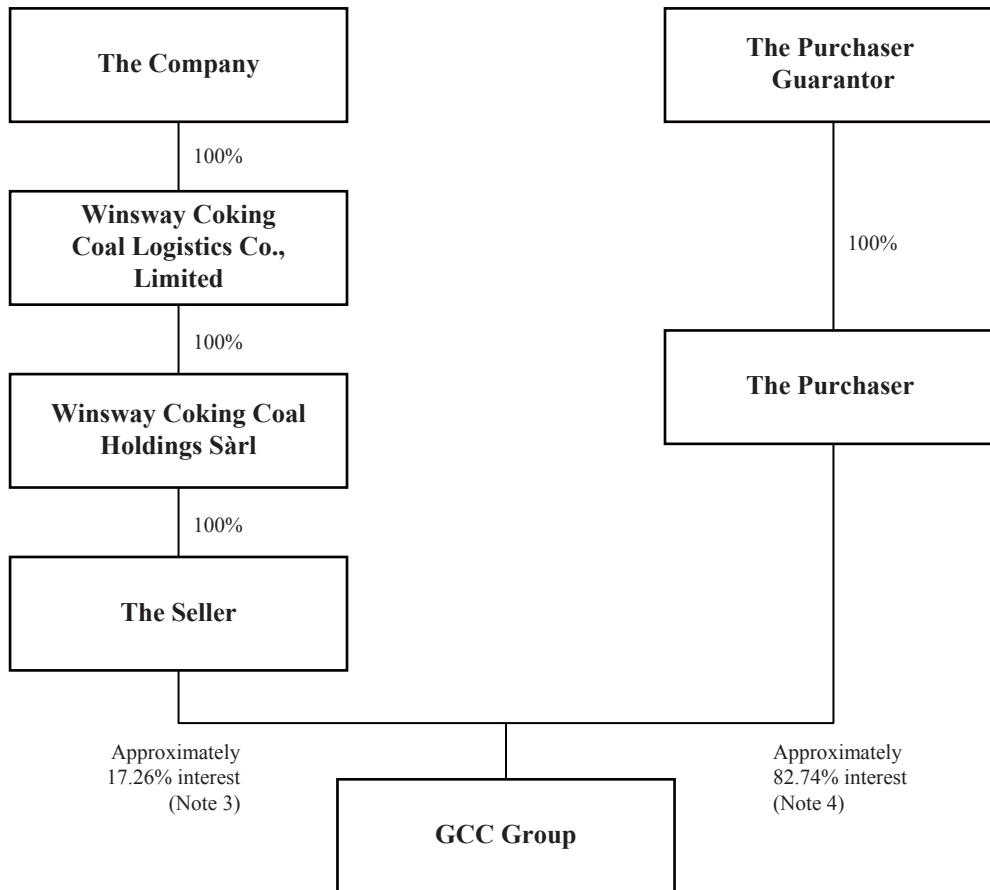
Note 2: Marubeni's interest in GCC Group immediately before Completion include a 40% shareholding interest in GCC and a 39.996% partnership interest in GCC LP.

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## LETTER FROM THE BOARD

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### Shareholding Structure Immediately after Completion



Note 3: The Company's interest in GCC Group immediately after Completion include a 17.26% shareholding interest in GCC and a 17.2534% partnership interest in GCC LP.

Note 4: The Purchaser Guarantor's interest in GCC Group immediately after Completion include a 82.74% shareholding interest in GCC and a 82.7366% partnership interest in GCC LP.

### **Other Agreements**

The Company and the Purchaser, and Purchaser Guarantor (as applicable) have agreed to use their respective reasonable endeavours to negotiate and finalise the Marketing Agency Agreement, the Management Services Agreement, the Amended and Restated Partnership Agreement and the Amended and Restated USA on or before the December Longstop Date which conditions have been satisfied as stated in the January Announcement.

Details of the following agreements related to the Disposal are set out in the following paragraphs. The agreements include:

- (a) the Interim Support Agreement, providing the business strategy for the development, construction, commission operation of the GCC coal mining and processing operations from the date of this agreement until Completion;

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## LETTER FROM THE BOARD

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- (b) the Amended and Restated Bridge Loan Agreement, whereby GCC LP borrows funds from the Purchaser Guarantor for a total of US\$50,000,000;
- (c) the Amended and Restated Partnership Agreement setting out the respective partner's rights and obligations in GCC LP to carry on the business and activities of owning and operating a coal mining and development business post Completion;
- (d) the Amended and Restated Unanimous Shareholders' Agreement setting out the respective shareholder's rights and obligations in relation to GCC post Completion;
- (e) the Marketing Agency Agreement pursuant to which the Company provides exclusive marketing services in relation to GCC's products for the PRC for a term of 10 years from the Completion Date; and
- (f) the Buy-back Right Agreement giving the Company a right to purchase interests in GCC subject to certain conditions after Completion.

For the avoidance of doubt, the Interim Support Agreement and the Amended and Restated Bridge Loan Agreement are both entered into and are effective as at the Latest Practicable Date. The other agreements in connection with the Disposal are conditional upon Completion, namely, the Amended and Restated Partnership Agreement, Amended and Restated Unanimous Shareholders' Agreement, Marketing Agency Agreement, and Buy-back Right Agreement.

### **Interim Support Agreement**

On 17 December 2014, the Purchaser, Marubeni Seller, GCC and the Seller entered into the Interim Support Agreement, as supplemented by a letter agreement among the same parties dated 24 December 2014 and 12 May 2015, respectively, which sets out the business strategy for the development, construction, commission operation and maintenance of the GCC coal mining and processing operations until Completion. The reason for the Interim Support Agreement is for the Seller and Marubeni Seller (as GCC shareholders) to direct GCC to operate the GCC Group under an interim operation plan prior to Completion, on the understanding that the Purchaser and the Purchaser Guarantor must provide interim funding pursuant to the terms of the Amended and Restated Bridge Loan Agreement, dispatch a creditor representative as a full time observer at the premises of GCC Group to ensure that proceeds of the bridge facility are used in the agreed manner, and recommend changes to the interim objectives, being business strategy of GCC Group during the duration of the Interim Support Agreement, from time to time to improve efficiency and reduce losses in the GCC Group, on the understanding that the roles of the Purchaser and Purchaser Guarantor (as financing parties) with a view to profit in GCC LP. The business of GCC LP shall continue to be conducted under such name and as GCC as general partner may determine from time to time.

GCC undertook to pay a gratuity to the Purchaser in a range of US\$600,000 to US\$1,900,000 if completion under each of the Marubeni SPA and the Sale and Purchase Agreement occurs. Such gratuity added in the Interim Support Agreement is to compensate the additional risk the Purchaser and the Purchaser Guarantor are taking due to the extended Longstop Date and their inability to obtain security on GCC from their financiers. The range of US\$600,000 (if Completion occurred in April 2015) to US\$1,900,000 (if Completion occurs in July 2015) was determined based on the time of Completion and the agreement through arm's length negotiation by all parties of the Interim Support Agreement. Whilst the gratuity is a separate fee from the interest of the bridge facility, the gratuity amount roughly reflects the additional interest the Purchaser would have received if the bridge facility's interest rate is increased to 24% per annum. Payment will be due fourteen (14) days after the date on which financial statements

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## LETTER FROM THE BOARD

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become available showing that the GCC Group recorded a net income in a fiscal year. The same gratuity shall also be payable if the Marubeni SPA and the Sale and Purchase Agreement is terminated at any time between April and July 2015 and payable at the time of the earliest termination. If, as of 31 July 2015, completion under one or both of the Marubeni SPA and Sale and Purchase Agreement has not occurred and neither of the Marubeni SPA and Sale and Purchase Agreement has been terminated, the parties shall negotiate in good faith to enter into an additional side letter to amend the amount of gratuity payable.

The Interim Support Agreement constitutes the “Management Services Agreement” as referred to in the Sale and Purchase Agreement and is effective until the earlier of (a) Completion, and (b) termination of either or both the Sale and Purchase Agreement and Marubeni SPA. The execution of the Interim Support Agreement, which seeks to minimise the negative cash flow of GCC up to Completion, was a condition for the continuing funding of GCC by the Purchaser and the Purchaser Guarantor up to Completion. Such funding will be provided by the Amended and Restated Bridge Loan Agreement.

### **Amended and Restated Bridge Loan Agreement**

The Bridge Loan Agreement as amended by the Amendment Agreement, entered into by the Purchaser Guarantor as lender, GCC LP as borrower, the Marubeni Seller and the Seller, as supplemented by letter agreements among the same parties dated 24 December 2014 and 12 May 2015, respectively, is one of the transaction documents in connection with the Disposal. Funds in the aggregate principal amount of US\$50,000,000 were made available to GCC LP under the Bridge Loan Agreement as amended by the Amendment Agreement, all of which have been released to GCC LP.

Concurrently with the execution of the Interim Support Agreement, the Purchaser Guarantor as original lender, the Purchaser as new lender, GCC, GCC LP as borrower, the Marubeni Seller and the Seller had on 17 December 2014 entered into the Amended and Restated Bridge Loan Agreement and agreed to amend and restate the Bridge Loan Agreement as amended by the Amendment Agreement. The principal terms of the Amended and Restated Bridge Loan Agreement are as follows:

#### *Initial Loan and Assignment*

Each of the Marubeni Seller, the Seller, GCC and GCC LP acknowledges that, as at the date of Amended and Restated Bridge Loan Agreement, the Purchaser Guarantor as original lender has advanced the sum of US\$10,000,000 (the “**Initial Loan**”) to GCC LP’s account in accordance with the Bridge Loan Agreement and consents to the assignment by the Purchaser Guarantor as original lender to and in favour of the Purchaser as new lender of, and the acceptance and assumption by the Purchaser as new lender of, the rights, benefits and obligations of the Purchaser Guarantor as original lender under the Bridge Loan Agreement.

#### *Additional Loan*

The Purchaser as new lender shall, subject to the terms under the Amended and Restated Bridge Loan Agreement, advance, or procure any person to advance, the sum of up to an additional US\$40,000,000 (the “**Additional Loan**”) to GCC LP’s account for the purposes of allowing GCC LP to meet its day to day operational expenses incurred in accordance with an interim operational plan during the period from the date of the Interim Support Agreement and ending on the earlier of the date of (a) Completion Date; or (b) the termination of the Disposal under either Marubeni SPA or the Sale and Purchase Agreement.

#### *Purchaser as New Lender’s Obligation to Fund*

The Marubeni Seller, the Seller, GCC and GCC LP agree that the election by the Purchaser as new lender not to accept a borrowing request or release request shall not constitute a breach of the Marubeni

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## LETTER FROM THE BOARD

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SPA, the Sale and Purchase Agreement or the Interim Support Agreement. However, notwithstanding the relevant provisions of the Marubeni SPA and the Sale and Purchase Agreement or any other provision of the Amended and Restated Bridge Loan Agreement, if the Purchaser as new lender fails to provide any advances thereunder, fails to approve any fund releases or fails to fund GCC LP in accordance with the Amended and Restated Bridge Loan Agreement for any reason whatsoever each of the Seller and Marubeni Seller shall have the option to terminate the Amended and Restated Bridge Loan Agreement, the Interim Support Agreement and (as applicable) the Sale and Purchase Agreement and the Marubeni SPA.

### *Final Repayment Date*

GCC LP shall repay the Amended Bridge Loan, any unpaid interest accrued thereon and any other amounts due but unpaid under the Amended and Restated Bridge Loan Agreement in full on the earlier of: (i) one day after Completion Date under both of the Marubeni SPA and the Sale and Purchase Agreement; and (ii) the termination of either or both of the Marubeni SPA and the Sale and Purchase Agreement, unless extended by mutual consent by the parties (the “**Final Repayment Date**”).

The accrued interest on the Amended Bridge Loan will also be payable if completion under each of the Marubeni SPA and the Sale and Purchase Agreement occurs. The Final Repayment Date for any and all unpaid interest accrued will be postponed to fourteen (14) days after the date on which financial statements of GCC Group become available showing that the GCC Group recorded a net income in that fiscal year. If either the Marubeni SPA or the Sale and Purchase Agreement, or both, is terminated, interest on the Amended Bridge Loan will be payable to the Purchaser at the time of the earliest termination.

### *Prepayment*

No prepayment may be made except with the prior written consent of the Purchaser as new lender. Any prepayment (if permitted) under the Amended and Restated Bridge Loan Agreement shall be made together with accrued interest on the amount prepaid.

### *Non-Revolving Loan*

GCC LP may not re-borrow any part of the Amended Bridge Loan that is repaid or prepaid.

### *Interest Rate*

GCC LP shall pay to the Purchase Guarantor as original lender interest on the outstanding principal amount of the Initial Loan at the interest rate of 18% per annum (the “**Initial Loan Interest**”) on the basis of the actual number of days elapsed from the date of the receipt of the relevant advance by GCC LP and a year of 360 days.

GCC LP shall pay to the Purchaser as new lender interest on the outstanding principal amount of the Additional Loan at the interest rate of 7% per annum (the “**Additional Loan Interest**”) on the basis of the actual number of days elapsed from the date of the receipt of the relevant advance by GCC LP and a year of 360 days. Interest shall continue to accrue until the Amended Bridge Loan is repaid. Accrued and unpaid interest shall be paid on the Final Repayment Date or upon a request made by the Purchaser as a new lender in accordance with the Amended and Restated Bridge Loan Agreement.

### **Amended and Restated Partnership Agreement**

On 31 December 2014, GCC, the Seller and the Purchaser Guarantor agreed on the terms of the Amended and Restated Partnership Agreement to be entered into on or before Completion in relation to

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## LETTER FROM THE BOARD

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GCC LP setting out their respective rights and obligations for the purpose of carrying on, among other things, the business and activities of owning and operating a coal mining and development business, including related marketing and sales activities, and any business which is ancillary, incidental or directly or indirectly related thereto.

GCC LP shall be effective as of the date of the filing of the partnership certificate until GCC LP is dissolved or terminated. GCC LP shall be wound up or dissolved on the authorization by an extraordinary resolution, being partners holding more than 85% by votes casted at a meeting or a written resolution signed by partners holding 85% or more partnership interest.

The capital contribution of each partner upon Completion would be as follows:

<b>Partner</b>	<b>Partnership Interest</b>	<b>Percentage Interest</b>
GCC	General Partnership Interest	0.0100%
The Purchaser	Limited Partnership Interest	82.7366%
The Seller	Limited Partnership Interest	17.2534%
	<b>TOTAL</b>	<b>100.00%</b>

The liability of each of the Seller and the Purchaser as limited partners for the debts, liabilities and obligations of GCC LP shall be limited to its capital contributions plus its pro rata share of any undistributed income of GCC LP. GCC as general partner shall have unlimited liability for the debts, liabilities and obligations of GCC LP.

The Amended and Restated Partnership Agreement shall amend and restate the original limited partnership agreement upon Completion. The parties to the original limited partnership agreement will enter into a letter agreement to confirm that Marubeni Seller should no longer be a party to the original limited partnership agreement, and the current partners, being the Purchaser and the Seller, will confirm that GCC LP established pursuant to the original limited partnership agreement as amended and restated and to further amend and restate the original limited partnership agreement on the terms and conditions set out in the agreed form of the Amended and Restated Partnership Agreement.

### **Amended and Restated USA**

On 31 December 2014, the Company, the Seller and the Purchaser (being a new shareholder of GCC), among others, agreed the terms of the Amended and Restated USA setting out their respective rights and obligations in relation to GCC, which as the general partner of GCC LP, is responsible for the operations of GCC LP to each other as shareholders of GCC and to GCC as legal and beneficial owners of GCC Shares and provide for the management of the business of GCC. The Amended and Restated USA shall amend and restate the original shareholders' agreement and will regulate the affairs of GCC upon and subject to Completion, including certain key matters relating to GCC. The principal terms of the Amended and Restated USA are set out below:

#### *Commencement*

The Amended and Restated USA shall take effect on or before Completion.

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## LETTER FROM THE BOARD

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### *Composition of the board of GCC*

GCC shall have a board of directors consisting of seven (7) directors, unless otherwise agreed by the shareholders of GCC and changed in accordance with the Act. The chairman of the board of directors shall be elected by a simple majority of the board of directors.

### *Management Committee*

The shareholders of GCC shall act collectively through the management committee (the “**Management Committee**”), which has exclusive with respect to the management of the business of GCC. Decisions or actions taken by the Management Committee in accordance with the provisions of the Amended and Restated USA shall constitute decisions or actions by GCC and its shareholders and shall be binding on each shareholder, director, officer and employee of GCC. The Management Committee will be comprised of a number of representatives appointed by the shareholders of GCC (the “**Representative**”) that is equal to the number of directors from time to time permitted under the articles of association of GCC. The Company shall, in the aggregate, be entitled to appoint:

- (a) for so long as the Group holds not less than 15% of the outstanding common shares of GCC, one (1) Representative; and
- (b) for so long as the Group holds not less than 30% of the outstanding common shares of GCC, two (2) Representatives.

### *Quorum for meetings of the Management Committee*

The necessary quorum for a meeting of the Management Committee shall consist of two (2) Representatives of the Purchaser Group and one (1) Representative from the Company, provided that, in the event the Purchaser Group holds less than 50.1% of the outstanding common shares, the quorum shall be one (1) Representative for each of the shareholders of GCC.

### *Quorum for meetings of the shareholders of GCC*

The necessary quorum for a meeting of the shareholders of GCC shall be established in the same manner as set out above for Management Committee meetings.

### *Restrictions on transfer*

No shareholder of GCC may transfer its shareholding interest in whole or in part unless permitted under the Amended and Restated USA, and no shareholder may transfer less than its entire shareholding interest. If a shareholder of GCC wishes to transfer its shareholding interest, it shall first notify the other shareholders, who have a right of first refusal to purchase such shares. Subject to the terms and conditions of the Amended and Restated USA, a shareholder may only transfer all of its shareholding interest to a wholly-owned affiliate. Any such transfer shall be only effective upon the transferor and transferee have entered into an agreement with other shareholders in accordance with the Amended and Restated USA, in relation to, among other things, the assumption of transferor’s obligations thereunder.

### *Termination of the Amended and Restated USA*

The Amended and Restated USA shall continue in full force and effect until (i) it is terminated by unanimous shareholder approval; (ii) the business of the GCC LP is sold or completely decommissioned; or (iii) the winding up or dissolution of GCC.

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## LETTER FROM THE BOARD

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### **Marketing Agency Agreement**

On 31 December 2014, the Company, the Purchaser Guarantor and GCC also agreed on the terms of the marketing agency agreement to be entered into on or before Completion, pursuant to which GCC shall grant certain marketing rights to the Company (or its subsidiaries) as its agent to provide exclusive marketing services in relation to the products of GCC for the PRC for a term of 10 years from the Completion Date subject to extension by agreement. The Marketing Agency Agreement is designed to provide the Company with the exclusive sale and marketing rights for GCC products in the PRC. At the same time, it would provide GCC with an assured off take channel through a strong sales and marketing agent that is very familiar with the PRC market.

#### *Appointment of agent and marketing rights*

GCC shall appoint the Company or any of its subsidiaries as the exclusive marketing agent (the “**Marketing Agent**”) in China (excluding Taiwan) to promote and sell its products to buyers in China (excluding Taiwan), and the Marketing Agent agrees to act in that capacity, subject to the terms of the Marketing Agency Agreement. As Marubeni is from Japan, the Company (and its subsidiaries) as marketing agents are prohibited from promoting and selling GCC coal in Japan.

#### *Minimum purchases and price*

The Company will commit to offtake 40% of GCC’s annual production of coal products, and such commitment shall be confirmed by coal sale agreements to be entered into between the Company and GCC. The parties to the Marketing Agency Agreement shall seek to agree in good faith before the beginning of each quarter of each calendar year, the delivery of the next quarterly quantity and the applicable coal price for each customer, with the parties acknowledging that the price may differ, depending on the relevant customer.

#### *Fees*

GCC shall pay the Company fees for all of the GCC coal products sold through the Company or any of its subsidiaries during the term of the Marketing Agency Agreement based on the different price of GCC coal products fixed in accordance with the terms and conditions set out in the Marketing Agency Agreement.

The relevant fees should be payable by GCC in U.S. Dollars and shall be fully paid to the Company in accordance with banking instructions to be provided by the Company not less than five (5) days prior to the last payment date of the relevant fees in accordance with the Marketing Agency Agreement.

### **Buy-back Right Agreement**

In conjunction with the Disposal, the Parties propose to enter into the Buy-back Right Agreement pursuant to which the Purchaser will grant the Company a buy-back right to acquire a 16.86% shareholding interest in GCC and 16.86% partnership interest in GCC LP. The Purchaser will be acquiring a total of 82.74% interest of GCC after completion of both the Sale and Purchase Agreement and the Marubeni SPA. As the Purchaser intends to maintain at the minimum 50.1% majority interest after the buy-back, only 32.64% of GCC interest will available for buy-back by the Company and Marubeni Seller calculated based on their respective proportion of GCC to be disposed of, being 42.74% and 40%, respectively. Accordingly, the Company’s Buy-back Right up to 16.86% of GCC is calculated as follows,  $32.64\% \times (42.74\%/82.74\%)$ .



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## LETTER FROM THE BOARD

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### *Grant of Buy-back Right*

- (a) The Purchaser will grant to the Company an irrevocable and unconditional right to purchase the Buy-back Interests for the Buy-back Price in accordance with the terms and conditions of the Buy-back Right Agreement.
- (b) The Buy-back Right shall be exercisable once only by the Company within a three-month period immediately following any date upon which the HCC Coal Benchmark Price is within the Trigger Price Range during the Buy-back Period (as defined below).
- (c) The “**Buy-back Period**” means the period commencing on the date upon which Completion occurs and ending on the later to occur of:
- (i) the date which is three years from the date upon which Completion occurred; or
  - (ii) the date upon which the first principal repayment is due payable under the Senior Facilities Agreement,
- subject to the condition that, if the event described in (ii) above has not occurred within five years of Completion, the Buy-back Period shall expire on such fifth anniversary of Completion.
- (d) Any notice issued by the Company exercising the Buy-back Right must state a single percentage of up to 16.86% which the Company wishes to acquire comprising an equal percentage of:
- (i) Buy-back Shares (expressed as a percentage of all Shares); and
  - (ii) Buy-back Partnership Interests (expressed as a percentage of all Partnership Interests),
- collectively the “**Transfer Buy-back Interests**”.
- (e) The Trigger Price Range shall in each year of the Buy-back Period be a price range equal to or greater than the HCC Floor Benchmark Price (as set out below) but equal to or less than the HCC Ceiling Benchmark Price (as set out below):

<b>Year (after Completion)</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
HCC Floor Benchmark Price (US\$)	138	160	170	174	176
HCC Ceiling Benchmark Price (US\$)	200	200	200	200	240

### *Buy-back Price*

The actual Buy-back price for the Transfer Buy-back Interests shall be the actual aggregate amount injected into GCC LP by the Purchaser (including investment, advance payments and shareholder loans) after Completion until the date of Buy-back Completion, in respect of the Transfer Buy-back Interests (as a fraction of the Purchaser’s total Partnership Interest), plus interest. The interest is calculated based on the actual amount injected by the Purchaser into GCC LP after Completion until Buy-back Completion, or until

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## LETTER FROM THE BOARD

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the repayment date for those amounts repaid before Buy-back Completion at a compound annual rate of interest as shown below.

<b>Year (after Completion)</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Compound Interest rate	10%	15%	18%	21%	24%

### **Failure to satisfy Conditions**

If the relevant remaining Conditions cannot be satisfied (as applicable) by the Longstop Date, the parties to the Sale and Purchase Agreement have agreed to consult in good faith with a view to agreeing an extension to (as applicable) the Longstop Date for the satisfaction or waiver of those Conditions which have not been or are unlikely to be satisfied in time.

Notwithstanding the relevant provision of the Sale and Purchase Agreement, if one or more of the Conditions remains unsatisfied on or becomes impossible to satisfy on the Longstop Date and has not been waived on or before that date, either the Seller or the Purchaser may give notice to the Purchaser or Seller, as applicable, that it wishes to terminate the Sale and Purchase Agreement.

If on the day of Completion the Purchaser and/or the Purchaser Guarantor fails to fulfil its or their obligations to complete the transaction under the Sale and Purchase Agreement, the Seller may elect either of the following remedies:

- (i) require the Purchaser or the Purchaser Guarantor to pay to the Seller US\$1,000,000; or
- (ii) seek specific performance by the Purchaser and/or the Purchaser Guarantor of their obligations set out in the Sale and Purchase Agreement (as applicable).

If on the day of Completion the Seller fails to fulfil its obligations to complete the transaction under the Sale and Purchase Agreement, the Purchaser may elect either of the following remedies:

- (i) require the Seller to pay to the Purchaser US\$1,000,000; or
- (ii) seek specific performance by the Seller of its obligations set out in the Sale and Purchase Agreement.

In the case that the Purchaser or the Seller fails to obtain specific performance under the Sale and Purchase Agreement, the Purchaser or the Seller shall be entitled to collect from the Seller or the Purchaser, respectively, a cash amount of US\$1,000,000. The basis for this US\$1,000,000 is to cover the fees incurred by professional parties in connection with the Disposal.

### **INFORMATION ON THE GROUP**

The Company is a company incorporated in the British Virgin Islands with limited liability under the Business Companies Act of the British Virgin Islands (2004) and listed on the Stock Exchange. The Company and its subsidiaries are principally engaged in the processing and trading of coking coal and other products, development of coal mills and production of coking coal (classified as a discontinued operation) and rendering of logistics services.

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## LETTER FROM THE BOARD

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### THE PURCHASER AND THE PURCHASER GUARANTOR

The Purchaser, Up Energy Resources Company Limited, is a company incorporated in the BVI and is a wholly-owned subsidiary by the Purchaser Guarantor. Its business is investment holding and being a subsidiary of the Purchaser Guarantor, facilitates the Purchaser Guarantor in its principal business as described below.

The Purchaser Guarantor, Up Energy Development Group Limited, a company listed on the Stock Exchange (Stock Code: 307), is engaged in coking coal business in the Xinjiang Uygur Autonomous Region of China. The Purchaser Guarantor and its subsidiaries is principally engaged in mining of coking coal, production and sales of raw coking coal, clean coking coal, coking and chemical products. Since 2003, the Purchaser Guarantor and its subsidiaries have been actively engaged in the development of coal business. To realize the business concept of “increased value in circulation”, the Purchaser Guarantor and its subsidiaries started from coal resources exploration and gradually established a complete set of upstream and downstream projects with the business model of circulative economy, which includes raw coal mining, raw coal washing, coal coking, cogenerating and coal mine gas utilizing.

### INFORMATION ON GCC

GCC is engaged in the production and sales of premium hard coking coal, which was categorised as a discontinued operation in the consolidated statement of profit or loss and the assets and liabilities of which were classified as a disposal group held for sale. It was acquired by the Company, together with Marubeni Corporation, in March 2012. Following the completion of acquisition of GCC and re-structuring of its assets and liabilities immediately after the acquisition by the Company, GCC became an indirect subsidiary of the Company owned as to 60% by the Company and 40% by Marubeni Corporation.

### Use of Proceeds

The cash component of the consideration is a nominal US\$1 and will be used as working capital of the Remaining Group. It will not be used to invest in any assets.

### Combined financial information of GCC Group

The combined loss of GCC Group for the 10 months ended 31 December 2012, and the two financial years ended 31 December 2013 and 2014 are as follows:

	<b>For the financial year ended 31 December 2014 HK\$'000,000</b>	<b>For the financial year ended 31 December 2013 HK\$'000,000</b>	<b>For the 10 months ended 31 December 2012<sup>(1)</sup> HK\$'000,000</b>
Loss before taxation	(5,471)	(1,323)	(433)
Loss after taxation <sup>(2)</sup>	N/A	N/A	N/A

*Note 1:* The Company's interest in GCC/GCC LP was only acquired on 1 March 2012

*Note 2:* Taxation is not accounted for in the accounts of GCC LP because following the acquisition of GCC, the assets and liabilities of GCC were re-structured, pursuant to which GCC LP, a limited partnership, was established to own all assets and assume as liabilities of GCC excluding deferred tax liabilities, a limited partnership structure is an income tax-free structure in Canada.

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## LETTER FROM THE BOARD

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The combined net asset value of the GCC Group as of 31 December 2014 is approximately HK\$206,227,000. The Consideration is lower than the net asset value of the GCC Group.

### FINANCIAL EFFECTS OF THE DISPOSAL ON THE GROUP

Upon completion of the Disposal, the Company will retain and hold a 17.26% interest in the total issued share capital of GCC and a 17.2534% Partnership Interest in GCC LP. After the Disposal, GCC and GCC LP will cease to be subsidiaries of the Company and its financial results will no longer be consolidated into the financial statements of the Group and it is expected that the Group's remaining interest in GCC and GCC LP would be accounted for as an interest in an associate in the Group's consolidated financial statements. GCC Group would be accounted for as an associate because there will be one director from the Company out of the five directors in total of GCC, which indicates that the Company would have the ability to exercise significant influence over the entities. Furthermore, when assessing significant influence, the effects of the Buy-back Rights held by the Company of up to a 16.86% share interest in GCC should also be taken into account. With this regard, although the share interest of GCC to be retained by the Company would be no more than 20% after the Completion, GCC would be accounted for as an associate of the Company.

GCC LP has been presented as a discontinued operation in the consolidated statement of profit or loss for financial year ended 31 December 2014 and the assets and liabilities of GCC LP have been classified as an asset held for sale in the consolidated statement of financial position as at 31 December 2014. The revenue and loss for the financial year ended 31 December 2014 and total assets of GCC LP as at 31 December 2014 are HK\$1,080,419,000, HK\$4,681,208,000 and HK\$4,304,164,000, respectively.

As set out in the Competent Person's Report (section 22.1), in calculating the discount cash flow of the GCC Group, a discount rate of 10% used is the Competent Person's estimate of the Weighted Average Cost of Capital ("WACC") for similarly situated projects. The development of the WACC includes an analysis of the cost of equity, the cost of debt and the debt/equity ratio. The cost of equity includes the risk free rate of return, a market premium, and a volatility measure or Beta. The Competent used the 30 year Canadian Long Bond Rate of 2.2% as of 10 March 2015 as the risk free rate. This is essentially the same rate that exists for US long-term government bonds. The market premium of 6% was taken. The Competent Person noted that this was consistent with recent estimates of other financial firms. The Beta of 2.62 was taken from the average of six major metallurgical coal producing companies on 6 March 2015. The selection of the six companies the Competent Person used for comparable Betas was based on the Company's review of US and Canadian coal companies listed on the various exchanges. The Competent Person's criteria for selecting the final list was that the companies had to have operating mines rather than be development stage enterprises and have significant operations in metallurgical coal. The Competent Person believes they are a representative sample of coal companies with operating mines with significant operations in metallurgical coal. These relatively high Betas are a reflection of the market's perception of the risk associated with these companies and the business they carry out and not a specific project.

The cost of debt included in the WACC calculation is an after tax interest rate on debt of the organization.

The debt/equity ratio that the Competent Person used was based on its analysis of the current debt and our view of additional capital required in the near term.

All of these factors result in an estimated WACC of 9%. As noted above, the risk adjustment using the Betas is a reflection of the average risks the market assigns to these companies. In the opinion of the Competent Person, the discount rate for GCC Group should include a risk premium over the calculated

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## LETTER FROM THE BOARD

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WACC. This is due to the Betas used for major metallurgical coal producers reflect the market perception of risk for those companies as a whole and not one specific project as is the case in this valuation. In addition, as noted in the Competent Person's Report, there are risks associated with this project that can have an impact on the cash flows from this project. These include exchange rate risk, coal price risk, permitting and environmental risks, operating and capital cost risks, and mining risks, especially those associated with the longwall mining. The longwall risks affect approximately 45 million tonnes of metallurgical coal reserves or approximately one-third of the 148 million total tonnes of metallurgical coal reserves. The risks have been identified as regulatory approval of this type of longwall mining in Alberta and geo-technical risks associated with the steepness of the grade and the depth of cover in the longwall mining area. The Competent Person's assessment of these risks results in a project risk adjusted WACC of 10% as the appropriate discount rate for GCC Group.

The comparative consolidated statement of profit or loss for the financial year ended 31 December 2013 and 2014 has been set out in the Company's 2014 Annual Report, which was restated to show the discontinued operations separately from continuing operations.

The effects of the Disposal on the assets and liabilities and earnings of the Group assuming completion of the Disposal will be recorded in the Company's accounts in the year in which Completion takes place (subject to the Shareholders' approval) which is expected to be later in 2015. The total assets of the Group would decrease from HK\$10,286,821,000 to HK\$6,092,220,000; and the Group's total liabilities would decrease from HK\$9,904,233,000 to HK\$5,806,296,000, as a result of the Disposal. The loss from continuing operations of the Group would increase from HK\$1,215,550,000 to HK\$1,215,974,000. The increased loss of HK\$424,000 represents the loss of the Disposal, which was the resulting difference based on the calculation between (i) the sum of the net assets and the carrying amount of the non-controlling interest in GCC, and (ii) the total of the amounts previously recognised in other comprehensive income to be reclassified in profit or loss in connection with the Disposal and the estimated fair value of the Group's interest in GCC after the Disposal. All of HK\$424,000 will be recorded for the Disposal in the financial year ending 31 December 2015. For the financial year ended 31 December 2014, the loss from the discontinued operations, i.e. GCC, was HK\$4,681 million. It is expected that the Disposal will not have any material adverse impact on the earnings of the Company for the financial year ending 31 December 2015.

## FINANCIAL AND TRADING PROSPECTS OF THE GROUP

Coking coal prices remained depressed throughout the financial year ended 31 December 2014 and trading prospects remain relatively bearish due to the ongoing oversupply and declining demand in large part associated with slowing growth in the PRC as well as legislation and policies of the Chinese government to reduce overcapacity in the steel sector which directly affect the demand for coking coal. The Group has been carefully managing its risks to retain market share, streamlining its current operations to lower its operating costs in the logistics and mining sector and adjust its business strategy to establish the Group as an integrated solutions provider in the supply chain for a variety of commodities. The Group will continue to implement these measures during 2015. As a result of the deterioration in prices for metallurgical coal and the continuing drain on the Company's resources in maintaining its support of GCC, the Board has concluded that the Disposal is essential for the continuing viability of the Company's remaining business and to be able to explore new business opportunities. Shareholders are referred to the Company's announcement of 8 May 2015 in relation to the Company's non-payment of interest under the Senior Notes and its announcement of 22 June 2015 in relation to ongoing discussions in respect of a possible Debt Restructuring and Equity Financing. Even if the Disposal is approved and completed, there is no assurance that the Company will be able to continue as a going concern without a satisfactory Debt Restructuring being agreed and implemented.

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## LETTER FROM THE BOARD

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### MARUBENI CORPORATION'S INTEREST

The Company understands that Marubeni Corporation entered into the Marubeni SPA with the Purchaser and the Purchaser Guarantor for the sale of Marubeni Corporation's 40% share interest in GCC and 39.996% Partnership Interest in GCC LP.

### REASONS FOR AND BENEFITS OF THE DISPOSAL

In response to the bearish outlook for the coal market, the Company has after careful consideration decided to reduce its dependence on coal and to diversify into services for other bulk commodities. Although these efforts have not yet resulted in significant earnings, the Company is confident that the proposed new business model will enable it to better utilise its logistics resources and contribute to its earnings in the near future. The Directors further consider that the Group should retain an interest of approximately 17.26% in GCC Group for the following reasons:

- (1) GCC is a leading exporter of premium low volatile hard coking coal and the retention of certain coking coal assets in Canada is complementary to the Group's existing coking coal business in China.
- (2) GCC has a large reserve and resource base with a premium product. It has 25 coal leases that cover over 29,000 hectares with total recoverable reserves of 147.6Mt and total measured, indicated and inferred resources of 663Mt (based on tables 4.1, 1.1, 1.2 and 1.4 of the CPR prepared for this circular, respectively) which approximates to an estimated mine life of over 40 years. GCC's coal is high quality being low-volatile, low ash, hard coking coal and it also possesses very low sulphur and phosphorus characteristics.
- (3) The mine asset is a proven producing asset with significant growth potential. GCC's operation is located in the Smoky River Coal Field and has been in production since 2004. It is located approximately 400km west of Edmonton, Alberta with established logistics and infrastructure. Direct access is available to Canadian National Railway with connection to the main east-west line. The planned production in 2015 is for 0.7 million tonnes of clean coal (see page 1-9 of the CPR). There is the opportunity to expand production at the existing location to 5 million tonnes per annum of clean coal.
- (4) The Disposal could enable the Purchaser and its holding company, the Purchaser Guarantor (through its subsidiaries) to control and further develop its coal mines business and diversify its access to coal resources and reserves, to complement its existing business portfolio, being the mining of coking coal, production and sales of raw coking coal, clean coking coal, and coking and chemicals products in the PRC, and to broaden its source of income. From the Group's perspective, the Disposal is considered an effective and practical means of maintaining the continuity, stability and growth of GCC by establishing a long term and strategic alliance with the Purchaser, and the Purchaser Guarantor that has expertise in the industry. It is expected that existing management of GCC will remain in place during this period up to Completion and any supporting resources will be provided by existing Company operational staff and project management team.
- (5) The Group principally engages in, among others, the processing and trading of coking coal and other products, development of coal mills and rendering of logistics services. The Group's development plans include, among other things, the growth in revenue and profitability contribution of GCC to the Group. The Disposal is consistent with such objectives and give the Company will still continue to have an equity interest in GCC notwithstanding the Disposal, the Company will continue to benefit from any potential growth in GCC as its shareholder.

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## LETTER FROM THE BOARD

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- (6) This Disposal can maintain the diversification of the Company's risk profile as GCC's assets are located in Canada, a politically stable country and a jurisdiction with a stable legal and regulatory framework. This Disposal enables the Company to retain its coal mines business and geographically diversify its access to coal resources and reserves and production.
- (7) Currently, the market price of coking coal is close to cost suggesting that further decrease is quite limited. Meanwhile, the demand for production capacity of steel in the international market sees a moderate increase. As a result, the Company believes it is an opportune time to continue securing a foothold in the overseas market and to increase reserves and resources controlled by GCC.
- (8) The Company is developing its strategic plan to refocus on the core logistics business by maximizing the utilization of its logistics facilities. The Disposal provides the Group an opportunity to change its role from a mine operator to a mine equity holder and to free the Group from intense capital demand but still secure a marketing right over coal supply.
- (9) The Company has continued to manage its risks carefully and successfully retained its market share, although at the cost of lower margins. As a reaction to the relatively gloomy outlook for the coal market, the Company has conducted research and started preparations to reduce its dependence on coal and to diversify into services for other bulk commodities. The Company plans to evolve its role to become more of a service provider through a platform to provide a total supply chain solution to the greater market involving small and medium-sized customers engaged in bulk commodity trading. Such a platform will be positioned to become a public platform that will base its service centers in major land-to-land ports and seaborne ports. With the Company's possession of logistic infrastructure, storage facilities, expertise in trading and specialised experience in the industry, the Company will seek to become a one-stop service center by providing an integrated services proposition. Through implementing the abovementioned changes, the Company will strive to enhance the utilization and profitability from its well-established logistics facilities. The Group will exercise care and diligence in identifying new sources of funding and selecting funding mechanism to grow the abovementioned activities.

The Directors consider that the Disposal contemplated under the Sale and Purchase Agreement will help the Company to focus its internal resources on developing its new business mode as described in subparagraph (9) above which is expected to benefit the Company. The Directors are of the view that, assuming satisfactory finalisation of all agreements contemplated under the Sale and Purchase Agreement, the terms of the Sale and Purchase Agreement are fair and reasonable and the entering into the Sale and Purchase Agreement and proceeding with the Disposal are in the interests of the Company and shareholders of the Company as a whole. The Company has engaged BNP Paribas as its financial advisor for the Disposal.

Shareholders are referred to the Company's announcement of 8 May 2015 in relation to the Company's non-payment of interest under the Senior Notes and its announcement of 22 June 2015 in relation to ongoing discussion in respect of a possible Debt Restructuring and Equity Financing. Even if the Disposal is approved and completed, there is no assurance that the Company will be able to continue as a going concern without a satisfactory Debt Restructuring being agreed and implemented.

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## LETTER FROM THE BOARD

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### IMPLICATIONS OF THE SALE AND PURCHASE AGREEMENT UNDER THE LISTING RULES

As one or more of the applicable percentage ratios set out in Rule 14.07 of the Listing Rules in respect of the Disposal are 25% or more but less than 75%, the Disposal constitutes a major transaction for the Company under Chapter 14 of the Listing Rules and is therefore subject to the notification, publication and shareholders' approval requirements under Chapter 14 of the Listing Rules.

As the value of the Buy-back Right Agreement is nil according to a calculation report dated 31 March 2015, the relevant percentage ratios set out in Rule 14.07 of the Listing Rules in respect of the Buy-back Right Agreement are not applicable. Therefore, the entering into the Buy-back Right Agreement does not constitute a notifiable transaction for the Company under Chapter 14 of the Listing Rules. The Company will take immediate steps to ensure compliance with the relevant requirements under the Listing Rules (such as Chapter 14 of the Listing Rules) should the exercise of the Buy-back Right constitute a notifiable transaction in the future. Further, given the transactions under the Marketing Agency Agreement are transactions of a revenue nature in the ordinary and usual course of business of the Company, the relevant transactions under the Marketing Agency Agreement will be exempted from the requirements under Chapter 14 of the Listing Rules.

Following Completion, the Company will retain an interest of approximately 17.26% in GCC Group, and GCC and GCC LP will cease to be the subsidiaries of the Company, and the Purchaser Guarantor does not constitute a connected person of the Company under Chapter 14A of the Listing Rules. Therefore, the entering into the Buy-back Right Agreement, Marketing Agency Agreement and other agreements in relation to the Disposal does not constitute connected transactions of the Company under Chapter 14A of the Listing Rules.

The EGM will be convened and held for the Shareholders to consider and, if thought fit, approve the Sale and Purchase Agreement and the transactions contemplated thereunder. To the best of the Directors' knowledge, information and belief after having made all reasonable enquiries, the Purchaser, the Purchaser Guarantor and their ultimate beneficial owner are Independent Third Parties. To the best of the Directors' knowledge, information and belief having made all reasonable enquiries, no Shareholder is required to abstain from voting at the EGM.

In addition, as the assets of GCC Group comprise mainly Mineral Assets (as defined in the Listing Rules), and the Disposal constitutes a Relevant Notifiable Transaction under Chapter 18 of the Listing Rules, the Company will need to comply with certain provisions of Chapter 18 of the Listing Rules in respect of the Disposal including the inclusion of the Competent Person's Report in this circular which are set out in Appendix II to this circular.

In compliance with the requirements of Chapter 18 of the Listing Rules, the Company has appointed the Competent Person to issue the Competent Person's Report to provide the estimated amounts of resources and reserves in respect of the GCC Group in accordance with NI43-101, National Instrument 43-101, the (Canadian) Standards of Disclosure for Mineral Projects, including Companion Policy 43-101 from time to time.



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## LETTER FROM THE BOARD

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The appointment of Norwest Corporation was discussed and reviewed by the executive Directors of the Board. Norwest Corporation was first hired by the Purchaser Guarantor. Given that Norwest Corporation has conducted site visits of the GCC property and has communicated with its management, then Norwest Corporation has had an opportunity to gain a good understanding of the GCC property. Accordingly, the Company also engaged Norwest Corporation in the interests of working efficiency and time saving to prepare the Competent Person's Report. The Purchaser Guarantor consented to the Company using Norwest Corporation as the Competent Person for both the Purchaser Guarantor and the Company for preparation of the Competent Person's Report. The engagement of Norwest Corporation by the Company and the Purchaser Guarantor are separate engagements. The Company is required to remunerate Norwest Corporation for its service provided in the capacity of the Competent Person and such fee has been negotiated between the Company and Norwest Corporation independently. Engagement fees payable to Norwest Corporation will not be split between the Company and the Purchaser Guarantor.

To the best of the Directors' knowledge, information and belief having made all reasonable enquiries, each of the Competent Person and their respective ultimate beneficial owners and associates are Independent Third Parties, and none of the Competent Person and other personnel of Norwest Corporation that have performed work associated with the Competent Person's Report is an officer or employee of the Company or any of its associates.

The Competent Person has confirmed that no material changes have occurred since the effective date of the Competent Person's Report (i.e. 31 December 2014) to the Latest Practicable Date.

### RECOMMENDATIONS

Having regard to the nature of and the benefits resulting from the Disposal as set out in the section "Reasons for and benefits of the Disposal" of this circular, the Directors believe that the terms of the Disposal are fair and reasonable and in the interests of the Company and the Shareholders as a whole.

Accordingly, the Directors recommend the Shareholders to vote in favour of the resolutions to be proposed at the EGM to approve the Sale and Purchase Agreement and the transactions contemplated thereunder.

### THE EGM

The notice convening the EGM is set out on pages N-1 to N-2 of this circular. At the EGM, resolutions will be proposed to the Shareholders to consider and, if thought fit, to approve the Sale and Purchase Agreement and the transactions contemplated thereunder.

The voting in respect of the approval of the resolutions at the EGM will be conducted by way of poll.

A form of proxy for use at the EGM is enclosed with this circular. Whether or not you are able to attend the EGM, you are requested to complete and return the enclosed form of proxy in accordance with the instructions printed thereon as soon as possible and in any event not less than 48 hours before the time appointed for the holding of the EGM (or any adjournment thereof). Completion and return of the form of proxy will not preclude you from attending and voting in person at the EGM (or any adjournment thereof) should you so wish.

An announcement will be made by the Company following the conclusion of the EGM to inform the Shareholders of the results of the EGM.

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## LETTER FROM THE BOARD

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In the event that Shareholders' approval in respect of the Disposal is obtained at the EGM, the Company will make further announcement(s) as and when the Disposal is completed.

### **CLOSURE OF REGISTER OF MEMBERS**

The register of members of the Company will be closed from 16 July 2015 to 17 July 2015, both days inclusive, during which period no transfer of shares of the Company will be effected. In order to qualify for the attendance at the EGM, all transfers accompanied by the relevant share certificates must be lodged with the Company's Hong Kong share registrar, Computershare Hong Kong Investor Services Limited at 17M Floor, Hopewell Centre, 183 Queen's Road East, Wanchai, Hong Kong not later than 4:30 p.m. on 16 July 2015.

### **ADDITIONAL INFORMATION**

Your attention is drawn to the further information contained in the appendices to this circular.

By Order of the Board  
**Winsway Enterprises Holdings Limited**  
**Cao Xinyi**  
*Company Secretary*

**A. CONSOLIDATED FINANCIAL INFORMATION OF THE GROUP**

The consolidated financial statements of the Group for each of the financial year ended 31 December 2012, 2013 and 2014 is disclosed in the annual report of the Company for the three financial years ended 31 December 2012, 2013 and 2014 published on (i) 29 April 2013, from pages 65 to 164; (ii) 30 April 2014, from pages 70 to 165, and (iii) 2 April 2015, from pages 89 to 226, all of which have been published on the website of the Stock Exchange ([www.hkex.com.hk](http://www.hkex.com.hk)) and the website of the Company (<http://www.winsway.com>).

A disclaimer of opinion was expressed in the auditors' report dated 26 March 2015 on the consolidated financial statements of the Group for the year ended 31 December 2014 included in the Company's 2014 Annual Report because of the potential interaction of the uncertainties and their possible effect on the consolidated financial statements.

These facts and circumstances, along with other matters as described in note 2(b) to the consolidated financial statements in the 2014 Annual Report, indicate the existence of multiple material uncertainties that may cast doubt on the Group's ability to continue as a going concern.

Should the Group be unable to continue to operate as a going concern, adjustments would have to be made to write down the value of assets to their recoverable amounts, to provide for further liabilities which might arise and to reclassify non-current assets and non-current liabilities as current assets and current liabilities respectively. The effect of these adjustments has not been reflected in the consolidated financial statements as set out in the Company's 2014 Annual Report.

As explained in the 2014 Annual Report, the Group sustained a further loss from continuing operations before taxation and impairment losses for non-current assets, of HK\$703,726,000 and incurred a net cash outflow from operating activities of HK\$2,417,795,000 from continuing operations for the year ended 31 December 2014. As at 31 December 2014, the Group had net current assets before the net assets held for sale, of HK\$504,599,000, which may not be able to fund the Group's operations in 2015 in view of the net cash outflow in respect of operating activities for the year ended 31 December 2014. In addition, the Group's outstanding Senior Notes amounted to HK\$2,364,347,000 (approximately US\$309,310,000) as at 31 December 2014 are due to mature on 8 April 2016. As at the Latest Practicable Date, the principal amount of the Senior Notes was US\$309,310,000 that are due to mature on 8 April 2016.

The Directors have been and are undertaking certain measures to improve the Group's liquidity and financial position, which are set out in note 2(b) to the consolidated financial statements in the 2014 Annual Report. The consolidated financial statements have been prepared on a going concern basis, the validity of which is dependent on the outcome of these measures, which are subject to the following uncertainties, including (i) whether the Group is able to complete the restructuring of the outstanding Senior Notes with cash, equity or other form of consideration offered at a discount to the principal amount of the Senior Notes; (ii) whether the Group is able to obtain support from the prospective investors and complete the proposed fund raising activities, the achievability of which depends on a number of factors including the completion of the restructuring of the outstanding Senior Notes; (iii) whether the Group is able to successfully negotiate with the lenders for the renewal of all the existing borrowings upon their maturity and/or obtaining additional financing as and when required, the achievability of which depends on the completion of the proposed fund raising activities and the future trading results of the Group and (iv) whether the Group is able to implement its operation plans to control costs and to generate adequate cash flows from operations, the achievability of which depends on the market environment which is expected to remain challenging.

**B. INDEBTEDNESS STATEMENT**

At the close of business on 31 May 2015, being the latest practicable date for the purpose of preparing this indebtedness statement prior to the printing of this circular, the Remaining Group had the following indebtedness:

- (1) Secured bank and other loans of approximately HK\$1,969,774,781, of which
  - a. HK\$213,247,919 were secured by trade and bills receivables;
  - b. HK\$796,302,190 were secured by bank deposits;
  - c. HK\$401,352,667 were secured by trade and bills receivables, property, plant and equipment and land use rights;
  - d. HK\$243,044,530 were secured by bank deposits, property, plant and equipment and land use rights; and
  - e. HK\$315,827,475 were secured by property, plant and equipment and land use rights;
- (2) Outstanding unsecured senior notes of approximately HK\$2,506,190,264.

Save as aforesaid and apart from intra-group liabilities and normal trade payables in the ordinary course of the business, none of the companies in the Group had outstanding at the close of business on 31 May 2015 any mortgages, charges or debentures, loan capital, bank overdrafts, loans, debt securities or other similar indebtedness or any finance lease or hire purchase commitments, liabilities under acceptances or acceptances credits or any guarantees or other material contingent liabilities.

**C. MATERIAL ADVERSE CHANGE**

As at the Latest Practicable Date, save as disclosed by the Company in the 2014 Annual Report and in the announcements of the Company on 8 April 2015, 8 May 2015, 31 May 2015 and 22 June 2015 in relation to the following:

- (a) Company's non-payment of interest under the Senior Notes after the relevant grace period, the formation of a Bondholder Group facilitating discussions between the Bondholders and the Company about the possible restructuring of the Senior Notes, the appointment of an independent financial advisor, Houlihan Lokey (China) Limited, acting as the financial advisor to the Bondholder Group and Akin Gump Strauss Hauer & Feld LLP as legal adviser to the Bondholder Group, and the entering into a Standstill Agreement whereby any Bondholder that is or becomes a party to the Standstill Agreement agrees not to take or request, or instruct any other person to take any enforcement action against the Company under the Senior Notes, subject to certain conditions, and the subsequent extensions of the expiry date of the Standstill Agreement until 20 July 2015; and

- (b) no agreement in connection with Equity Financing has been reached with any potential investors and discussions with certain investors have now ceased. While some potential investors are still assessing the opportunity, there is no assurance that the discussions with potential investors will lead to any agreement. The Company is still in discussions with the Bondholder Group to also explore recapitalisation and other potential options that might form the basis of a Debt Restructuring,

the Directors confirmed that there had been no material adverse change in the financial or trading position or prospects of the Group since 31 December 2014, the date to which the latest published audited financial statements of the Group were made up.

#### **D. WORKING CAPITAL**

As disclosed in the paragraph headed “C. Material Adverse Change” above, the Company’s 2014 Annual Report and the Company’s announcements dated 8 May 2015, 31 May 2015 and 22 June 2015, as at the Latest Practicable Date, the Company is in discussions with the holders of the Senior Notes, i.e. the Company’s US\$500,000,000 8.5% senior notes due 2016 of which approximately US\$309,310,000 in principal amount currently remain outstanding, and in negotiations with potential equity investors to raise new capital by issuance of new equity, i.e. Equity Financing (collectively, the “Debt Restructuring”).

The Directors are of the opinion that, after due and careful enquiry, after taking into account the Group’s present internal resources, and in the absence of a successful Debt Restructuring (which itself would likely be conditional upon the Equity Financing), the Group will not have sufficient working capital for its present requirements for a period of 12 months from the date of this circular taking into account payment obligations under the Senior Notes during such 12 month period until the time of maturity of the Senior Notes on 8 April 2016.

The Company will continue such discussions in connection with the Debt Restructuring and the Equity Financing. However, the Directors are of the view that the Company’s working capital outlook will not be adversely affected by the Disposal over the 12-month period.

**TECHNICAL REPORT**

**GRANDE CACHE COAL OPERATION,  
GRANDE CACHE, ALBERTA, CANADA**

Submitted to:  
**WINSWAY ENTERPRISE HOLDINGS LIMITED**

Report Date:  
**March 27, 2015**

Report Effective Date:  
**December 31, 2014**

**Norwest Corporation**  
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Authors: **Lawrence D. Henchel, P.Geo**  
**John Lewis, M.E., P.Eng.**  
**James D Sorensen, QP, MMSA**  
**Anthony Carl Pollastro, QP, MMSA**



**CERTIFICATE OF QUALIFICATIONS**

I, Lawrence D. Henchel, P.Geo., PG, of Salt Lake City do hereby certify that:

1. I am currently employed as Vice President of Geologic Services with Norwest Corporation, 136 East South Temple, 12th Floor, Salt Lake City, Utah 84111 USA.
2. I graduated with a Bachelor of Science Degree in Geology from Saint Lawrence University, Canton, NY, USA in 1978.
3. I am a licensed Professional Geoscientist in the province of Alberta, Canada, #159013. I am a licensed Professional Geologist in the State of Utah, #6087593-2250 and I am a Registered Member of The Society for Mining, Metallurgy and Exploration, Inc., #4150015RM.
4. I have worked as a geologist for a total of thirty-two years since my graduation from university, both for coal mining and exploration companies and as a consultant specializing in coal and industrial minerals. The first ten years of my work were almost exclusively in the coal industry which continues to be a large part of the consulting work that I perform.
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 responsible for Sections 1.1 through 1.7, 2.6.3, 2.6.4, 4 through 12, and 14 of the technical report titled “Technical Report, Grande Cache Coal Operation, Grande Cache, Alberta, Canada” (the “Technical Report”) dated March 27, 2015, with an **effective date of December 31, 2014**.
7. I personally inspected the Grande Cache coal property and mining operations on January 27 and 28, 2015.
8. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the parts of the Technical Report for which I am responsible not misleading.
9. I am independent of Up Energy Development Group Limited applying all of the tests in Section 1.5 of NI 43-101.
10. I have read NI 43-101 and the parts of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.

Dated this 27th day of March, 2015.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

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Lawrence D. Henchel, P.Geo, PG  
Vice President Geologic Services, Norwest Corporation

**CERTIFICATE OF QUALIFICATIONS**

I, John Lewis, of Salt Lake City, Utah, do hereby certify that:

1. I am currently employed as Manager, Underground Mining with Norwest Corporation, 136 East South Temple, 12th Floor, Salt Lake City, Utah, 84111 USA.
2. I graduated from the University of Utah with a Bachelor of Science Degree in Mining Engineering in 1993, and a Master of Engineering Degree in 1997.
3. I am a Registered member of the Society for Mining and Metallurgy and Exploration (Member #1898600) a Registered Professional Engineer in the State of Utah, (License #191488), and I am a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGA membership #143601).
4. I have worked as a mining engineer for 20 years of which 15 years were underground coal mining industry experience in Utah, Wyoming, and Colorado.
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 professional associations (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 responsible for the preparation of Sections 1.8, 1.9, 1.12, 1.14, 1.16, 15.2, 15.4, 16.1, 16.2.2, 16.3.2, 16.4.2, 16.5.2, 21.1.2, 21.2.2, 25 and 26.1.1, and 26.1.7 relating to underground coal operations of the technical report titled “Technical Report, Grande Cache Coal Operation, Grande Cache, Alberta” and dated March 27, 2015, with an **effective date of December 31, 2014** (the “Technical Report”).
7. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the parts of the Technical Report for which I am responsible not misleading.
8. I personally inspected the portions of the property relating to the operating No. 12 South B2 Mine, the planned No. 12 South A Mine, and the proposed No. 9D Mine on October 20–22, 2014.
9. I am independent of Up Energy Development Group Limited applying all of the tests in Section 1.5 of NI 43-101.
10. I have read NI 43-101 and the parts of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.

Dated this 27th day of March, 2015.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

---

John C. Lewis, P.Eng.  
Manager, Underground Mining



**CERTIFICATE OF QUALIFICATIONS**

I, James D Sorensen, of Salt Lake City, Utah, do hereby certify that:

1. I am currently employed as Senior Mining Engineer, Surface Mining with Norwest Corporation, 136 East South Temple, 12th Floor, Salt Lake City, Utah, 84111 USA.
2. I graduated from the University of Utah with a Bachelor of Science Degree in Mining Engineering in 2000.
3. I am a Registered member of the Society for Mining and Metallurgy and Exploration (Member #4117148), recognized as a Qualified Professional Member by the Mining and Metallurgical Society of America (Member # 01426-QP).
4. I have worked as a mining engineer for 15 years since my graduation from university, both working for mining companies and as a consultant working in areas related to the surface coal mining industry.
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 professional associations (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 responsible for the preparation of Sections 1.8, 1.9, 1.14, 15.1, 15.2, 15.3, 15.5, 16.1, 16.2.1, 16.3.1, 16.4.1, 16.5.1, 21.1.1, 21.1.3, 21.2.1, 25, and 26.2.1 through 26.2.5 relating to surface coal operations of the technical report titled “Technical Report, Grande Cache Coal Operation, Grande Cache, Alberta” and dated March 27, 2015, with an **effective date of December 31, 2014** (the “Technical Report”).
7. I personally inspected the Grande Cache coal property and mining operations on January 27 and 28, 2015.
8. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the parts of the Technical Report for which I am responsible not misleading.
9. I am independent of Up Energy Development Group Limited applying all of the tests in Section 1.5 of NI 43-101.
10. I have read NI 43-101 and the parts of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.

Dated this 27th day of March, 2015.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

---

James D Sorensen, QP, MMSA  
Mining Engineer

**CERTIFICATE OF QUALIFICATIONS**

I, Anthony Carl Pollastro, of Salt Lake City, Utah, do hereby certify that:

1. I am currently employed as Senior Vice President Engineering/International with Norwest Corporation, 136 East South Temple, 12th Floor, Salt Lake City, Utah, 84111 USA.
2. I graduated from the University of Utah with a Bachelor of Science degree in Mining Engineering in 1976.
3. I am a Registered Qualified Person in Mining and Ore Reserves with the Mining and Metallurgical Society of America (#01427QP).
4. I have worked as a mining engineer for 39 years since graduation from university of which 33 years were working directly in underground coal mining industry experience in Utah and Wyoming in senior technical and operational roles and 6 years as an international consultant in underground coal mining throughout the world and senior manager in the consultancy.
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 professional associations (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 responsible for the overall preparation of the Technical Report and personally responsible for Sections 1.1, 1.1.1, 1.13, 13, 17, 18, 19, 20, 22, 23, 24, 26.5 of the technical report titled “Technical Report, Grande Cache Coal Operation, Grande Cache, Alberta” and dated March 27, 2015, with an **effective date of December 31, 2014** (the “Technical Report”).
7. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the parts of the Technical Report for which I am responsible not misleading.
8. I personally visited the portions of the property relating to the operating No. 12 South B2 Mine underground mine, the operating No. 8 surface mine, the planned location of the No. 12 South A Underground Mine, and the proposed No. 9D Underground Mine and all other sites of potential areas of reserves listed in the Technical Report during the site visit on October 20–22, 2014.
9. I am independent of Up Energy Development Group Limited applying all of the tests in Section 1.5 of NI 43-101.
10. I have read NI 43-101 and all of the Technical Report for which I am responsible and certify they have been prepared in compliance with NI 43-101 standards and guidelines. Dated this 27th day of March, 2015.

Dated this 27th day of March, 2015.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

\_\_\_\_\_  
Anthony Carl Pollastro, QP-MMSA  
Senior Vice President Engineering/International

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## 1 SUMMARY

The following report was prepared by Norwest Corporation (Norwest). All Qualified Persons are employees of Norwest. It addresses the coal geology, resources and reserves of the coal mining and processing operations of Grande Cache Coal Corporation (GCC) in the Smoky River Coalfield of Alberta.

These coal deposits were explored and partially mined prior to 2000 by Smoky River Coal Ltd. (SCRL) and McIntyre Porcupine Mines (MPM), companies which are not related to Grande Cache Coal Corporation. The previous mine operator, SCRL, was placed in receivership in the year 2000. Grande Cache Coal Corporation acquired the assets in the same year and has continued to explore, evaluate and operate the mine and facilities. On March 1, 2012 the Grande Cache Coal Corporation was acquired jointly by a numbered company, owned by Winsway Coking Coal Holdings Ltd. of Hong Kong, and Marubeni Corporation of Japan. In late 2014, a pending acquisition was announced in which 82.74 percent (%) interest in Grande Cache Coal Corporation and Grande Cache Coal LP would be acquired by Up Energy Development Group Limited. This transaction is not complete as of the date of this report.

Numerous studies and reports, including Technical Reports, have been completed on the operations in recent years. Norwest has prepared this document to report resources and reserves resulting from its findings from producing areas and future mining areas and the change or depletion of a previously reported mining areas. This report also reflects changes in the economic environment since the last report completed in February 2014 for the year ending 2013. The Terms of Reference for this report include a validation of the coal resources and reserves in compliance with the current reporting requirements of National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101, 2011).

### 1.1 LOCATION AND ACCESSIBILITY

The GCC property is located in West Central Alberta, approximately 400 kilometers (km) west of the City of Edmonton, the capital of the Province of Alberta in Canada. The property is accessed via Highway 40, a two lane, paved provincial highway which connects the town of Grande Cache to the major, east-west, provincial Highway 16. The property is also serviced by a branch line of the Canadian National Railway which connects to the main east-west rail line at the town of Hinton, approximately 145km south of the mine.

### 1.2 SURFACE AND MINERAL TENURE

In Alberta, coal tenure is held through coal leases granted by the province. Surface and underground mining rights are also granted by the province first through a mine permit, then by a mine license for each individual mining area. GCC currently has approximately 29,968 hectares (ha) under coal lease, with dates of record ranging from the year 2000 through 2014. The mineral leases that contain the coal resources and reserves presented in this report are summarized in Table 4.1 and displayed on Figure 4.2.

### 1.3 REGIONAL STRUCTURE AND STRATIGRAPHY

The Gates Formation is the stratigraphic unit within the Smoky River Coalfield that contains the coal seams of economic interest. The Gates Formation consists of 320 meters (m) of sandstone, shale and coal, and is subdivided into three members:

- The Torrens Member, the lowermost unit of the Gates Formation, is a marine sandstone and siltstone sequence approximately 30m in thickness.
- The Grande Cache Member is composed of interbedded sandstone, siltstone, coal and mudstone. The unit is up to 150m thick. Eight coal seams (3 Seam through 8 Seam, 10 Seam and 11 Seam) are present.
- The Mountain Park Member, the uppermost unit of the Gates Formation, consists of 150m to 180m of non-marine fine-grained sandstone and siltstone with minor interbedded coal seams.

The Smoky River Coalfield was deformed by tectonic events of the Laramide Orogeny which created the Rocky Mountains approximately 60 million (M) years ago. The rock strata are folded, often in tight, steep anticlinal/synclinal pairs, and are cut by numerous thrust faults. Structural shortening of the region is estimated to be one-third of the original flat-lying strata. Surface traces of these folds and thrust faults trend northwest-southeast. The majority of the faults are southwest-dipping thrusts, displaying ramps that cut up stratigraphic section and flats that are parallel to bedding. Asymmetric folds with relatively long, straight limbs and short, narrow hinge zones are common. The folds generally have chevron or box shapes and maintain their profile over distances of up to 2km along trend. These folds are conical at their tapering ends. Amplitude of the major fold sets generally range from 200m to 1,000m. Minor, parasitic folds along the limbs of the major anticlines and synclines are common.

### 1.4 DATA SOURCES

The information used to estimate the coal resources and reserves of the Smoky River Coalfield was gathered using industry standard data acquisition techniques. With over 43 years of mining activity and coal processing, data from operations were also used to help predict coal recovery, yield, and quality from the different seams and mining areas. Drilling was and still is the most common method used to acquire data prior to mining. Over 4,300 holes have been drilled in the coal field since the late 1950s. Summaries of drillholes in the reported coal resource and reserve areas are found in Section 10. Development of adits was a common method utilized for obtaining bulk samples for coal washability test work prior to opening a new mine area. A total of 129 adits have been driven within the Smoky River Coalfield.

### 1.5 DEPOSIT GEOLOGY

The coal seams in the Smoky River Coalfield are numbered sequentially, beginning with 3 Seam occurring as the lowermost coal of interest in the Grande Cache Member, through the 11 Seam at the top of the stratigraphic sequence.

The coal seam thickness and continuity across the individual mine areas is discussed in detail in Section 7.1.

## 1.6 COAL QUALITY

The majority of samples were collected and submitted for analysis by previous operators. Results have been stored electronically within GCC's mining software package and in spread sheets. For metallurgical coal, important quality parameters are:

- Ash Content — The relative amount of non-combustible material in the coal.
- Free Swelling Index (FSI) — A measure of the amount the coal swells when heated under controlled conditions. It gives a rough indication whether the coal is suitable for metallurgical use.
- Sulphur Content – The relative amount of sulphur in the coal.
- Volatile Matter Content – other than moisture, the substances that are given off as gas and vapour during combustion of the coal.

The in-situ coal quality data are discussed in Section 7.2.

The operation produces a high quality, low-ash, low-volatile, hard coking coal, with an ash content of 8.5% to 9% sold for coke oven blends or as a pulverized injection coal. The quality of GCC's coal resources make them suitable for use as a metallurgical coal which has been successfully marketed over the life of the operation.

Minor quantities of oxidized coal, occurring at the coal seams eroded contact, is sold occasionally on the spot market for thermal coal.

## 1.7 COAL RESOURCES

Coal resource models are generated from the drillhole information through the use of crosssections and/or seam surface interpretation. Computer software has been used to translate the geologic geometry interpretations into 3D block models. The QP for coal resources has verified the interpretation of these elements. These models form the basis of the resource estimates reported in this document as well as the basis of reserve estimates after additional mining and recovery criteria are applied. The coal resource estimates are subdivided into categories based on "assurance of existence" using GSC Paper 88-21 criteria and reported using the equivalent mineral resource categories specified in NI 43-101.

The coal resources with an effective date of December 31, 2014 are shown in Table 1.1 and Table 1.2. As no new information has been generated for the No. 16, No. 12 North and No. 2 mining areas since the resources were compiled in the 2013 Technical Report, and no production has occurred, these estimates have been carried over. The No. 7 underground mine was mined out in 2012. This report does not include resources from highwall mining areas, and former surface mines No. 1, No. 5 and No. 11 and other potential mining areas within GCC's leased land.

TABLE 1.1 SUMMARY OF COAL RESOURCES, MEASURED AND INDICATED

	Measured (Mt)	Indicated (Mt)	Total (Mt)	Ash (%)	FSI
<b>Surface Mining Area<sup>(2)</sup></b>					
No. 2 Area	61.4	23.2	84.6	26.8	5.0
No. 8 Area	35.4	7.4	42.8	23.2	5.0
No. 9 Area	38.2	70.6	108.8	22.2	5.0
No. 12 South B2 Area <sup>(3)</sup>	2.6	1.0	3.6	13.9	3.0
No. 12 North Area	39.1	15.6	54.7	16.6	3.5
No. 16 Area	56.0	20.2	76.2	13.9	3.5
<b>Total Surface Areas</b>	<b>232.7</b>	<b>138.0</b>	<b>370.7</b>	<b>20.8</b>	<b>4.0</b>
<b>Underground Area<sup>(4)</sup></b>					
No. 9 Area	108.2	33.6	141.8	21.9	5.0
No. 12 South B2 Area	4.3	5.2	9.5	13.9	3.0
No. 12 South A Area	25.4	39.6	64.9	14.8	3.0
<b>Total Underground Areas</b>	<b>137.9</b>	<b>78.4</b>	<b>216.2</b>	<b>19.4</b>	<b>4.5</b>
<b>Grand Total</b>	<b>370.6</b>	<b>216.4</b>	<b>586.9</b>	<b>20.3</b>	<b>4.0</b>

## Notes:

- (1) Quality of all resources classified as Low Volatile Bituminous (ASTM)
- (2) Surface mining resources estimated by GCC staff based on a 20:1 strip ratio cut-off and a 45 pit wall angle
- (3) No.12 South B2 surface resources are those remaining after the open pit reserves have been mined out
- (4) Underground resource estimated by GCC staff. Minimum depth of cover approx. 50m. Maximum underground extraction angle 30°; 20m buffer from faulting, 50m buffer from highwalls
- (5) Coal resources are inclusive of the coal reserves
- (6) The resource estimates are effective December 31, 2014 and have been prepared under supervision of Lawrence D. Henschel, P. Geo. and Qualified Person
- (7) Rounding as required by reporting guidelines may result in apparent summation differences

TABLE 1.2 SUMMARY OF COAL RESOURCES, INFERRED

	Inferred (Mt)	Ash (%)	FSI
<b>Surface Mining Area<sup>(2)</sup></b>			
No. 2 Area	6.3	23.2	5.0
No. 8 Area	0.7	24.4	5.0
No. 9 Area	27.5	20.5	5.0
No. 12 South B2 Area <sup>(3)</sup>	0.5	17.9	4.0
No. 12 North Area	2.2	21.2	3.0
No. 16 Area	15.9	15.3	4.0
<b>Total Surface Areas</b>	<b>53.1</b>	<b>19.3</b>	<b>4.5</b>
<b>Underground Area<sup>(4)</sup></b>			
No. 9D Area	20.1	20.1	5.0
No. 12 South B2 Area	0		
No. 12 South A Area	3.4	16.0	3.0
<b>Total Underground Areas</b>	<b>23.5</b>	<b>19.5</b>	<b>4.5</b>
<b>Grand Total</b>	<b>76.6</b>	<b>19.4</b>	<b>4.5</b>

Notes:

- (1) Quality of all resources classified as Low Volatile Bituminous (ASTM)
- (2) Surface mining resources estimated by GCC staff based on a 20:1 strip ratio cut-off and a 45 pit wall angle
- (3) No.12 South B2 surface resources are those remaining after the open pit reserves have been mined out
- (4) Underground resource estimated by GCC staff. Minimum depth of cover approx. 50m. Maximum underground extraction angle 30°; 20m buffer from faulting, 50m buffer from highwalls
- (5) Coal resources are inclusive of the coal reserves
- (6) The resource estimates are effective December 31, 2014 and have been prepared under supervision of Lawrence D. Henchel, P. Geo. and Qualified Person
- (7) Rounding as required by reporting guidelines may result in apparent summation differences

## 1.8 COAL RESERVES

To convert coal resources to coal reserves, a number of economic and technical factors must be applied. These include but are not limited to the following:

- An estimate for the long term price of metallurgical coal in the domestic and international market place; in the case of this report, C\$180 per tonne (/t) has been used, based on recently published data. This price was only used for initial mine design parameters. It was not used in the financial forecast. The prices in the financial forecast were taken from the Market Study referred to in Section 19.
- Operating costs associated with open pit mining, underground mining, transporting and processing the coal at the mine site.
- Overhead costs associated with marketing and transporting the finished coal product to customers. Overhead costs associated with administrative and technical functions relative to running a mine.
- Geotechnical parameters governing the orientation of the pit slopes, haul roads, waste dumps and other parameters associated with water flow and climate.

- Estimates for the recovery of coal and addition of dilution material during the mining and coal handling process (resulting in the Run-of-Mine (ROM) estimate).
- Estimate for the recovery of coal from processing – approximately 70% - resulting in the Clean or Saleable estimate.

Using these and other factors, Norwest and GCC engineers and their consultants used mining software to produce economic mine designs at the Grande Cache operation. The QPs have reviewed these procedures and parameters and determined that the mine designs are valid.

The parameters used for the mine designs are based on previous operating experience and the most recent geotechnical investigations (see Reference Nos. 5, 6, 7, 13, 14 and 15 in Section 27.0 of this report).

The QP for surface mining has determined that the assumptions used for the 2013 Technical Report for the design of the No. 16, No. 12 North and No. 2 pits are still appropriate; consequently, the reported reserves for these areas have not changed. Mining of these deposits has not yet occurred.

The completion of an updated pit design based on revised economic analysis for the No. 8 along with production in 2014 resulted in a revised reserve estimate for this area. No. 12 South B2 underground production in 2014 reduces the reported reserve from this area.

The No. 9 Area has been included in the reserves since 2013 based on the existing exploration database in this area of drillholes and adits dating between 1969 and 1997. No changes have been made to this reserve area.



The reserves with the effective date of December 31, 2014 are summarized on Table 1.3 and Table 1.4.

**TABLE 1.3 SUMMARY OF PROVEN AND PROBABLE ROM RESERVES**

	<b>Proven (Mt)</b>	<b>Probable (Mt)</b>	<b>Total (Mt)</b>
<b>Surface Mining Areas</b>			
No. 2 Area	13.7	1.2	14.9
No. 8 Area	12.5	0.1	12.6
No. 9 Area	13.5	11.2	24.7
No. 12 North Area	31.3	12.2	43.5
No. 16 Area	19.7	9.6	29.4
<b>Total Surface Mining</b>	<b>90.7</b>	<b>34.3</b>	<b>125.1</b>
<b>Underground Areas</b>			
No. 9D Area	59.8	3.7	63.5
No. 12 South B2 Area	3.0	1.4	4.5
No. 12 South A Area	4.6	9.4	14.0
<b>Total Underground Mining</b>	<b>67.5</b>	<b>14.5</b>	<b>82.0</b>
<b>Grand Total</b>	<b>158.2</b>	<b>48.8</b>	<b>207.1</b>

Notes:

- (1) Quality of all reserves classified as Low-Volatile Bituminous (ASTM)
- (2) Average ROM coal quality for reserves is reported in Section 7.2 under the respective mining areas
- (3) Planned surface pits only
- (4) Underground ROM estimates include mining recoveries ranging from 44% to 62%, which are inherent to multi-seam room-and-pillar operations
- (5) Both underground and surface mineable estimates include allowance for loss and dilution and are supported by mining designs as described in Section 16.0
- (6) The surface reserve estimates do not include thermal coal consistent with previous GCC Technical Reports
- (7) The surface reserve estimates are effective December 31, 2014 and have been prepared under the supervision of James Sorensen, Sr. Mining Eng.
- (8) The underground reserve estimates are effective December 31, 2014 and have been prepared under the supervision of John Lewis, P. Eng., Qualified Person
- (9) Rounding as required by reporting guidelines may result in apparent summation differences

TABLE 1.4 SUMMARY OF PROVEN AND PROBABLE SALEABLE COAL RESERVES

	Proven (Mt)	Probable (Mt)	Total (Mt)
<b>Surface Mining Areas</b>			
No. 2 Area	9.2	0.8	10.0
No. 8 Area	8.8	0.1	8.9
No. 9 Area	10.4	8.3	18.8
No. 12 North Area	22.5	8.3	30.8
No. 16 Area	14.4	7.0	21.4
<b>Total Surface Mining</b>	<b>65.3</b>	<b>24.5</b>	<b>90.0</b>
<b>Underground Mining</b>			
No. 9 Area	41.4	2.6	44.0
No. 12 South B2 Area	2.3	1.1	3.3
No. 12 South A Area	3.4	6.8	10.3
<b>Total Underground Mining</b>	<b>47.1</b>	<b>10.5</b>	<b>57.6</b>
<b>Grand Total</b>	<b>112.4</b>	<b>35.0</b>	<b>147.6</b>

## Notes:

- (1) Quality of all reserves classified as Low-Volatile Bituminous (ASTM)
- (2) Total coal will be marketed as hard coking coal
- (3) Planned surface pits only
- (4) Saleable coal from Table 15-3 considers a yield of 69% based on the historic average plant yield from No. 7 and No. 12 South B2 mines
- (5) Plant yield for the surface mineable coal varies in relation to the ROM ash content:  
Plant Yield = (ROM Ash%-Plant Reject Ash%)/(Clean Coal Ash%-Plant Reject Ash%), where  
Plant Reject Ash = 55% to 63% depending on mine area and seam and Clean Coal Ash = 8.5%
- (6) Saleable (Clean) coal reserves are a subset of and not additive to Run-of-Mine reserves
- (7) The surface reserve estimates do not include thermal coal consistent with previous GCC Technical Reports
- (8) The surface reserve estimates are effective December 31, 2014 and have been prepared under the supervision of James Sorensen, Mining Eng.
- (9) The underground reserve estimates are effective December 31, 2014 and have been prepared under the supervision of John Lewis, P.Eng., Qualified Person
- (10) Rounding as required by reporting guidelines may result in apparent summation differences

**1.9 MINE PRODUCTION**

Operations were suspended January 28, 2015 at the No. 8 surface operation and to resume operation in the first quarter of 2017. The No. 2 surface pits, which lie adjacent to the No. 8 pits, are planned to be brought into production in start of 2019. The No.16 pits and No. 9 pits are scheduled to commence operations in 2025 and in 2027, respectively at the completion of the No.8 surface operations. The No. 12 North area will be the last pits to be developed starting in 2038.

The surface mines are proposed to be operated by GCC as a typical truck-shovel operation, using large electric cable shovels and large hydraulic shovels as the primary loading units similar to the current operation. The waste would be hauled in large rear dump trucks (220t capacity) to nearby waste dumps. Coal movement is proposed to be accomplished by a combination of contract highway class trucks, large off road haulers with coal boxes and new conveying systems.

The No. 2, No. 9, No. 16, and No. 12 North pits will be developed with similar operating techniques, equipment, and other shared facilities in the proposed plan.

The underground operations currently employ the room-and-pillar mining method; activities include development and panel preparation followed by de-pillar mining. Five- or six-entry panels are developed with one belt conveyor system. The proposed new room-and-pillar mine is in the No. 12 South A area and like No. 12 South B2, mines the 4 Seam and the 7/8 Seam horizons. Underground coal production from the No. 9 Area is planned to occur from the proposed No. 9D Mine, which would utilize development and longwall equipment suitable for producing coal in steep gradient conditions in the 10 Seam and 4 Seam. Based on current similar underground mines operating in China, the No. 9D Mine would average approximately 2 million (M) ROM tonnes per year.

GCC plans to reduce production in 2015 with the shut down of surface mining operations until 2017. GCC plans to continue underground operations through this period at an average 0.7M clean coal tonnes per calendar year to an approximate production rate of 4.0M clean coal tonnes per calendar year by CY 2024.

### **1.10 COAL PROCESSING AND PLANNED COAL PRODUCTION**

The majority of the GCC coal washing plant circuitry is typical for the plants built around the 1970s. ROM coal is delivered by truck from the operating areas to a ROM coal stockpile. After removal of the oversize material in a Bradford breaker, the feed coal is conveyed to the raw coal silo. Cleaning of the coarse coal takes place in heavy media cyclones using finely ground magnetite in water as the dense medium. Fine coal is cleaned in froth flotation circuits. The coal is dewatered in centrifuges or on disc filters as well as in a fluidized bed dryer. The clean coal is transferred to a clean coal stockpile for loading on to rail cars. Fine coal refuse is dewatered and combined with the coarse refuse for disposal at the No. 8 area waste dumps, or pumped in slurry form to the fine tailings facility.

In order to achieve the planned processing capacity of 5M clean tonnes per year, a second processing plant is proposed in the Sheep Creek valley near portal of planned No. 9D Underground Mine. This plant would be tied into the current load-out in the Smoky River valley by a conveyor.

### **1.11 MARKETS**

The principal product from GCC is hard coking coal (metallurgical coal). This coal is sold on the seaborne hard coking coal market. Contracts are typically renewed on an annual basis with final pricing defined annually or quarterly. Marketing of the coal will be through marketing agreements with marketing agents or direct sales to clients.

GCC has a contract with Canadian National Railway (CNR) for the transport of coal to terminals on the west coast. Price and car commitment is open to negotiation on a bi-annual basis. A contract is in place with the Westshore Terminals shipping port located at Roberts Bank near Vancouver, B.C.

Grande Cache coking coal is the only high rank, low volatile (LV) coking coal produced in Canada. As such it competes with low volatile coking coals from the Appalachian region of the United States, and with low volatile coking coals from Queensland.

Following a quality comparison of Grande Cache coal with selected US and Australian brands, price benchmarks were established for GCC, using a price index series that exists for US low volatile coking coal, together with an analysis of pricing for Tier 2 Australian coking coals.

Section 19 includes an analysis and discussion of markets and a range of price forecasts for this coal. Norwest used the mid-point of the various ranges shown in Section 19. The price forecast in this report ranges from a low of US\$104 in 2016 increasing to US\$170 by 2021 and staying at that level for the life of the mine. The market study in this report was prepared by Kobie Koornhof and Associates. The metallurgical coal price forecasts in the Koornhof market study used in this report are consistent with recent publicly available forecasts.

### 1.12 OPERATING AND CAPITAL COSTS

Mine operating costs are based on current performance and projections of ongoing improvements. Substantial capital of C\$1.5B is allocated over the life of the mine for both surface and underground mines, and coal processing and handling infrastructure. Total operating cost of sales is projected to be at an average of C\$120/t of clean coal over the life of the mine.

All costs are stated in constant 2014 Canadian dollars (C\$). There is no provision for inflation. Direct mine cash operating costs for both the surface and underground mines were developed on a unit cost basis except for the 9D longwall mine which was developed from first principles.

As further discussed below, the unit costs developed for this report were based on recent historical costs from Grande Cache Coal mines, from the 2014 Mine and Mill Equipment Cost Guide, and on Norwest's experience in surface and underground mining.

Based on a comparison of the resulting forecasted operating costs to recent actual costs at Grande Cache, the operating cost forecast developed for this report is a reasonable estimate of future operating costs.

Table 1.5 combines the Life-of-Mine (LOM) projected waste movement, coal haulage, haulage to the preparation plant, processing cost at the preparation plant, and a conveyor cost once the new plant is constructed. The G&A expenses are not included in the summary presented in below. The table shows the total projected surface mining operating costs and the relative cost per clean MET tonne from surface mining operations.

**TABLE 1.5 SURFACE MINING LOM OPERATING COSTS PROJECTION**

<b>Surface Mine Operating Cost</b>	<b>LOM</b>
Waste Movement	4,386,194
Coal Haul	801,423
Mine Overhead	1,192,481
Conveyor	132,265
Processing	942,646
<b>Total Surface</b>	<b>7,455,009</b>
\$/Clean MET tonne	54.82

The LOM operating costs for the No. 12 South B2 with the East Extension, the No. 12 South A, and the No. 9D Area combines the projected mine operating cost, the truck haulage to the preparation plant, processing cost at the preparation plant, and a conveyor cost once the new plant is constructed. The G&A expenses are not included in the summary presented in Table 1.6 showing the total projected underground operating costs and the relative cost per clean MET tonne.

TABLE 1.6 UNDERGROUND MINING LOM OPERATING COST PROJECTION

Underground Operating Cost	LOM
Operating Cost	\$3,633,116
Coal Haul	\$306,108
Conveyor	\$77,938
Processing	\$695,757
<b>Total UG</b>	<b>\$4,712,918</b>
\$/Clean MET tonne	\$81.80

Capital costs were developed based on the mine plan requirements for all mining methods. Table 1.7 below shows a summary of total mine capital requirements. Following that is a discussion of the basis for the capital cost estimates.

TABLE 1.7 TOTAL LOM COMBINED CAPITAL COST PROJECTION

Total Capital	Total
Exploration	39,748
All Mines Infrastructure	166,445
Pre-production Expense & Development OP	87,997
Equipment Surface	580,025
Contingency Surface	66,802
Pre-production Expense & Development UG Longwall	30,329
Equipment UG Longwall	354,270
Longwall Infrastructure	46,512
Pre-production Expense & Development UG Room & Pillar	19,663
Equipment UG Room & Pillar	89,293
Room & Pillar Infrastructure	23,550
<b>Total</b>	<b>1,504,634</b>

### 1.13 FINANCIAL ANALYSIS

The cash flow and financial analysis is presented in constant 2014 dollars, there is no provision for inflation.

Since revenues are denominated in US dollars (US\$) and the costs are in Canadian dollars (C\$), the model uses an assumed exchange rate for converting the US\$ denominated revenue to C\$. The exchange rate is based on recent five year futures quotes from several firms and a long range forecast using the last ten years actual exchange rates. The recent five year futures quotes are approximately C\$1 equals US\$0.80. The ten year historical average is C\$1 equals US\$0.93. The assumption in the model is that the exchange rate will be C\$1 equals US\$0.80 for the next five years and will then increase rateably over the next five years to the historical average of C\$1 equals US\$0.93 and remains at that level for the remaining life of the project.

Table 1.8 summarizes the cash flow from the mine.

TABLE 1.8 LOM CASH FLOW SUMMARY

	<b>Total</b>
Coal Sales, Kt	<b>160,159</b>
Metallurgical Coal, Kt	<b>148,112</b>
Thermal Coal, Kt	<b>12,047</b>
Revenue, C\$K	<b>\$27,557,231</b>
Cost \$K	<b>\$20,677,897</b>
Cost of Sales	<b>\$19,173,263</b>
Royalty — Tier 1	<b>\$219,978</b>
Royalty — Tier 2	<b>\$642,083</b>
On Site Operating Costs, \$K	<b>\$12,751,750</b>
Off Site Operating Costs, \$K	<b>\$5,559,452</b>
Income Taxes	<b>\$1,631,757</b>
Total Capital Costs, \$K	<b>\$1,504,635</b>
After-Tax Net Cash Flow, \$K	<b>\$5,276,577</b>
Cumulative DCF @ 10.0%	<b>\$622</b>

Clean metallurgical coal production ranges from 2.6M to 5.0M tonnes and totals 146M tonnes over the 41 year remaining mine life. Approximately 14M thermal tonnes are sold over the mine life.

A summary of the unit average selling prices and unit costs are shown in Table 1.9.

TABLE 1.9 UNIT REVENUE AND COST SUMMARY

<b>Description</b>	<b>\$/tonne</b>
Gross Revenue (Includes thermal coal)	\$172
Selling Expenses	\$3
Loading and Transportation Expenses	\$32
<b>Net Revenue FOB Mine</b>	<b>\$137</b>
Direct Mining Costs	\$80
Royalties	\$5
<b>Total Cash Costs of Production</b>	<b>\$85</b>
Net Margin	\$52
Income Taxes	\$10
<b>Cash Flow from Operations</b>	<b>\$42</b>
Capital Expenditures	\$9
<b>Net Cash Flow</b>	<b>\$33</b>

Due to the low production volume in 2015 and 2016, low metallurgical coal prices and significant capital expenditures, cash flow from the mine is negative for the next three years. Cumulative EBITDA is C\$50M during that period while negative after tax cash flows total C\$144M due to the capital requirements in those years. Significant capital expenditures in 2020 result in a large negative cash flow that year

of \$173M. Cumulative after tax cash flows turn positive in 2019, when metallurgical coal prices are projected to improve to the \$143/t level and clean coal production increases to the 3.1M level. Cumulative undiscounted cash flows over the 41 year project life are C\$5.3 billion (B).

The after tax internal rate of return for the project is approximately 40%. After tax net present values at 8%, 10%, 12% and 15% are shown in Table 1.10.

**TABLE 1.10 NPV RESULTS (\$M)**

<b>Interest Rate</b>	<b>8%</b>	<b>10%</b>	<b>12%</b>	<b>15%</b>
NPV	\$878	\$622	\$454	\$294

### 1.13.1 Sensitivity Analysis

The economics of the project are extremely sensitive to the Canadian/US dollar exchange rate and the price of metallurgical coal. For example, if metallurgical coal prices do not recover in the next five years and then increase over the next five to the maximum projected price of US\$170 per tonne, the after tax NPV at 10% would be reduced to C\$266M and the IRR would be 15%. In that case, cumulative cash flows are negative until 2026 and peak at (C\$590) in 2021. Of course, if prices do not recover, some capital could be delayed. In addition, if the Canadian/US dollar exchange rate increases to the long term historical average in the next two years instead of over the next ten years, the after tax NPV at 10% decreases to C\$450M and the IRR decreases to 25%.

Sensitivity of the economics regarding Canadian/US exchange rate, coal sales price, direct mining costs and capital expenditures were evaluated. The results are summarized in Table 1.11.

**TABLE 1.11 SENSITIVITY ANALYSIS (\$M)**

	<b>IRR</b>	<b>NPV at 8%</b>	<b>NPV at 10%</b>	<b>NPV at 12%</b>	<b>NPV at 15%</b>
<b>1.0% Decrease in C\$ to \$US</b>	35%	\$710	\$495	\$354	\$223
<b>10% Increase in Met Coal Prices</b>	75%	\$1,300	\$955	\$725	\$503
<b>10% Decrease in Met Coal Prices</b>	19%	\$427	\$260	\$156	\$63
<b>10% Increase in Total Cash Costs</b>	23%	\$517	\$336	\$220	\$114
<b>10% Decrease in Total Cash Costs</b>	71%	\$1,236	\$906	\$685	\$472
<b>10% Increase in Capital Costs</b>	35%	\$824	\$576	\$413	\$260
<b>10% Decrease in Capital Costs</b>	46%	\$931	\$669	\$495	\$329

### 1.14 MINE LIFE

The mine life for the combined operation as currently scheduled is approximately 41 years starting in 2015. This includes all of the current reserves, most of which are exhausted prior to 2048. There are additional areas on the property, they include but are not limited to No. 1, No. 5 and No. 11 Mines, and some highwall mining areas in No. 7 and No. 9 Mines studied by Norwest and other potential areas with previous mining, which have the potential to extend the current reserve base and mine life.

### 1.15 RISK STATEMENT

The financial results presented in this report represent forward looking information regarding future projections of mining operations and resulting cash flows. By its nature, forward-looking information involves a number of assumptions, known and unknown risks and uncertainties, which could cause actual results to differ materially from those forecasts. These risks include, but are not limited to the future price of coal, rail freight rates and availability of coal cars to transport the coal to port. There may be inflation of input costs such as diesel, steel, and labour as well as mining equipment. The high activity in the mining industry and other industries that rely on large earth moving equipment may cause delays in delivery of mining equipment. The problem of retaining and recruiting skilled personnel is an industry wide issue. There can be delays in obtaining or renewing mining permits. Concerns over greenhouse gas emissions and compliance with greenhouse gas regulations may place additional costs on a coal mining operation or negatively impact the market for coal.

There is risk involved in GCC's aggressive plans to increase the production rates used in the analysis. This includes the requirement for timely regulatory approvals, the practical aspects of establishing several new mining operations, along with a new process plant and the conveyor system in a short time period. Issues with timing and production rate however, would not have a significant impact on the reserves reported in this document in the opinion of the QPs.

### 1.16 RECOMMENDATIONS

Key recommendations for the attainment of the plan proposed in this report are listed below. A more detailed list of recommendations is in Section 26.

- The No. 12 South A mine area should have additional refinement of mine design based on 2014 drilling, and the resulting geological model update.
- The new location for the fault crossing to access the No. 12 South B2 EE 7/8 Seam reserves should be drilled to determine displacement and distance for the rock tunnel development.
- The No. 9D mine area should have a multi-year drilling program to eliminate inferred areas that limit the mineable boundary and improve confidence levels in the delineated areas. This program would include additional testing to refine estimates of in-place coal quality, washing yield, geotechnical parameters, hydrology and in-seam gas content.
- The priority regulatory issue for the surface mine is the licensing of both No. 8 East and No. 8 West areas. Areas not yet licensed in No. 8 Mine are scheduled for production in the proposed cash flow analysis in Section 22 commencing as early as 2nd quarter 2017. Submission for these license applications should be targeted for 1st quarter 2015 at the latest.
- The long lead time for the regulatory approval of greenfield areas above the treeline such as No. 12 North Area and No. 16 Area requires initiation of the process very shortly in order to achieve the proposed production schedule.
- The No. 9D mine area licence application will be presenting longwall mining method in a steep seam environment. Pre-application education of the AER and OHS enforcement staff on the longwall operation and the planned system for the No. 9D could identify any potential issues that would delay the licence process so application preparation could focus on providing information to resolve any issues.



- The new coal process plant proposed for this report is sufficiently well understood from a capital and performance perspective for the purposes of the cash flow analysis. However, the current sensitivity to water use and other environmental considerations mean the details of location, and process must be resolved to start the regulatory process within the next 2 years.
- The areas that should be prioritized for additional exploration based on their proposed timing and current data point density are: No. 8 Mine, northwest area; No. 2 Mine, Maskwa and Muskeg pits; and No. 12 South A, northwest area.
- The proposed Beaverdam Creek Coal Preparation Plant, the associated overland conveyor system and the underground conveyor system to the Smoky River Coal Preparation plant should be studied in more detail.
- The timing of the increase in production and the required capital expenditures for both the surface and underground mines should be the subject of an optimization study.

## 2 INTRODUCTION

Norwest has completed a Qualified Person's (QP's) Review and Technical Report that covers the following active mining or future mining areas: No. 2, No. 8, No. 9 Surface, No. 12 North and No. 16 surface pit areas, and No. 12 South B2, No. 12 South A and No. 9D underground deposits.

The work entailed estimating coal resources and reserves is in conformance with National Instrument 43-101, Standards of Disclosure for Mineral Projects, 2011 ("NI 43-101"). It also involved the preparation of a Technical Report as defined in NI 43-101 and in compliance with Form 43-101F1, 2011 ("Technical Reports"). The Report was prepared to update the last disclosure in the 2013 GCC Technical Report dated March 11, 2014. This has involved geological updates in the active mining areas, new geological modeling and open pit and underground mine designs. Mr. Larry Henchel, P.Geol, Vice President of Geologic Services; Norwest, Mr. John Lewis, P. Eng., Manager, Underground Mining, Norwest Corporation, and Mr. James Sorensen, MMSA, Senior Mining Engineer are the QPs in the team along with other Norwest professionals who are responsible for preparing this 2014 Technical Report. QP site visits were conducted by Mr. Lewis on October 20-22, 2014 and Messrs. Henchel and Sorensen on January 27-28, 2015.

The Report was prepared in the format of a Technical Report (the Report) following the item headings and content requirements in the Form 43-101F1. Norwest has focused the text of this review toward providing a summary-level review of the Project resources and reserves, mine plan, and supporting financial analysis within the context of the Form 43-101F1 requirements. The Technical Report has an effective date of December 31, 2014.

## 3 RELIANCE ON OTHER EXPERTS

Grande Cache Coal Corporation has supplied significant base data used in the preparation of this report. In their professional judgement, the authors have reviewed the data supplied by Grande Cache and other experts and have taken appropriate steps to ensure that the work, information, and advice of other parties are sound for the purpose of this Technical Report.

The Market Study discussed in Section 19 was prepared by Kobie Koornoff Associates of Vancouver Canada. Norwest relied on this report in preparing the cash flows for this Technical Report.

## 4 PROPERTY DESCRIPTION AND LOCATION

### 4.1 LOCATION

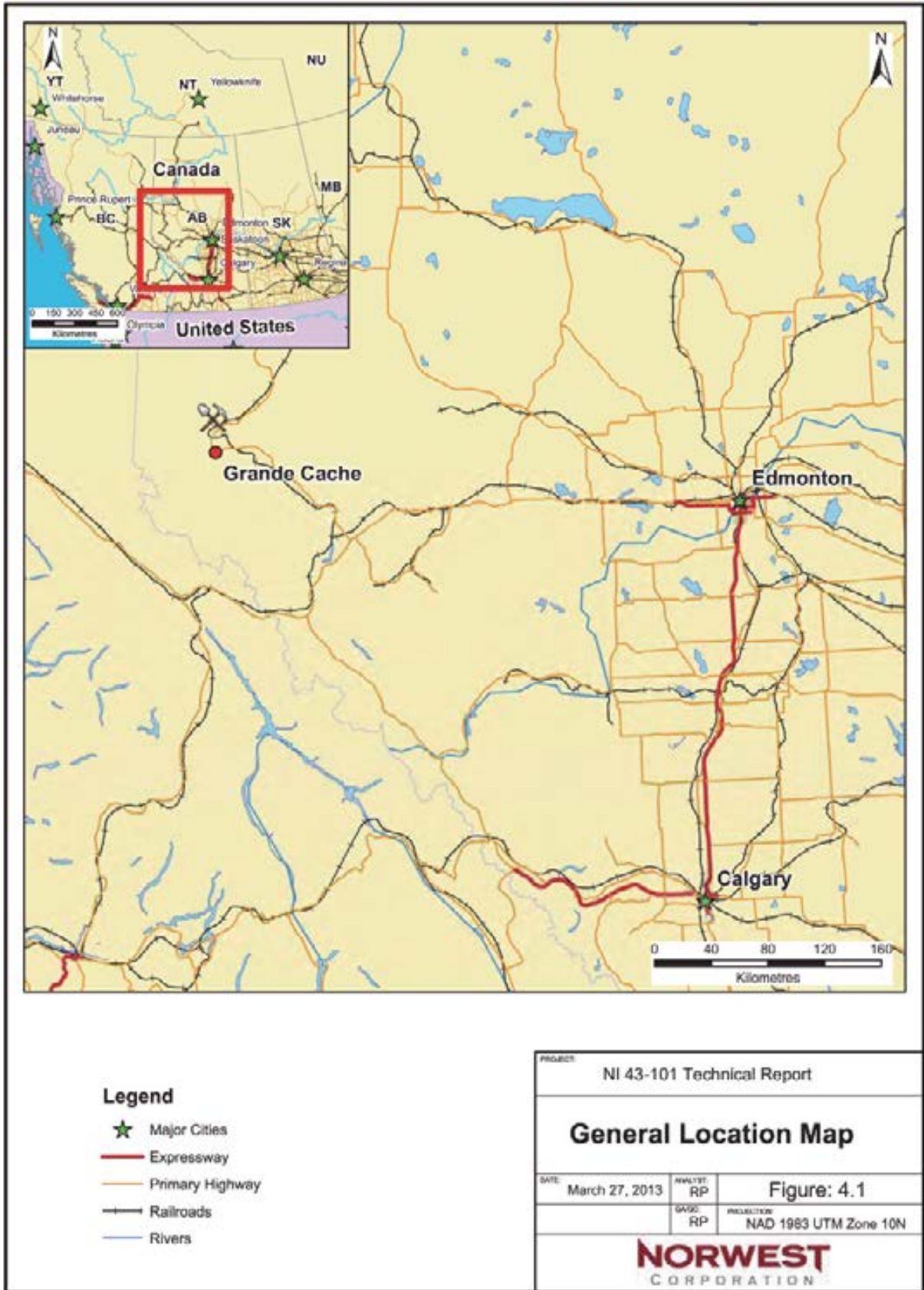
The GCC mine and process facilities are located within GCC's coal mining lease blocks in the Grande Cache area of West Central Alberta (Figure 4.1). The mine site is approximately 20km north of the town of Grande Cache in the Municipal District of Greenview.

The No. 2 and No. 8 surface pit areas are located in a coal lease area covering portions of Sections 8, 9, 14-23, 27,28 in Township 58, Range 8, West of the 6th Meridian. This area is located in an area of rugged topography on the top and sides of the ridge between the Smoky River and Sheep Creek valleys. It lies between 120m and 550m above the Sheep Creek valley floor.

The No. 9 Area is located northwest of the No. 2 Area in Sections 19, 20, 29, 31 of in Township 58, Range 8; Sections 24-27, 33-36 of Township 58, Range 9, and Sections 1-5, 8-11, 15-20 of Township 59, Range 9, all West of the 6th Meridian. This area is bounded by the Sheep Creek on the southeast, the Beaverdam Creek on the southwest and the Copton Creek on the northwest. The geographic form is that of a plateau cut and bounded by steep valleys. To the northeast the mine area is the transition between the Inner and Outer Foothills of Alberta. Elevation of the plateau is up to 1,500m with the lowest area being the Sheep Creek valley at an elevation of approximately 980m. No. 12 South area is located approximately 7km west of the No. 8 pits and includes the current No. 12 South B2 underground operation and the planned No. 12 South A underground operation. The No. 12 South Area is located within Sections 16-20, 30 and 31 in Township 58, Range 9, and Section 24, 25, and 26 in Township 58, Range 10, West of the 6th Meridian. The 12 South Area is in a valley surrounded by ridges on the southwest, northwest, and northeast sides, the valley floor being approximately 1,600m to 1,700m elevation and the surrounding ridges being nearly 2,100m in elevation and above the tree line in this area (approximately 1,850m).

The No. 12 North surface operations area is northwest of the No. 12 South A Area. The coal leases cover portions of Sections 24, 25, 26, 34-36 in Township 58, Range 10, and 2-4 in Township 59, Range 10, all West of the 6th Meridian. The geography of this area is dominated by a long northwest trending ridge known as Caw Ridge bounded by deeply cut valleys to the southwest and northeast. This area is mostly above the treeline.

No. 16 Area is located within a coal lease covering portions of Sections 29-32 in Township 58, Range 9, Sections 5 and 6 in Township 59, Range 9, Section 36 in Township 58, Range 10 and Sections 1, 2, 9-12, 15, 16 in Township 59, Range 10, all West of the 6th Meridian. No. 16 Area is parallel to No. 12 North, and to the northeast of it, on the lower elevations of Caw Ridge.



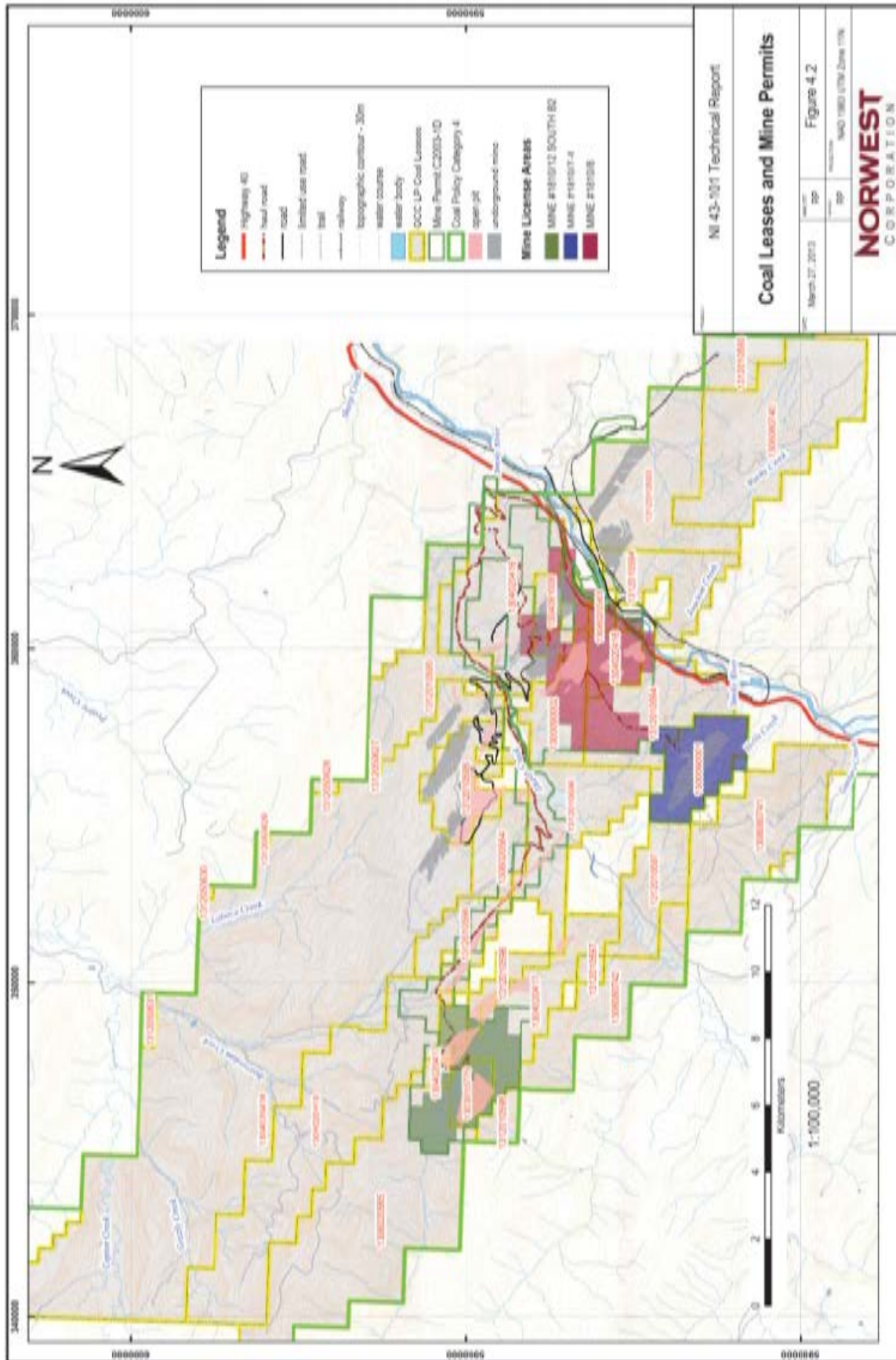
## 4.2 SURFACE AND MINERAL TENURE

In Alberta, coal tenure is held through coal leases granted by the province. Surface and underground mining rights are also granted by the province through a mine permit, followed by a mine licence. GCC currently has 29,968ha under coal lease.

The coal leases that contain the resources for this report are summarized in Table 4.1 and displayed on Figure 4.2.

**TABLE 4.1 SUMMARY OF COAL LEASE TENURE AT GCC**

<b>Lease Number</b>	<b>Mining Area</b>	<b>Area (ha)</b>	<b>Date Recorded</b>
1300090001	No. 7	608	September 6, 2000
1300090002	No. 8	496	September 6, 2000
1303010775	No. 12 South B2	224	January 31, 2003
1304020416	No. 2 and part of No. 8	1,744	February 2, 2004
1304020417	No. 12 South A and No. 12 South B2	912	February 2, 2004
1304020418	No. 9	8,720	February 2, 2004
1304020419	No. 16	2,576	February 2, 2004
1304091006	No. 2	192	September 1, 2004
1306020563	No. 8 East	64	February 17, 2006
1306020564	No. 9	416	February 17, 2006
1305020565	No. 12 North and No. 12 South B2 Underground	2,736	February 17, 2006
1306080740	No. 5	1,792	August 4, 2006
1306080741	No. 1	1,360	August 4, 2006
1306080742	No. 1 North	864	August 4, 2006
1312010593	No. 5	1,680	January 26, 2012
1312010594	No. 5	1,584	January 26, 2012
1212010595	No. 9	1,488	January 26, 2012
1312010596	No. 12 South	1,568	January 26, 2012
1312010597	No. 11	656	January 26, 2012
1312010598	No. 12 South	144	January 26, 2012
1312050627	No. 9	16	May 3, 2012
1312050628	No. 9	32	May 3, 2012
1312050629	No. 9	16	May 3, 2012
1312050630	No. 9	16	May 3, 2012
1312050631	No. 9	64	May 3, 2012
<b>Total</b>		<b>29,968</b>	



Coal leases historically are granted by the Provincial Government of Alberta for a period of 15 years and are renewable. Lease numbers 1312050627 through 1312050631 have no expiry date. Leases are granted with the following conditions:

- Payment of a royalty (currently 1% of Product Revenue)
- Compliance with laws:
  - Mines and Minerals Act
  - Coal Conservation Act
- Indemnification of Leaser
- Lost coal provision
- Agreement not to mine, without consent, under any bridge, railway, pipeline, public road or highway
- Special provisions of the GCC leases include:
  - Cannot transfer lease without consent
  - Compliance with a plan for mining coal from the lease
  - Compliance with milestones, in some leases
  - Renewal predicated on attaining milestones, in some leases.

GCC was incorporated in 2000 as a private Alberta corporation to reactivate coal mining and processing in the Grande Cache area on selected coal leases No. 1300090001 (No. 7 Lease) and 1300090002 (No. 8 Lease) issued by Alberta Energy on September 6, 2000. GCC was granted additional leases in 2003, 2004, 2006, and 2012 which, together with No. 7 and No. 8 leases, provided the basis for a longer term mine project.

GCC received Permit No. C 2003-1 from Alberta Energy and Utilities Board (EUB) on January 31, 2003, covering the areas of activity for the GCC Project including the No. 7 mining area, haul road, coal processing plant and related infrastructure. Subsequently, this Permit has been amended to encompass the No. 12 South B2 and the No. 8 surface mining areas and the No.12 South B2 underground operations area.

On January 22, 2003, GCC received an Order in Council for Approval C 85-1A from the EUB to resume operations of the coal processing plant. The Coal Processing Plant was subsequently amended in 2012 to allow production to its full name plate capacity at 3.86M clean coal tonnes per year.

The Energy Resources Conservation Board (ERCB), formerly EUB, issued Mine Licences for surface mining operations in the No. 12 South B2 and the No. 8 South, Middle and North Pits. GCC has completed surface mining operations in the No. 12 South B2 area. Surface operations are currently completing in the No.8 North Pits and planned to be idle commencing the end of January 2015 for a 22 month period. Coal recovery has ceased in the South and Middle Pits, although these pits are being backfilled as part of the decommissioning and reclamation process. Alberta Environment (AENV), presently designated as Alberta Environment and Sustainable Resource Development (AESRD), issued the corresponding EPEA Approvals, presently amended to EPEA Approval No. 155804-00-06, as well as Approvals under the Water Act for the associated water management facilities.

In November 2009, GCC filed an application for approval of the No. 12 South B2 underground operation with the ERCB and AENV. The application for the No. 12 South A Pit (Phase 1), originally filed in 2008, was re-submitted on March 15, 2010, to the ERCB and AENV, based on revised geotechnical, mine equipment and scheduling configurations. The ERCB subsequently issued Mine Licence C 2011-11 in July 2011 under Mine Permit C 2003-1 for the underground No. 12 South B2 mine; development of this mine began in August 2011 and is currently completing recovery of the 7/8 Seam and moving to the 4 Seam for future production. The No. 7 underground mine was depleted in January 2012.

In March 2011 GCC filed an application with Alberta Energy for additional coal leases to consolidate its coal rights and enable GCC to undertake continued exploration and confirmation of coal reserves in support of its long range mine plan.

As stated by Osler, Hoskin & Harcourt, LLP there are Security Notices registered against the interest of GCC on the coal leases. No other significant encumbrances have been identified regarding GCC, to the extent known, or any other significant factors and risks that may affect access, title, or the right or ability to perform work on the property.

## **5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY**

### **5.1 ACCESS AND INFRASTRUCTURE**

Provincial Highway 40 is a paved, two-lane road that connects the project area with the local town of Grande Cache (pop. 4,500). Highway 40 connects Grande Cache with the city of Grande Prairie (pop. 47,000) 185km to the north and the town of Hinton (pop. 10,000) 145km to the southeast. The Project area is served by an existing branch line of Canadian National Railway (CNR). This line connects with the main east-west line of CNR, allowing access to the major coal export terminals in British Columbia and the Great Lakes.

Existing infrastructure at the mine consists of coal processing, rail loadout, plant refuse, storage, and office facilities. Adjacent to the GCC facilities is the H.R. Milner natural gas and coal fired generating station owned by Milner Power Inc., a subsidiary of Maxim Power Corp.

### **5.2 TOPOGRAPHY AND CLIMATE**

The operations area is located in the eastern foothills of the Rocky Mountains. The general area consists of a series of northwest-southeast elongated ridges, which are cut by rivers and major streams generally flowing in a north-easterly direction. Elevations range from 94m in the Smoky River valley floor to over 2,000m in the No. 12 North Area. The area is forested land categorized as sub-alpine, serving general watershed, recreational and wildlife habitat uses. Approximately one-fifth of the project area is above the elevation of the tree line which is approximately 1,800m elevation at this latitude.

The climate is characterized by relatively long cold winters and moderate to warm summers. The average annual summer and winter temperatures are approximately plus 10°C and minus 15°C, respectively. Frost can occur throughout the year and the snow pack often persists from late October to May at higher elevations. Precipitation ranges between 800mm and 1,100mm annually. The climate does not normally limit the year-round operation of the mines.

## 6 HISTORY

The following historical overview of mining in the Grande Cache area was provided by GCC.

### 6.1 OWNERSHIP

McIntyre Mines Ltd. began operations in the Smoky River Coalfield in 1969. Initially, the planned production rate was 2M clean coal tonnes annually. In 1985, Dome Mines (Dome) purchased McIntyre and established Smoky River Coal Limited (SRCL) as an operating company. In March 1987, a private Canadian-controlled corporation owned by Kaieteur Investments Inc., an Alberta corporation, and Dong Jin Commercial Inc., a commodity trading company based in Korea, purchased SRCL from Dome.

The McIntyre and SRCL operations in the Grande Cache area employed, on average, 400 people, although the number of employees was as high as 1,200. Most of the mine employees lived in the town of Grande Cache. The SRCL mine permit and coal leases represented a major portion of the Smoky River Coalfield. The coal leases during this ownership period covered approximately 37,475ha.

On March 31, 2000, SRCL was placed into receivership by a group of secured lenders. This culminated a two-year period of operations under Corporate Creditor Arrangement Act. The receivership resulted from depressed market conditions and an investment in longwall mining technology, a change from SRCL's traditional room and pillar underground mine operations, commencing in 1996. While longwall mining achieved the mine design extents, delays associated with mine development and longwall productivity increased costs. In large part the problems with the longwall mine were related to the geotechnical problems associated with a previously mined room and pillar area in a seam underlying the longwall operation.

In 2000, the last year of operation, SRCL operated under:

- The Environmental Protection and Enhancement Act (EPEA) Approval No. 11929-01-01
- Alberta Environmental and Utilities Board (EUB) Mine Permit No. 1765 for the No. 5B-4 Underground Mine and No. 1774 for the No. 12 Surface Mine.

GCC was incorporated in 2000 as a private Alberta corporation to reactivate coal mining and processing in the Grande Cache area on selected coal leases. Contract mining at the No. 12 South B2 surface pit commenced in August 2004 with raw coal being trucked to the processing plant the same month. The first rail shipments to the Westshore Terminals port facility near Vancouver, B.C. occurred in October 2004. Mining at the No. 7 underground operation commenced in November 2004. In November 2006, GCC ended its relationship with North American Energy Partners, who had been contracted to operate the surface pit through the initial phase. In September 2007, operations at the No. 12 South B2 pit resumed with GCC employees and equipment. Development of the No. 8 Area surface operation commenced in December 2009. The No.12 South B2 Area underground operation started in August 2011 to replace the No. 7 Mine.

On March 1, 2012 the Grande Cache Corporation was acquired jointly by a numbered company, owned by Winsway Coking Coal Holdings Ltd., and Marubeni Corporation. In late 2014, a pending acquisition was announced in which 82.74% interest in Grande Cache Coal Corporation and Grande Cache Coal LP would be acquired by Up Energy Development Group Limited. This transaction is not complete as of the date of this report.



## 6.2 HISTORICAL RESOURCE ESTIMATE

In May 2000, SRCL prepared resource and reserve estimates for the property as of January 1, 2000. These estimates were prepared at the request of the SRCL receiver as part of the receivership process. This section contains estimates for coal deposits within GCC's coal leases that have not been verified or reported in GCC's Technical Reports to date, but were included in the May 2000 estimate.

The report contains the criteria used to determine these estimates, which are not compliant with GSC paper No.88-21 guidelines and use categories that are not consistent with the current resource definitions and categories under the CIM Definition Standards of Mineral Resources and Mineral Reserves. Criteria used in the historical estimates shown in Table 6.1.

**TABLE 6.1 HISTORICAL RESOURCE AND RESERVE BASE ESTIMATION CRITERIA**

<b>Underground Mining</b>	
Seam Thickness	>2.5m
Seam Dip	<25°
Mining Buffer from Subcrop	60m
<b>Surface Mining</b>	
Seam Thickness	>1m
Seam Overburden	<10:1 BCM/tonnes ROM
Open Pit Wall Angle	<53°
<b>Confidence Levels Measured from Nearest Data Point (Strike Direction x Dip Direction)</b>	
Measured	150m x 75m elliptical zone around data point
Indicated	300m x 150m elliptical zone around data point, less measured area
Inferred	1.2km x 0.6km elliptical zone around data point, less measured and indicated areas
<b>Categories</b>	
Geologic	Coal in-situ
Recoverable	Run-of-Mine from mine design
Saleable	Product coal after processing

Using these criteria and resource/reserve categories, the historical estimates are presented in Table 6.2.

**TABLE 6.2 HISTORICAL SRCL RESOURCE AND RESERVE BASE ESTIMATES  
(JANUARY 1, 2000)**

Area	Mining Method	Geologic Resource		
		Reserve Base		Resource
		Measured	Indicated + Measured = Demonstrated	Inferred + Indicated + Measured
No. 5 Mine	Room and Pillar	7.1	13.8	32.8
No. 1 Mine	Room and Pillar	0.2	0.7	5.0
No. 11 Mine	Open Pit	3.9	4.3	4.7
<b>Total</b>		<b>11.1</b>	<b>18.7</b>	<b>42.4</b>

While it appears that the methodology followed was logical and consistently applied, a QP has not performed sufficient work to classify these historical estimates as current mineral resources or mineral reserves. The estimates are presented for the historical perspective of tonnage estimates for the SRCL property and GCC is not treating these as current mineral or mineral reserve estimates. Current estimates do not include the mine areas reported in Table 6.2. GCC intends to review, verify and/or complement the available geological data and construct a current geological model for one or more of these areas, which could become the basis of future mineral resource and/or mineral reserve estimates.

### 6.3 PRODUCTION

Annual coal production from surface and underground mines operated by SRCL during the period 1969 to 2000 ranged up to more than 3Mt and total metallurgical coal exports over this period exceeded 75Mt. SRCL produced the following metallurgical coal products:

- Smoky River Premium 7 (PR7) — A prime quality, low-ash, low-volatile, hard coking coal, with an ash content of 7%.
- Smoky River Standard (SRS) — A high quality, soft-coking coal, with an ash content of 9.5%, used in coke oven blends or as an injection coal.

SRCL established a customer base of approximately 12 companies in 8 countries on 4 continents. Since GCC took over, the vast majority of the coal produced is sold as Hard Coking Coal (HCC) at an ash content of 8.5%. The remainder is thermal coal sold on local and overseas spot markets. Total mine production through calendar year 2014 in million ROM tonnes is presented below.

**TABLE 6.3 HISTORIC PRODUCTION**

	Period	Surface	Underground	Total
		Product (Mt)		
Previous Owners	1969–2000	46.8	28.4	75.2
GCC	2004–2014	12.1	8.0	20.1
<b>Total</b>		<b>58.9</b>	<b>36.4</b>	<b>95.3</b>

## 7 GEOLOGICAL SETTING AND MINERALIZATION

### 7.1 GEOLOGIC SETTING

#### 7.1.1 Regional Geology

The Grande Cache area is situated in the Inner Foothills<sup>1</sup> of the Rocky Mountain fold and thrust belt. In this area, the Inner Foothills are bounded on the southwest by the Rocky Pass Thrust and on the northeast by the Muskeg Thrust. Because of a general northwesterly plunge of Paleozoic carbonate rocks, the Inner Foothills are much wider along the Smoky River than along the Athabasca River.

The Inner Foothills in the Grande Cache area are characterized by exposures of Mesozoic (Upper Jurassic and Cretaceous) clastic rocks. The lowermost unit is the Nikanassin formation. It is overlain by the Luscar Group, which is about 550m thick. Coal seams within the Luscar Group range from medium to low volatile bituminous coal. The top of the succession comprises the Shaftesbury, Dunvegan, and Kaskapau formations (Langenberg et. al., 1987).

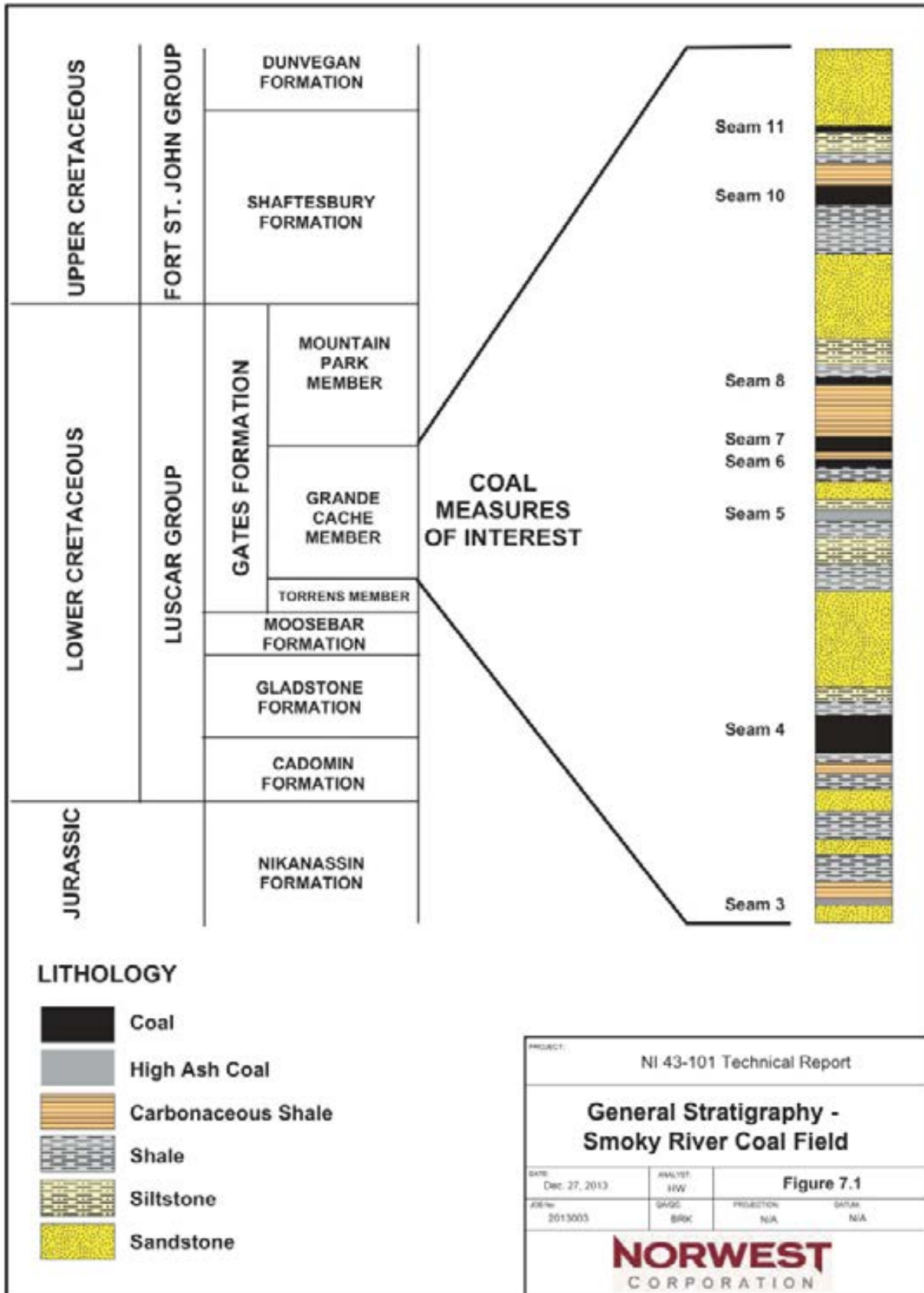
Strata in the region are complexly folded and cut by numerous thrust faults. The main deformation took place between early Campanian and late Eocene eras and is thought to have proceeded from southwest to northeast (Bally et al., 1966; Price, 1981). It is estimated that folding and faulting occurred in the Grande Cache area primarily during the Paleocene era (Kalkreuth and McMechan, 1984). The major thrusts (e.g., the Cowlick, Syncline Hills, Mason and Muskeg thrusts) are rooted in a common floor thrust at the top of the Precambrian basement, which is estimated to be at a depth of 5,500m below sea level (Mountjoy, 1978). The shortening accomplished by folding and faulting is about 30%, and fault-to-fold displacement transfer has been documented along the Mason Thrust (Langenberg, 1985).

The generalized stratigraphic column of Mesozoic sediments found in the region and the Smoky River Coalfield is illustrated in Figure 7.1.

The Nikanassin Formation, of Late Jurassic to Early Cretaceous age, is the oldest stratigraphic unit exposed. The Nikanassin Formation consists of more than 400m of interbedded sandstone, shale and minor coal seams. The lower part of the Nikanassin Formation is marine in origin.

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<sup>1</sup> The Inner Foothills are defined as that area of the foothills that has a predominance of Lower Cretaceous rocks at the surface; the Outer Foothills show a predominance of Upper Cretaceous and Paleocene outcrops.



Disconformably overlying the Nikanassin is the Lower Cretaceous Cadomin Formation. This is the oldest formation in the Luscar Group. The Cadomin Formation consists of 30 m to 40m of pebble-cobble conglomerate and sandstone lenses. It is very resistant to weathering and forms prominent ridges, which make excellent stratigraphic markers throughout the Inner Foothills.

The Gladstone Formation, which lies atop the Cadomin Formation, is made up of 100m of interbedded sandstone, siltstone, shale and minor coal seams. Two coal seams (1 and 2 Seams) are present in the Gladstone Formation over parts of the Project area, most notably in the No. 7 and No. 8 Areas.

Overlying the Gladstone Formation is the Moosebar Formation, which consists of 60m of dark grey marine shale. The shale is interbedded with siltstone in the upper part of the Moosebar Formation over most of the Project area.

Above the Moosebar Formation is the Gates Formation, which is the uppermost unit of the Luscar Group and the formation that contains the coal seams of economic interest. The contact with the underlying Moosebar Formation is gradational. The Gates Formation consists of 320m of sandstone, shale and coal and is subdivided into three members:

- The Torrens Member is the lowermost member of the Gates Formation and is a marine sandstone and siltstone sequence approximately 30m in thickness. The Torrens Member is distinctive due to its weathering-resistant nature and blue-grey colour. Throughout the operations area, there is an abrupt contact to the overlying 3 Seam, the lowermost unit of the Grande Cache Member.
- The Grande Cache Member overlies the Torrens Member and is the middle member of the Gates Formation. Interbedded sandstone, siltstone, coal and mudstone units make up the 150m thickness of the Grande Cache Member. The Grande Cache Member contains the economically mineable seams in the Smoky River Coalfield.
- The Mountain Park Member is the uppermost member of the Gates Formation, and consists of 150m to 180m of non-marine fine sandstone and siltstone. Some coal seams are present in the Mountain Park Member, although they are not laterally continuous across the area.

Above the Gates Formation, the recessive-weathering shales of the Shaftesbury Formation make up the uppermost unit that outcrops across most of the area. The Shaftesbury Formation is primarily shale, 160m in thickness, and is the lowermost formation in the Fort St. John Group. In the northern and eastern part of the area, the marine Dunvegan and Kaskapau Formations overlie the Shaftesbury. The Dunvegan Formation consists of approximately 50m of interbedded sandstone and shale. The Kaskapau Formation consists of shale greater than 100m in thickness.

### *7.1.2 Property Geology*

The general stratigraphic sequence in the GCC Project area has been shown in Figure 7.1, which also illustrates the coal seam geometry of the Smoky River Coalfield and the general sequence within the Grande Cache property. The regional distribution of the main stratigraphic units is illustrated in Figure 7.2.

Surface traces of complex folds and thrust faults trend northwest-southeast across the Project area. The majority of the faults are southwest-dipping thrusts, displaying ramps that cut up stratigraphic section and flats that are parallel to bedding. From southwest to northeast there are four major thrust sheets in the area, shown in Figure 7.3:

- Cowlick Thrust
- Syncline Hills Thrust
- Mason Thrust
- Muskeg Thrust.

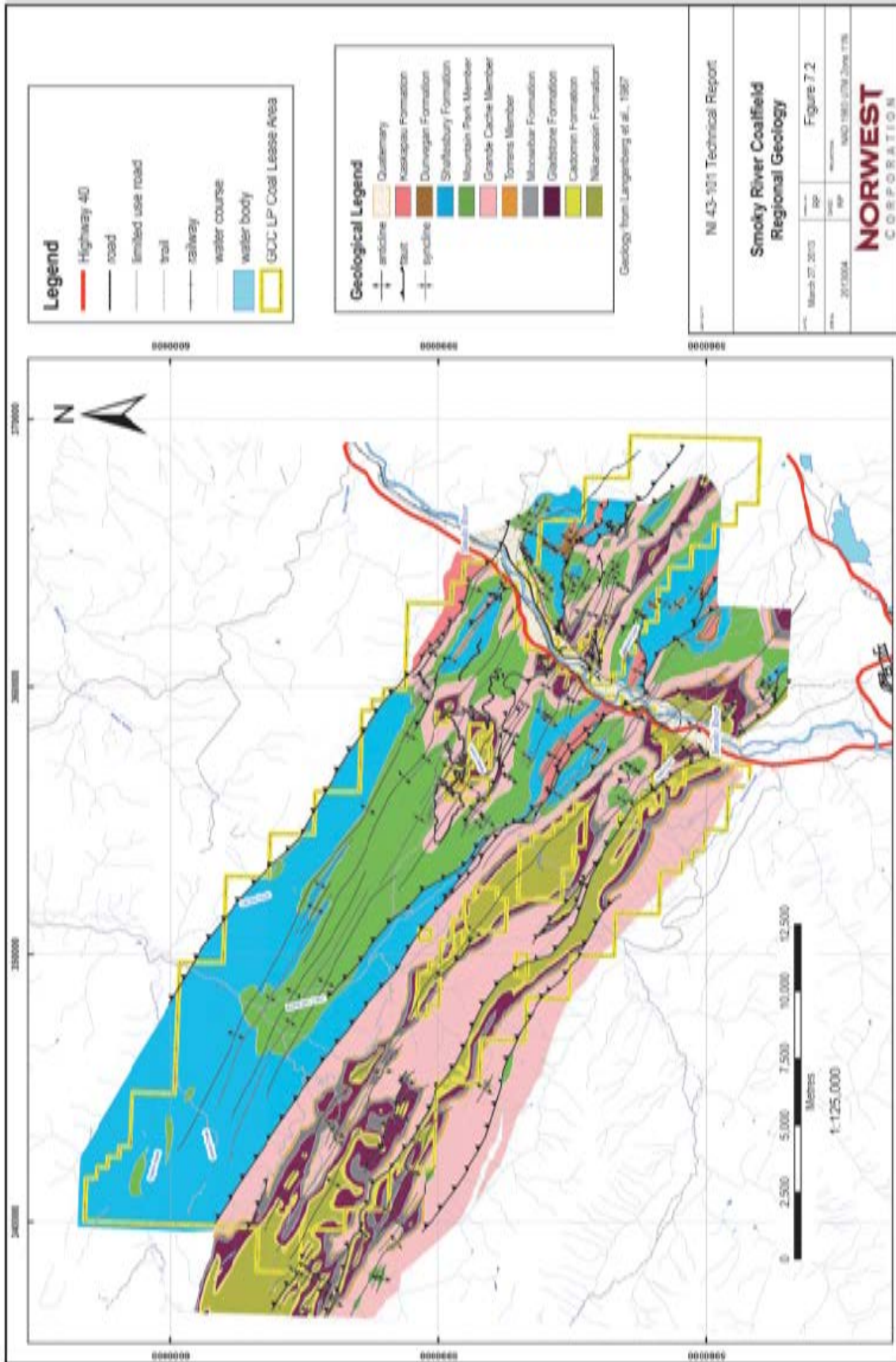
Asymmetric folds with relatively long, straight limbs and short, narrow hinge zones are commonly found throughout the Smoky River Coalfield. The folds generally have chevron or box shapes and maintain their profile over distances of up to two kilometres along trend. These folds are conical at their tapering ends. Amplitude of the large folds is of the order of 200m to 1,000m. Parasitic folds on the limbs of the major anticlines and synclines are common.

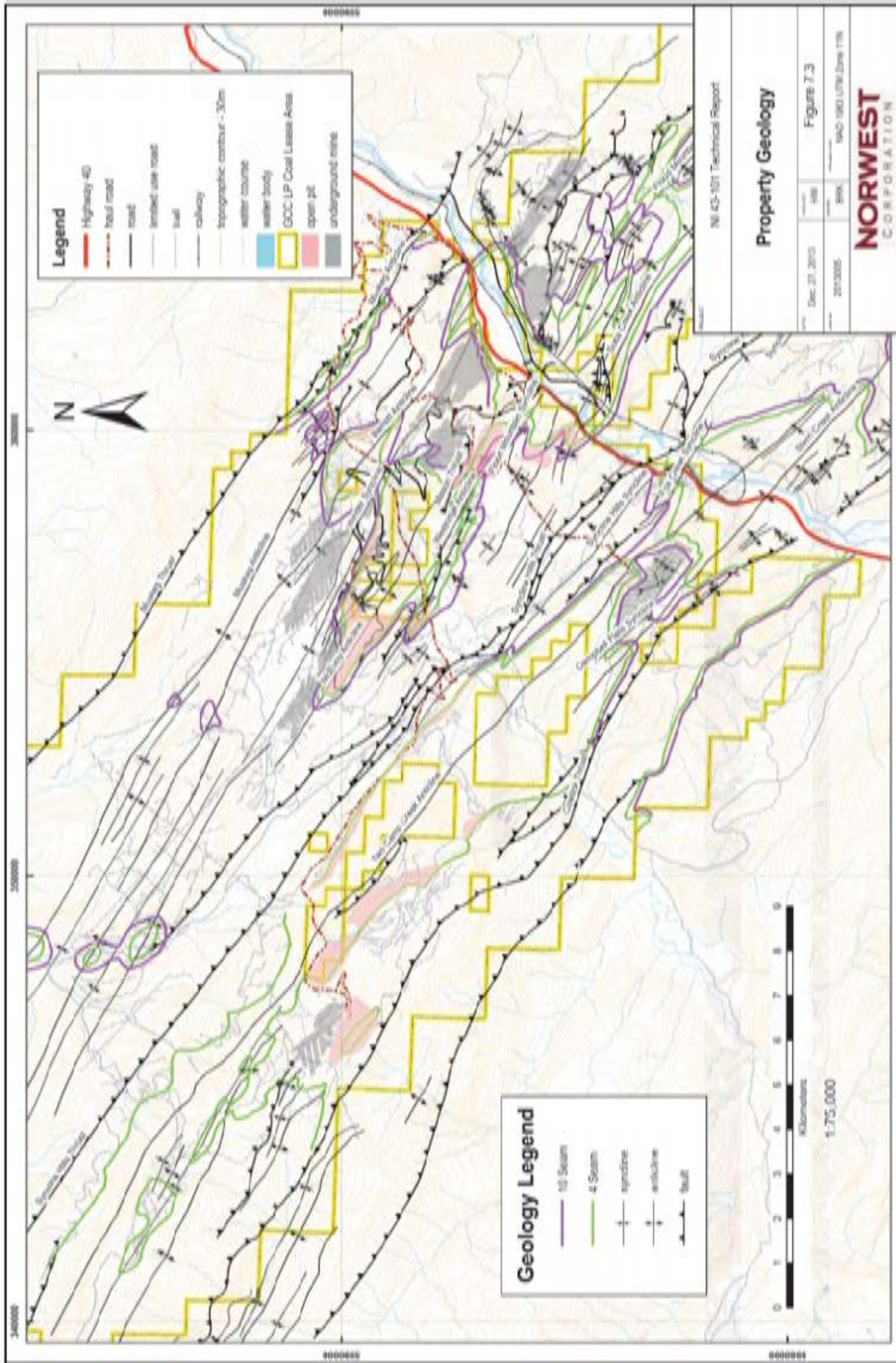
Major folds from southwest to northeast are as follows:

- Sterne Creek Anticline
- Two Camp Creek Anticline
- Syncline Hills Syncline
- Westridge Anticline
- McEvoy Anticline
- Winder Syncline
- Barrett Anticline
- Muskeg Anticline.

## **STRUCTURE**

The Smoky River Coalfield is deformed by tectonic events of the Laramide Orogeny, which created the Rocky Mountains 60M years ago. The rock strata are complexly folded and cut by numerous thrust faults. Structural shortening is estimated to be one-third.







Typical structures consist of a series of northeast verging thrust sheets bound by major faults with displacements varying from several hundred to several thousand metres. The strata contained within the thrust sheets are commonly folded and cut by subsidiary faults with displacements in the order of 10m to 100m. These thrust faults have folds produced by associated fault plane drag.

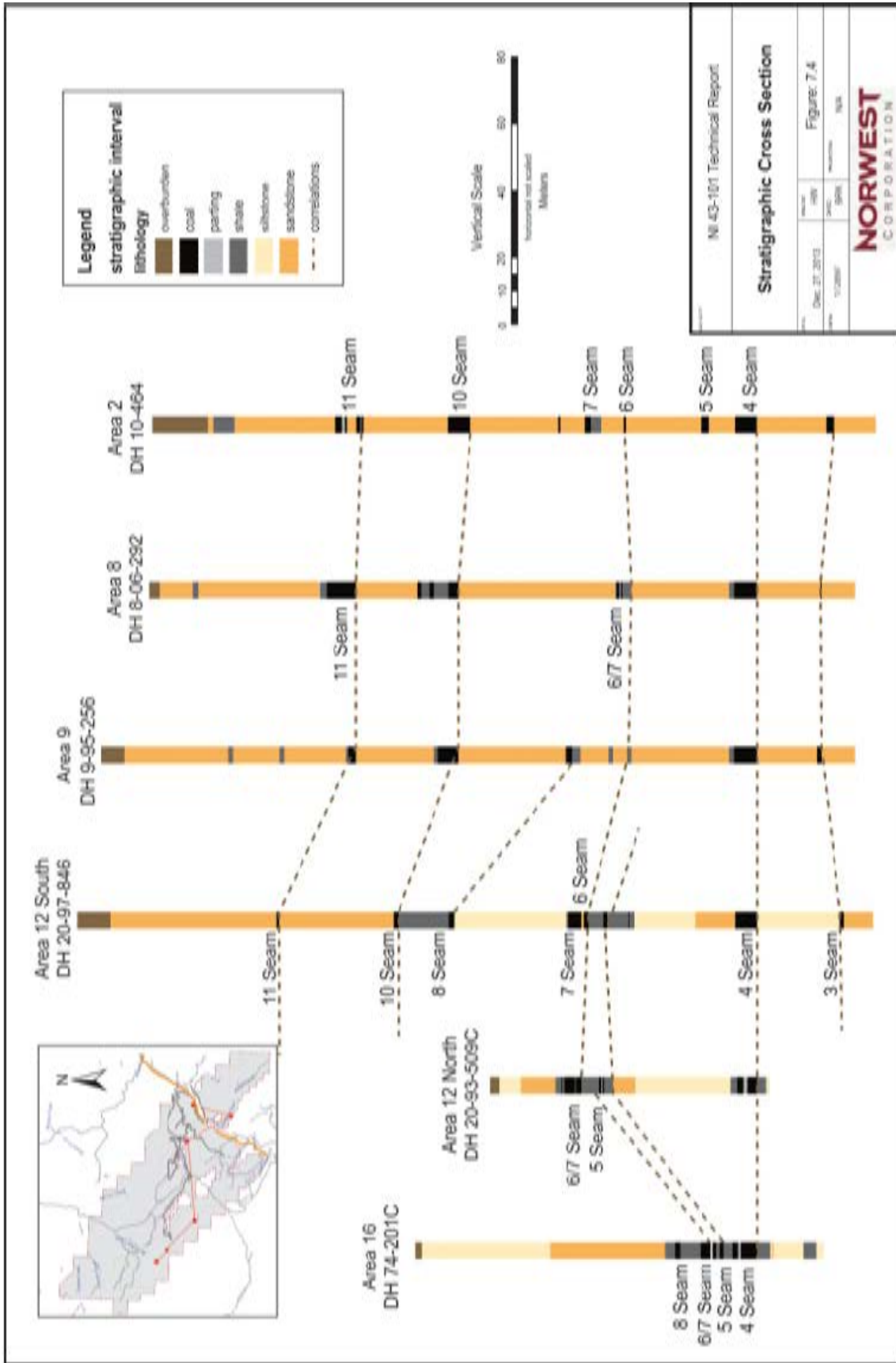
### STRATIGRAPHY

Although the stratigraphy of the area is fairly consistent, variations in seam and inter-seam thicknesses across the property exist. Eight coal seams (3 Seam through 8, 10 Seam, and 11 Seam) are present, with 4, 10, and 11 Seams being the dominant targets for mining in the No. 8 and No. 9 Mine areas. The 3 Seam through 8 Seam are the targets in the No. 12 and 16 Mine areas.

Table 7.1 presents a summary of seam thickness data for the areas included in this report. A detailed stratigraphic section of coal Seams 3 through 11 and how coal development changes across the property is illustrated in Figure 7.4, using the base of 4 Seam as a datum.

**TABLE 7.1 SEAM THICKNESS DATA FROM DRILLHOLES**

Coal Seam No.	Seam Thickness	Project Area					
		No. 2	No. 8	No. 9	No. 12 South	No. 12 North	No. 16
11 Seam	Min.	0.5	0.2	0.3			
	Max.	4.6	9.8	4.4			
	Avg.	2.3	2.7	2.1			
10 Seam	Min.	0.3	0.4	0.1			
	Max.	6.7	10.2	12.6			
	Avg.	2.6	3.8	3.4			
8 Seam	Min.					0.3	0.3
	Max.					15.6	15.9
	Avg.					1.4	2.2
7 Seam	Min.				0.5	0.2	0.4
	Max.				22.5	8.4	18.5
	Avg.				4.5	2.7	2.8
6 Seam	Min.				0.4	0.3	0.2
	Max.				3.3	10.4	9.6
	Avg.				1.3	1.7	1.5
5 Seam	Min.				0.2	0.3	0.3
	Max.				6.1	5.5	5.8
	Avg.				1.6	1.6	1.8
4 Seam	Min.	1.2	0.1	0.1	0.3	0.3	0.3
	Max.	24.2	50.7	31.2	25.8	28.3	30.1
	Avg.	6.9	7.8	6.3	7.5	6.8	6.8
3 Seam	Min.					<0.5	
	Max.					4.7	
	Avg.					1.3	



### 7.1.3 Mine Area Geology

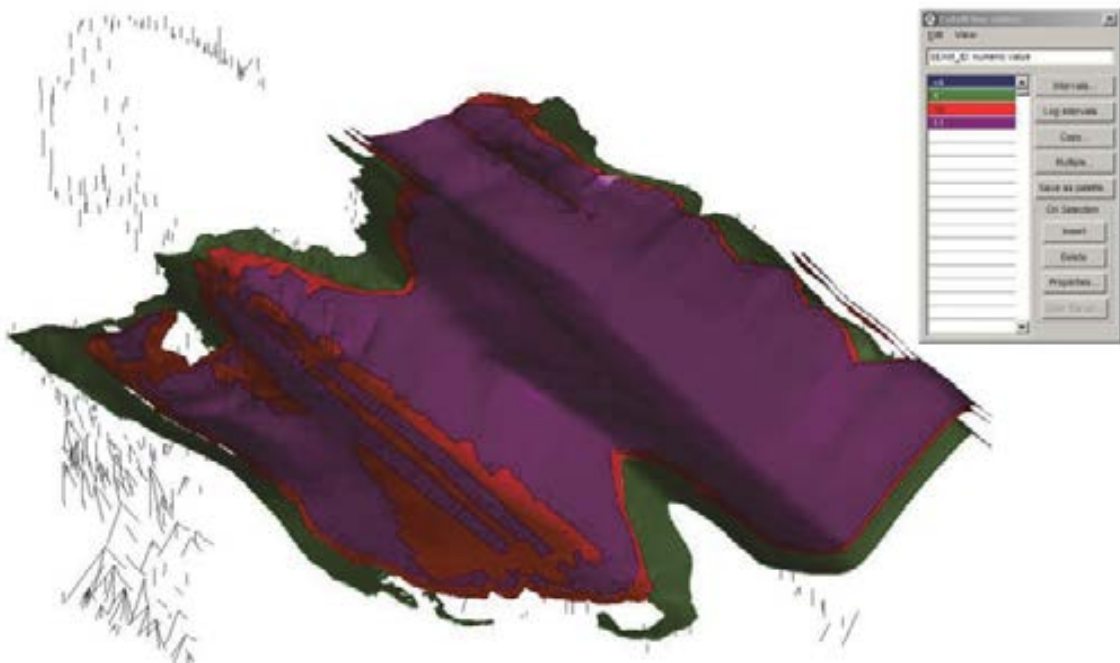
#### NO. 2 AREA

The coal seams of interest in the No. 2 Area are the 4, 10 and 11 Seams that average 6.9m, 2.6m and 2.3m in thickness, respectively.

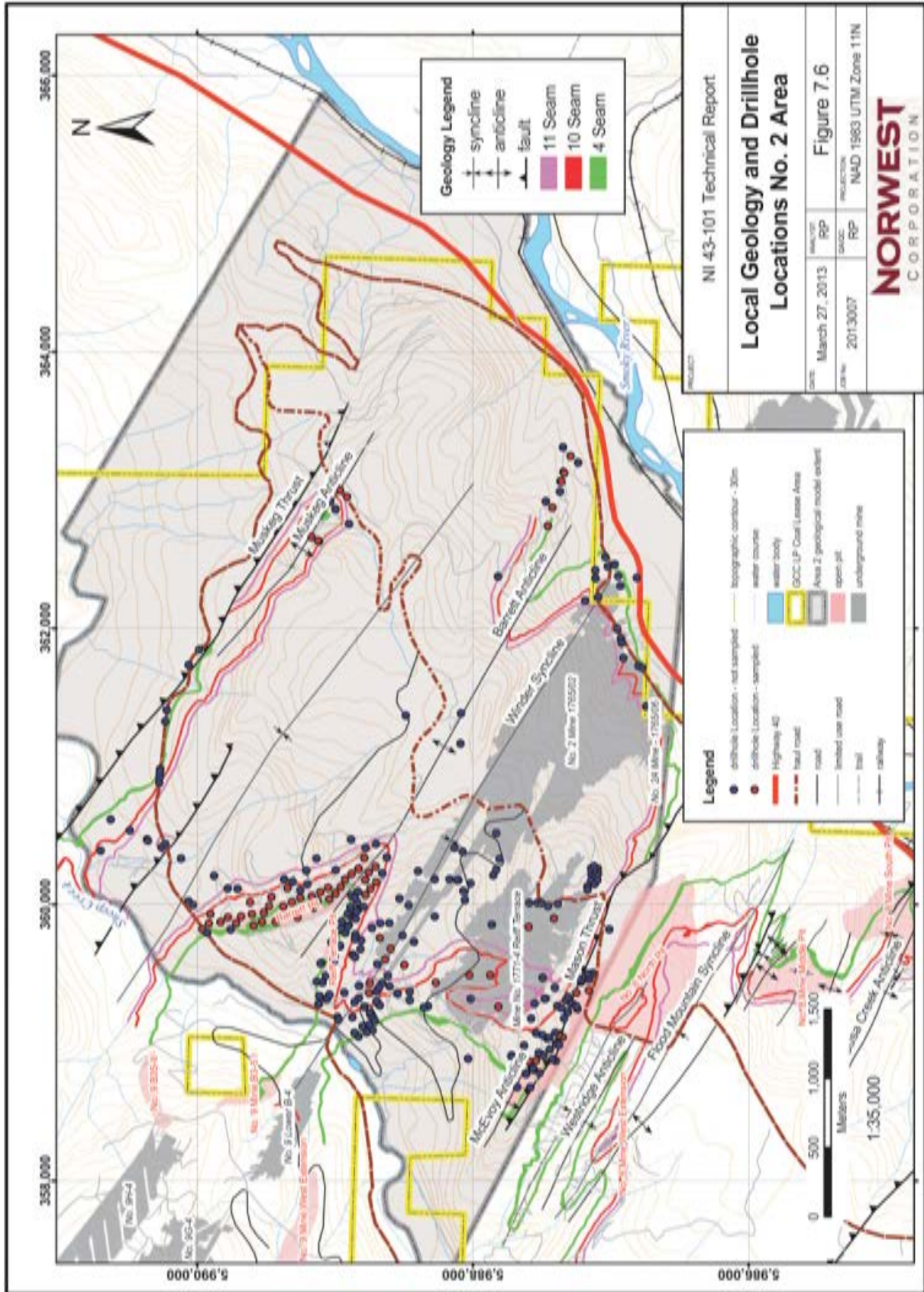
The 10 Seam is 70m stratigraphically above 4 Seam, while 11 Seam is approximately 33m above 10 Seam. This area is similar to the No. 8 Area in terms of stratigraphy and coal quality. Underground mining has taken place within 4 and 11 Seams. The underground mineable coal was completely removed within the mined extents.

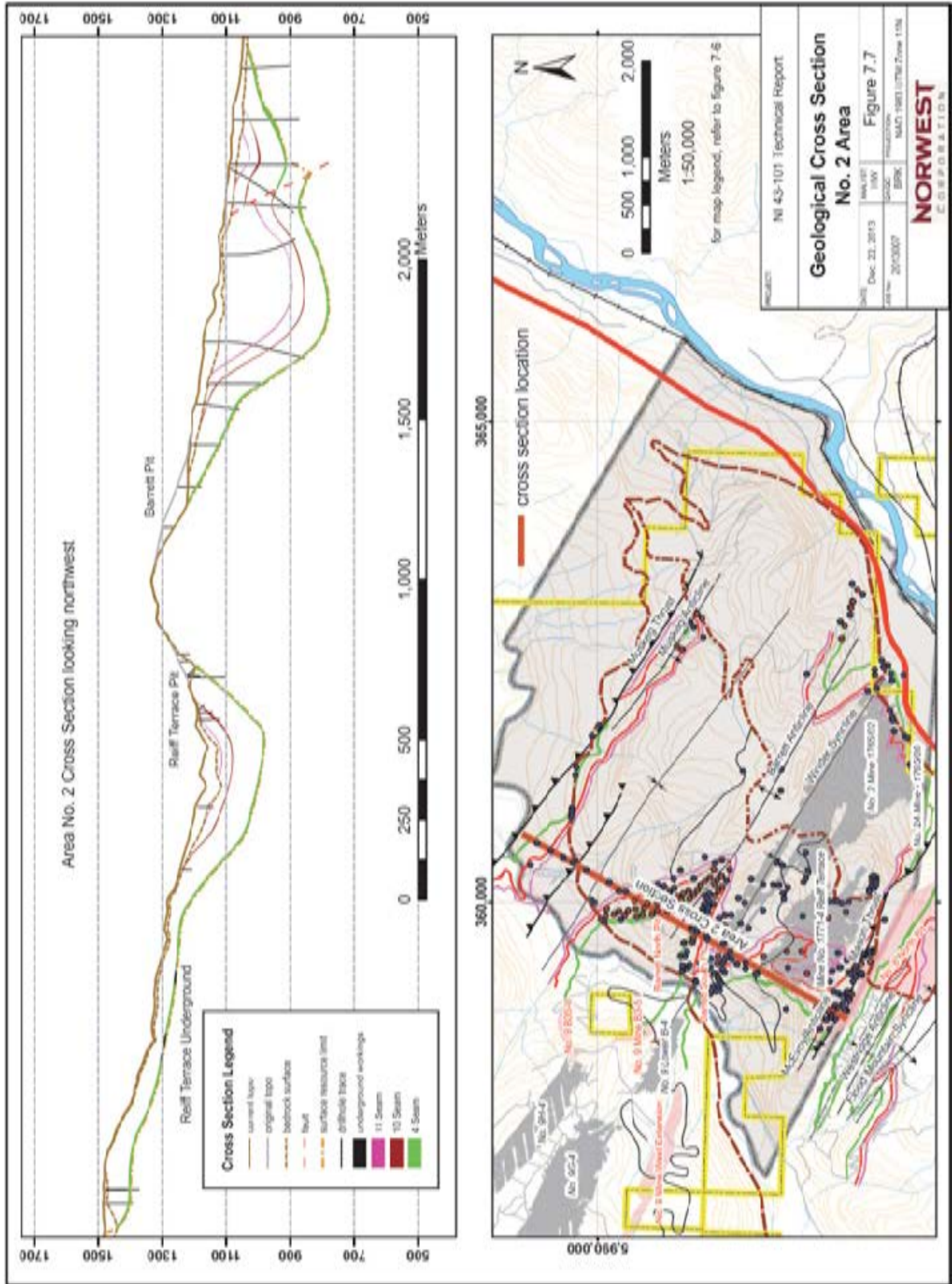
The No. 2 Area encompasses a large area adjacent and to the northeast of No. 8 Area. The southwest boundary is a fault associated with the McEvoy Anticline that was mined out in the original pit at No. 8 Mine. It includes areas previously referred to as Barrett and Reiff Terrace. Several folds occur between the Mason thrust fault and the Muskeg thrust fault, the northeastern boundary of No. 2 Area. These include the Winder Syncline and the Barrett Anticline. Gently dipping to nearly flat lying areas are separated by steeper dipping sections. No. 2 Area structure is shown in 3D in Figure 7.5, in plan in Figure 7.6, and in cross-section in Figure 7.7.

**FIGURE 7.5 3D ISOMETRIC VIEW (NW) OF NO. 2 AREA COAL SEAMS, AND DRILLHOLES**



Surfaces: 4 Seam — green, 10 Seam — red, 11 Seam — purple, Faults — grey





**NO. 8 AREA**

Within the No. 8 Area there are eight coal seams of which 4, 10 and 11 Seams are of economic interest. They average 7.8m, 3.8m and 2.7m in thickness, respectively. The other seams, 3 Seam and 5 to 8 Seams, are generally too thin and/or of poor quality to be considered resources.

The 4 Seam occurs approximately 20m above the Torrens Member and varies in thickness and geometry along and across strike, but primarily across the strike. The coal seam thins along the limbs of folds and thickens through the fold hinges. In the synclinal hinge zones, the thickness of 4 Seam approaches 50m. The 4 Seam has the largest areal extent of the three mineable seams and contains the majority of coal resources for the No. 8 Area.

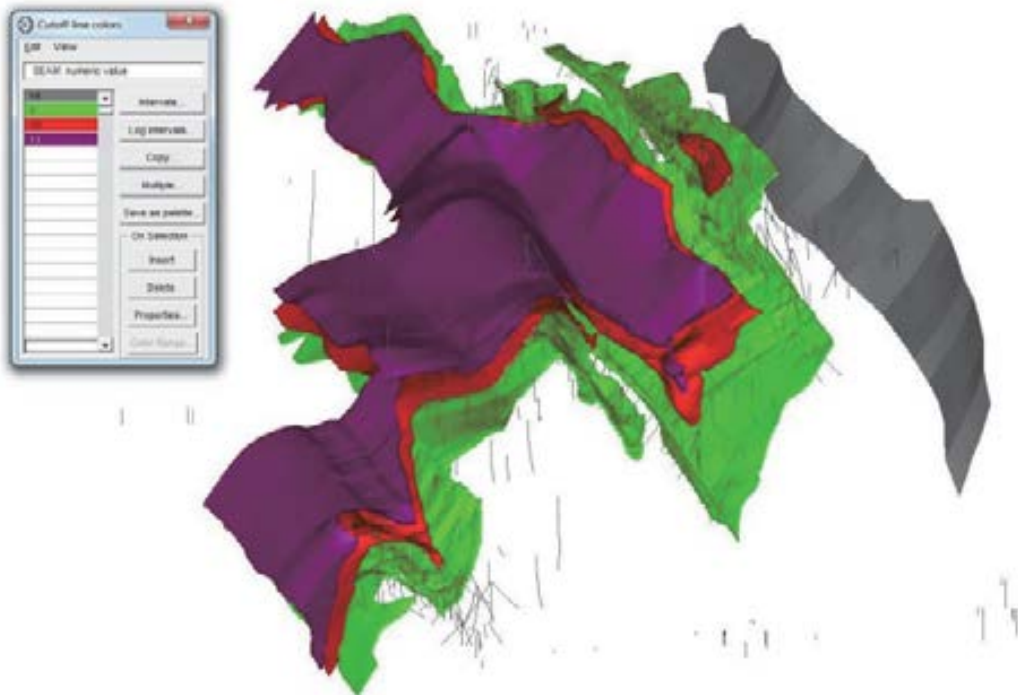
The 10 Seam occurs approximately 100m stratigraphically above 4 Seam. The 10 Seam also varies in thickness across strike, although not as pronounced as the 4 Seam.

The 11 Seam occurs approximately 34m stratigraphically above 10 Seam. The subcrop extent available for mining is the least of the three seams targeted for mining.

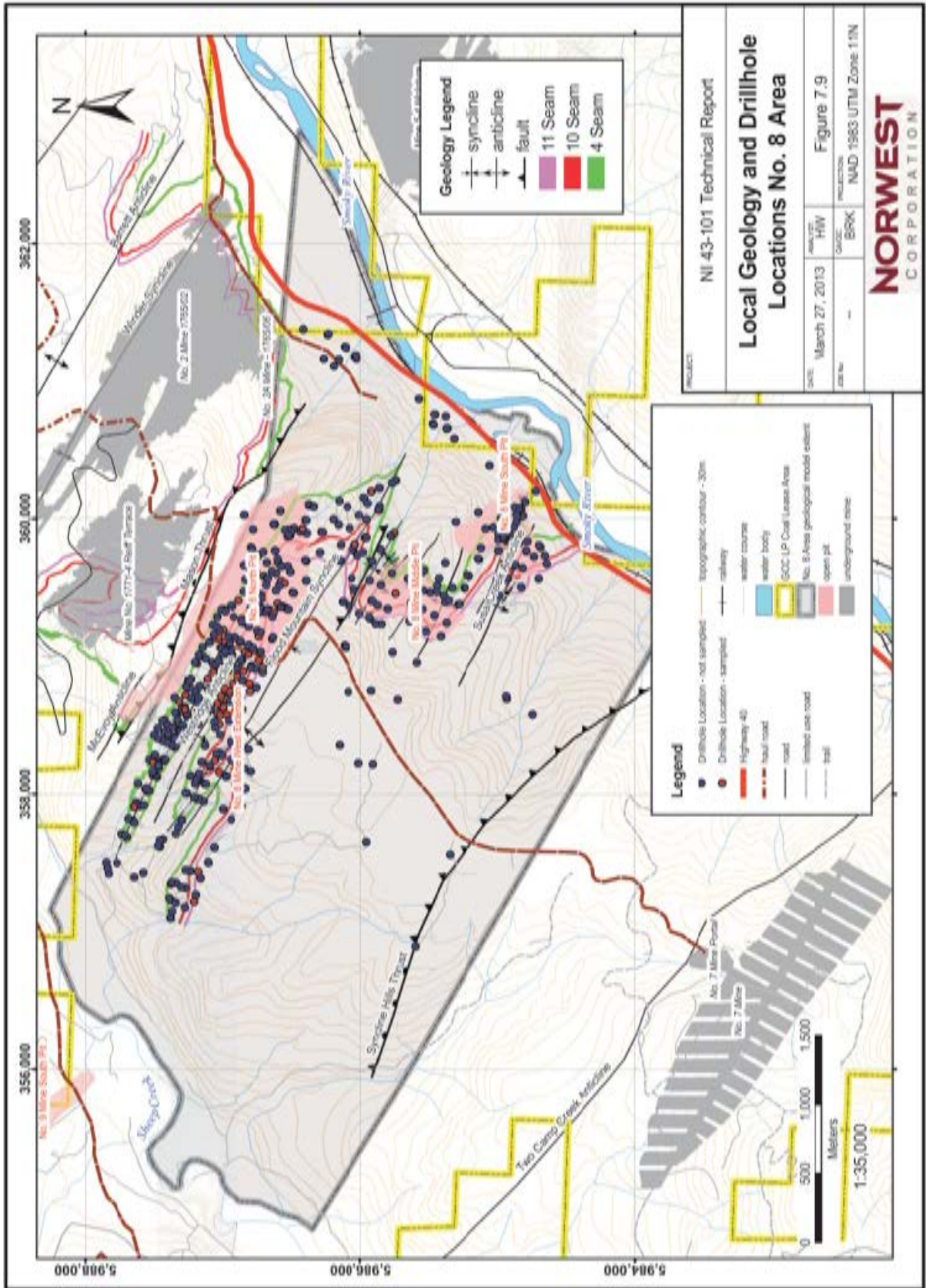
Structurally, the No. 8 Area is bounded to the southwest and northeast by two major northeast verging faults: Syncline Hills Thrust Fault to the southwest and Mason Thrust Fault to the northeast. No 8 Area structure is shown in 3D in Figure 7.8, in plan in Figure 7.9, and in cross-section in Figure 7.10. Mining is limited to the north by a previous surface mine, to the east and west by the outcrop of 4 Seam, and to the south by high strip ratios.

Folding is the dominant mode of shortening within the No. 8 Area, resulting in northeast-southwest anticline/syncline pairs. The folds range in style from tight chevron to open parallel folds. The wavelength of the major folds is between 275m and 1,500m with corresponding amplitudes of 185m and 490m. The anticlines are asymmetric with longer south-westerly limbs. The limbs of the synclines have dips of 30° to 80° (average 55°) on the northeast limbs and 40° to 80° (average 70°) on the southwest limbs. The fold hinges plunge to the northwest at 11°. Proposed No. 8 Area mining is in the two northeastern-most synclines known as the Westridge North and South synclines.

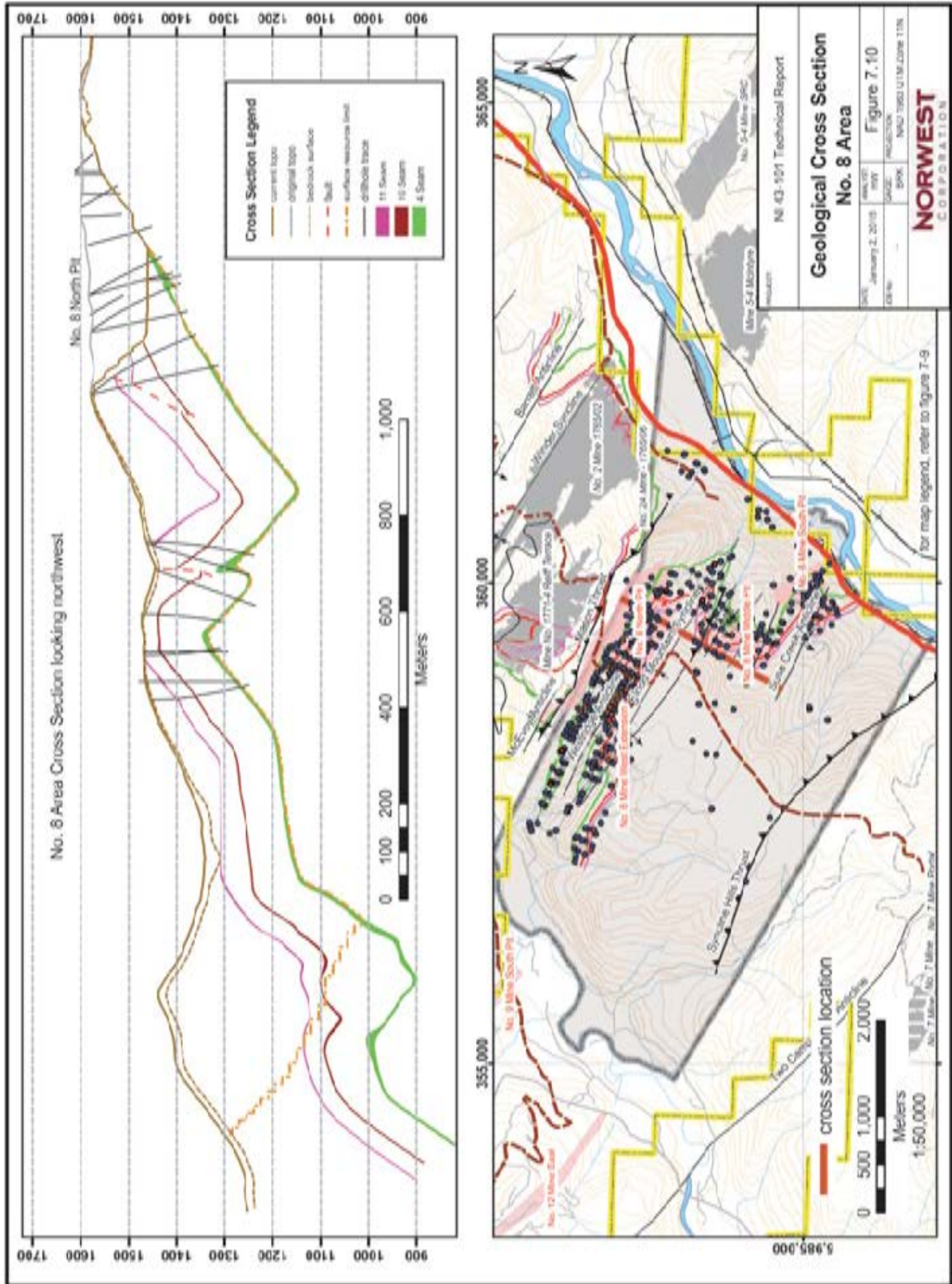
FIGURE 7.8 3D ISOMETRIC VIEW (NW) OF NO. 8 AREA COAL SEAMS, FAULTS AND DRILLHOLES



Surfaces: 4 Seam — green, 10 Seam — red, 11 Seam — purple, Faults — grey







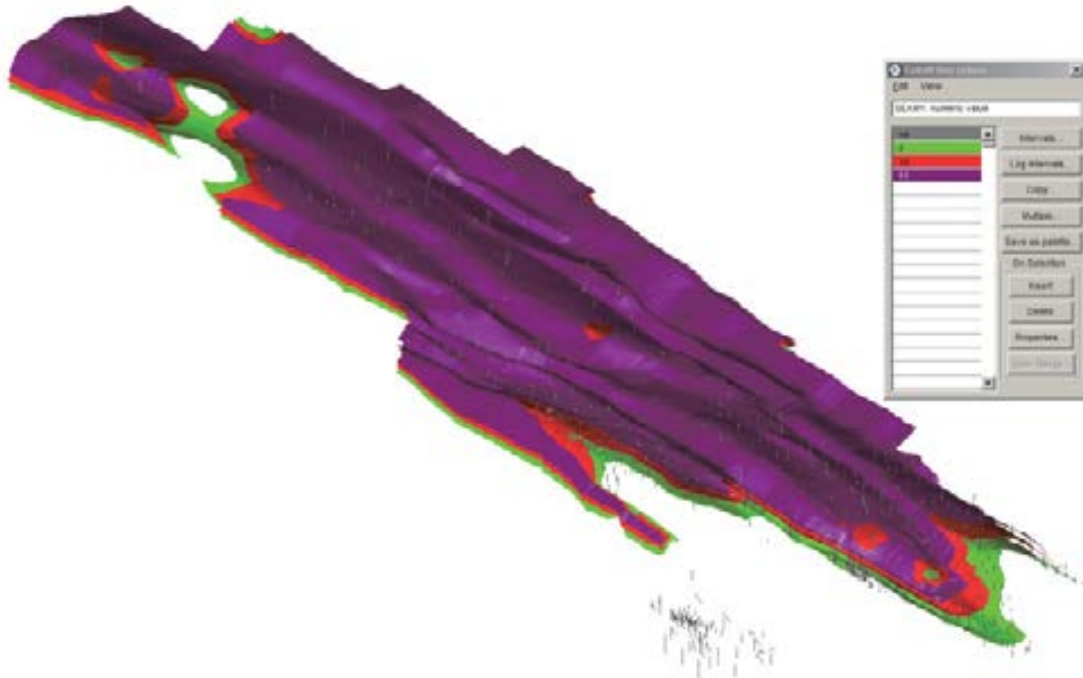
## NO. 9 AREA

Numerous coal seams occur within the No. 9 Area, from 4 Seam, to 5, 8, 10, 11, and 12 Seams, and 15 Seam. With poor lateral continuity and thickness in the most of the seams, only 4, 10 and 11 Seams, with average thickness of 6.3m, 3.4m and 2.1m, respectively, are considered economically significant. All of these seams thin from the southeast towards the northwest.

The 4 Seam contains the majority of the resource in the No. 9 Area. 4 Seam has a “marker” seam located 2m–5m underneath, and is mostly overlain by shaley siltstone. The interburden between 4 and 10 Seams is interbedded shale, siltstone, fine sandstone and carbonaceous bands grading into high ash coal (the most prominent being 5 Seam and 8 Seam) with an overall thickness of around 70m. The immediate roof of 10 Seam is shale and siltstone with two or more “rider” seams being generally present in the southwest end of the No. 9 Area. These “rider” seams are generally between 1.0m and 0.3m thick and occur 3m–10m above 10 Seam. These “rider seams” pinch out to the northwest. The 11 Seam was deposited around 50m above 10 Seam. In the southeast it is a single seam; to the northwest it thins and splits into multiple seams separated by partings based on local depositional environment.

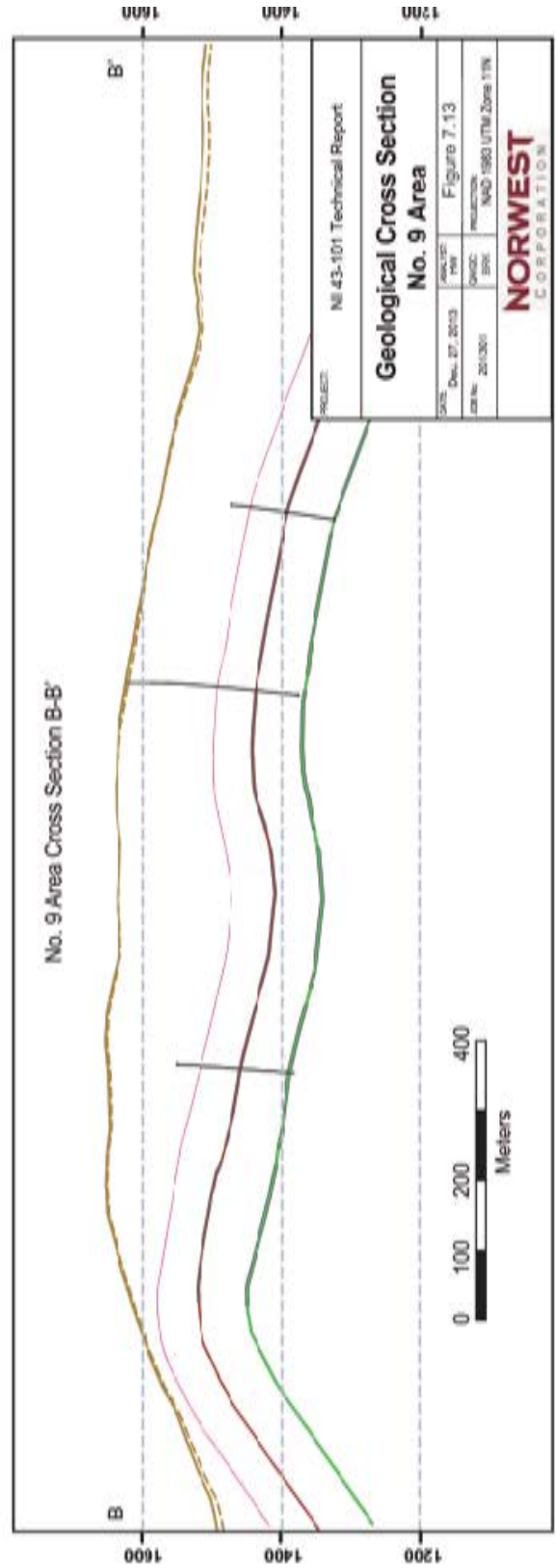
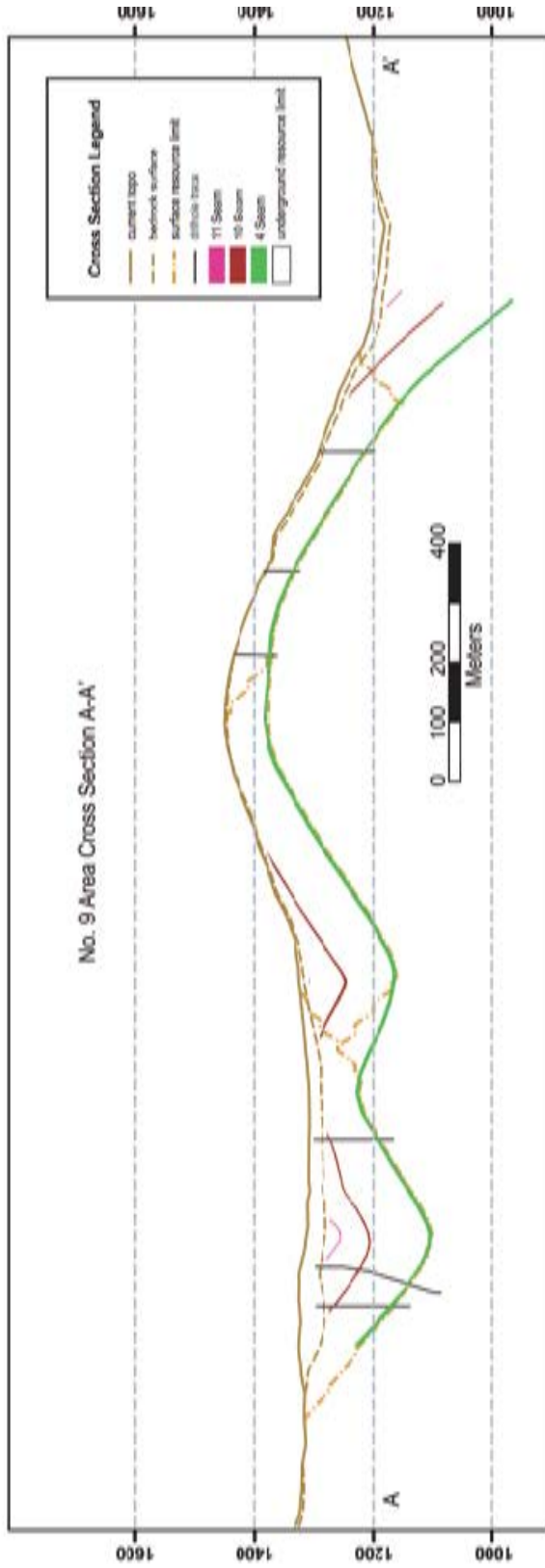
Geographically, No. 9 area is between Sheep Creek in the southeast and Beaverdam Creek in northwest. Structurally, No. 9 area is bounded by the Muskeg Thrust on the northeast side and a sequence of secondary faults of the Syncline Hills Thrust on the southwest. No. 9 Area covers over 90km<sup>2</sup> and the structural features vary considerably across the area. Folds in the southeast tend to be slightly less open and change form more rapidly along strike than the northwest. The No. 9 Area structure is shown in 3D in Figure 7.11, in plan in Figure 7.12, and in cross-section in Figure 7.13. Fold wavelength increases to the northwest, ranging from 1,300m–1,500m.

**FIGURE 7.11 3D ISOMETRIC VIEW (NW) OF NO. 9 AREA COAL SEAMS, FAULTS AND DRILLHOLES**



Surfaces: 4 Seam — green, 10 Seam — red, 11 Seam — purple, Faults — grey





**NO. 12 SOUTH AREA**

The 10 and 11 Seams have graded laterally into thin carbonaceous shale zones in the No. 12 South Area. The seams of interest are 4, 5, 6, and 7/8 Seams, with average thicknesses of 7.5m, 1.6m, 1.3m, and 4.5m, respectively.

The immediate roof and floor of 4 Seam is shale. A marker seam 0.3m to 0.5m thick is located 1.0m below the bottom of 4 Seam. The 4 Seam is located about 22m above the Torrens Member.

The stratigraphic position of the 5 Seam averages 36m above 4 Seam. Geophysical logs indicate that a high ash band is often found in the lower half of the seam, with other minor ash bands occasionally appearing at variable locations within it.

The 5, 6 and 7/8 Seams have soft mudstone footwalls and hanging walls.

The interburden thickness between the 5 and 6 Seams averages 5m and consists of shale with some interbedded siltstone.

The interval from the top of 8 Seam to the bottom of 7 Seam averages 4.5m. This interval consists of 0.6m of 8 Seam, 0.6m of carbonaceous mudstone, and 3.3m of 7 Seam. This carbonaceous mudstone grades in places to a very high ash coal, effectively merging 7 Seam and 8 Seam into a single coal seam.

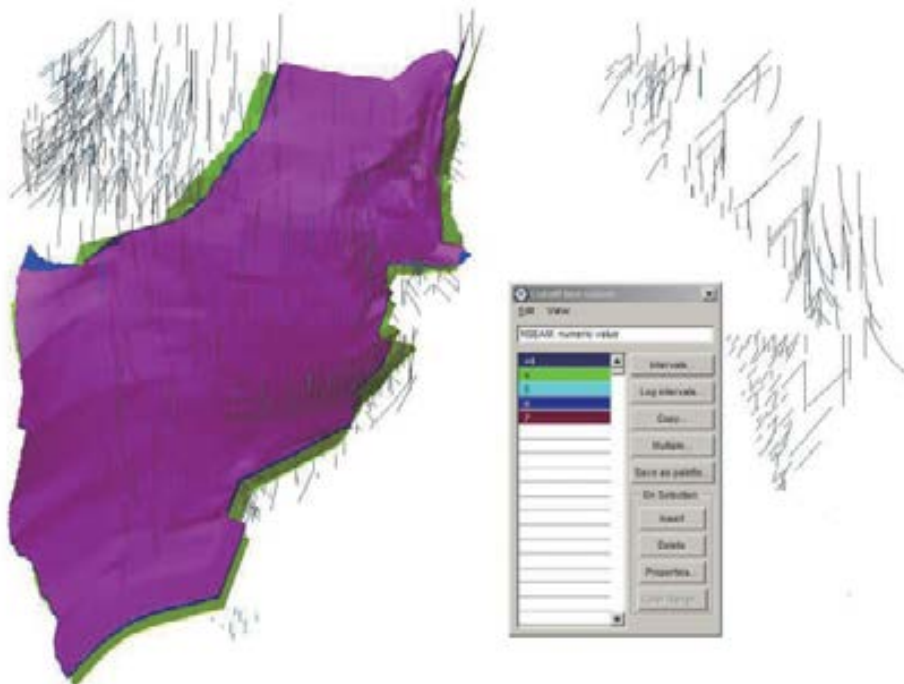
The interburden between 6 and 7 Seams averages 1.2m thick and consists of carbonaceous mudstone and a 0.2m thick coal marker seam.

The No. 12 South Area is contained in the Syncline Hills Thrust Sheet and lies on the south limb of the Two Camp Creek Anticline. No. 12 South Area structure is shown in 3D in Figure 7.14, in plan in Figure 7.15, and in cross-section in Figures 7.16 and 7.17. The Two Camp Creek Anticline is a regional structure with a fold axis trending southeast/northwest for 10km on either side of the mining area. The fold axis has a plunge of about 5° in the No. 12 South Area. The amplitude of the Two Camp Creek Anticline is approximately 800m.

The seams are folded into two syncline-anticline pairs that are parasitic folds on the south limb of the Two Camp Creek Anticline. The seams dip less than 15° between faults in Area No. 12 South A, and could be mined using underground methods. The seams steepen towards the northwest where they are exposed in the No.12 South B2 Area pits.

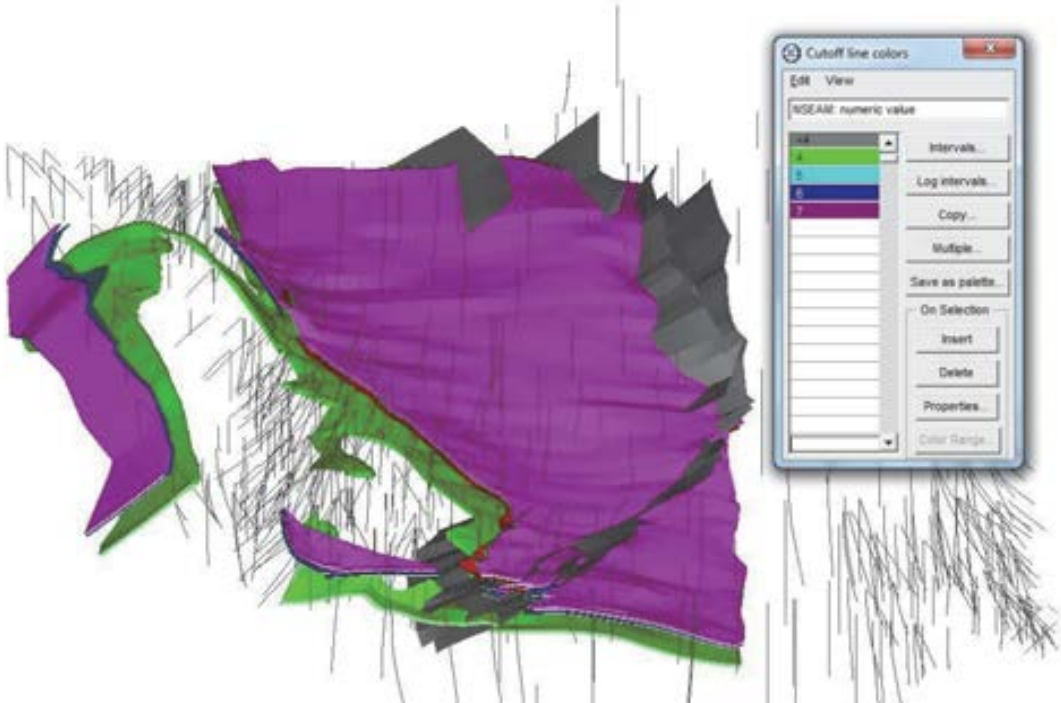
The coal occurrence in No. 12 South B2 Area includes 3, 4, 5, 6 and 7/8 Seams. The B2 Extension Pit exposes the strata of the southern syncline, with the pit bottom following the axes of the folds. The axis of the southern syncline has a plunge of approximately 5°. Figure 7.14B shows No. 12 South B2 structure in 3D.

FIGURE 7.14A 3D ISOMETRIC VIEWS (NW) OF  
NO. 12 SOUTH A (TOP) COAL SEAMS AND DRILLHOLES

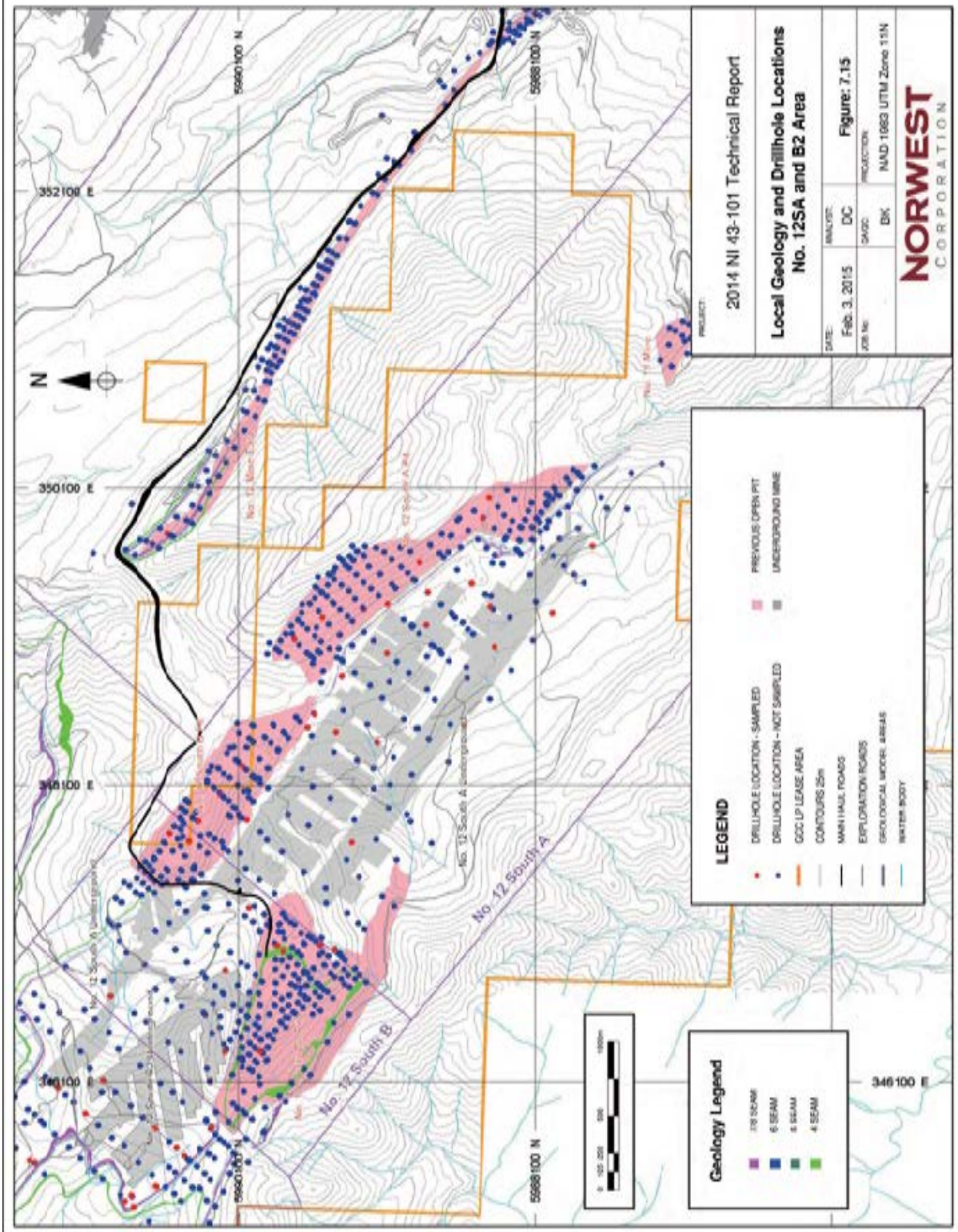


Surfaces: 4 Seam — green, 5 Seam — cyan, 6 Seam — blue, 7 Seam — purple, Faults — grey

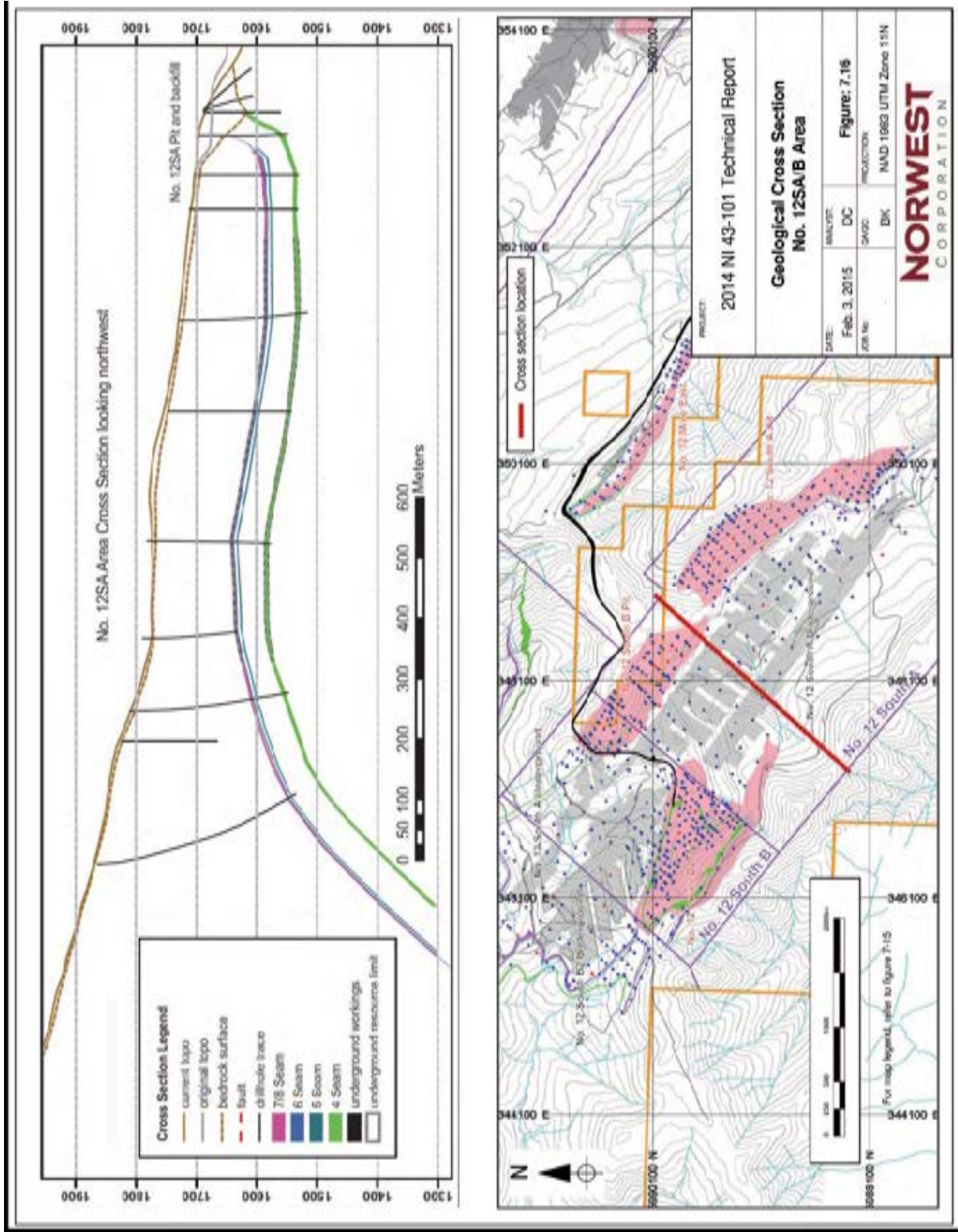
FIGURE 7.14B 3D ISOMETRIC VIEWS (NW) OF NO. 12 SOUTH B2 (BOTTOM) COAL SEAMS AND DRILLHOLES



Surfaces: 4 Seam — green, 5 Seam — cyan, 6 Seam — blue, 7 Seam — purple, Faults — grey









The footwall dips range from horizontal to overturned in the No. 12 South B2 pit. Bedding dips up to 65° are present in the western portion of the pit in the south limb of the south syncline. The bedding dip increases to near 80° in the vicinity of the pit bottom along the south limb of the anticline in the central part of the pit. In the eastern part of the pit the footwall strata are overturned. Most strata dip at less than 15° within northern highwall part of the pit area, as shown on the cross-section in Figure 7.17. Coal seams generally retain their normal stratigraphic thickness throughout most of the mining area except where thickened pods of coal occur in the hinge area of the south syncline.

A number of thrust faults have been identified within the No. 12 South B2 Pit. The two major thrusts are interpreted as north verging with the first fault steeply dipping fault while the second fault is shallow dipping. Both structures have throws of 2m to 20m.

The 3 Seam is located directly above the Torrens Member and is in turn overlain by a distinct fossiliferous "Clam Zone". The 3 Seam maintains a thickness of roughly 1m throughout No. 12 South B2 Area and is an important stratigraphic marker horizon.

The underground resources for 7/8 and 4 Seams are located in the area north of the No. 12 South B2 pit, where the seams are shallowly dipping (< 15°). There are two thrust faults with throws of 10m to 30m that offset the entire seam package. They retain their shallow dip and thickness across the fault.

#### **NO. 12 NORTH AREA**

The No. 12 North Area includes seams of interest from 3 Seam through 8 Seam. As in the No. 12 South Area, the 3 Seam is located just above the basal Torrens Member. The average thickness of the seam is 1.3m. Abundant folding has resulted in the expression of three anticline-syncline pairs that expose 4 through 8 Seams in favourable mining geometries. No. 12 North area structure is shown in 3D in Figure 7.18, in plan in Figure 7.19, and in cross-section in Figure 7.20.

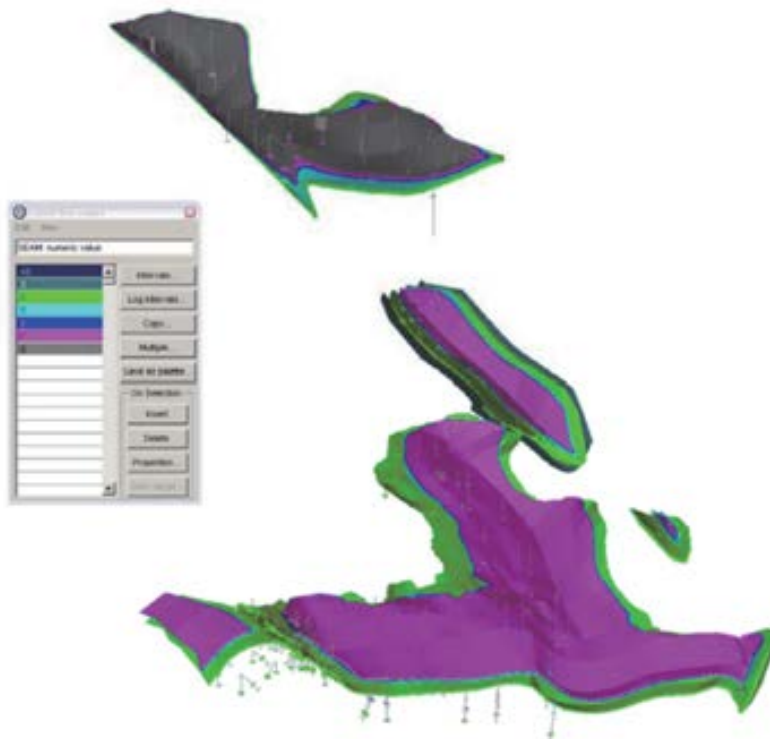
The 4 Seam is again the thickest seam in the area (average 6.8m). The seam reaches a maximum thickness of 28.3m in a structurally thickened zone in Drillhole 74-14. The seam thins out to non-mineable thicknesses (< 0.5m) in a few areas of No. 12 North. The 4 Seam is located about 30m above 3 Seam.

The 5 Seam is approximately 30m above 4 Seam, with an average thickness of 1.6m. The 6 Seam thickens to 10.4m in areas where the coal has been structurally thickened but has an average thickness of 1.7m. The interburden thickness between 5 Seam and 6 Seam averages 8m.

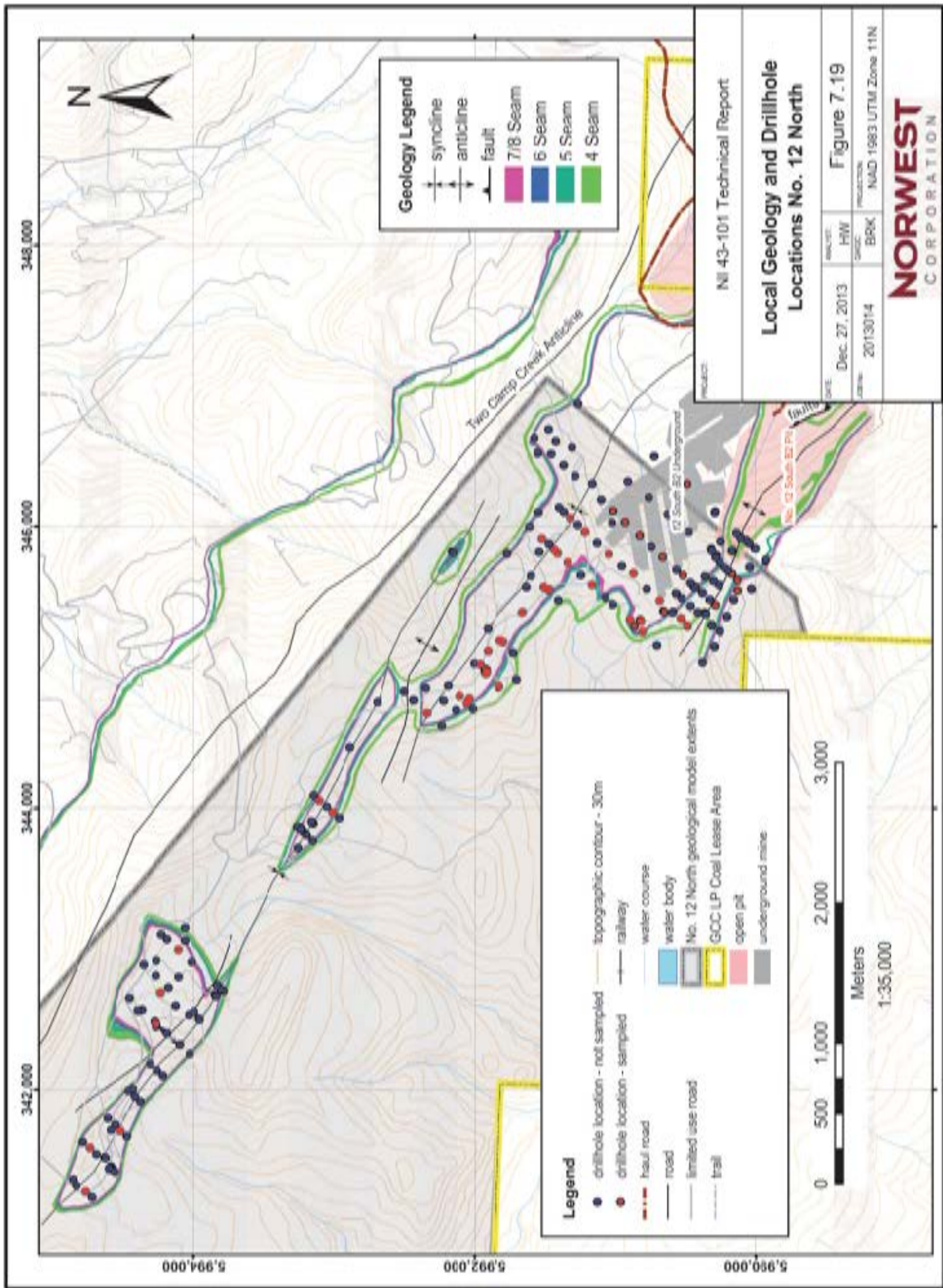
The 6 Seam is 1.7m thick and is separated by 1.5m of mudstone from the overlying 7 Seam.

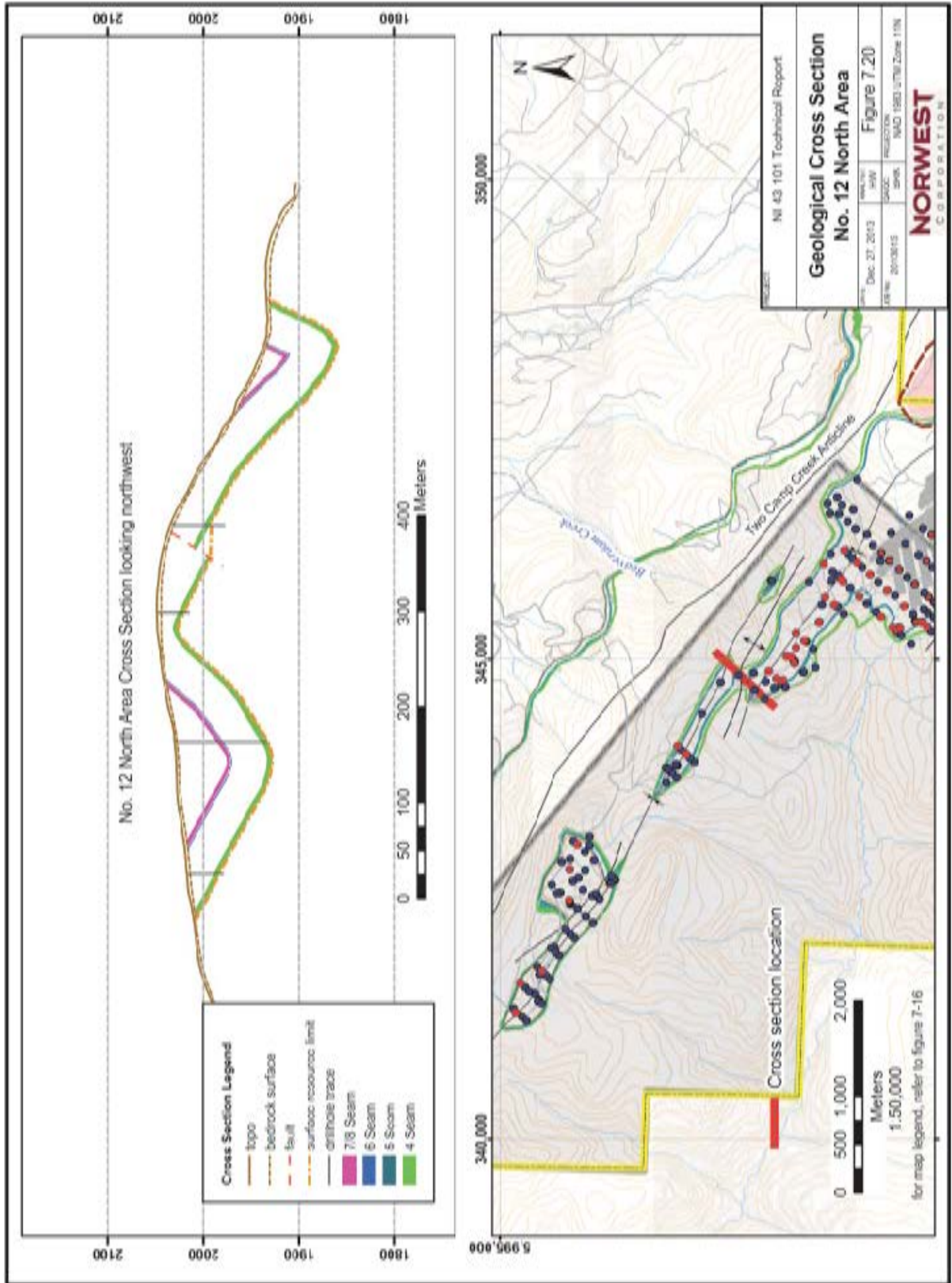
The 7 Seam is more than 8m in thickness in a structurally thickened synclinal axis as indicated by Drillhole 74-14. The seam is located approximately 5m above 6 Seam. The 8 Seam is approximately 6.5m above 7 Seam.

FIGURE 7.18 3D ISOMETRIC VIEW (NW) OF  
NO. 12 NORTH COAL SEAMS, FAULTS AND DRILLHOLES



Surfaces: 4 Seam — green, 5 Seam — cyan, 6 Seam — blue, 7 Seam — magenta, 8 Seam — grey





**NO. 16 AREA**

The coal seams that are of economic interest in the No. 16 Area are 4, 5, 6, 7 and 8 Seams. Combined coal thickness of these five seams is close to 15m in the area.

As in most areas, 4 Seam occurs 22m above the Torrens Member. It is the thickest seam in the south-eastern portion of the area, averaging 6.8m. Directly overlying 4 Seam is approximately 3.0m of interbedded carbonaceous shale and siltstone. The strata below 4 Seam consist of 1.0m of shale overlying a 1.0m to 1.5m interval of sandstone.

The 5 Seam has a consistent stratigraphic thickness, average 1.8m, and occurs approximately 39m above 4 Seam. A shale parting between 0.2m and 0.3m in thickness is typically encountered near the bottom of 5 Seam. The immediate roof and floor of 5 Seam are comprised primarily of shale.

The thickness of 6 Seam is more variable than 5 Seam, ranging from 0.2m to 9.6m, averaging 1.5. The 6 Seam occurs approximately 8.0m above 5 Seam.

The interval between 6 Seam and 7 Seam is approximately 1.7m and consists of carbonaceous shale and coal partings. The 7 Seam, averaging 2.8m is overlain by carbonaceous shale and the 8 Seam.

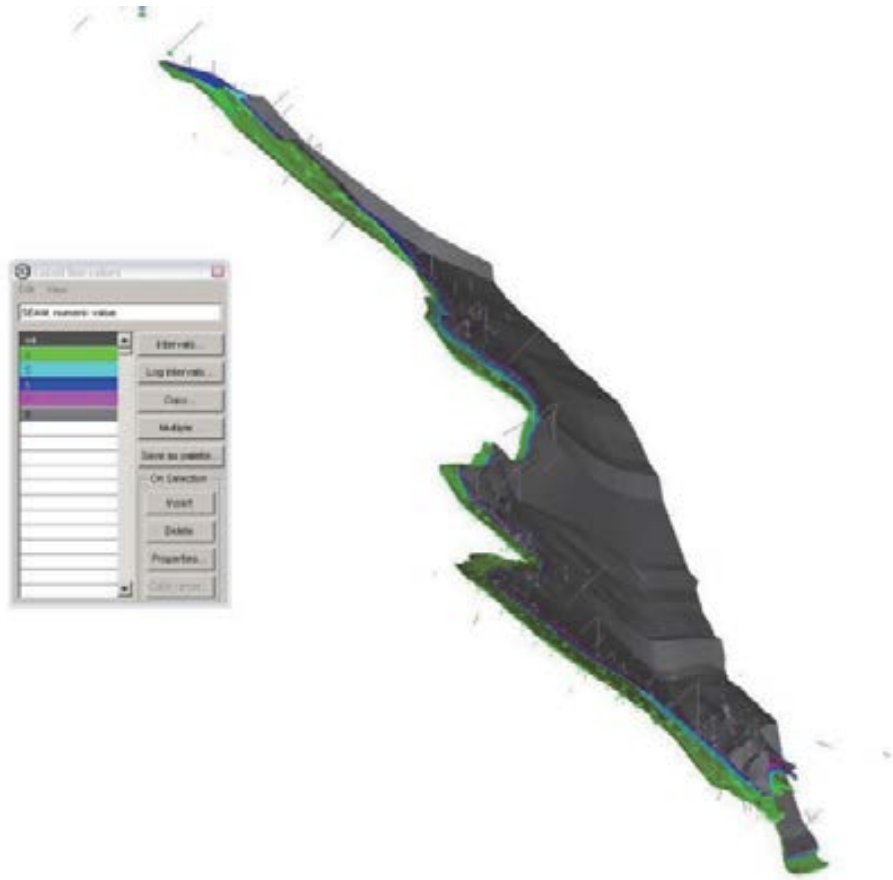
The 8 Seam, averaging 2.2 min thickness, occurs 0.4m to 2.2m above 7 Seam. The interburden is very carbonaceous where it thins.

The geological structure of within the No. 16 Area parallels the structure found in the No. 12 Area to the southwest. No. 16 Area structure is shown in 3D in Figure 7.21, in plan in Figure 7.22, and in cross-section in Figure 7.23. The two areas are separated by the Two Camp Creek Anticline although the coal measures of the Grande Cache Member are eroded from the top of this anticline. The No. 16 Area lies on the northeast limb of the anticline. Former mining areas No. 12 West Mine and No. 12 East Mine are located on the northeast limb of the anticline southeast of the No. 16 Area along strike.

The No. 16 Area is divided into a southeast and northwest mining areas by a drainage that trends northeast joining Beaverdam Creek.

In the No. 16 East Area, the dip of the northeast limb of the Two Camp Creek Anticline ranges from 35° to 60°. The slope of topography closely follows the dip of the bedding resulting in a dip slope mining configuration. The local structure is a relatively simple monocline. The coal measures are truncated at depth by the Syncline Hills Thrust Fault, which marks the northeast boundary of the No. 16 East Area. To the northwest in the No. 16 West areas the dips of the monocline steepen and southwest verging thrust faults cut the coal measures.

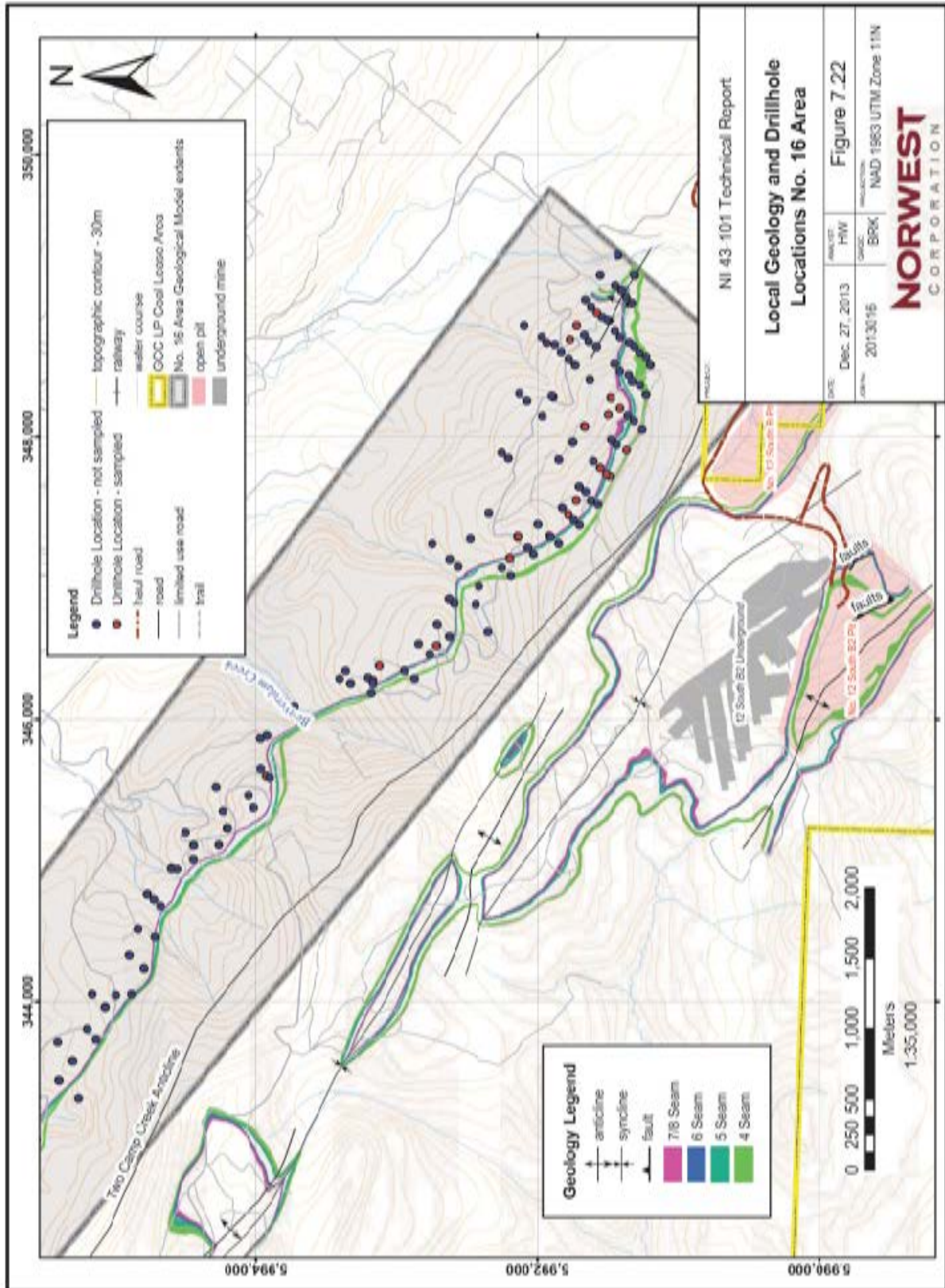
FIGURE 7.21 3D ISOMETRIC VIEW (NW) OF  
NO. 16 AREA COAL SEAMS AND DRILLHOLES

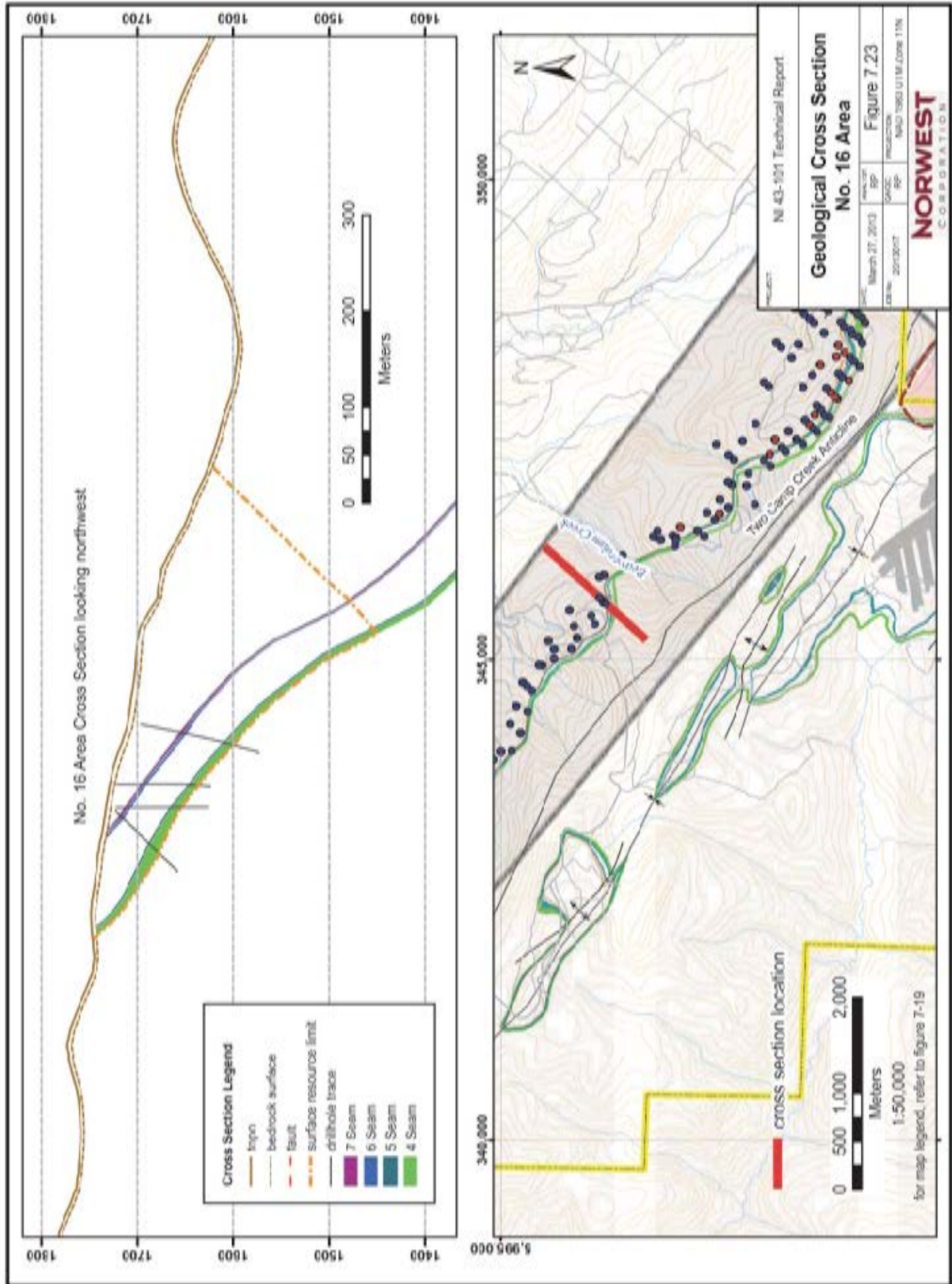


Surfaces: 4 Seam — green, 5 Seam — cyan, 6 Seam — blue, 7 Seam — magenta, 8 Seam — grey

An exception to the monocline structure is found in the southeast part of No. 16 East. The strata are folded into a syncline down dip. The coal seams are structurally thickened in the hinge area of this syncline.







## 7.2 MINERALIZATION AND COAL QUALITY

### *7.2.1 General Coal Quality of Smoky River Coalfield*

Coal quality trends within the Smoky River Coalfield have been modeled from an extensive database of exploration drillhole cores, reverse circulation drill samples and adits. Within the Smoky River Coalfield, coal rank has the greatest impact on the value of the product. Coal rank is indicated by the volatile matter and Free Swelling Index (FSI) tests, which both decrease as coal rank increases. While product ash can be controlled by processing, coal rank can only be controlled by blending coals from different mine areas. Coal rank is the primary determinant of the coking properties and coke yield of the product. In general, the coal rank can be categorized as low-volatile bituminous coal based on the American Society for Testing and Materials (ASTM) coal classification system. The overall trend is an increase in coal rank to the northwest for all seams.

Modeling of volatile matter in the Smoky River Coalfield has established predictable project-wide trends. Consistent with the trend of increasing rank with increasing depth of burial in coal-bearing strata, there is a consistent increase in volatile matter upward in the stratigraphic section from 4 Seam to 11 Seam. The lateral change in volatile matter within the Smoky River Coalfield can be summarized in general as increasing volatile matter and decreasing rank to the southeast.

Ash is the most variable of the key in-situ coal quality parameters. In general, the thicker coal seams are lower in ash content, reflecting that a more stable depositional environment is required for larger accumulations of organic material. Lower in-situ ash variability is also apparent in thicker coal seams. The 4 Seam has the overall lowest average ash and also the lowest variability in ash.

Much of the sulphur in the coal seams of the Smoky River Coalfield is organically bound as opposed to pyritic or mineral bound. Washing the coal generally results in a marginal increase in the sulphur content from the in-situ level. The thickest coal seam, 4 Seam, generally has the lowest average in-situ sulphur. Unlike volatile matter, sulphur does not follow regional trends but varies by mining area and seam. In general the thinner seams are higher in sulphur.

**7.2.2 Mine Area Coal Quality****NO. 2 AREA**

The coal quality of the No. 2 Area is similar to that of the No. 8 Area, with the exception of 4 Seam, which has a higher average FSI for the in-situ coal, as shown in Table 7.2.

**TABLE 7.2 AVERAGE IN-SITU COAL QUALITY  
FROM DRILLHOLE COMPOSITES FOR NO. 2 AREA**

<b>Coal Seam No.</b>	<b>Ash (db)</b>	<b>FSI</b>	<b>VM (db)</b>
4	17.9	7	17.5
10	28.0	3.5	18.8
11	29.0	3.5	22.4

**NO. 8 AREA**

The No. 8 Area is slightly higher in rank than the No. 2 Area, but all mineable seams are at the higher end of the volatile matter spectrum, property wide. The 4 Seam can be divided into an upper high ash zone and a lower low ash zone. A shaley horizon approximately 0.6m to 1.0m thick occurs 1.5m to 1.8m above the base of 4 Seam. In the No. 8 Area, 10 Seam consists of 1.3m of very high ash coal (approximately 45%) above 2.5m of low ash coal (approximately 11%). The 11 Seam typically has a rock split in the middle of the seam. In-situ ash as summarized in Table 7.3 does not include this split.

**TABLE 7.3 AVERAGE IN-SITU COAL QUALITY FROM DRILLHOLE FOR NO. 8 AREA**

<b>Coal Seam No.</b>	<b>Ash (db)</b>	<b>FSI</b>	<b>VM (db)</b>
4	17.3	5	17.2
10	20.7	4.5	19.0
11	30.0	5.5	16.8

**NO. 9 AREA**

The No. 9 Area is very large and there are significant rank changes from the southeast to the northwest in all three major seams. FSI and volatile matter in 4 Seam has the most obvious trend, with both volatile matter and FSI increasing to the southeast.

The 4 Seam is characterized by ash bands both in the middle of the seam and the base in the southeast. In the northwest, the seam is thinner but fairly consistent in in-situ ash content from top to bottom. The 10 Seam typically has a high ash zone making up 30% of the seam, over a low ash zone making up the bottom 70% of the seam. The 11 Seam is characterized by high ash/rock split in both the upper and lower 1/3 of the seam, the upper being very high ash. Table 7.4 provides average raw coal quality data by seam.

**TABLE 7.4 AVERAGE RAW COAL QUALITY BY SEAM  
FROM DRILLHOLE COMPOSITES FROM NO. 9 AREA**

Coal Seam No.	Ash (db)	FSI	VM (db)
4	14.8	5.5	16.9
10	17.6	6	17.7
11	32.7	7.5	20.8

#### **NO. 12 SOUTH A AREA**

There are four seams in the stratigraphic sequence in No. 12 South A Area that are of economic interest, comprising the 4, 5, 6 and 7/8 Seams. This area is directly south of the No. 12 South B2 pit. Table 7.5 provides average raw coal quality data by seam. The stratigraphy and coal quality are similar to the No. 12 South B2 Area described in the next subsection.

**TABLE 7.5 AVERAGE RAW COAL QUALITY BY SEAM  
FROM DRILLHOLE COMPOSITES FROM NO. 12 SOUTH A AREA**

Coal Seam No.	Ash (db)	FSI	VM (db)
4	12.3	4	17.0
5	13.4	4.5	17.0
6	18.3	5	19.0
7/8	15.3	4	18.0

#### **NO. 12 SOUTH B2 AREA**

The average in-seam ash content of the 4 Seam is 12.3% (dry basis). There is a zone of higher ash (15% to 20%) that is 0.3m to 1.6m thick near the top of the seam. Typical in-seam ash values below this high ash zone range between 4% and 8%. Typical in-seam ash values range between 8% and 11% above the high ash zone.

In-seam ash content for the 5 Seam is estimated to be 14.5% based on four cores drilled in the No. 12 Mine South B2 pit in 1992.

The 6 Seam generally consists of a lower clean portion and an upper higher ash zone. The clean portion of the seam is generally 0.9m thick and the higher ash zone is usually about 0.4m thick. The average in-seam ash content of 6 Seam is estimated to be 15.8%.

In-seam ash content of the 7/8 Seam interval is 22.1%. The lower half of 7 Seam typically contains a high ash zone 0.3m thick. Table 7.6 provides average raw coal quality by seam.

**TABLE 7.6 AVERAGE RAW COAL QUALITY BY SEAM  
FROM DRILLHOLES COMPOSITES FROM NO. 12 SOUTH B2**

Coal Seam No.	Ash (db)	FSI	VM (db)
4	12.3	3	16.4
5	14.5	4	16.9
6	15.8	5.5	16.6
7/8	22.1	4	17.0

#### **NO. 12 NORTH AREA**

In the No. 12 North Area, all of the seams of interest have coal quality parameters similar to the No. 12 South areas (B2 and A), with the exception of 6 Seam. This seam has a distinctively higher average ash content resulting in a lower overall FSI. Table 7.7 provides average raw coal quality data by seam.

**TABLE 7.7 AVERAGE RAW COAL QUALITY BY SEAM  
FROM DRILLHOLE COMPOSITES FROM NO. 12 NORTH**

Coal Seam No.	Ash (db)	FSI	VM (db)
4	13.8	3	16.3
5	14.6	3.5	17.7
6	34.2	1	15.7
7	16.8	5	17.4
8	15.6	5.5	19.0

#### **NO. 16 AREA**

The 4 Seam is generally characterized by an upper low ash, a middle medium ash and a lower low ash zone. These zones generally comprise 30%, 20% and 50% of the seam respectively. All three zones are consistent in their geophysical log signature throughout the southeast portion of the area.

The 5 Seam consists of a lower zone grading from high up to medium ash and an upper zone of very low ash coal. The 6 Seam is somewhat the inverse of No. 5 and consists of a lower low ash and an upper, high-ash zone. The seam typically has a carbonaceous shale roof and floor. The 7 Seam contains a band of higher ash coal near the middle of the seam. Table 7.8 summarizes the average coal quality within the No. 16 Area.

**TABLE 7.8 AVERAGE RAW COAL QUALITY BY SEAM  
FROM DRILLHOLE COMPOSITES FROM NO. 16 AREA**

Coal Seam No.	Ash (db)	FSI	VM (db)
4	13.2	3	18.0
5	15.3	4.5	17.0
6	22.3	3	17.0
7	16.4	3.5	18.0
8	15.6	5.5	19.0

## 8 DEPOSIT TYPES

The B.C. Geological Survey has established a series of mineral deposit profiles that cover a wide variety of mineral deposits. The deposit type “A04 — Bituminous Coal” matches the characteristics of the coal seams found in the Smoky River Coalfield (Ryan and Barry, 1995). Their description of this deposit type presents a description of the geological characteristics, exploration guides and economic factors. The following Sections 8.1 through 8.3 are taken verbatim from this document.

### 8.1 GEOLOGICAL CHARACTERISTICS

#### *8.1.1 Capsule Description*

Seams of black coal hosted by clastic sedimentary rocks. Coal is banded bright and dull. Generally hard with well-developed cleats.

#### *8.1.2 Tectonic Settings*

Stable continental basins; shelves on the trailing edge of continents; foreland (molasse) basins; back-arc basins.

#### *8.1.3 Depositional Environment/Geological Setting*

An area of slow sedimentation in fresh water with few or no marine incursions. Can be produced by fault blocks associated with strike-slip movement to limit sediment influx. Delta; shoreline swamp; raised swamp; lake; floating vegetation mats.

#### *8.1.4 Age of Mineralization*

Generally older than Tertiary; major deposits are Cretaceous, Permian or Carboniferous in age.

#### *8.1.5 Associated Rock Types*

Sedimentary rocks exhibiting evidence of non-marine deposition; carbonaceous mudstones; siltstones and sandstones often with cross-stratification and other sedimentary structures of fluvial/alluvial or deltaic origin.

### ***8.1.6 Deposit Form***

Coal seams generally conform to regional bedding; sometimes seams are deposited in areas of local subsidence, such as fault-controlled blocks. Seams may be thickened/deformed by faulting, folding and shearing. Seams may pinch-out or split on a local or regional scale.

### ***8.1.7 Texture/Structure***

Bituminous coal is usually composed mostly of clarain and vitrain. Footwall sediments are often penetrated by roots or weathered to clay (seatearth).

### ***8.1.8 Coal Seams/Associated Mineral Matter***

Bituminous coal has Rmax values in the range of 0.5% to 2.0%. In outcrop it can contain up to 15% moisture. It usually contains a high percentage of the maceral vitrinite; at higher ranks liptinite is difficult to detect; the amount of fusinite is variable. Mineral matter is in the coal seams as rock bands, as finely intermixed material of authogenic or detrital origin (inherent mineral matter) and as secondary material deposited in fractures and open spaces. Inherent mineral matter includes pyrite, siderite and kaolinite. It may be dissimilar to that of the surrounding rocks.

### ***8.1.9 Weathering***

Weathering of the bituminous coal reduces the calorific value by oxidizing the carbon-hydrogen complexes. It also destroys the agglomerating (coke making) properties. Minerals such as pyrite oxidize to sulphates. Secondary carbonates are formed. These transformations may further damage the coking properties.

### ***8.1.10 Ore Controls***

The geometry of the seam/seams is controlled by sedimentary features, such as extent of the delta, trend of the shoreline, and trend of sand-filled river channels. Deformation (faulting and folding) is also important.

### ***8.1.11 Comments***

Bituminous coal is widely used for coke making by the steel industry because of its agglomerating properties.

## **8.2 EXPLORATION GUIDES**

### ***8.2.1 Geochemical Signature***

Geochemistry is generally not used as a prospecting tool for coal.

### ***8.2.2 Geophysical Signature***

Bituminous coal has a low density. Resistivity is variable to high. Surface techniques include direct-current profiling, refraction and reflection seismic, and gravity. Subsurface or bore-hole techniques include gamma logs, neutron logs, gamma-gamma density logs, sonic logs, resistivity logs and caliper logs.



### *8.2.3 Other Exploration Guides*

Presence of: a down-slope coal bloom; nonmarine sediments; coal spar. Presence of methane escaping through the surrounding sediments.

## **8.3 ECONOMIC FACTORS**

### *8.3.1 Typical Grade and Tonnage*

Numerous tests quantify the coking ability of bituminous coal; they measure rheology, melting and petrographic properties of the coal as well as the chemistry of the ash. The gross heating value of bituminous coal is 27 to 33MJ/kg on an ash-free moist basis. Net useable heat will be lower because of the presence of ash. Mine tonnages generally range from 10 to 1000Mt.

### *8.3.2 Economic Limitations*

Coal is a bulk commodity which is expensive to transport. Bituminous coal has a high market value because of its coking properties and high heating value. The ratio of tonnage to useable heat is good so that there is a lower proportion of waste material (such as water, fly ash and slag) generated than for other ranks of coals.

### *8.3.3 End Uses*

Coke; steam generation in turbines for electrical generation.

### *8.3.4 Importance*

Generally bituminous coal is the only source for coke used in the steel industry; weathered and non-agglomerating bituminous coal is utilized for power generation.

## **8.4 GEOLOGY TYPE**

“Geology Type” for coal deposits is a parameter that is specified GSC Paper 88-21, which is a guideline reference for coal deposits as specified in NI 43-101. Geology Type is a definition of the amount of geological complexity, usually imposed by the structural complexity of the area, and 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 drillhole.

The classification scheme of GSC Paper 88-21 is similar to many other international coal 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. The four classes of geologic complexity, from lowest to highest, are:

- Low
- Moderate
- Complex
- Severe.

The bituminous coal deposits that occur within the GCC property are typical of those in the inner foothills. Based on the data available and existing geological interpretation, coal mineralization is interpreted to be of both the Complex and the Moderate geology type. A Moderate geology type is believed to be found within mine areas where the folds are broad and the strata are relatively shallow dipping and lying in between the major bounding fault structures. Areas of complex geology type are delineated where the strata are more tightly folded, steeply dipping, and interrupted by significant faulting.

## 8.5 DEPOSIT TYPE

“Deposit Type” as defined in GSC Paper 88-21 refers to the extraction method most suited to the coal deposit. There are four categories, which are “surface”, “underground”, “non-conventional”, and “sterilized”. The coal deposit on the Property, based on the reported coal thicknesses, stripping ratios and depth of the coal occurrence below ground surface, is considered to contain areas of a “Surface” deposit type as well as areas of an “Underground” deposit type.

## 9 EXPLORATION

### 9.1 GENERAL

Exploration commenced in the Smoky River Coalfield in the late 1950s and a substantial amount of work has been carried out over the years. The amount of work completed to date consists of:

- 129 adits that have been driven across the Smoky River Coalfield to provide bulk samples for coal washability test work. Additionally, GCC has carried out re-mapping of accessible adits where possible. Adit locations are shown in Figure 9.1.
- Outcrop mapping in areas of natural exposure and exposures created by the construction of access roads for drilling was carried out on a periodic basis since the 1970s. A large amount of rock outcrops were logged during this time for lithology and bedding orientation.
- Surface trenches used to determine seam positions and thickness.

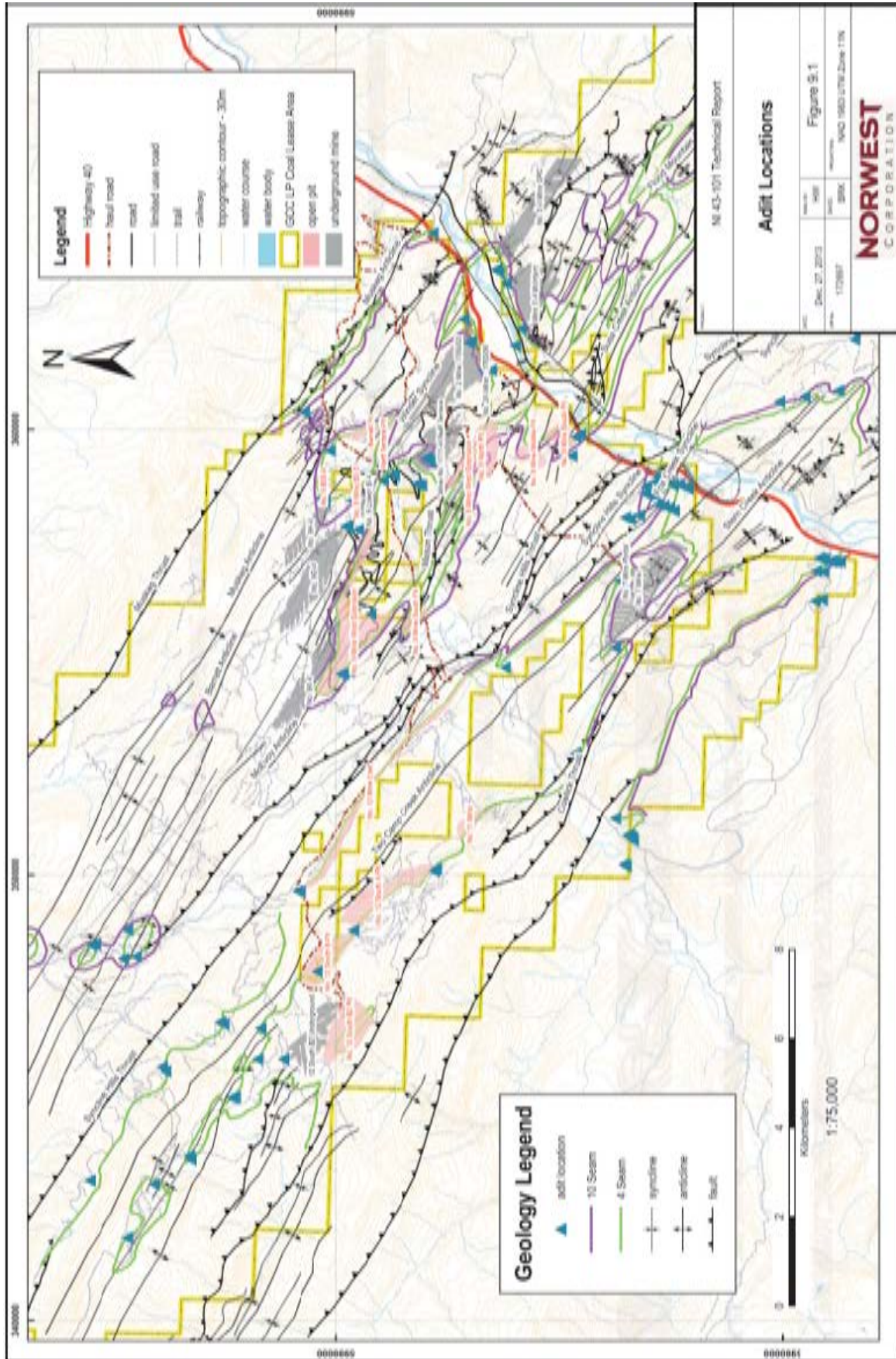
Previous audits determined that former mine operators used industry standard techniques gathering coal data on the Smoky River Coalfield. Drilling was the most common method used for data acquisition (see Section 10).

## **9.2 SAMPLING METHOD AND APPROACH**

Sampling methods for drilling prior to 2007 were previously reviewed by the consulting firm AMEC in the 2006 and 2007 AMEC Technical Reports. The AMEC reports concluded that all bulk samples and core samples collected and submitted for analysis prior to 2007 were handled using methods that are still standard for the coal industry. The methods are considered appropriate procedures for sampling coal and resulting data should be suitable to support resource estimates.

Bulk samples were collected up to the mid-1990s and were transported by truck from the field to independent laboratories for bulk coal sample testing. Trench samples were tested by the Smoky River Coal Limited on-site laboratory which was ISO certified from the early 1990s on.

No seismic surveys or other ground or aerial geophysical tests have been performed that support the current geological interpretation and resource/reserve models.

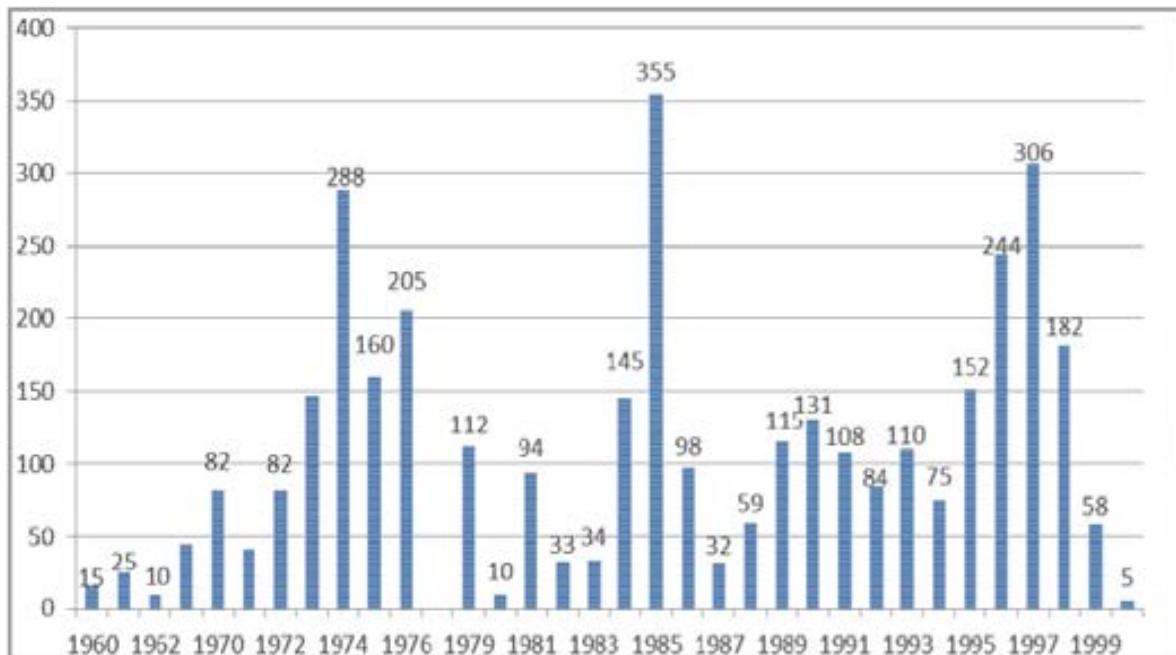


## 10 DRILLING

### 10.1 PREVIOUS OPERATORS

Exploration drill holes completed since 1970 have been geophysically logged with gamma, density, resistivity, caliper (GRDC), and drillhole deviation tools where conditions permitted. Drill holes completed since 1990 were also logged with dipmeter tools in addition to the standard suite of geophysical logs. Additionally, sonic logging was carried out on selected holes between 1990 and 1999 to assist in rock strength estimation. Cores of the coal seams and immediate roof sections were recovered from approximately 10% of the pre-2004 drillholes. In 2001, a drilling program consisting of one exploration hole and four water wells in the No. 7 Area was conducted for due diligence and regulatory requirements by the precursor company to GCC (Grande Cache Coal Inc.). Work was generally done in accordance with industry standard practices of the time. Figure 10.1 illustrates the amount of drilling in metres by year. Figure 10.2 is an overview of the exploration drillholes drilled prior to 2004.

**FIGURE 10.1 EXPLORATION DRILLING BY YEAR  
(PREVIOUS OPERATIONS) — NUMBER OF HOLES**



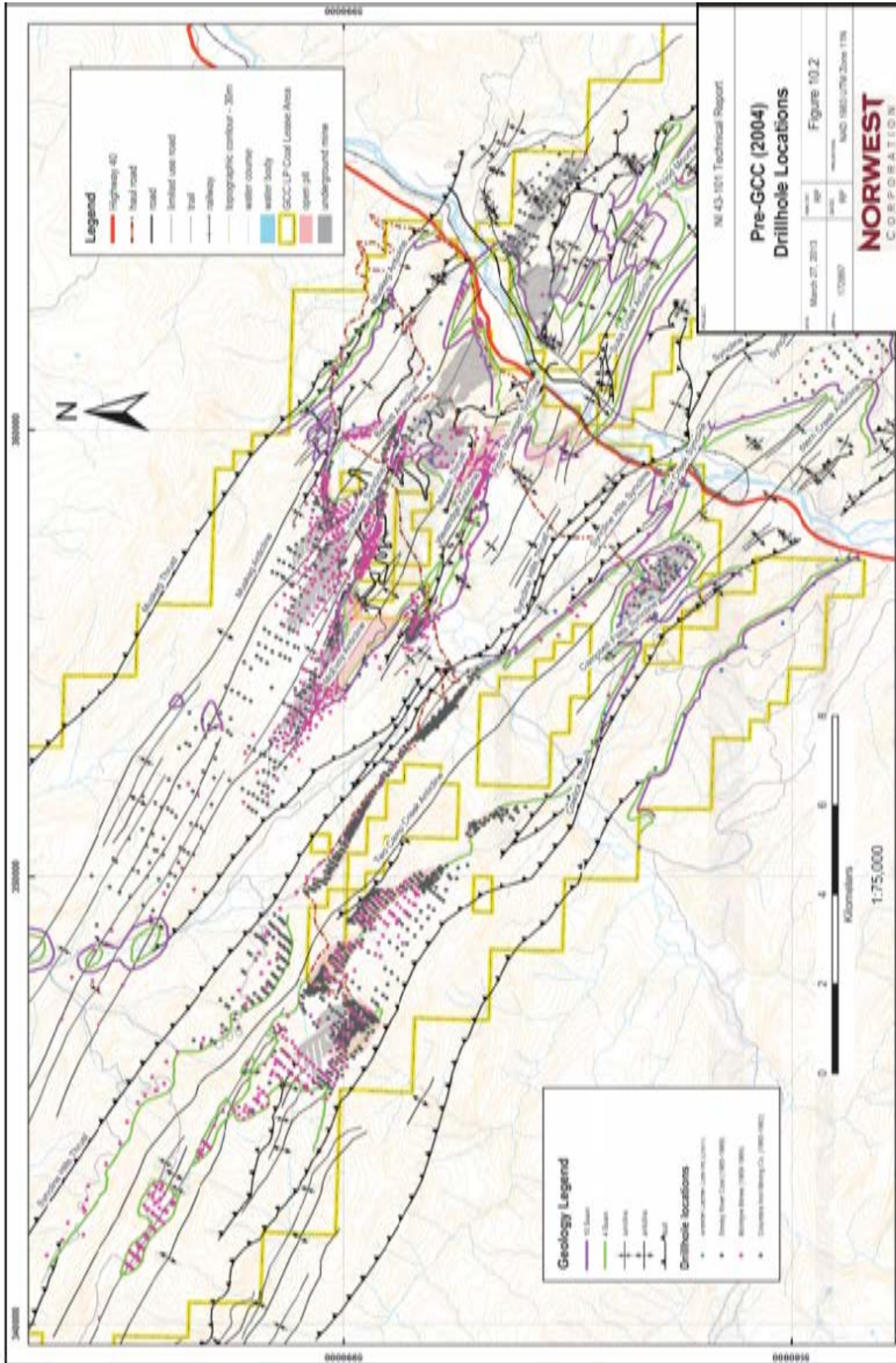


Table 10.1 is a summary of all drilling performed in the Smoky River Coalfield. Most of these holes are within the GCC lease area with the exception of approximately 50 holes in the Grande Mountain area (previously known as No. 14 Mine), and 100 holes outside the current leases in areas mined previous to 2000.

**TABLE 10.1 HISTORICAL DRILLING (SMOKY RIVER COAL FIELD)**

<b>Company</b>	<b>Period</b>	<b>No. of Holes</b>	<b>Total Metres</b>
Columbia Iron Mining Co.	1960-62	50	8,136
McIntyre Mines	1969-1984	1,441	158,750
Smoky River Coal	1985-1999	2,106	240,481
Grande Cache Coal Inc.	2001	5	595

## 10.2 GCC EXPLORATION

Since acquiring the site in 2004, GCC has conducted extensive yearly drilling programs in several areas. A summary of the distribution of holes by mine area and type is presented in Table 10.2 and Table 10.3. Drillhole spacing varied depending on structural complexity, as illustrated in Figure 10.3. Areas investigated for surface mining have commonly been evaluated at a close drill spacing to better define these more structurally complex areas. GCC has adhered to industry standard practices for conducting exploration programs.

Fifteen (15) core holes and four (4) air rotary holes were completed in 2013 in the No. 12 South A area and No. 8 Area respectively. Thirteen of the fifteen core holes were completed with coal intercepts, two being abandoned in overburden. Two (2) core holes and nine (9) rotary holes were completed during 2014 in the No. 12 South A area. Additional drilling undertaken in 2014, whose primary purpose was to obtain geotechnical data for mine planning, includes six (6) core and one (1) rotary hole in the No. 8 area.

TABLE 10.2 GCC DRILLING SUMMARY BY YEAR AND AREA

Location	Year	No. of Holes	Total Metres
No. 8 Area	2004	43	6,508
	2005	72	10,974
	2006	64	10,507
	2007	66	8,440
	2008	5	190
	2009	51	5,371
	2010	21	3,539
	2011	135	16,751
	2012	37	3,130
	2013	4	175
2014	7	991	
<b>Sub Total No. 8 Area</b>		<b>505</b>	<b>66,576</b>
No. 2 Area	2009	14	353
	2010	50	6,459
	2011	6	1,421
<b>Sub Total No. 2 Area</b>		<b>70</b>	<b>8,233</b>
<b>No. 16 Area</b>	<b>2008</b>	<b>70</b>	<b>10,888</b>
No. 12 South B2	2006	1	318
	2008	6	1,420
	2010	2	444
	2011	1	207
<b>Sub Total No. 12SB2</b>		<b>10</b>	<b>2,389</b>
No. 12 South A	2006	22	4,845
	2010	3	396
	2011	1	178
	2013	15	2,655
	2014	11	2,470
<b>Sub Total No. 12 South A</b>		<b>52</b>	<b>10,544</b>
<b>No.12 North</b>	<b>2008</b>	<b>8</b>	<b>2,117</b>
<b>No. 12 East</b>	<b>2010</b>	<b>1</b>	<b>267</b>
<b>Total GCC Drilling 2004 – 2014</b>		<b>716</b>	<b>101,014</b>

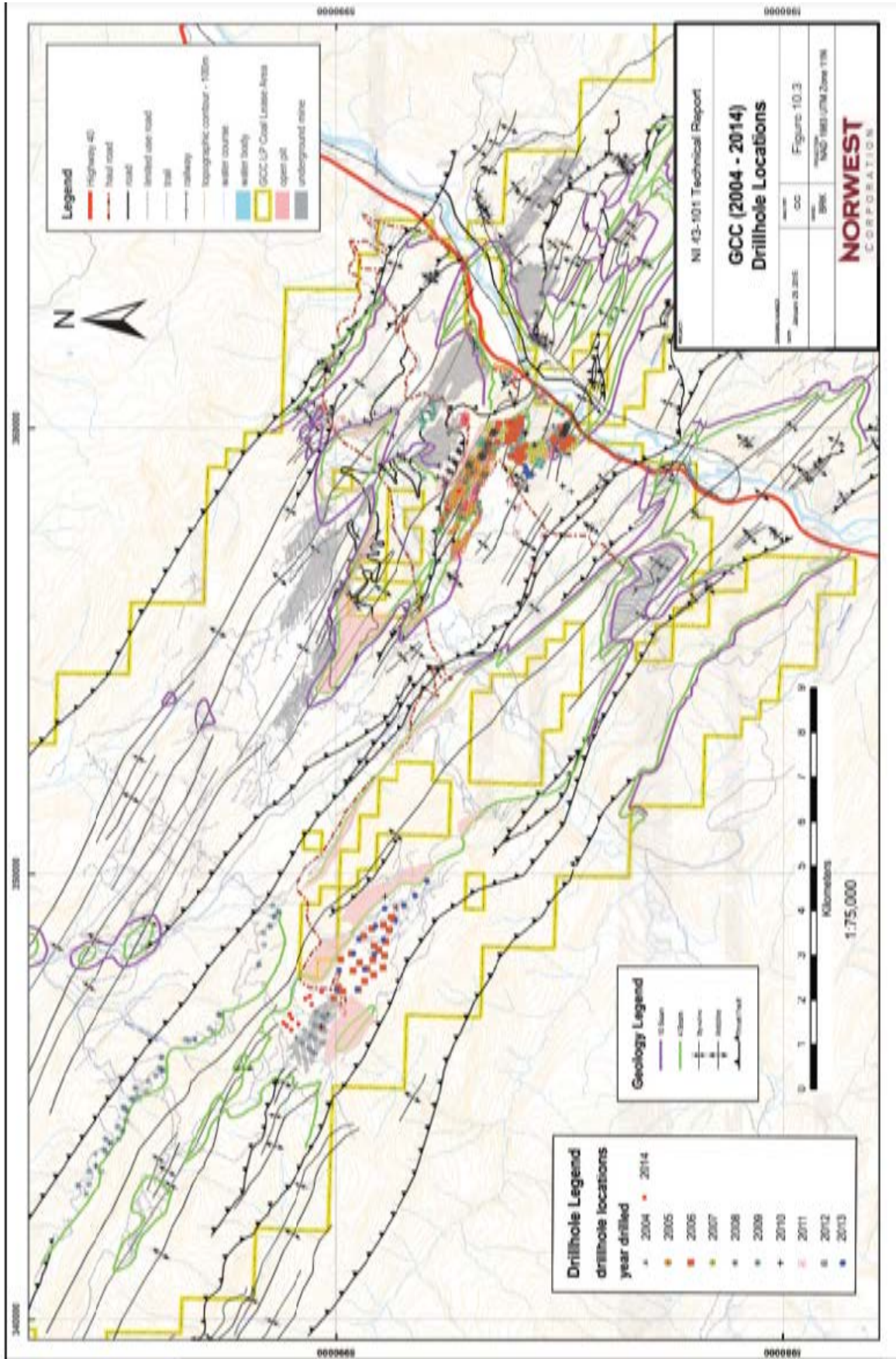


TABLE 10.3 GCC DRILLING BY DRILLHOLE TYPE AND YEAR

Year	Drill Type	No. of Holes	No. of Samples <sup>(1)</sup>	Total Metres
2004	Rotary	43	0	6,508
2005	DDH <sup>(2)</sup>	7	39	1,048
	Rotary	65	0	9,927
2006	DDH	2	28	303
	Rotary	85	0	15,367
2007	DDH	2	0	74
	Rotary	64	3	8,366
2008	DDH	9	53	948
	Rotary	80	0	13,667
2009	DDH	24	0	726
	Rotary	41	0	4,998
2010	DDH	9	18	1,041
	Rotary	68	26	10,064
2011	DDH	18	1	1,026
	Rotary	125	46	17,531
2012	DDH	1	6	101
	Rotary	36	27	3,029
2013	DDH	15	142	2,655
	Rotary	4	0	175
2014	DDH <sup>(2)</sup>	8	114	3,321
	Rotary	10	0	140
DDH		85	287	7,785
Rotary		611	102	89,632
<b>Total GCC Drilling</b>		<b>716</b>	<b>503</b>	<b>101,014</b>

(1) Coal Samples collected for laboratory analysis

(2) DDH — Diamond Drill Hole for coal and geotechnical sampling



### 10.3 NO. 2 AREA DRILLING

This area was the primary focus of drilling activities during 2010 and 2011. Drilling was concentrated on the Reiff Terrace and Barrett Pit areas. A summary of the total drilling by type in this area is summarized in Table 10.4. The drillhole locations in No. 2 area are shown in Figure 7.6.

**TABLE 10.4 SUMMARY OF DRILLING IN NO. 2 AREA**

Year	Core		Rotary		Totals	
	#	m	#	m	#	m
1961			5	990	5	990
1962			6	1,235	6	1,235
1970			14	917	14	917
1971			23	1,856	23	1,856
1972			16	2,048	16	2,048
1973			106	5,382	106	5,382
1974	5	160	8	464	13	624
1976			9	683	9	683
1981			13	2,254	13	2,254
1982			6	491	6	491
1984			19	1,238	19	1,238
1985			13	945	13	945
1991			2	631	2	631
1995			7	430	7	430
1996			46	5,564	46	5,564
1999			8	439	8	439
2009	9	109	1	48	10	157
2010	4	429	46	6,030	50	6,459
2011			6	1,421	18	1,472
<b>Total</b>	<b>13</b>	<b>538</b>	<b>354</b>	<b>33,066</b>	<b>384</b>	<b>33,815</b>

### 10.4 NO. 8 AREA DRILLING

Drilling in the No. 8 Area began in the 1960s and continued intermittently until 1987. GCC continued drilling in the No. 8 Area in 2004. The majority of the drill holes penetrated into the Torrens Formation sandstone below No. 3 seam. All drillholes post-1970 were geophysically logged.

The focus of the 2004 drilling program was to establish seam position and thickness. Conventional rotary drill methods were selected as a more cost effective method to complete the drilling and obtain down-hole geophysical logs. In 2005 and 2006, coal seam samples were collected from core or reverse circulation drilling methods. GCC also carried out drilling programs in 2007, and 2009 to 2014. The 2013 drilling program was focused on confirming coal seam position and thickness. The 2014 drilling program focused on collecting geotechnical samples to assess roof and floor rock conditions.

A summary of all drilling in this area is presented in Table 10.5 with drillhole locations shown in Figure 7.9.

**TABLE 10.5 SUMMARY OF DRILLING IN NO. 8 AREA**

Year	Core		Rotary		Totals	
	#	m	#	m	#	m
1961			3	374	3	374
1962			4	1,012	4	1,012
1970			12	664	12	664
1971			16	1,082	16	1,082
1972			8	995	8	995
1973	1	30	36	2,055	37	2,085
1974	15	465			15	465
1982			23	1,927	23	1,927
1984			28	3,203	28	3,203
1985			44	3,151	44	3,151
1986			2	92	2	92
1987	2	80	16	959	18	1,039
2001			1	61	1	61
2004			43	6,508	43	6,508
2005	7	1,048	65	9,926	72	10,974
2006			64	10,507	64	10,507
2007	2	74	64	8,366	66	8,440
2008	5	190			5	190
2009	15	617	36	4,754	51	5,371
2010	3	168	18	3,371	21	3,539
2011	17	819	118	15,392	135	16,211
2012	1	101	36	3,029	37	3,130
2013			4	175	4	175
2014	6	851	1	140	7	991
<b>Grand Total</b>	<b>74</b>	<b>4,443</b>	<b>642</b>	<b>77,743</b>	<b>716</b>	<b>82,726</b>

## 10.5 NO. 12 SOUTH AREA DRILLING

### 10.5.1 No. 12 South A Area

A summary of the drilling completed in the No. 12 South A area is located in Table 10.6. All of the drilling that has been undertaken is consistent with the requirements of coal exploration and resource estimation, and includes diamond core drilling and rotary drilling. Coal samples were obtained from all core holes and one rotary drillhole.

GCC performed exploration drilling in 2006 and 2010 in the No. 12 South A area. The coal is expected to be extracted using both surface and underground mining methods. Two (2) of the 22 holes drilled in 2006 were cored to yield geotechnical information concerning roof and floor rock conditions. The 2013 drilling program again focused on collecting geotechnical samples to assess roof and floor rock conditions. The 2014 drilling program was focused on confirming coal seam position and thickness.

The drillhole locations are shown in Figure 7.15.

**TABLE 10.6 SUMMARY OF DRILLING IN NO. 12 SOUTH A AREA**

Year	Core		Rotary		Totals	
	#	m	#	m	#	m
1974			56	5,804	56	5,804
1975	20	2,266	5	516	25	2,782
1976			14	1,310	14	1,310
1989	3	230	8	2,321	11	2,551
1990	1	80	51	4,092	52	4,172
1991			55	3,575	55	3,575
1992	18	1,194	59	5,396	77	6,590
1993	4	334	7	330	11	664
1994	2	173	31	2,827	33	3,000
1995	3	324	32	2,906	35	3,230
1996	4	933	37	4,940	41	5,873
1997			11	2,425	11	2,425
1998			1	171	1	171
2006	2	303	20	4,542	22	4,845
2010			3	396	3	396
2011			1	178	1	178
2013	15	2,655			15	2,655
2014	2	440	9	2,030	11	2,470
<b>Grand Total</b>	<b>74</b>	<b>8,492</b>	<b>400</b>	<b>43,759</b>	<b>474</b>	<b>52,691</b>

### 10.5.2 No. 12 South B2 Area

Drilling in the No. 12 South B2 Area began in 1971 and continued intermittently until 1998 under previous operators (Table 10.7). Many of these exploration holes are now mined out with excavation of the No. 12 South B2 pit. GCC also carried out a small drilling program in 2008 and cored three holes in 2010 and 2011.

Drillhole locations are shown in Figure 7.15.

TABLE 10.7 SUMMARY OF DRILLING IN NO. 12 SOUTH B2 AREA

Year	Core		Rotary		Totals	
	#	m	#	m	#	m
1970			1	49	1	49
1974			17	2,224	17	2,224
1975	5	433			5	433
1976			4	321	4	321
1993	11	965			11	965
1994	1	140	11	1,271	12	1,411
1995	3	227	31	4,024	34	4,251
1996			48	5,710	48	5,710
1997	2	148	118	15,482	120	15,630
1998			115	16,579	115	16,579
2006			1	318	1	318
2008			6	1,420	6	1,420
2010	2	444			2	444
2011	1	207			1	207
<b>Grand Total</b>	<b>25</b>	<b>2,564</b>	<b>352</b>	<b>47,398</b>	<b>377</b>	<b>49,962</b>

## 10.6 NO. 12 NORTH AREA DRILLING

McIntyre Mines completed drilling in this area from 1969-1976. Between 1988 and 1998, SRCL drilling included both core holes and reverse circulation rotary holes (Figure 7.19). In 2008 GCC completed a limited drilling program in this area comprising coring and rotary drilling methods (Table 10.8).

TABLE 10.8 SUMMARY OF DRILLING IN NO. 12 NORTH AREA

Year	Core		Rotary		Totals	
	#	m	#	m	#	m
1969			3	433	3	433
1973			1	88	1	88
1974	5	454	112	10,593	117	11,047
1975	26	2,710			26	2,710
1976	1	70	36	2,873	37	2,943
1988			3	138	3	138
1993	20	1,235			20	1,235
1995	2	262	14	1,695	16	1,957
1996	1	130	49	4,190	50	4,320
1998			3	375	3	375
2008	2	566	6	1,551	8	2,117
<b>Grand Total</b>	<b>57</b>	<b>5,427</b>	<b>227</b>	<b>21,936</b>	<b>284</b>	<b>27,363</b>

**10.7 NO. 16 AREA DRILLING**

Previous exploration drilling was conducted in 1974 by McIntyre Mines and SRCL in 1997-1998 (Table 10.9). GCC completed additional drilling during 2008.

The drillhole locations are shown in Figure 7.22.

**TABLE 10.9 SUMMARY OF DRILLING IN NO. 16 AREA**

Year	Core		Rotary		Totals	
	#	m	#	m	#	m
1974			55	8,092	55	8,092
1997	5	331	55	7,074	60	7,405
1998	4	350	33	4,813	37	5,163
2008	2	192	68	10,696	70	10,888
<b>Grand Total</b>	<b>11</b>	<b>873</b>	<b>211</b>	<b>30,675</b>	<b>222</b>	<b>31,548</b>

**10.8 NO. 9 AREA**

Drilling in the No. 9 Mine area began in 1969 (Table 10.10) and continued, with the exceptions of a few years, to 1997. Drilling between 1969 and 1977 comprised predominately of diamond core drilling. Air rotary drilling became more common after 1970. Most boreholes were logged geophysically. The drillhole locations are shown in Figure 7.12.

TABLE 10.10 SUMMARY OF DRILLING IN NO. 9 AREA

Year	Open		Core		Total	
	# of BH	Metres (m)	# of BH	Metres (m)	# of BH	Metres (m)
1969	4	516	38	7,281	42	7,797
1970	12	1,088	32	6,894	44	7,982
1971						
1972	2	182	37	5,262	39	5,444
1973			4	796	4	796
1974			1	42	1	42
1975	5	934	74	8,306	79	9,240
1976			124	18,076	124	18,076
1977	33	4,897	58	5,998	91	10,894
1978						
1979						
1980	10	2,566			10	2,566
1981	24	5,489	7	1,720	31	7,209
1982	4	166			4	166
1983	9	499			9	499
1984	71	5,763	8	454	79	6,216
1985	103	5,565	11	502	114	6,067
1986	12	346	4	210	16	556
1987						
1988						
1989	20	5,031			20	5,031
1990	15	3,984			15	3,984
1991						
1992	1	99			1	99
1993	30	5,672			30	5,672
1994	6	978			6	978
1995	55	14,722	5	1,307	60	16,030
1996	48	7,071	4	603	52	7,674
1997	63	10,701	5	825	68	11,526
<b>Total</b>	<b>527</b>	<b>76,268</b>	<b>412</b>	<b>58,276</b>	<b>939</b>	<b>134,544</b>

### 10.8.1 No. 9D Underground Mining

Initial exploration drilling in the No. 9 Mine area was carried out 1969 and 1970. Follow-up drilling in southeastern extent of the No. 9D Underground resource was carried out in 1980 and 1981 and again between 1990 and 1991. Drilling of the northwestern extent of the deposit was predominately carried out between 1995 and 1997. About 120 boreholes were completed within the footprint of the No. 9D Underground Mining area between 1996 and 1997. Drill spacing in the southeast varies from 280m to 320m between section lines and 120m to 190m between boreholes along section lines. The drill spacing decreases to the northwest to about 500m to 700m between section lines and about 120m to 320m between boreholes along section lines.



### 10.8.2 No. 9 Surface Mining

Previous exploration drilling across the No. 9 Surface Mining area was carried out at regular intervals between 1996 and 1997 over which period about 420 boreholes were completed. The drill spacing of previously drilled boreholes is highly varied across the No. 9 Surface Mining area ranging from about 320m between section lines and 100m to 120m between boreholes along section lines in the northwest of the area to about 62m to 100m between section lines and about 30m to 45m between boreholes along section lines in the southeast of the surface mining area.

## 10.9 FUTURE EXPLORATION DRILLING

Exploration drilling planned by GCC in 2015 will primarily focus on the north part of No. 12 Mine South A underground mining area.

Future exploration work between 2016 and 2018 will focus primarily on resource development in the following areas:

- No. 9D Mine — Underground Mining Operation
- No. 9 Mine West Extension — Surface Mining Operation
- No. 2 Mine Muskeg Pit and Barrett South — Surface Mining Operation
- No. 16 Mine — Surface Mining Operation.

## 11 SAMPLE PREPARATION, ANALYSES AND SECURITY

The consulting firm AMEC previously reviewed the sample preparation, analysis and security for the drilling prior to an audit completed in 2007. AMEC concluded the procedures were appropriate and generally are the procedures employed by the coal industry today.

### 11.1 CORE SAMPLES

Drilling personnel collected drill core and placed the core in core boxes of appropriate size. Drill core size has been typically 3 inch (76mm) diameter, however some earlier programs collected diamond drill core of a slightly smaller diameter. The core was transported to logging facilities by geologists where the core was measured, logged for geology and coal intervals were identified and sampled. In some cases the core was logged in boxes at the drill site or logged and measured in the core barrel before being placed in tagged sample bags.

The sampling protocol for coal core was to bag the complete core for each ply. Sampling requirements were for each coal ply to be no less than 15 cm in length and for each rock ply not be less than 5 cm in length. In most cases, rock plies were analyzed for the ash content and the content of waste components.

Each ply was bagged and tagged and multiple bags were used if the ply was large. The samples were then dispatched by ground transportation to a commercial coal laboratory. Drill core samples were primarily analyzed by independent, accredited laboratories, including GWIL Industries — Birtley Coal & Minerals Testing Division and Coring Laboratories Ltd., both based in Calgary, Alberta, and Commercial Testing & Engineering Co. based in Vancouver, B.C. In some cases the initial preparation of the core plies (or “runs”) was completed by the SRCL laboratory. This laboratory was ISO-certified from approximately 1990 to 2000. As this laboratory was capable of only basic proximate and FSI tests, the ply samples would be shipped out to external laboratories for more sophisticated rheological, petrographic and chemical tests after the initial tests were performed onsite by SRCL.

Core plies were typically analyzed for in-place ash and FSI. Seam composites of cores were analyzed for sulphur, ash chemistry, proximate analysis and petrographic data. In some cases, the full suite of testing was applied to subsections of coal seams (high-ash or low-ash zones) where there was considered potential to mine and blend these subsections. Specifically, the upper 3m and the lower 4.5m of 4 Seam were sampled and analyzed separately for proximate and petrographic parameters in areas like No. 12 South.

Coal samples were analyzed for As-Received Moisture and air-dried moisture. The quality values are commonly presented on a "Dry Basis" by making adjustments for the measured moisture content, permitting the direct comparison of coal quality between coal seams.

Washability analyses of cores typically consisted of float/sink tests at one specific gravity (commonly between and SG of 1.40 to 1.50), which is dependent on the coal seam being analyzed. In later years, core composite samples were sieved at 0.5mm with the plus fraction being subjected to float sink and the minus fraction being subjected to froth testing, using similar chemicals as those in use by the GCC process plant at the time.

### 11.2 ADIT SAMPLES

Adit samples were subjected to extensive float/sink testing of the plus 28 mesh (0.5 mm) coal fraction. The float/sink testing was commonly applied to three or four size fractions at four or five specific gravities for floating each size fraction. The minus 28 mesh fraction was subjected to froth testing commonly for three time intervals.

SRCL and predecessors assembled an extensive database on the coking properties and washability characteristics of the different coal seams in the Smoky River Coalfield between 1969 and 2000. Most coking tests were conducted by CANMET, the federal government laboratory in Ottawa. These data now form part of the GCC quality data base.

GCC also has an extensive database of coal quality sampling of raw and clean coal conducted prior to shipping to ensure that the product meets customer specifications. Samples were produced from channel sample locations in surface and underground operations, and from raw and clean coal stockpiles. These samples were analyzed at the GCC mine laboratory which is not currently accredited, however periodic check samples were shipped out to accredited laboratories to confirm the in-house analyses. These sampling data come from all currently active and previously mined areas, including No. 12 South, No. 8, and No. 9.

## 12 DATA VERIFICATION

### 12.1 GEOPROG 2012 VERIFICATION

In 2012 a team comprised of GCC employees and Geoprog Consulting (Geoprog) completed verification of the GCC and legacy data for the 2007 and 2011 Technical Report, which was summarized in the AMEC 2012 NI 43-101 Technical Report and include data from Mine Areas No. 2, No. 8, No. 12S, No. 12 North, and No. 16. The team verified those data together with No. 9 Area data for this report and confirmed at that time that the procedures and data were adequately maintained.

The team independently checked the exploration results from the open pit mining areas by reviewing geophysical logs. This information was compared to the equivalent seam information recorded by GCC. A third check was made to ensure what was reported on the cross-sections used for geological interpretation matched the information.

The results of that verification showed that GCC geology and engineering technical staff have followed coal industry standard methods of recording, storing, analyzing, and interpreting drillhole data. With a few minor variations, the results of the evaluation were the same as the GCC data analysis and interpretation. The team concluded that information used from geological records was verified, recorded, stored and used appropriately and accurately for geological interpretation on the GCC open pit coal mine areas.

Mine operations have also validated the sampling and testing data with coal deliveries meeting client specifications for quality.

GCC maintains the historic data in binders and filing cabinets at the GCC mine office. The data contain driller's logs, geophysical logs, geological logs and deviation survey information data. The team observed this information was well maintained.

Much of the hardcopy content from previous exploration and sampling is also maintained as electronic files on a secure central server. Access to the server is controlled by GCC Information Technology personnel.

### 12.2 GEOPROG 2013 VERIFICATION

In 2013, GCC scanned all available hardcopies of historical exploration drillholes into digital format and then digitized the geophysical logs into LAS format for easy access.

Data verification in 2013 was completed by Geoprog for the historic No. 9 Area. For this area, GCC completed a number of tests on the No. 9 Area database, including cross checks of the collar elevation against recent LiDAR topography, comparisons of the seam picks from the drillhole databases against the geophysical logs, comparisons of deviation measurements down hole in the database against hardcopy in the files, and comparisons of the magnetic declination information from hardcopy files against the values in the drillhole database.

In addition to the data verification for the No. 9 Area, the QP verified the modeling for the No. 9 Area by constructing independently geometric and quality block models for this area using independent mining software and interpolation methods.

### 12.3 NORWEST 2014 VERIFICATION

#### 12.3.1 *Site Inspection*

The Qualified Persons for the report have undertaken a site inspection of the GCC coal operations on October 20 through 22, 2014 and on January 27 and 28, 2015. During the site inspection the Qualified Persons conducted interviews with GCC geologic, mine planning and coal processing staff. Inspections of the coal processing facilities, mining operations and explorations areas were also completed during these site visit.

#### 12.3.2 *Geologic Database Verification*

The original records for a subset of the exploration drillhole database used for coal resource estimation was obtained for detailed review and verification. The drillholes were selected such that their location represented the overall resource or areas believed to have the most impact on the current mine plans. The following number of exploration holes were selected for verification:

- No. 2 Area — 13 drillholes
- No. 8 Area — 26 drillholes
- No. 12 North Area — 3 drillholes
- No. 16 Area — 12 drillholes
- No. 12 South Area — 2 drillholes.

The detailed review of the above original records indicated that type and quality of information collected from previous exploration campaigns on the property is within expectations for similar coal projects located in the western Canada.

#### 12.3.3 *Geologic Models*

The geologic models used for resource estimation were completed by AMEC and GCC using GCC exploration data. These geologic models and associated scripts (macros) were completed using MineSight™ software and provided to Norwest for verification and review. Norwest's observation of the modeling methods, geologic interpretations and estimations is in accordance with industry best practice. Norwest was also able to independently reproduce the resource tonnes reported for the No. 2 Area model using the provided geologic model data.

## 13 MINERAL PROCESSING AND METALLURGICAL TESTING

### 13.1 INTRODUCTION

This section focuses on both the physical attributes of the coal as they relate to coal processing and product as well as petrographic attributes which are important to understanding and predicting key elements for coke manufacture.

Large samples, collected from the coal preparation plant (CPP) feed stream, have been collected and laboratory analyzed for washability characterization. The washability characteristics and simulations of Grande Cache's CPP process are discussed below.

The coals mined at Grande Cache can be characterized as high rank low-volatile metallurgical grade coking coals. The primary seams, highest to lowest rank, are Seam 4, Seam 6, Seam 7 and Seams 10 and 11. This determination has been made with petrographic analysis. These test data are used to characterize the key properties as they relate to coking operations.

### 13.2 WASHABILITIES DATA

The washability data for the main three seam groups, Seam 4, Seam 7 and Seams 10-11 are discussed here. Although an extensive database of washability data exists from the GCC property dating back to exploration adits from the mid 1960s, the basis for the following discussion is GCC-delivered raw samples, in the range of 500-600kg for each seam, to Birtley Coal and Mineral Testing laboratory in December 2011. The laboratory is located in Calgary, AB.

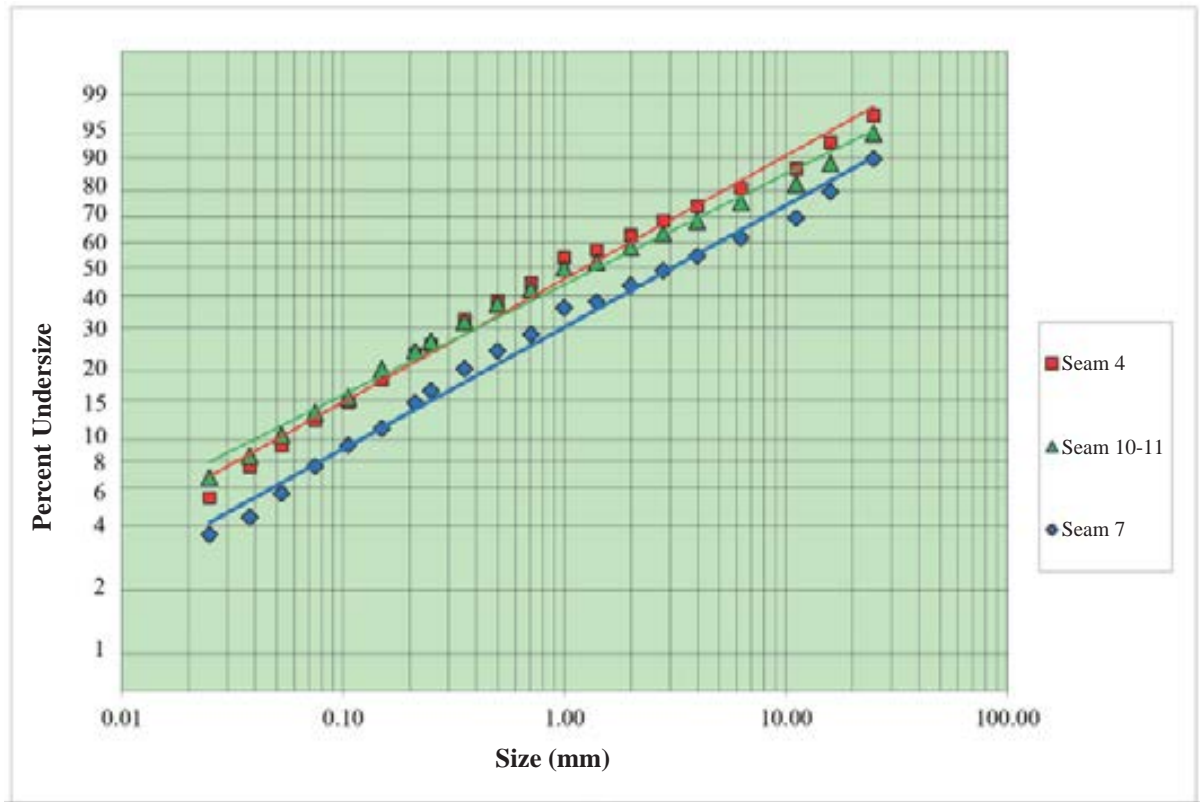
The test work for the washability study was comprehensive with the samples each screened and sieved into 21 size fractions, weighed and tested for raw ash content.

The screened fractions were recombined into eight logical size groups and subjected to sink-float testing. Fourteen density increments in each size fractions were obtained.

13.2.1 Size Distribution

An important part of a washability study is the determination of particle size distribution for each seam. This information is essential to proper sizing of the CPP processes. Figure 13.1 below is a standard Rosin-Rammler plot of the seams washed at GCC. The samples were collected postrotary breaker, effectively minus 35mm material. The size distribution shown is consistent with friable low-volatile coking coals.

FIGURE 13.1 ROSIN-RAMMLER PARTICLE SIZE DISTRIBUTIONS OF GCC SEAMS



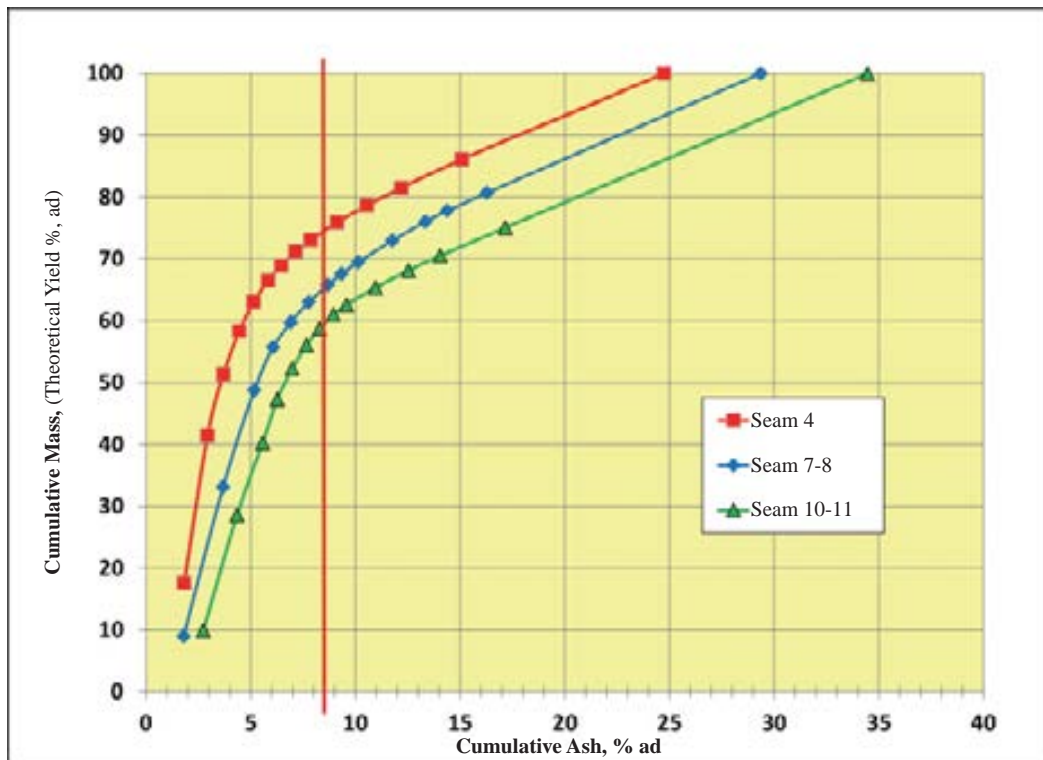
13.2.2 Sink-Float Analyses

After determination of size distribution, eight particle size groupings were subjected to sink-float testing utilizing 14 densities to provide a comprehensive washability characterization of the CPP feedstock.

Figure 13.2 below represents a weighted composite of the eight sink-float fractions for each seam. The cumulative float weight (mass) as a function of cumulative ash is a densimetric characterization of each seam. Note the knee-bend curve of each seam which indicates a “black and white” separation with minimal middlings material. The target product ash, 8.5% ad, is located to the right of the knee-bend, suggesting low near-gravity or relatively easy separation. The relative positions of each seam curve suggest that Seam 4 exhibits the lowest ash-product potential while Seam 10-11 the highest ash-product potential.

These ash-yield curves also provide an indication of theoretical yield for each seam. However, practical CPP yields will be lower due to process inefficiencies and the influence of out-of-seam dilution as well as particle size distribution.

FIGURE 13.2 COMPOSITE THEORETICAL ASH-YIELD CURVES OF GCC SEAMS



Figures 13.3 through 13.5 show the detail of each sink-float size fraction for each of the major seams at GCC. These ash-yield curves appear to be normal with the coarse fractions having the lowest yield potential and the fine fraction greater yield potentials. The coarser fractions indicate significantly higher ash content; this is primarily due to the high-ash dilution rock being physical stronger than the friable coal — hence a concentration of rock in the coarsest fractions.

FIGURE 13.3 SIZE FRACTIONAL ASH-YIELD CURVES — SEAM 4

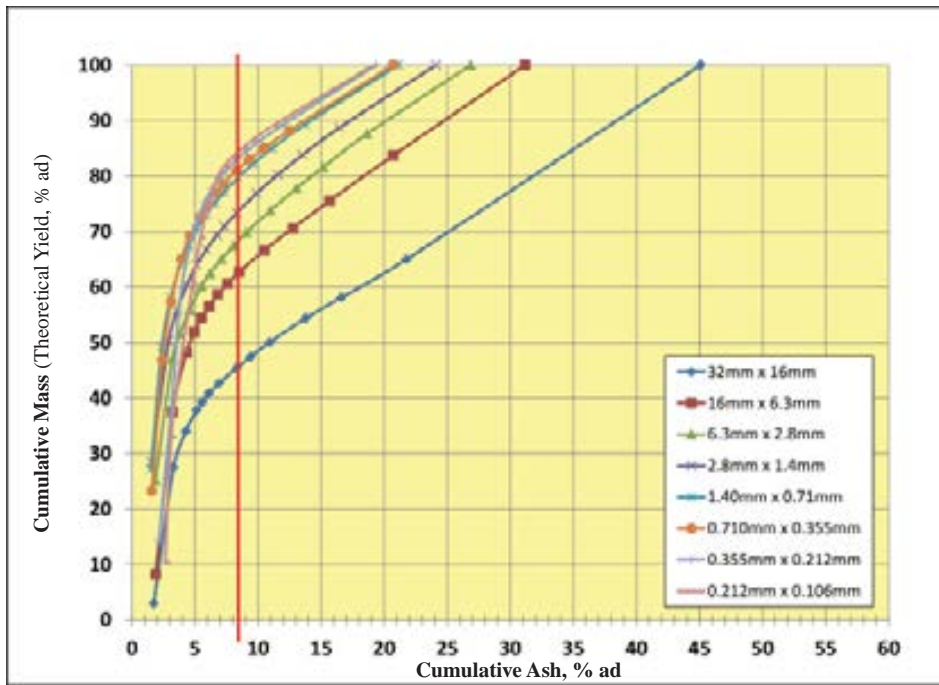


FIGURE 13.4 SIZE FRACTIONAL ASH-YIELD CURVES — SEAM 7

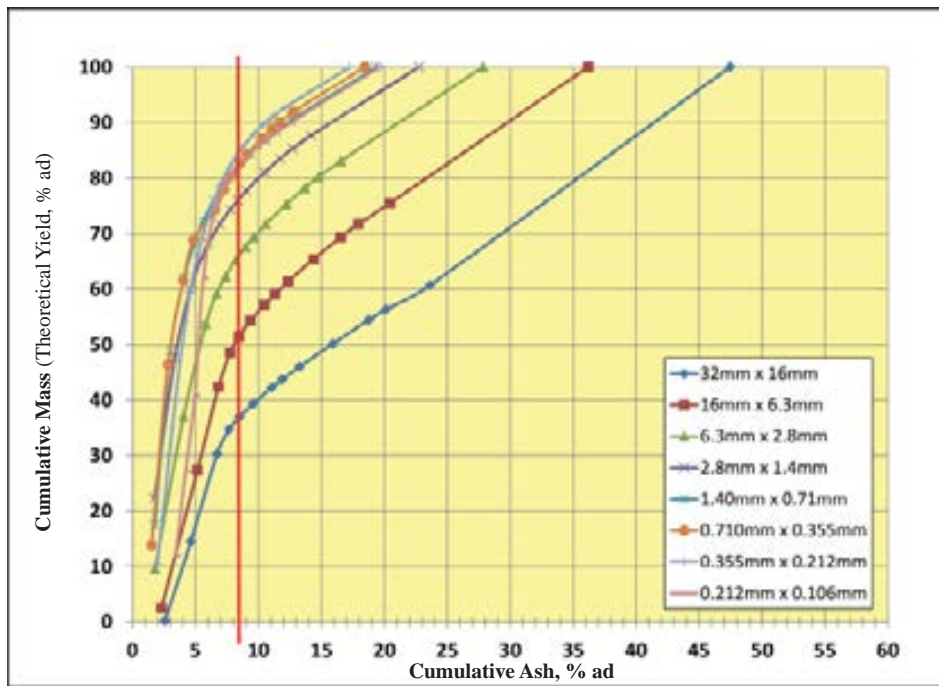
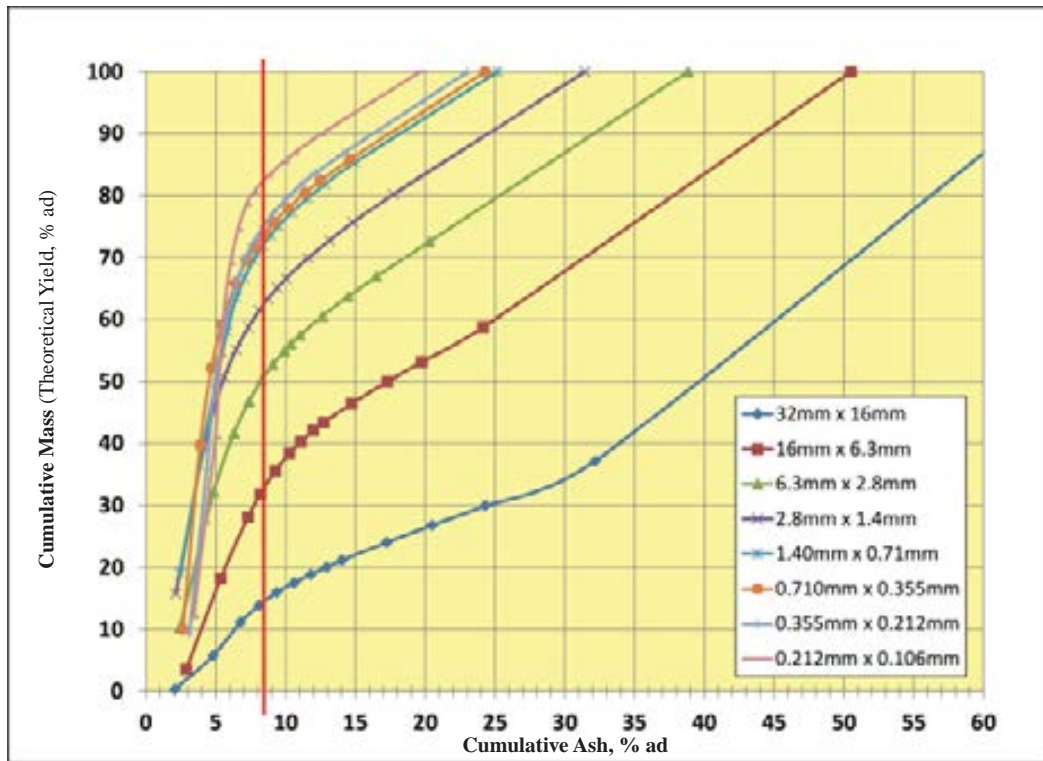




FIGURE 13.5 SIZE FRACTIONAL ASH-YIELD CURVES — SEAMS 10-11



13.2.3 CPP Process Simulations

To determine the expected yields and product quality potentials, the process circuitry of the Grande Cache CPP was modeled in a Limn<sup>®</sup> simulation program. Limn<sup>®</sup> models the actual expected performance of each individual plant process, e.g., screens, cyclones, HMC, froth flotation, etc., and is capable of accounting for recirculating loads. The washability data — size and density distributions — are the input information.

Using the 2011 washabilities, Norwest simulated the Grande Cache CPP to determine the expected yields for a given product ash. These simulations are based on the CPP as described in Section 17 of this report. Norwest performed two sets of simulations. Figure 13.6 reflects the “as-is” condition of the CPP while Figure 13.7 reflects the planned modification of adding a reflux classifier circuit to span the now overlapping HMC and froth flotation circuits. This latter improved circuitry not only represents the potential yield improvement of the current CPP, but would also represent the expected performance of the planned new CPP at Beaverdam Creek.

FIGURE 13.6 SIMULATED CPP YIELD — EXISTING PROCESS

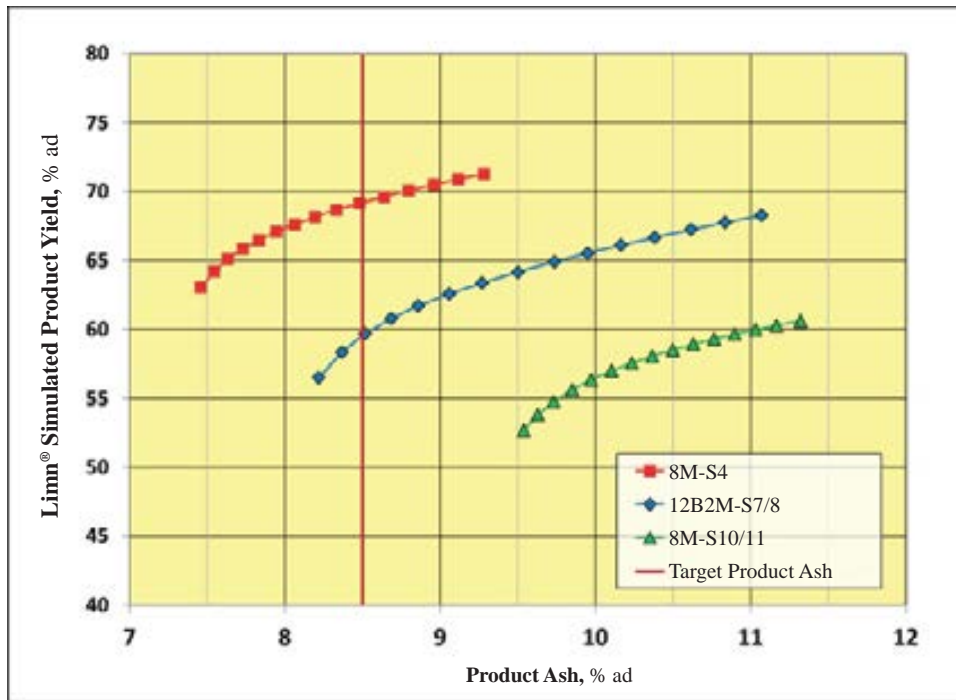
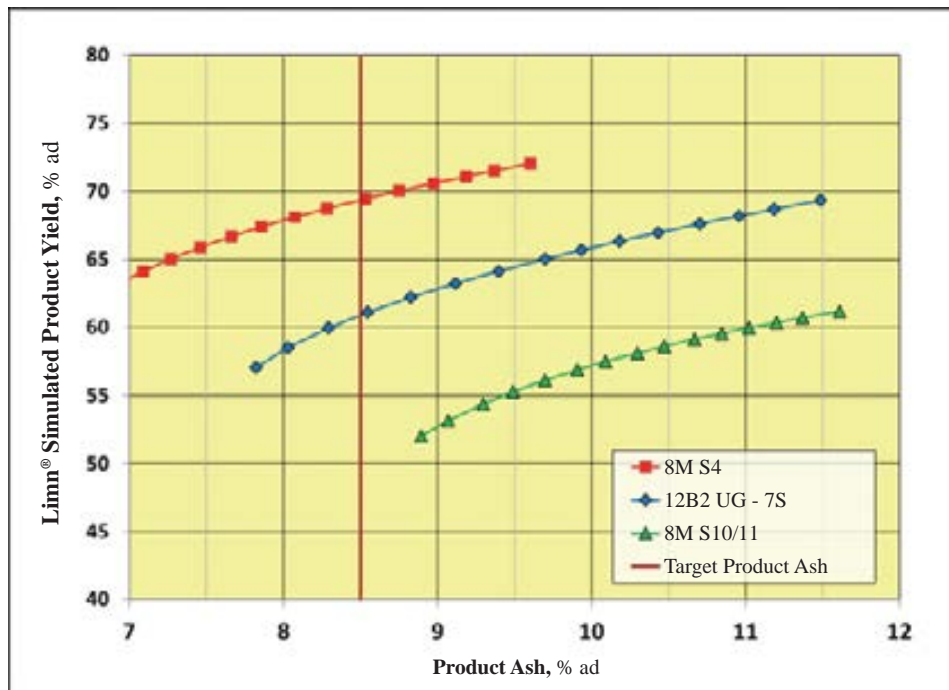


FIGURE 13.7 SIMULATED CPP YIELD — WITH REFLUX CLASSIFIER CIRCUIT



### 13.3 METALLURGICAL COKING CHARACTERISTICS

This section discusses the key metallurgical quality characteristics of the Grande Cache coals.

#### 13.3.1 Petrographic Characterization

Petrographic analysis, the study of coal macerals, provides a means of identifying coking properties as well as predicting the coking performance coal. Table 13.1 below lists the key values developed from petrographic analyses.

**TABLE 13.1 KEY INDICATIVE COKING PROPERTIES FROM PETROGRAPHIC ANALYSIS**

Seam No.	4 (9/2/8 Mine)	4 (12S/12N/16 Mine)	6	7	10	11
Mean Reflectance, % ( $R_{o_{max}}$ )	1.63	1.64	1.58	1.57	1.51	1.47
Ash, %	6.4	6.9	6.0	8.1	7.8	8.1
Composition Balance Index	3.63	4.35	3.30	4.31	3.41	2.81
Calculated Strength Index	7.16	7.06	7.04	6.84	6.84	6.71
Calculated Stability Index	52	47	54	47	54	57
Estimated Coke Strength DI 30/15	94.1**	92.1	93.8	92.3	93.6	93.9
Predicted Free Swelling Index (FSI or CSN)	8**	6½	7½	5½	8	7
Total Reactive Components (Macerals), %	71.4	67.4	69.5	62.7	65.1	66.5
Total Inert Components, %	28.6	32.6	30.5	37.3	34.9	33.5

\*\* Actual pilot oven coke test results, CANMET Bells Corners laboratory.

The GCC coals are low volatile, high rank coals which fluidity and petrographic reflectance properties are consistent with coking coals of this rank. These are shown on the MOF graph on the next page (Figure 13.8).

Typical vitrinoid-type (V-type) distribution is shown in Figures 13.9 and 13.10. Again, these Vtype distributions are consistent trending from the right (V-16) for lower seams to the left (V-14) for the upper seams.

FIGURE 13.8 MOF GRAPH

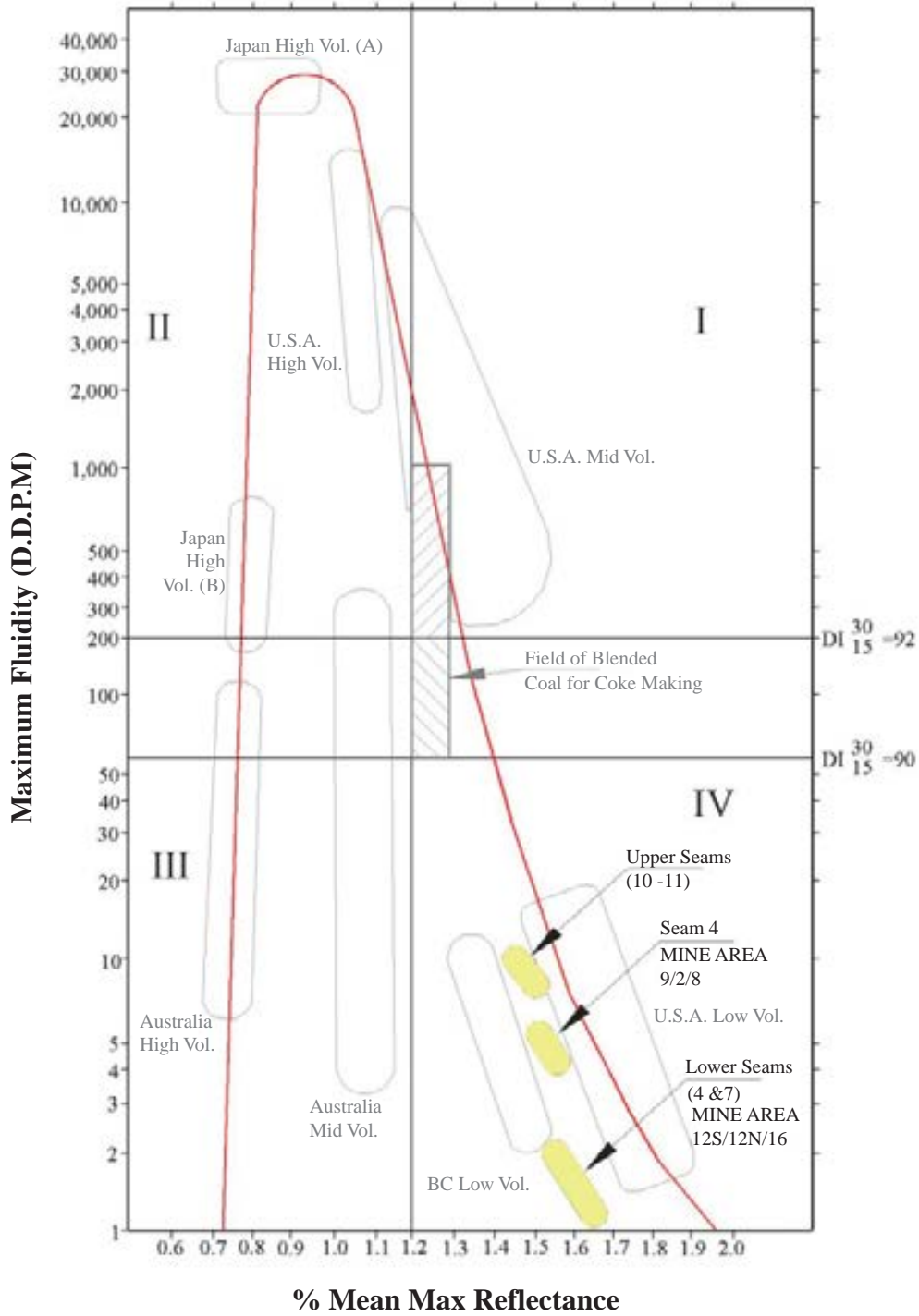


FIGURE 13.9 GCC V-TYPES — SEAMS 4 AND 7 (LOWER SEAMS)

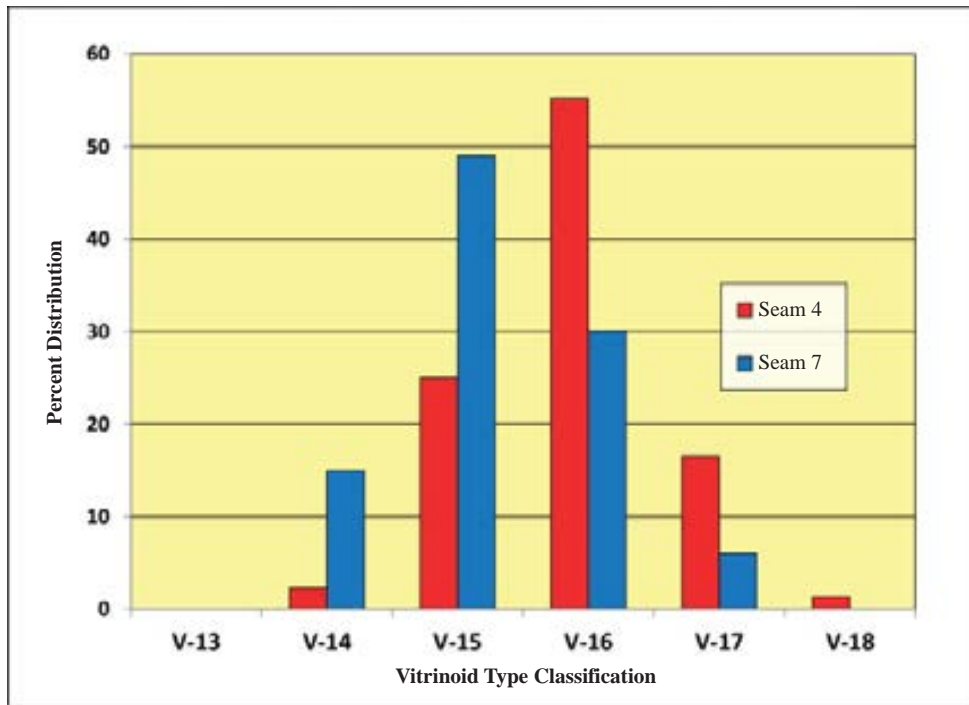
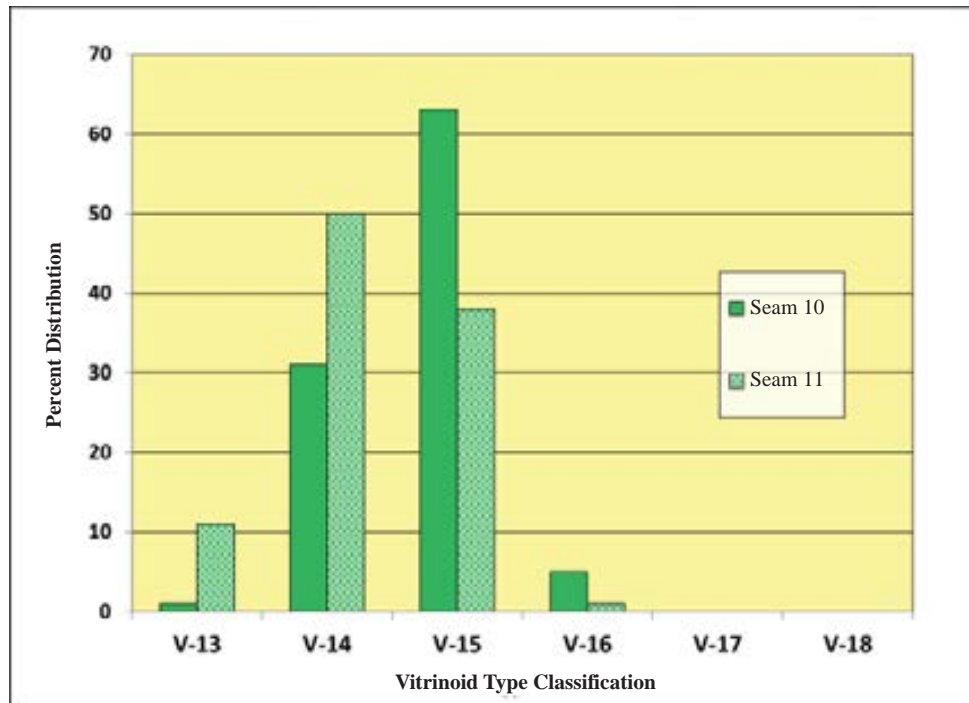


FIGURE 13.10 GCC V-TYPES — SEAMS 10 AND 11 (UPPER SEAMS)



13.3.2 Coke Strength Prediction

The predicted coke strength for select seams is shown in Figures 13.11 through 13.13. These are indicative only and may vary slightly due to location or ply.

Another means for predicting coke strength is the composition balance (Shapiro-Gray) graph. This is very useful since it uses petrographic data of the coal itself instead of actual oven tests. Figure 13.14 is also useful for pre-determining coal blends for coke making.

FIGURE 13.11 PREDICTED COKE STRENGTH — TYPICAL SEAM 4

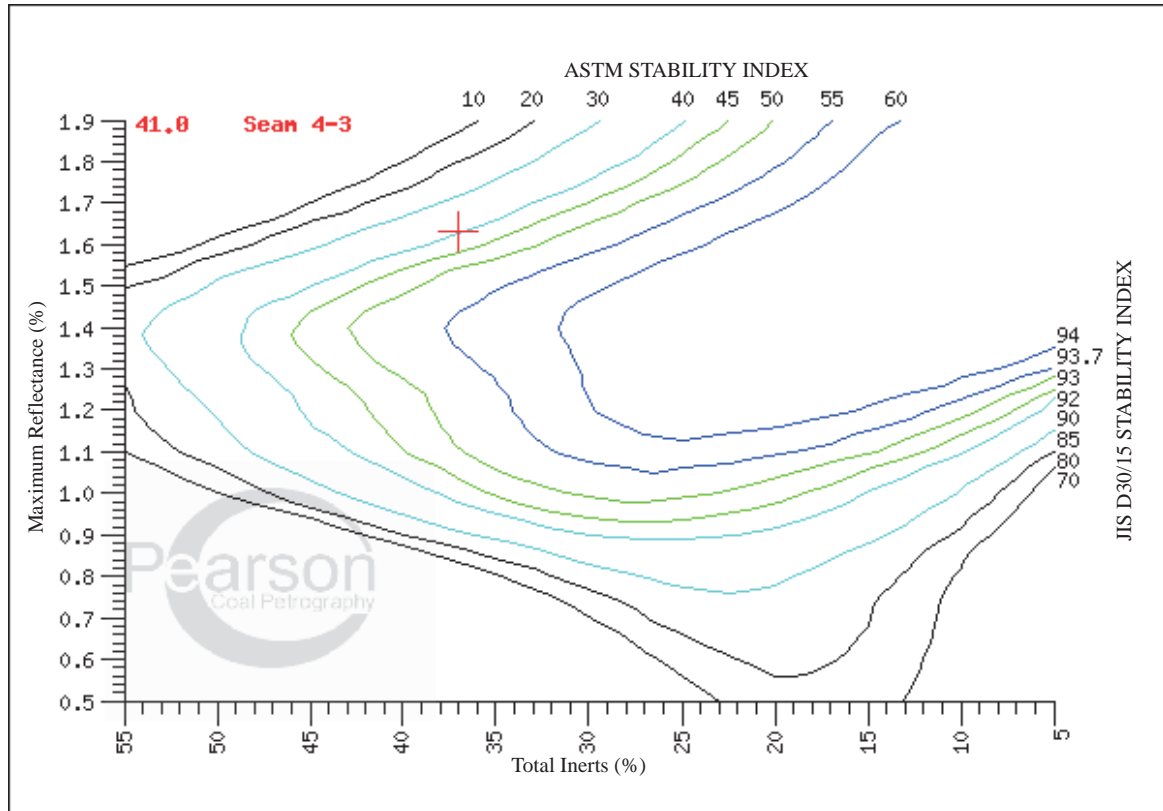


FIGURE 13.12 PREDICTED COKE STRENGTH — TYPICAL SEAM 6

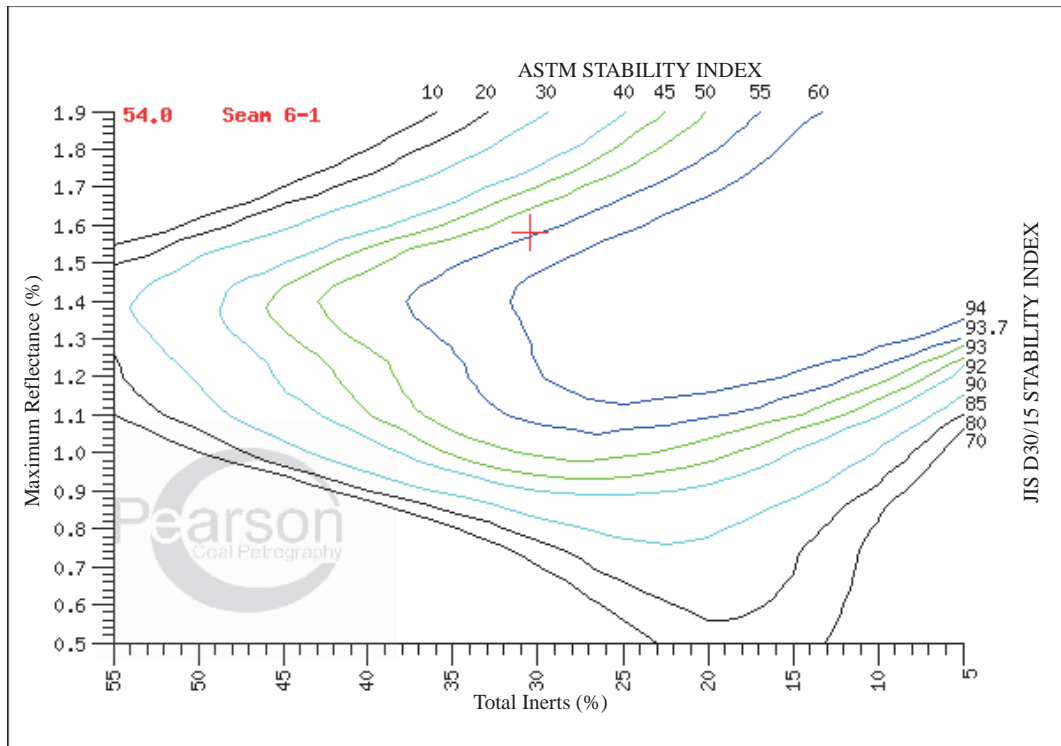


FIGURE 13.13 PREDICTED COKE STRENGTH — TYPICAL SEAM 7

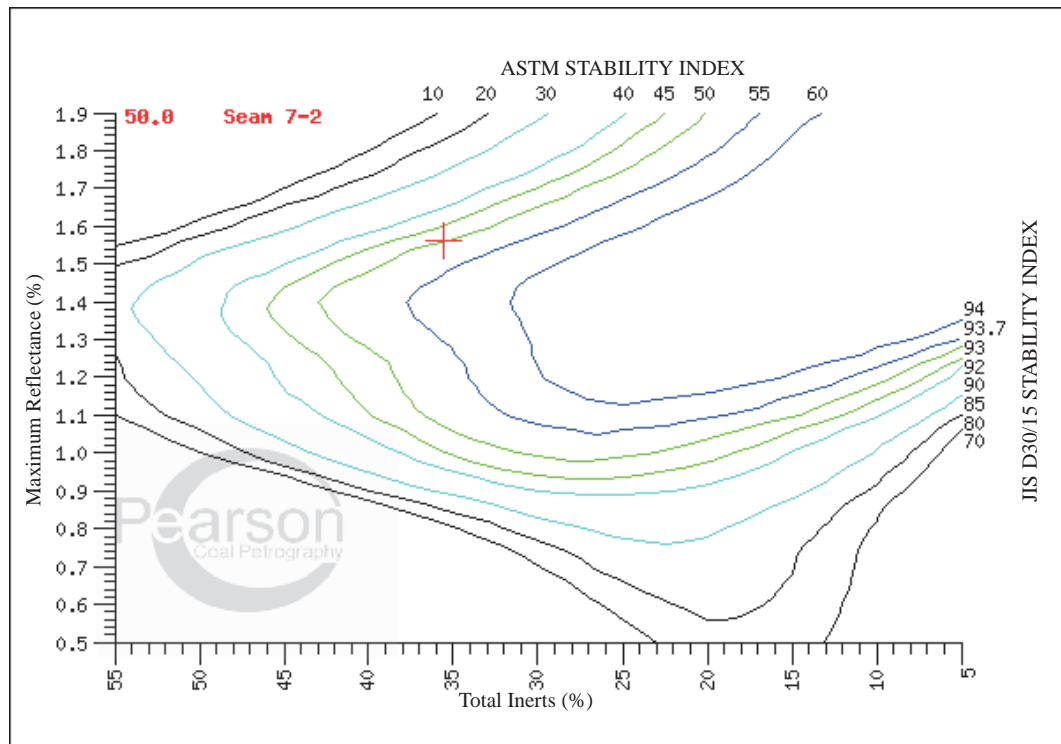
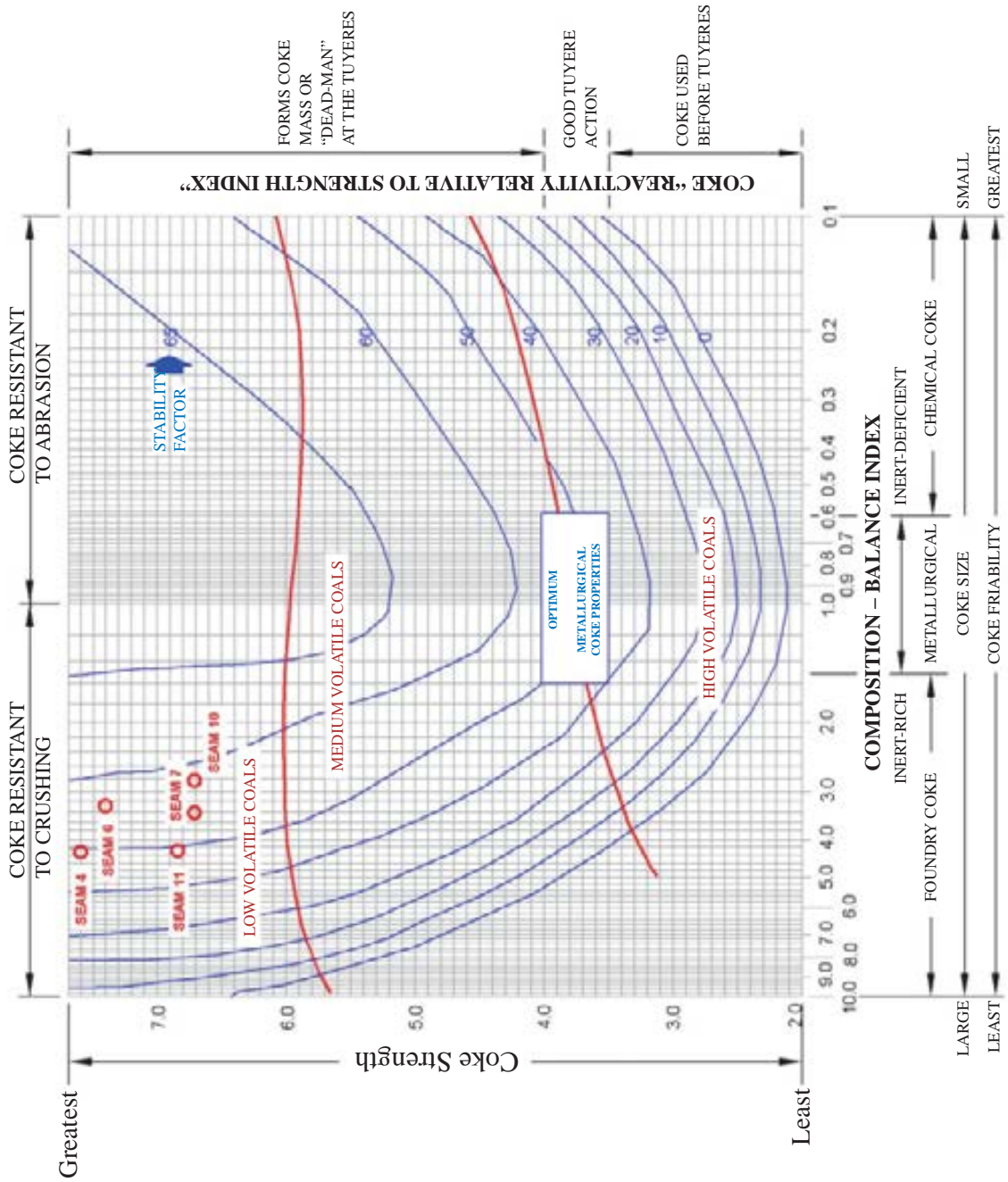


FIGURE 13.14 COMPOSITION BALANCE & STRENGTH GRAPH





## 14 MINERAL RESOURCE ESTIMATES

### 14.1 COAL RESOURCES

For the No. 2, No. 16, and No. 12 North areas, the coal resource estimates for this report were generated by the consulting firm AMEC with input from GCC staff geologists and were checked and reviewed by AMEC in 2012. No exploration, modeling or design work has been done in the No. 2, No. 16, and No. 12 North areas since the AMEC evaluation. For the No. 8, No. 9, No. 12 South B2 and No. 12 South A areas, the resource estimates have been updated based on new exploration, and/or modeling, and/or mining activity by GCC staff. Norwest has performed sufficient review and validation of the base data, geologic models, and resource estimates for the QP to confirm that these results meet industry standards for accuracy.

#### *14.1.1 Reporting Coal Resources in Canada — Background Information*

National Instrument 43-101 is the law that establishes scientific and technical disclosure standards for mineral projects in Canada and how mineral resources and reserves must be reported. This instrument was updated on December 30, 2005. The areas affecting resource and reserve reporting for coal properties was amended. The section of the Companion Policy 43-101CP, Part 2, Section 2.2 states:

“A qualified person estimating mineral resources or mineral reserves for coal may follow the guidelines of Paper 88-21 of the Geological Survey of Canada: A Standardized Coal Resource/ Reserve Reporting System for Canada, as amended (“Paper 88-21”). However, for all disclosure of mineral resources or mineral reserves for coal, Section 2.2 of the Instrument requires an issuer to use the equivalent mineral resource or mineral reserve categories set out in the CIM Definition Standards and not the categories set out in Paper 88-21.”

In this report, all new resource calculations (No. 8, No. 9, No. 12 South B2, and No. 12 South A Areas) have been done using a sectional based method as strictly defined in Paper 88-21 for geology complexity types that require this method. Resource estimates in this report unchanged (No. 2, No. 16, No. 9 and No. 12 North Areas) from the previously filed Technical Report have been reviewed by the QP. While these resource estimates do not utilize a sectional based method for the more complex geological areas, the QP concludes they represent a method equivalent to the sectional method for these deposits.

#### *14.1.2 Assurance of Existence*

Assurance of Existence classes divides the total resource based on the level of certainty known about the quantities of coal. The amount of certainty is based on the distance of a resource block from a valid data point which provides the locations of the top and/or bottom of the coal seam. A valid data point is defined as a position that wholly or partially exposes a coal seam or any marker horizon that indicates the structure and/or proximity of the coal seam of interest. These can be obtained from any of the following:

- Surface outcrop
- Surface trench
- Adit driven
- Drillhole intersection.

The more complex the stratigraphic and structural regime of the coal deposit, the greater the number of data points that are required to assign the coal resource to a measured, indicated or inferred resource category. Table 14.1 below outlines the criteria used for the resource estimates for the No. 8, No. 9, No. 12 South B2, and No. 12 South A Areas. Table 14.2 outlines the criteria used for resource estimates for the No. 2, No. 16, and No. 12 North Areas.

**TABLE 14.1 METRES DISTANCE FROM NEAREST DATA POINT FOR RESOURCE CLASSIFICATION, NO. 8, NO. 9, NO. 12 SOUTH B2 AND NO. 12 SOUTH A**

Geological Type	Criteria	Confidence Class		
		Measured	Indicated	Inferred
Moderate	Distance from the nearest point (m)	0–450	450–900	900–2400
Complex	Cross-section spacing (m)	150	300	600
	Minimum number of data points per section	3	3	3
	Mean data point spacing along section (m)	100	200	400
	Maximum data point spacing along section (m)	200	400	800

**TABLE 14.2 METRES DISTANCE FROM NEAREST DATA POINT FOR RESOURCE CLASSIFICATION, NO. 2, NO. 16 AND NO. 12 NORTH**

Geology Type	Confidence Class		
	Measured	Indicated	Inferred
Moderate	0–300m	300–600m	900–2400m
Complex	0–100m	100–200m	200–400m

A moderate geology type consists of deposits that have been subjected to a moderate amount of tectonic deformation. Structural characteristics of these types of deposits include homoclines or broad open folds with seam dips less than 30°. Faults may be present with displacements of less than 10m. The No. 2, No.7, and the northwestern part of No. 9 Areas are the deposits that fit this classification.

A complex geology type consists of deposits that have been subjected to a high amount of tectonic deformation. Structural characteristics of these types of deposits include numerous anticline/syncline pairs, both symmetric and overturned, associated with large scale thrust faulting. The complex geology areas in the Project area include the No. 8, No. 12 South A, and the No. 12 South B2 Areas, and the southeastern part of the No. 9 Mine area.

Confirmation from GCC personnel has indicated that the coal quality has been generally consistent within each of the mined pits; therefore, modifying the classification parameters based on the presence of coal quality information is not warranted.

#### **14.1.3 Probable Method of Extraction**

Coal can be extracted using a variety of mining methods. For the purposes of resource estimation a simplified division is made such that resources are classified as surface or underground. Surface resources are considered to be non-underground mineable resources that exist within a conceptual open pit design (pit shell) that meets a 20:1 (bcm waste: tonne coal) cut-off strip ratio. Underground resources are considered as such where they are contained in seams with a dip of less than 30° and a minimum and maximum depth from surface of 50m and 600m, respectively.

#### 14.1.4 Seam Thickness Criteria

Seam thickness parameters are also a factor in determining whether a coal seam becomes part of a resource. This includes the concept of separable partings, which are rock bands between seams that can be removed during mining activities. For surface resources, minimum coal ply thickness of 0.5m was used as a cut-off for inclusion of a seam in the resources. Partings were included where they were less than 0.5m, with an overall coal to rock ratio of 1.5 or greater.

For underground resources, the minimum seam thickness used to determine whether a seam is included in the resource was 1.5m.

#### 14.1.5 Density

GSC Paper 88-21 refers to coal bulk density as:

“The inherent specific gravities of the coal (including empty pores) and included non-coal material (ash), and of the fluid-filled porosity within the coal.”

An empirical formula for density calculations has been developed for the Smoky River Coalfield using experimental data obtained using particle density test methods. These source coals for these tests have been obtained from drillholes, bulk samples and operating mines. They have been used to develop an empirical formula relating density to in-situ ash values. The density formula is:

Density (metric tonne per cubic metre) =  $-206.2/(\text{ash \% (db)} - 163.2)$   
Ash% (db): ash content in the coal on an air dry basis

Density values for each block in the resource model were assigned based on the interpolated in situ ash content.

#### 14.1.6 Geological Interpretation and Block Modeling

The modeling methodology used for resource estimation for all areas consisted of the following steps:

- Prepare data including database error checking within a mine area subset.
- Import of the drillhole data to the mining software package (Minesight® Torque®).
- Use the drillhole data to create 3D wire frame solids from cross sectional polygons for each seam.
- Create a triangulated 3D surface model representing the surface topography and the bedrock topography.
- Create coal seam solids models for each seam for coding coal ore percent into 3D block models.
- Create a 3D block model using blocks measuring 15m x 15m x 15m (except for No. 12 North Area and No. 16 Area, which are only 5m in height, and for No. 9, which is 25m x 25m x 15m). The relative percentages of each seam are then coded to the blocks, along with the percentage of the block that exists below topography.

- Interpolate coal quality using inverse distance squared ( $ID^2$ ) from drillhole composites of sampled holes.
- Determine extent of oxidized coal as a function of depth from topographic or bedrock surface (10m was the value used for all areas except No. 16, where past experience in the No. 12 West Area along strike from No. 16 Mine indicate that a more appropriate value of 24m should be applied).
- Classify a block's confidence class based upon its distance to the nearest drillhole intersection of the most abundant seam in the block, and in the case of sectional methods, the number of drillholes on a section line and the average spacing between those drillholes.
- Prepare surface resource pit shells using the Lerches-Grossmann (LG) algorithm at 20:1 cut-off incremental strip ratio (bcm waste:tonnes in-situ coal) with a 45° wall angle, following guidelines set out in GSC Paper 88-21.
- Determine underground resource limits for areas with shallowly dipping coal meeting thickness, dip and depth from surface criteria.
- Prior to resource reporting, the geologic models were checked against the input drillhole data for errata, errors or omissions. No significant differences were observed.
- Calculate surface and underground resources and coal quality from the block models and coal seam solids, including estimation of the resulting in-situ coal quality.

In 2012, the consulting firm AMEC and GCC completed LG analysis using updated resource models for all mine areas. In 2013, GCC updated the open pit resources with LG analysis using an updated model for No. 8 Area, and using a newly built model for the No. 9 Area. The criteria used in this analysis are summarized in Table 14.3.

**TABLE 14.3 SUMMARY OF INPUT CRITERIA FOR LERCHS-GROSSMANN ANALYSIS**

<b>Parameters</b>	<b>No. 2 and No. 8 Area</b>	<b>No. 12 and No. 16 Area</b>	<b>No. 9 Area</b>
Overall Cutwall Angle	45°	45°	45°
Exchange Rate (C\$/US\$)	1.00	1.00	1.00
Price of Met. Coal (US\$/t Clean)	170.00	170.00	170.00
Price of Ox. Coal (US\$)	75.00	75.00	75.00
Mining Cost (C\$/BCM)	4.00	4.00	4.00
Coal Haulage (C\$/t Clean)	8.00	8.00	8.00
Met. Coal Processing (C\$/t ROM)	14.00	14.00	14.00
Offsite Cost (C\$/t Clean)	35.00	35.00	35.00
Sustaining Capital (C\$/t Clean)	15.00	15.00	15.00
General & Admin (C\$/t Clean)	13.00	13.00	13.00

### 14.1.7 Resource Summary

The coal resources with an effective date of December 31, 2014, are shown in Table 14.4 and Table 14.5. Figure 14.1 illustrates the distribution of the coal resources for all areas of the GCC property. Figures 14.2, 14.3, and 14.4 illustrate the distribution of resources in the newly added No. 9 Area for the three coal seams of economic interest. Figures 14.5 and 14.6 show re-categorized resources in the No. 12 South B2 and No. 12 South A areas. The re-categorization of the No. 12 South area was done primarily to reflect the change in deposit type for 12 South A from open pit to underground. Oxidized coal is a by-product at GCC's operation and not included in these resources. This report does not include from highwall mining areas and former surface mines No. 1, No. 5, and No. 11 or from underground Mine No. 7.

The accuracy of resource and reserve estimates is, in part, a function of the quality and quantity of available data and of engineering and geological interpretation and judgment. Given the data available at the time this report was prepared, the estimates presented herein are considered reasonable. However, they should be accepted with the understanding that additional data and analysis available subsequent to the date of the estimates may necessitate revision. These revisions may be material. There is no guarantee that all or any part of the estimated resources or reserves will be recoverable.

**TABLE 14.4 SUMMARY OF COAL RESOURCES, MEASURED AND INDICATED**

	<b>Measured (Mt)</b>	<b>Indicated (Mt)</b>	<b>Total (Mt)</b>	<b>Ash (%)</b>	<b>FSI</b>
<b>Surface Mining Area<sup>(2)</sup></b>					
No. 2 Area	61.4	23.2	84.6	26.8	5
No. 8 Area	35.4	7.4	42.8	23.2	5
No. 9 Area	38.2	70.6	108.8	22.2	5
No. 12 South B2 Area <sup>(3)</sup>	2.6	1.0	3.6	13.9	3
No. 12 North Area	39.1	15.6	54.7	16.6	3.5
No. 16 Area	56.0	20.2	76.2	13.9	3.5
<b>Total Surface Areas</b>	<b>232.7</b>	<b>138.0</b>	<b>370.7</b>	<b>20.8</b>	<b>4</b>
<b>Underground Area<sup>(4)</sup></b>					
No. 9 Area	108.2	33.6	141.8	21.9	5
No. 12 South B2 Area	4.3	5.2	9.5	13.9	3
No. 12 South A Area	25.4	39.6	64.9	14.8	3
<b>Total Underground Areas</b>	<b>137.9</b>	<b>78.4</b>	<b>216.2</b>	<b>19.4</b>	<b>4.5</b>
<b>Grand Total</b>	<b>370.6</b>	<b>216.4</b>	<b>586.9</b>	<b>20.3</b>	<b>4</b>

#### NOTES

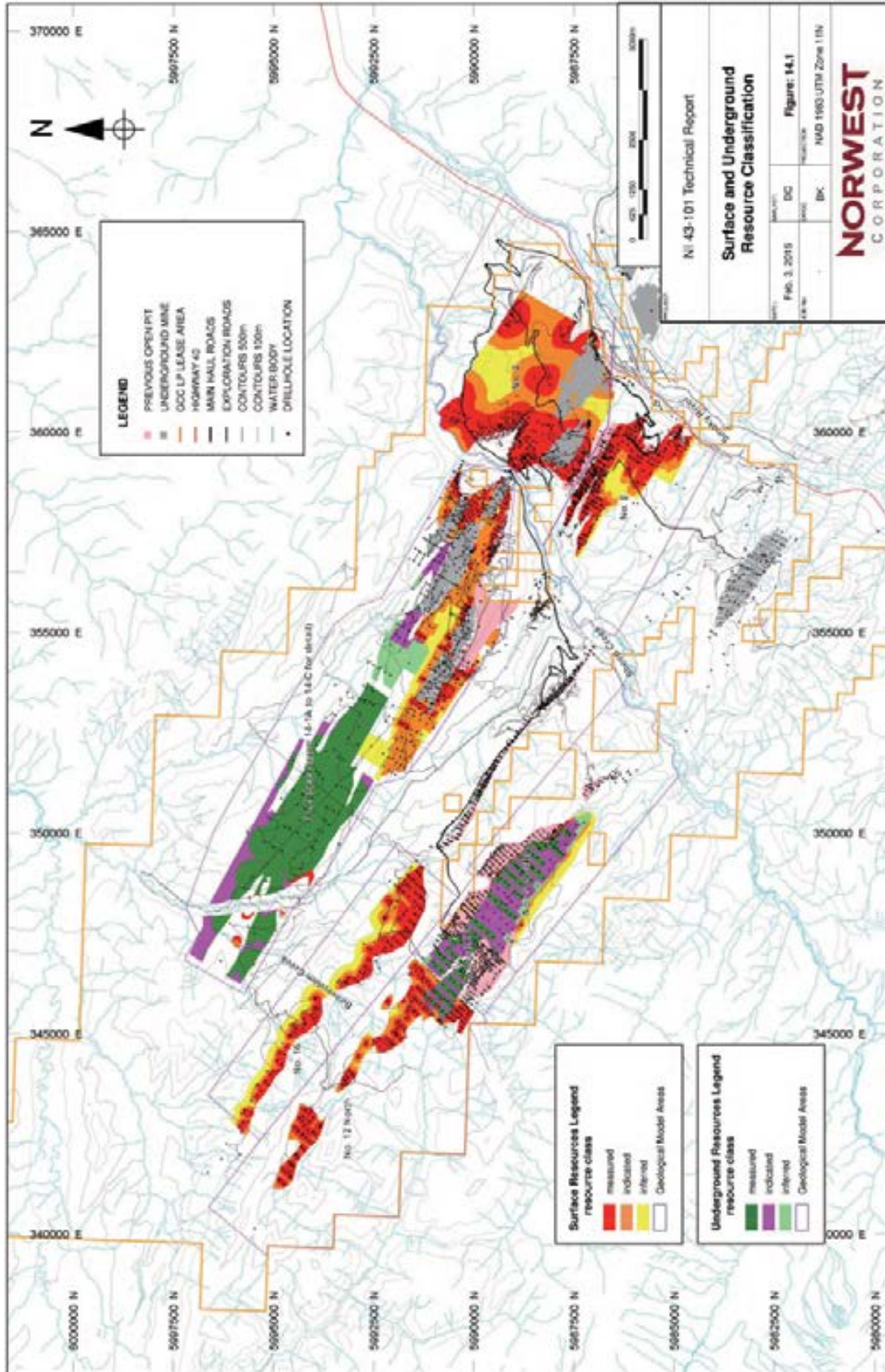
- (1) Quality of all resources classified as Low Volatile Bituminous (ASTM)
- (2) Surface mining resources estimated by GCC staff based on a 20:1 strip ratio cut-off and a 45 pit wall angle
- (3) No.12 South B2 surface resources are those remaining after the open pit reserves have been mined out
- (4) Underground resource estimated by GCC staff. Minimum depth of cover approx. 50m. Maximum underground extraction angle 30°; 20m buffer from faulting, 50m buffer from highwalls
- (5) Coal resources are inclusive of the coal reserves
- (6) The resource estimates are effective December 31, 2014 and have been prepared under supervision of Lawrence D. Henchel, P. Geo. and Qualified Person
- (7) Rounding as required by reporting guidelines may result in apparent summation differences

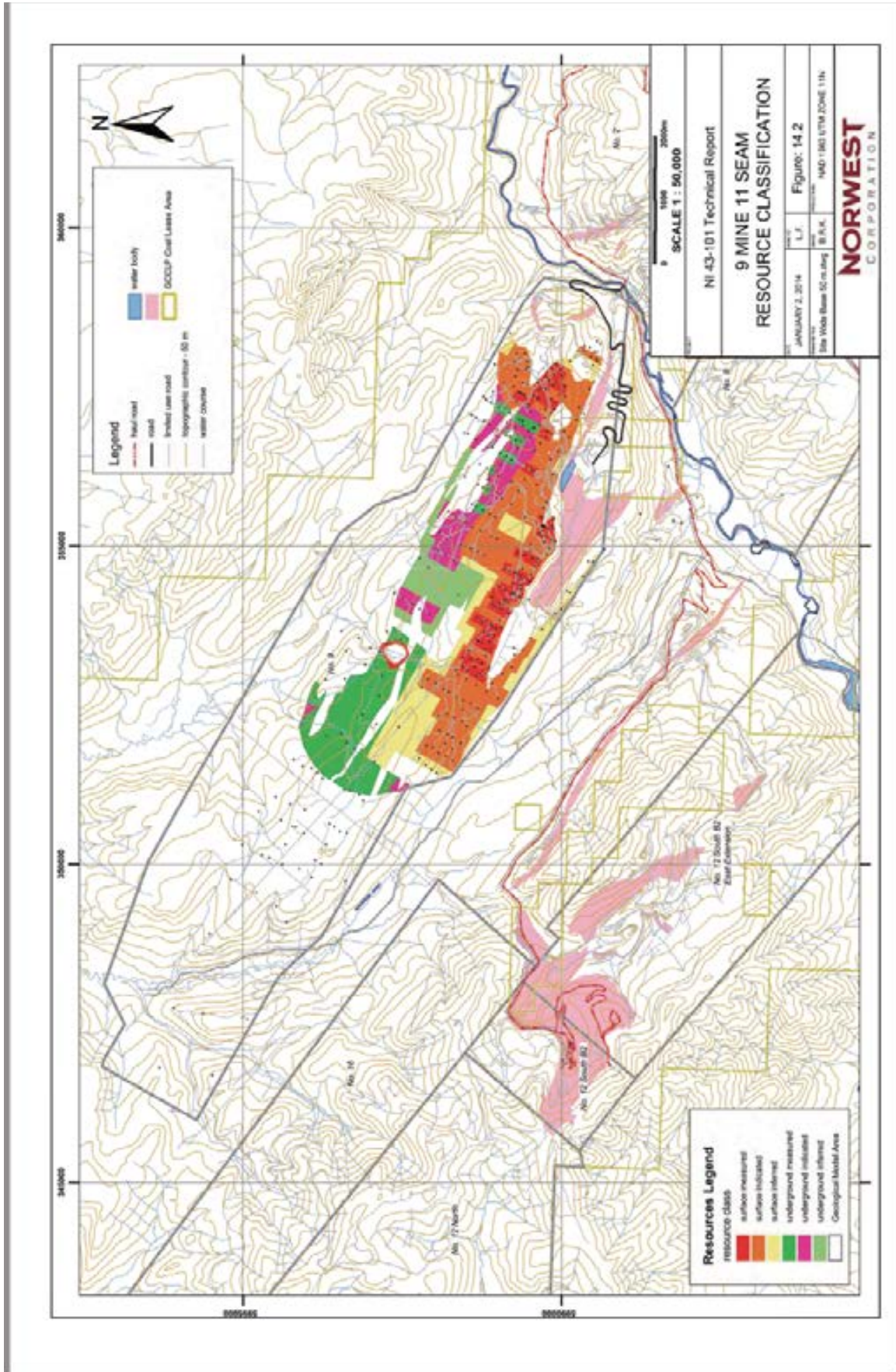
TABLE 14.5 SUMMARY OF COAL RESOURCES, INFERRED

	Inferred (Mt)	Ash (%)	FSI
<b>Surface Mining Area<sup>(2)</sup></b>			
No. 2 Area	6.3	23.2	5
No. 8 Area	0.7	24.4	5
No. 9 Area	27.5	20.5	5
No. 12 South B2 Area <sup>(3)</sup>	0.5	17.9	4
No. 12 North Area	2.2	21.2	3
No. 16 Area	15.9	15.3	4
<b>Total Surface Areas</b>	<b>53.1</b>	<b>19.3</b>	<b>4.5</b>
<b>Underground Area<sup>(4)</sup></b>			
No. 9D Area	20.1	20.1	5
No. 12 South B2 Area	0		
No. 12 South A Area	3.4	16.0	3
<b>Total Underground Areas</b>	<b>23.5</b>	<b>19.5</b>	<b>4.5</b>
<b>Grand Total</b>	<b>76.6</b>	<b>19.4</b>	<b>4.5</b>

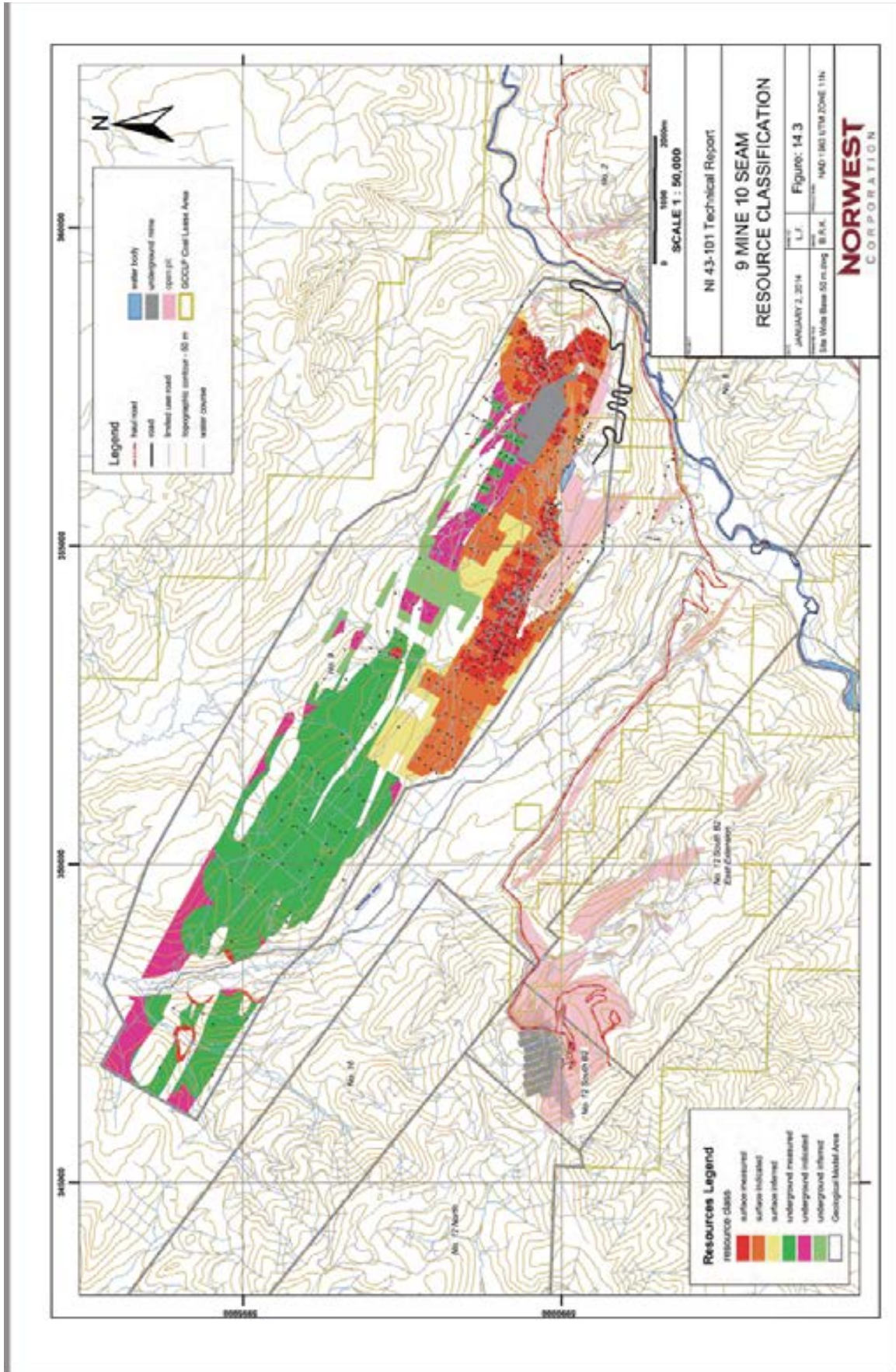
## NOTES

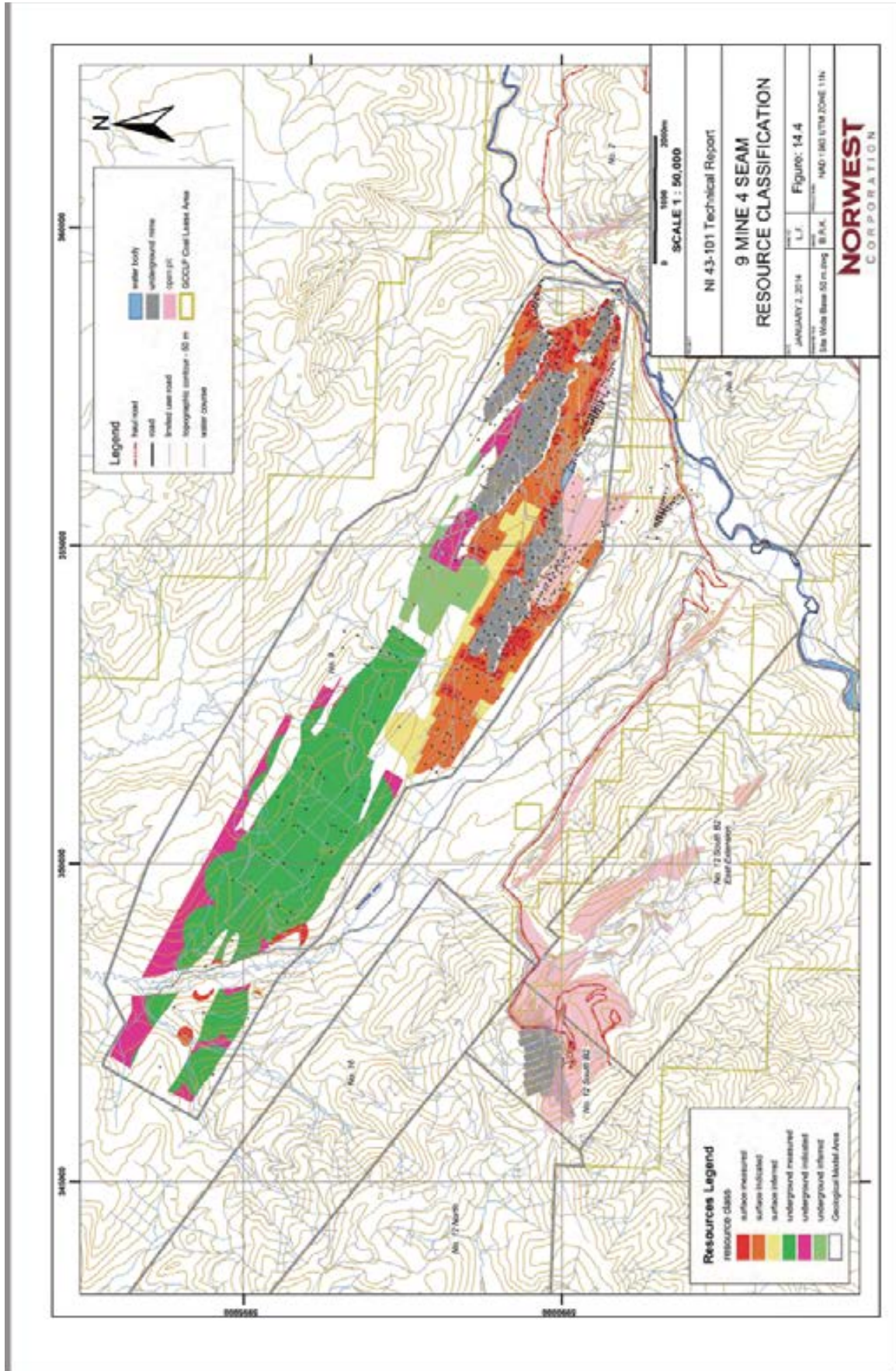
- (1) Quality of all resources classified as Low Volatile Bituminous (ASTM)
- (2) Surface mining resources estimated by GCC staff based on a 20:1 strip ratio cut-off and a 45 pit wall angle
- (3) No. 12 South B2 surface resources are those remaining after the open pit reserves have been mined out
- (4) Underground resource estimated by GCC staff. Minimum depth of cover approx. 50m. Maximum underground extraction angle 30°; 20m buffer from faulting, 50m buffer from highwalls
- (5) Coal resources are inclusive of the coal reserves
- (6) The resource estimates are effective December 31, 2014 and have been prepared under supervision of Lawrence D. Henchel, P. Geo. and Qualified Person
- (7) Rounding as required by reporting guidelines may result in apparent summation differences

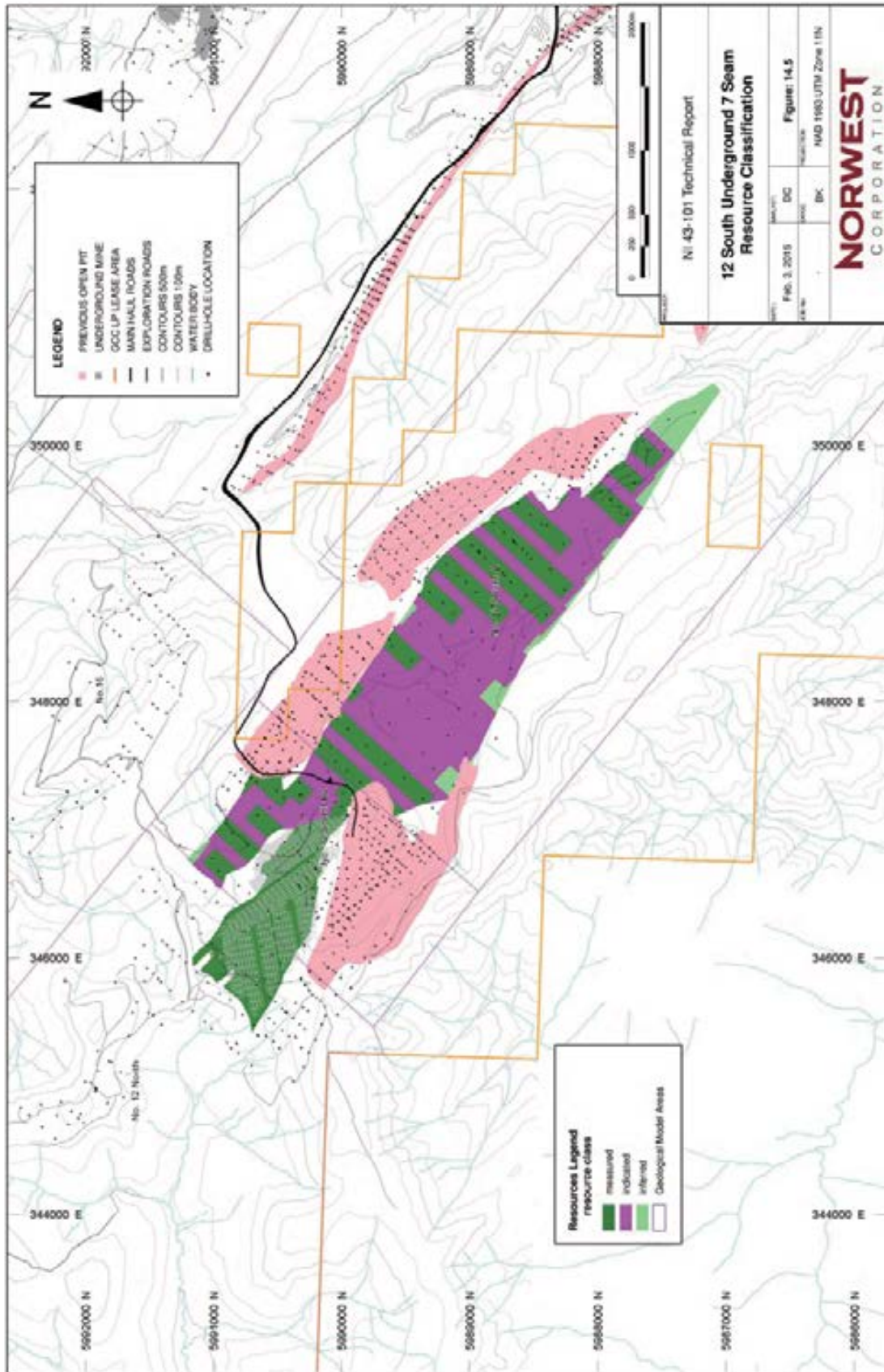


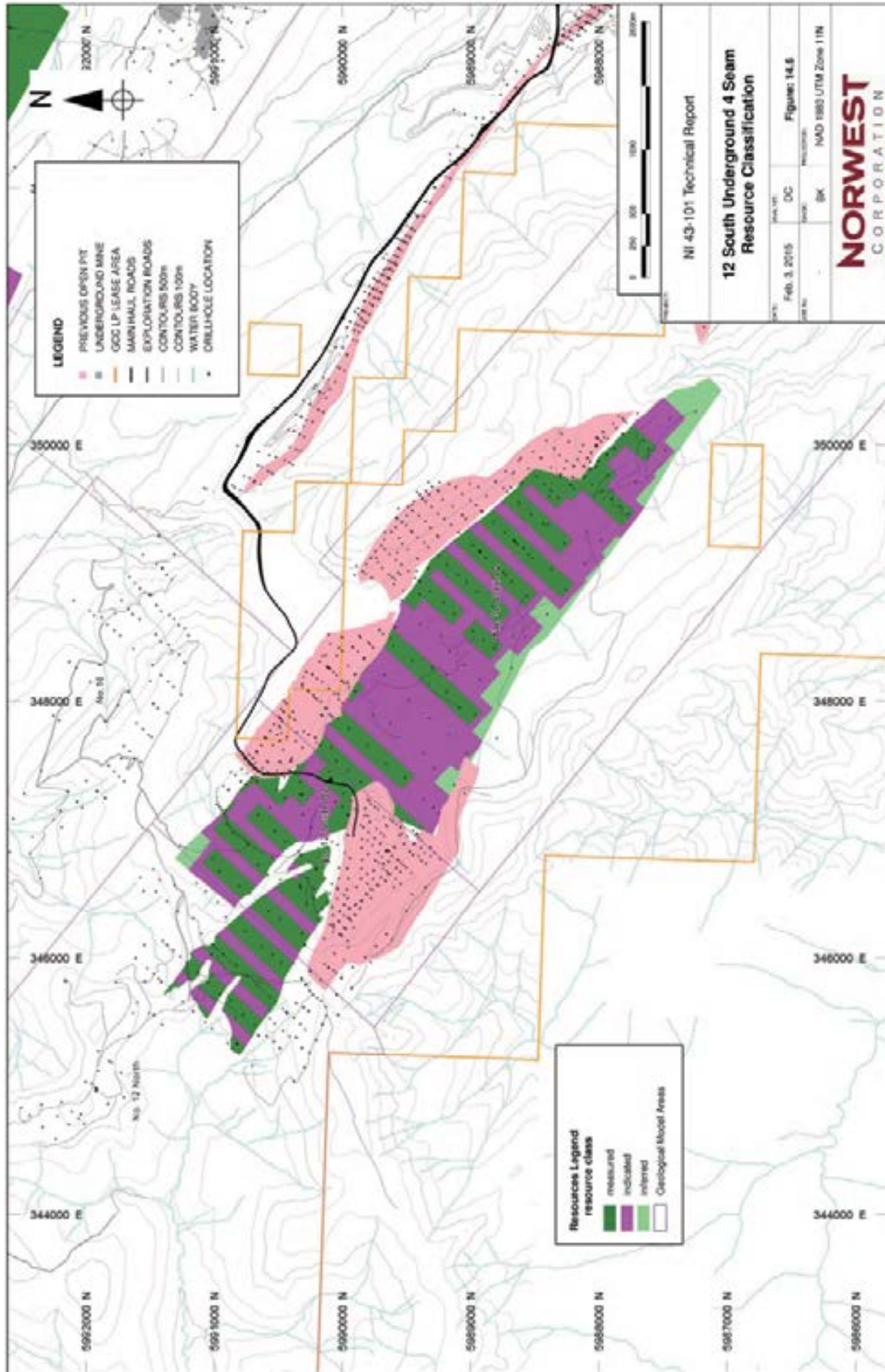












## 15 MINERAL RESERVE ESTIMATES

To qualify coal resources as coal reserves, a number of economic and technical factors must be applied. These include but are not limited to the considerations addressed in this section.

### 15.1 REVENUE AND COST FACTORS

Revenue and cost factors considered in the evaluation of coal reserves include:

- Estimates for the near and long term price of metallurgical coal in the domestic and international market place.
- Operating costs associated with mining, transporting and processing the coal at the mine site.
- Overhead costs associated with marketing and transporting the finished coal product to customers.
- Overhead costs associated with administrative and technical functions relative to operating a mine.

Norwest has reviewed these economic factors as supplied by GCC and used in previous Technical Reports prepared by Norwest and the consulting firm AMEC, and confirmed them as appropriate to verify the economic viability of the individual mining areas. These also form the basis of the economic analysis summarized in Section 22.3.

### 15.2 GEOTECHNICAL PARAMETERS

Geotechnical parameters governing the orientation of the pit slopes, haul roads, and waste dumps have been reviewed. Due to the complex geology in the surface mining areas, the final design parameters for the pit walls and some of the access road cuts can only be determined once detailed field investigations of each area have been completed. GCC plans to perform this work in advance of mining. Approximate parameters have been used for long range pit design, based upon the experience gained from more than 36 years of open pit mining on the GCC property.

Geotechnical investigations were used to assess ground conditions<sup>2</sup> and ground control aspects of the mine design<sup>3</sup> during mine licensing along with site specific assessments. The parameters governing the stability of the excavations and ground control practices in the underground operations were reviewed by Norwest and were found to be reasonable and consistent with standard industry practice.

The No. 12 South B2 underground geotechnical designs are based upon finite element analysis reviews prior to the start of mining operations. As mining progresses, geotechnical data is collected and mine plans are revised accordingly. Norwest has conducted bi-annual geotechnical inspections which include a review of ground control and excavation stability to provide independent observations and recommendations. The design basis for the No. 12 South B2 mining operations has been considered in the design of adjacent No. 12 South A mining operations in the 7/8 Seam and 4 Seam mining horizons. A finite element analysis has been completed for the initial design of the No. 12 South A mine plan. Geotechnical boreholes were completed for the planned No. 12 South A Mine with laboratory test results provided to GCC in March, 2014. The results of this additional geotechnical information may be utilized to confirm the current design and/or utilized to reassess ground support requirements and geotechnical modeling for the mine license application.

<sup>2</sup> 12SB2 Underground, Geotechnical Drilling and Assessment of CMRR, Golder Associates, March 2010

<sup>3</sup> LAMODEL Analysis of Multiple Seam Mining in the 7/8 and 4 Seams at the Grande Cache Coal Corporation 12SB Mine, Appalachian Mining & Engineering, Inc., July 2011

Geotechnical information for the No. 9D Area is limited to E-log information correlated to provide guidance with regard to unconfined compressive strength of the geologic strata. E-log information in the No. 9D Area has been reviewed along with historic longwall and room and pillar mining completed to the southwest of the planned mining area. Available 4 Seam information indicates moderate to good roof conditions similar to the historic mining operations of the 4 Seam. Referencing available limited historic underground mining conducted in the 10 Seam, geotechnical information appears less favorable with E-log information showing weaker immediate roof conditions with variable weak zone strata thickness. Additional detailed geotechnical investigations are necessary to provide increased confidence for ground control design and out of seam dilution projections. GCC has budgeted approximately 110 boreholes to be completed in 2015–2017 to aid in mine design.

### 15.3 COAL RECOVERY PARAMETERS SURFACE MINING

The ROM tonnage estimates for the open pit mines are determined using estimated coal recovery and out-of-seam dilution (OSD) added during the mining and coal handling process. The QP has reviewed the factors supplied by GCC and found them to be appropriate with additional provisions discussed below. Table 15.1 tabulates the specific recovery parameters applied to each seam and operating area.

**TABLE 15.1 COAL RECOVERY PARAMETERS — SURFACE MINING**

	Average Seam Thickness (m)					Dilution (m)		Loss (m)	
	No. 2 Area	No. 8 Area	No. 12 Area	No. 16 Area	No. 9 Area	No. 2/8/9 Area	No. 12/16 Area	No. 2/8/9 Area	No. 12/16 Area
4 Seam	6.9	7.8	7.2	6.8	6.3	0.15	0.15	0.50	0.45
5 Seam			1.6	1.8			0.15		0.75
6 Seam			1.5	1.5			0.15		0.55
7 Seam			3.6	2.8			0.15		0.55
8 Seam			1.4	2.2			0.15		0.55
10 Seam	2.6	3.8			3.4	0.15		0.80	
11 Seam	2.3	2.7			2.1	0.15		0.70	

For the Clean or Saleable tonnage estimate the following formula is used for the recovery of coal from processing, generally referred to as cleaning or washing the coal:

Yield = (ROM Ash%–Plant Reject Ash %)/(Clean Coal Ash%–Plant Reject Ash%), where the Plant Reject Ash is 55% to 63% depending on mine area and seam and the resulting Clean Coal Ash is 8.5%.

#### 15.4 COAL RECOVERY PARAMETERS UNDERGROUND MINING

For the underground mine ROM tonnage estimates, the mining limits applied to the geologic model were established based upon governmental regulations, geologic anomalies, and sound mining principles as follows:

- A minimum overburden depth of 50m for room and pillar mining, and 100m for longwall mining.
- A buffer zone of 100m horizontally from seam out crop and adjacent mining where potential hazards cannot be verified; 50m from an open pit highwall or other adjacent workings.
- A buffer zone of 20m adjacent to major faults.
- Gradient limitation of less than or equal to 16° for place change continuous miner room and pillar operations.
- Road header gradient limitation of less than or equal to 18° without winch assist. Road header gradient limitation of 30° or less with winch assist.
- Longwall mining gradient limitation of 30°.
- A protection buffer for perennial streams of 100m plus 20° subsidence angle.

ROM reserve estimates for the underground mines were determined using GCC projected recovery of coal and addition of dilution material during the mining and coal handling process. Norwest reviewed current projections with prior reports and field observations of the current No. 12 South B2 underground mining operation and interpretation of the coal seam structures and ground conditions for the projected No. 12 South A and No. 9D underground mines.

Recoverable ROM coal tonnages were estimated using recovery factors considering coal thickness, maximum mining height and coal seam dip. OSD material was projected to vary by method and seam. An average ROM ash of 26% has been used by GCC in the projection of plant yield for the No. 12 South B2 East Extension. The No. 12 South B2 7/8 Seam historic ROM plant feed samples averaged 28.3% ash.

An average ROM ash of 20% has been used by GCC in the projection of plant yield for the 4 Seam underground operations. However, Norwest's review of historic ROM plant feed samples of the 4 Seam from the 8 Mine surface operations indicates an average of 26.8% ash.

For estimating Clean or Saleable tonnage for the underground operations, GCC presented a yield model based on historic plant data. GCC projects an improvement in plant yield by planned area with a reduction in ROM ash. Norwest review of the saleable tonnage estimate showed the plant yield ranging from 63% to 65% for the 7/8 Seam and 79% for the 4 Seam in the No. 12 South B2 and No. 12 South A Area. These projected yields show an increase from prior studies. The No. 9D Mine Area remained unchanged from prior studies at 63% yield for the 10 Seam and 74% for the 4 Seam. The plant yield and other coal recovery parameters for underground mining are summarized in Table 15.2.

TABLE 15.2 COAL RECOVERY PARAMETERS SUMMARY — UNDERGROUND MINING

Mine Area	Parameter	Coal Seam/Mining Horizon		
		10 Seam	7/8 Seam Horizon	4 Seam
No. 12 South B2	Projected Average Overburden Depth (m)	N/A	103	179
	Projected Average Coal Thickness (m)		4.65	7.37
	Projected Average In Seam Ash (db) (%)		22	12
	Required ROM Ash (db) for GCC Yield Model (%)		26	20
	Projected Plant Yield — GCC Yield Model (%)		63	79
	Historic Plant Yield (%)		62	74
No 12 South A Area	Projected Average Overburden Depth (m)	N/A	153	203
	Projected Average Coal Thickness (m)		4.38	6.38
	Projected Average In Seam Ash (db) (%)		15	12
	Required ROM Ash (db) for GCC Yield Model (%)		26	20
	Projected Plant Yield — GCC Yield Model (%)		65	79
	Historic Plant Yield (%)		62	74
No. 9D Mine Area	Projected Average Overburden Depth (m)	230	N/A	288
	Projected Average Coal Thickness (m)	3.48		4.79
	Projected Average In Seam Ash (db) (%)	18		15
	Required ROM Ash (db) (%)	27		21
	Historic Plant Yield (%)	63		74
	Percent Longwall Tonnage from >25° Dip Areas (%)	6		6

### 15.5 SUMMARY OF COAL RESERVES

Coal reserves are summarized in Table 15.3 and Table 15.4. To comply with NI 43-101, the reserve tables only report Proven and Probable reserves. For coal, it is standard practice to report ROM Coal Reserves and/or a Clean Coal Reserves (Saleable reserves in GSC Paper 88-21). These factors are explained in point form at the beginning of this section.

Reserves are that part of Resources proven to be economically mineable. Because coal resources include coal reserves, the reported *Reserves and Resources are not additive*. This applies to the ROM quantities as well as the Clean Coal quantities.



TABLE 15.3 SUMMARY OF PROVEN AND PROBABLE ROM COAL RESERVES

	Proven (Mt)	Probable (Mt)	Total (Mt)
<b>Surface Mining Areas</b>			
No. 2 Area	13.7	1.2	14.9
No. 8 Area	12.5	0.1	12.6
No. 9 Area	13.5	11.2	24.7
No. 12 North Area	31.3	12.2	43.5
No. 16 Area	19.7	9.6	29.4
<b>Total Surface Mining</b>	<b>90.7</b>	<b>34.3</b>	<b>125.1</b>
<b>Underground Areas</b>			
No. 9D Area	59.8	3.7	63.5
No. 12 South B2 Area	3.0	1.4	4.5
No. 12 South A Area	4.6	9.4	14.0
<b>Total Underground Mining</b>	<b>67.5</b>	<b>14.5</b>	<b>82.0</b>
<b>Grand Total</b>	<b>158.2</b>	<b>48.8</b>	<b>207.1</b>

## NOTES

- (1) Quality of all reserves classified as Low-Volatile Bituminous (ASTM)
- (2) Average ROM coal quality for reserves is reported in Section 7.2 under the respective mining areas
- (3) Planned surface pits only
- (4) Underground ROM estimates include mining recoveries ranging from 44% to 62%, which are inherent to multi-seam room-and-pillar operations
- (5) Both underground and surface mineable estimates include allowance for loss and dilution and are supported by mining designs as described in Section 16.0
- (6) The surface reserve estimates do not include thermal coal consistent with previous GCC Technical Reports
- (7) The surface reserve estimates are effective December 31, 2014 and have been prepared under the supervision of James Sorensen, Mining Eng., Qualified Person
- (8) The underground reserve estimates are effective December 31, 2014 and have been prepared under the supervision of John Lewis, P. Eng., Qualified Person
- (9) Rounding as required by reporting guidelines may result in apparent summation differences

TABLE 15.4 SUMMARY OF PROVEN AND PROBABLE SALEABLE RESERVES

	Proven (Mt)	Probable (Mt)	Total (Mt)
<b>Surface Mining Areas</b>			
No. 2 Area	9.2	0.8	10.0
No. 8 Area	8.8	0.1	8.9
No. 9 Area	10.4	8.3	18.8
No. 12 North Area	22.5	8.3	30.8
No. 16 Area	14.4	7.0	21.4
<b>Total Surface Mining</b>	<b>65.3</b>	<b>24.5</b>	<b>90.0</b>
<b>Underground Areas</b>			
No. 9D Area	41.4	2.6	44.0
No. 12 South B2 Area	2.3	1.1	3.3
No. 12 South A Area	3.4	6.8	10.3
<b>Total Underground Mining</b>	<b>47.1</b>	<b>10.5</b>	<b>57.6</b>
<b>Grand Total</b>	<b>112.4</b>	<b>35.0</b>	<b>147.6</b>

## NOTES

- (1) Quality of all reserves classified as Low-Volatile Bituminous (ASTM)
- (2) Total coal will be marketed as hard coking coal
- (3) Planned surface pits only
- (4) Saleable coal from Table 15-3 considers a yield of 69% based on the historic average plant yield from No. 7 and No. 12 South B2 mines
- (5) Plant yield for the surface mineable coal varies in relation to the ROM ash content:  

$$\text{Plant Yield} = (\text{ROM Ash\%} - \text{Plant Reject Ash\%}) / (\text{Clean Coal Ash\%} - \text{Plant Reject Ash\%})$$
, where  
 Plant Reject Ash = 55% to 63% depending on mine area and seam and Clean Coal Ash = 8.5%
- (6) Saleable (Clean) coal reserves are a subset of and not additive to Run-of-Mine reserves
- (7) The surface reserve estimates do not include thermal coal consistent with previous GCC Technical Reports
- (8) The surface reserve estimates are effective December 31, 2014 and have been prepared under the supervision of James Sorensen, Mining Eng., Qualified Person
- (9) The underground reserve estimates are effective December 31, 2014 and have been prepared under the supervision of John Lewis, P.Eng., Qualified Person
- (10) Rounding as required by reporting guidelines may result in apparent summation differences

## 16 MINING METHODS

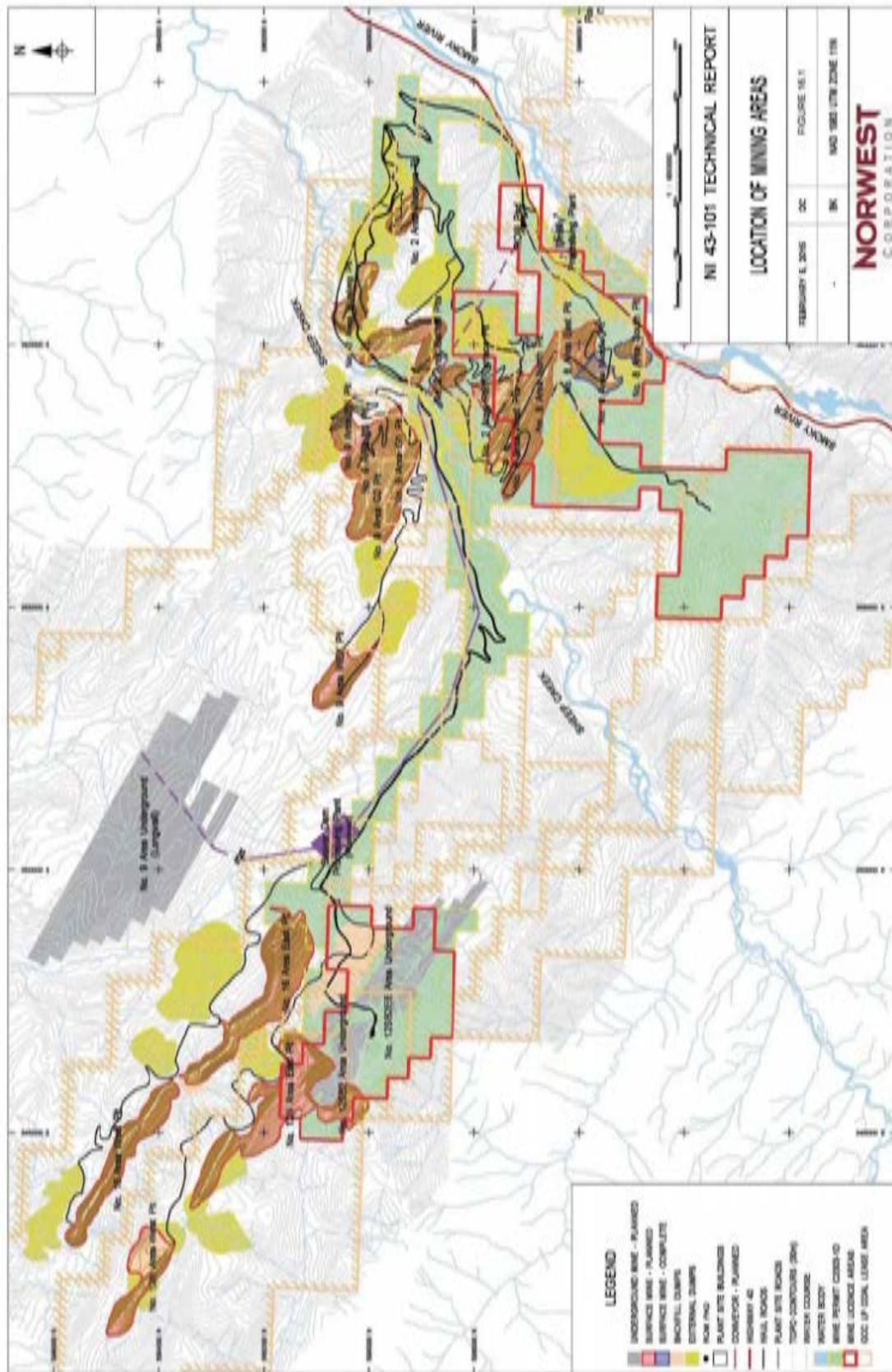
### 16.1 MINING OPERATIONS

Operations were suspended January 28, 2015 at the No. 8 surface operation and are planned to resume operation in the first quarter of 2017. The No. 2 surface pits, which lie adjacent to the No. 8 pits, are planned to be brought into production in early 2019. The No. 16 pits and No. 9 pits are scheduled to commence operations in 2025 and in 2027, respectively at the completion of the No. 8 surface operations. The No. 12 North area will be the last pits to be developed starting in 2038.

As of the effective date of this report, GCC is producing coal from the No. 12 South B2 underground operation in the 7/8 Seam. The underground mining areas consist of the No. 12 South B2 underground operation, the No. 12 South A Area, and the No. 9D Area. The No. 12 South B2 underground operation and the adjacent No. 12 South A Area are both multi-seam mines designed to extract the 7/8 Seam horizon and the 4 Seam. The No. 12 South B2 underground operation began development in August 2011 in the 7/8 Seam. Development of the 7/8 Seam was completed in April 2014 and depillaring of the developed mine workings is planned to be completed by October 2015. Portal development of the No. 12 South B2 4 Seam began in October 2013, however development of the 4 Seam has been idled since late 2013 due to regulatory issues. Development of the 4 Seam mains is scheduled to re-commence in May of 2015 with 4 Seam mining completed in 2019.

Current operations in the No. 12 South B2 are planned to expand from No. 4 Seam into the northern portion of No. 12 South A through access development that is scheduled to start in the 4th quarter of 2016. This access consists of developing rock declines through a low-angle fault zone from the No. 12 South B2 4 Seam workings to reach the 7/8 Seam in the No. 12 South A area. This area is also referred to as 12 South B2 EE (Eastern Extension). A second access into the 12 South A area is scheduled to be constructed starting in 2016. The construction will entail the construction of portals in the 7/8 Seam horizon adjacent to the central south portion of the 12 South A surface pit via the planned excavation of a 3,300,000 BCM trench. Excavation of the trench includes the recovery of approximately 43,000t of clean saleable coal. Underground mining operations are projected to begin producing from the No. 12 South A trench area in September 2018 from this second access location.

The No. 9D Area is approximately 6km east northeast of the No. 12 South B2 underground operation 7/8 Seam portals. The No. 9D mine area is also a multi-seam mining area with two mineable seams identified as the 10 Seam and the 4 Seam. Portal access to both seams is proposed via the Beaverdam Creek drainage along the southwest side of the No. 9D Area, utilizing a minimum of three rock tunnels.



In addition to this main portal area, additional small diameter shafts and incline tunnels may be necessary for ventilation and have been included in the No. 9D mine plans to be constructed as this mining area expands. Construction of the No. 9D portal is scheduled to commence in 2020, with mining commencing late in the same year. Figure 16.1 shows the location of surface and underground mining areas.

## 16.2 MINING METHOD

### 16.2.1 *Surface Mines*

The surface mines will employ a truck and shovel operation commonly used in mountainous areas. The overlying waste rock is drilled and blasted and then removed in benches. Bench height is 15m. The waste rock is trucked to designated waste storage areas (or “dumps”) within prepared areas, and wherever practical backfilled into pit phases where excavation is complete. The use of hydraulic excavators, electric shovels and trucks are selected as the best fit for the expected mining conditions. The flexibility of truck-shovel mining methods makes it an ideal choice to handle the relative complexity of the geology and variability in coal qualities and products, as well as a proven low-cost method of surface mining.

Topsoil will be pushed into piles by dozers and motor graders and then loaded into the small end-dump trucks with a front-end loader and hauled to stockpiles outside of the active mining areas. This salvaged topsoil will be used later to cover re-graded mine lands to support plant growth. Waste overlying and in between the various seams at GCC will be excavated using a combination of diesel-hydraulic excavators and electric cable mining shovels. Large (36 cubic meter (m<sup>3</sup>) bucket capacity) electric shovels are scheduled to move the bulk of the waste material to provide low unit operating costs, primarily through lower energy and repair costs.

A range of different (21–27m<sup>3</sup> bucket capacity) diesel-hydraulic excavators will augment waste removal operations at the project. These machines are also more mobile than electric shovels, and are able to relocate relatively quickly with faster propel speeds. Diesel-hydraulic machines can work in tight areas and on steeper grades and require no electric trailing cable for power. They can be used where selective waste removal or coal mining is required. Coal and waste will be hauled with large end-dump mining trucks: 220t capacity (e.g., Komatsu 830E). Truck size was selected to efficiently match the different size excavators and electric shovels.

### 16.2.2 *Underground Mines*

The size of a mining area and the gradient of the seams are primary considerations in the selection of mining method. Mining areas with dip angles less than 16° allow consideration in the selection of room and pillar or longwall methods. However, the selection of the longwall method also requires a larger mineable area to justify the capitalization. Mining areas that average over 16° are not productive for room and pillar mining and the longwall method becomes the primary mining method. The No. 12 South B2 Mine, the No. 12 South A Mine, and No. 9D Mine are, or are planned to be multiple seam mining operations. Mining of multi-seam areas has been sequenced to occur from the upper most to the lower seam, which has historically proven to be successful.

The current operations in the No. 12 South B2 underground operations and the adjacent No. 12 South A Area utilize, or are designed to utilize, the room and pillar mining method. General mining design is to develop five to seven roadways for main development and panel development. Development mining is planned to average 3.0m mining height. Floor coal will be mined when the thickness of the seam allows and previously developed coal pillars will be mined in a process referred to as “depillaring”.

Depillaring is the process of mining coal from the support pillars as operations “retreat” from the area and in the case of the underground operations at GCC the recovery thickness may be up to 4.5m. This depillaring process allows an increase in the recovery of the coal seam being mined. Floor coal recovery allows for the mining of all or a portion of the remaining coal seam not mined during development. Floor coal recovery occurs in areas where seam thickness is greater than the 3.0m development height. Mining recovery ranges from 62% for the 7/8 Seam down to 44% for the 4 Seam in some typical areas. Once the coal pillar and floor coal are removed, the rock above the coal seam collapses in a systematic approach to maintain safe work conditions for the employees. The No. 9D Area study identifies two mining areas — one designated for longwall mining and the second much smaller “inferred” area designated for room and pillar mining. The area identified for room and pillar mining is not included in this report due to the resource classification as mostly inferred. However it is a target identified for future exploration.

The longwall mining area recovery is based on an average mining gradient or dip of 25° across the longwall extraction face with limited areas approaching 30°. In the mining sequence, the upper-most coal seam, the 10 Seam is mined first and access is via a set of rock tunnels. The development of a rock tunnel access to the 4 Seam from the initial 10 Seam rock tunnels allows the transition to the lower coal seam without additional portals. Main development, which provides personnel and material access, ventilation, and coal haulage in both seams, is planned to be limited to three roadways in the deeper and steeper areas of development and expanded to four roadways in the shallower less steep areas near the rock tunnel access. These roadways are designed at 3.0m to 3.5m height and 6m average width. A bleeder system is designed along the perimeter of longwall panel areas as a means to maintain effective ventilation and manage any potential methane liberation. Longwall gate roads are developed as a two roadway system with the spacing between the roadways designed to maintain pillar stability taking into account mining depth.

## 16.3 MINE EQUIPMENT

### 16.3.1 *Surface Mines*

The current primary waste loading units consist of a 36m<sup>3</sup> capacity electric cable shovel, and two hydraulic shovels (27m<sup>3</sup> and 21m<sup>3</sup>). Additional shovels will be required as new pits (No. 16, No. 9 and No. 12 North) commence development.

The waste rock is hauled in large rear dump trucks (220t capacity). The fleet currently consists of 12 units with additional haul truck acquisitions planned as needed. Coal from surface pits is also hauled with the same trucks. Two large blasthole drills (35cm diameter), one electrical and one diesel driven unit, form the primary drilling fleet. The other support equipment in use includes:

- Tracked dozers for coal cleaning, shovel support, as well as road and waste dump construction and maintenance;
- Road graders for haul road construction and maintenance;
- Backup and pre-shear blasthole drills (27mm and 15mm);
- Large front-end loaders for coal loading and shovel backup;
- Backhoes for coal cleaning and recovery, and ditching for water control; and
- Miscellaneous equipment to support a 24/7 operation.

The primary mobile mining equipment used at GCC is shown in Table 16.1 (not all equipment shown).

TABLE 16.1 GCC EQUIPMENT SUMMARY

Category	Name	Description	Maximum Fleet Size
<b>Overburden Mining Equipment</b>			
Overburden Drill	P&H 320XPC	68,038kg pulldown, 27–44.4cm hole, diesel, 19.8m rod length	1
Overburden Drill	P&H 250XPC	40,823kg pulldown, 20–31.1cm hole, diesel, 13.7m rod length	1
Overburden Drill	Pit Viper 271	34,019kg pulldown, 17.1–27.0cm hole, diesel, 7.62m rod length	2
Large Electric Excavators	P&H2800XPC	35.9m <sup>3</sup> bucket	2
Large Hydraulic Excavators	Hitachi EX5500	29m <sup>3</sup> bucket	2
Medium Hydraulic Excavators	Hitachi EX3600	23m <sup>3</sup> bucket	1
Dozers	Cat D10T	5.3m max blade width	14
Large Overburden Trucks	Komastu 830E	218Mt, 147m <sup>3</sup>	36
<b>Coal Mining Equipment</b>			
Medium Coal Excavators	Komastu PC3000	22.3m <sup>3</sup> bucket	2
Front End Loader	Komastu WA1200	23.8m <sup>3</sup> bucket	1
Large Coal Trucks	Komastu 830E	218Mt, 147m <sup>3</sup>	10
Rubber Tire Dozer — Stockpile	Cat 834	7.9m <sup>3</sup> blade	1

*16.3.2 Underground Mines*

The underground operations of the No. 12 South B2 and the transition into the adjacent No. 12 South A Area are planned for two to four producing locations. Room and pillar operations are planned to start with the current fleet of mining equipment with additions to the fleet noted in Table 16.2.

**TABLE 16.2 UNDERGROUND EQUIPMENT FLEET — ROOM AND PILLAR**

<b>Equipment</b>	<b>No. of Units</b>
Current No. 12 South B2 Fleet	
Continuous Miners	5
Shuttle Cars	6
Double Boom Roofbolters	6
Feeder-breakers	5
LHD Scoop tram	6
Mobile Roof Supports (MRS)	4
Axial Main Fans	4
Diesel Mantrips	3
<b>Additional Required Fleet Equipment for No. 12 South B2 and No. 12 South A</b>	
Axial Main Fans	2
Continuous Miners (Replacement)	4
Double Boom Roofbolters (Replacements)	5
Mobile Roof Supports (MRS)	14
Shuttle Cars (Replacement)	10
Feeder-breakers (Replacement)	6
LHD Scoop tram (New plus replacement)	6
Diesel Transportation — Service Vehicles (New plus replacement)	22

GCC underground operations in the No. 12 South B2 will transition from the 7/8 Seam into the 4 Seam in 2015 with depillaring operations in the 4 Seam beginning 3rd quarter 2016. The 4 Seam has a 5.0m maximum mining horizon during depillaring. Reserves are based on a more conservative 4.5m average depillaring height. Expansion of mining operations to the adjacent No. 12 South A Area is planned to begin when development in the No. 12 South B2 4 Seam is complete. Mining of the larger No. 12 South A Area will require a higher capacity main mine fan installation from that which has historically been utilized for GCC underground operations over the last decade.

The transition to the No. 9D Area requires a complete fleet replacement as noted in Tables 16.3 and 16.4. A small block of coal in the No. 9D Area was identified with gradient less than 16°. This area is currently classified as “inferred” and requires additional drilling to be included in future mining plans. Room and pillar equipment to complement the No. 9D room and pillar equipment fleet would be available from the completion of the No. 12 South A Area should this area be proven by planned exploration.



The No. 9D Area also contains a much larger mineable block of coal with gradient or dip greater than 16°. The longwall mining method would be the primary production method for this block. A fleet of equipment much different than the room and pillar fleet is required to operate in this coal block which includes gradients up to 30°. Tables 16.3 and 16.4 list the fleet of longwall equipment capable of operation in these steeper gradient areas along with development equipment for main airways and longwall gate roads.

**TABLE 16.3 UNDERGROUND DEVELOPMENT EQUIPMENT FLEET —  
NO. 9D MAINS AND GATE ROADS**

<b>Equipment</b>	<b>No. of Units</b>
<b>Mains and Longwall Gate Road Development</b>	
Roadheaders	7
Bridge Loaders	7
Extensible Belt Conveyors	7
Narrow frame Roof Bolters	14
Auxiliary Fan systems	7
Dust scrubber fan system	7

TABLE 16.4 UNDERGROUND EQUIPMENT FLEET — NO. 9D LONGWALL SYSTEMS

Equipment	No. of Units
<b>10 Seam Longwall System Equipment</b>	
Shearer	2
Armored Face Conveyor (AFC)	2
Stageloader	2
Crusher	2
Mobile Tailpiece	2
Hydraulic Roof Support (Shields/Chocks)	162
Gateroad (Face End) Supports (extended Shields/Chocks)	8
Emulsion Pump Station	2
High Pressure Water Pump Station	2
Monorail System	4
Longwall Transportation/Setup-Teardown Equipment	4
<b>4 Seam Longwall System Equipment</b>	
Shearer	2
Armored Face Conveyor (AFC)	2
Stageloader	2
Crusher	2
Mobile Tailpiece	2
Hydraulic Roof Support (Shields/Chocks)	139
Gateroad (Face End) Supports (extended Shields/Chocks)	8
Emulsion Pump Station	2
High Pressure Water Pump Station	2
Monorail System	4
Longwall Transportation/Setup-Teardown Equipment	4

## 16.4 MINE DESIGN PARAMETERS AND ASSUMPTIONS

### 16.4.1 Surface Mines

The mine plan area is split into different areas with multiple pits and benches. The objective of these areas is to assist in mine phasing, and also provide continuous coal release, maintain a relatively smooth stripping ratio profile and facilitate in-pit backfilling as soon as practical. Mining in each area begins near the outcrop/subcrop and advances down-dip. Mining in this fashion will facilitate maintaining a relatively consistent stripping ratio and promote in-pit backfilling as soon as practical.

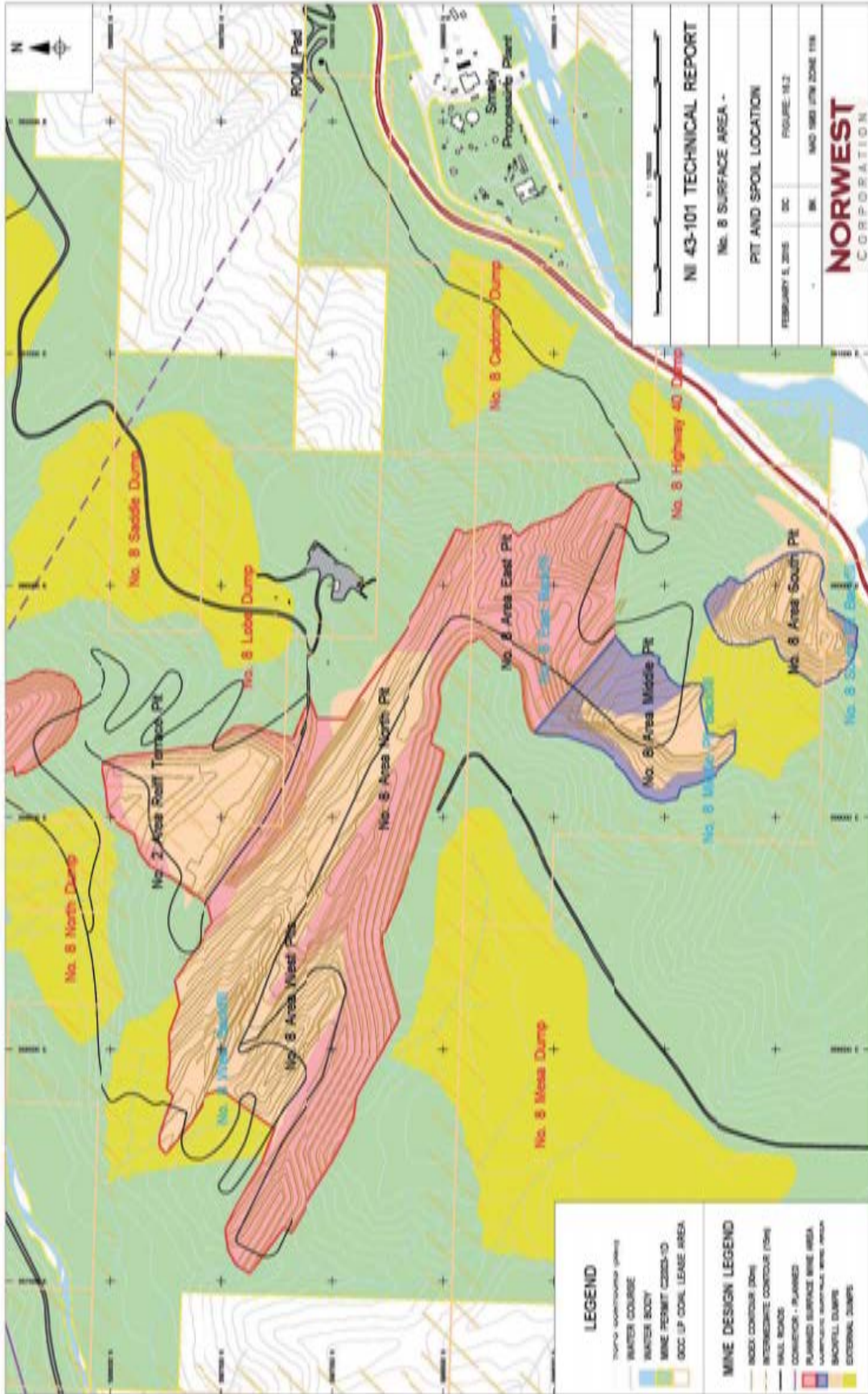
The detailed assumptions used in mine planning for GCC are shown in Table 16.5.

TABLE 16.5 PIT DESIGN PARAMETERS

<b>Pit Wall Angles</b>		
Rock Face Overall Angle	42–54°	
Rock Bench Face Slope Angle	50–70°	
Overburden Slope Cut Angle	35–40°	
Overall Slope Angle Footwall	Dependent on bedding dip	
<b>Standard Berm Width</b>		
	10m	
<b>Bench Height</b>		
Standard Height	15m	
Split benching may be applied to facilitate coal recovery		
<b>Waste Disposal Sites</b>		
Outside Slopes	37° as-built	
	26.5° re-sloped	
Dump Foundations	<25° slope	
Avoid areas of poor footing, where known		
<b>Material Characteristics</b>		
Waste	Swell	1.30 loose cubic metre per bank cubic metre
		1.25 cubic metre per bank cubic metre in dumps and stockpiles
		1.20 metre per bank cubic metre in dumps built in lifts
Coal	Swell	1.30 loose cubic metre per bank cubic metre
<b>Haul Road Design</b>		
Width, Main Roads	Minimum 15m overall width (one-way traffic), typical 30m width running surface	
Maximum Gradient near Pit Bottom	Maximum 10% grade (most areas maximum grade is 8%)	
<b>Minimum Mining Width</b>		
	50m	
	30m near pit bottom	

### NO. 8 PITS

The No. 8 surface mining area consists of a series of pits following the synclines and anticlines crossing the Horse Mountain Ridge in a southeast-northwest direction. Mining commenced in the eastern pits with waste rock dumps being developed in the draws above Highway 40 and along the top of the ridge. As mining progresses, mined-out areas will be used for waste backfill. Accessing these pits in the steep terrain will require a considerable effort. The pit subdivisions, main access roads and external dumping areas are shown in Figure 16.2.



The proposed sequence for No. 8 would re-start the mining in the first quarter of 2017 where it left off, in the 8 West Extension Pit with waste going to the large dump approximately 1.5 km to the southwest of No. 8 West currently partially completed (the Mesa Dump). 8 West Extension mines a syncline. The 8 East Pit, which mines a syncline anticline pair, would be commenced shortly after, with waste from this pit being backfilled into the adjacent previously completed 8 Middle and 8 South pit phases.

The 8 West Extension Pit would be followed by the contiguous 8 West 1 pit phase, mined down the slope of the Sheep Creek valley, to the north west in the same syncline as 8 West Extension. Waste from this pit would be allocated to the Mesa Dump to the south west of 8 West (upper benches), and to a smaller dump directly to the north on the terrace of the Sheep Creek valley bottom.

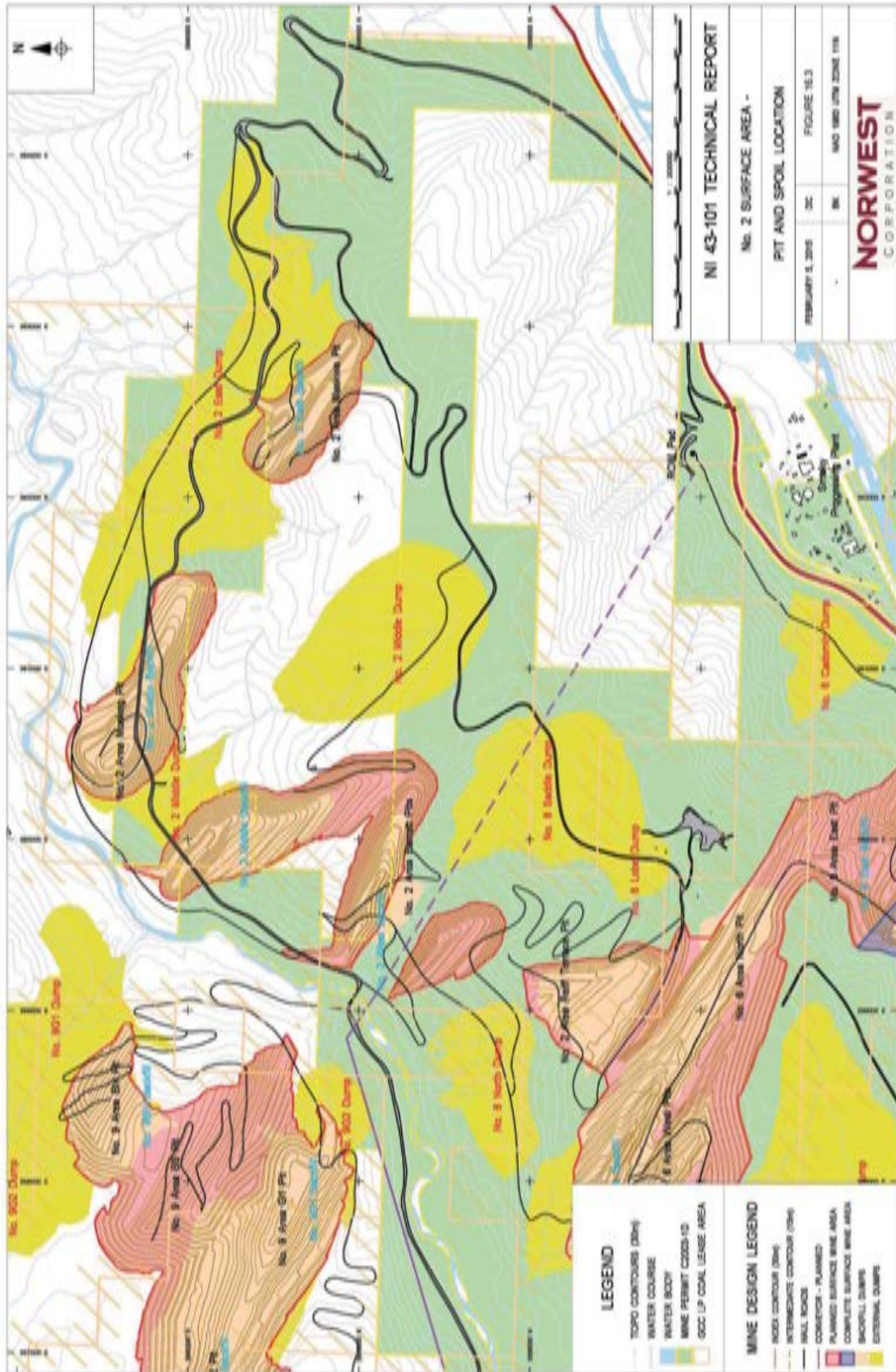
Last mined in the No. 8 sequence would be 8 West 2, which like West 1 would commence on the ridge, with waste from the upper benches going to the Mesa Dump. This pit mines a syncline anticline pair merging into a southwest dipping monocline to the northwest. Waste from the lower benches would be backfilled into the completed 8 West 1 pit immediately adjacent to the north east of 8 West 2. This last phase of No. 8 would be completed in 2024.

## **NO. 2 PITS**

These are basically continuations of the previously mined Barrett pits. The pit designs, access and waste dump designs are shown in Figure 16.3. The first phase to be mined would be 2 Reiff Terrace, which is immediately to the north east of 8 West 1 and 8 West Extension. This phase would be started contemporaneous with the mining of 8 West 1 in early 2019. The pit encompasses a north east dipping monocline. Initial mining waste would be dumped in the gulley immediately to the north east of 2 Reiff Terrace. Waste from the lower benches of this phase would be backfilled into the completed 8 West 1.

After the completion of 2 Reiff Terrace pit, mining moves to the most north east phase of No. 2, the Maska pit. This is the first greenfield pit phase in the surface mine plan and would commence in 2022. This pit mines a syncline, with all waste deposited in external dumps to the north east on the middle slopes of the Sheep Creek valley.

Next in the No. 2 mining sequence is the Muskeg Pit, a monocline dipping to the north east. Waste is deposited to the east of the pit, in the same area as the dumps started by the Maskwa Pit. Some waste is hauled uphill to be backfilled into the Maskwa Pit.



The next three phases of the No. 2 mining sequence mine out the crest and both limbs of the Barrett anticline structure. 2 Barrett Upper Pit mines the crest, then the north limb (2 Barrett North Pit) and the south limb (2 Barrett Middle). Waste from 2 Barrett Upper is placed in an external dump west of this phase on the ridge overlooking the Sheep Creek. Waste from 2 Barrett North is hauled both to this same dump on the ridge (upper benches) and then to backfill the Muskeg Pit to the north (lower benches). Waste from 2 Barrett Middle is wrapped around the nose of the Barrett anticline to be backfilled into 2 Barrett North.

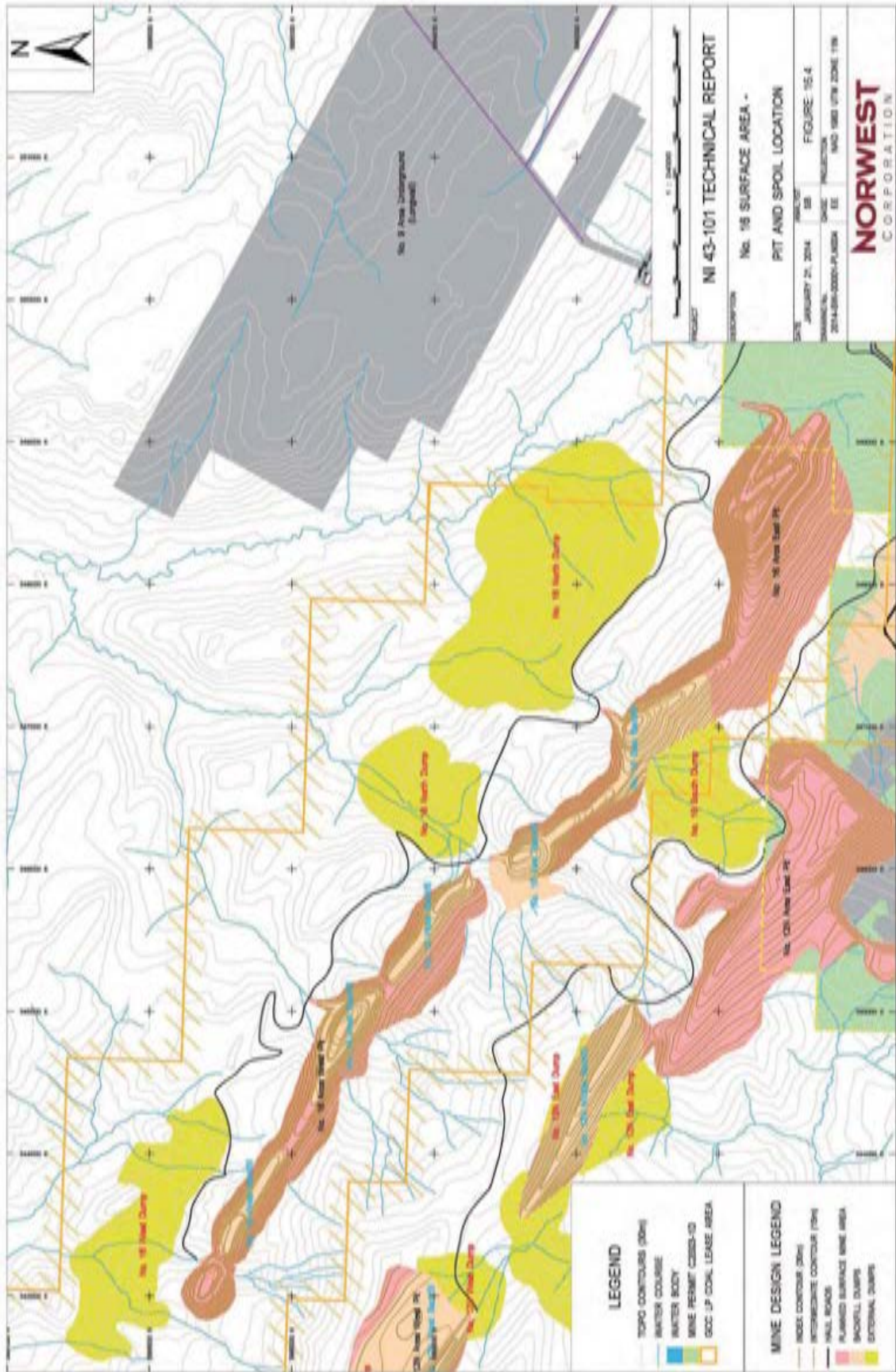
The final No. 2 pit phase to be mined is 2 Barrett South. This phase is essentially a continuation of the north east dipping monocline structure mined by 2 Rieff Terrace, but with dips increasing. Waste from this pit is backfilled into 2 Barrett Middle immediately to the north east. This final phase is completed in 2035.

### **NO. 16 PIT**

The No. 16 pit consists of two main areas (East and West Pits) that follow the same northeast dipping monocline system in a starting in the southeast and mining to the northwest. The area involves a large vertical relief and access is the continuation of a deposit trend mined in the 1990s in a series of pit known as 12 East and 12 West Pits. The pit phases, planned access roads and external waste dumps are shown in Figure 16.4.

The first pit phases to be mined are 8 East 1 to 8 East 4, commencing in 2025. These phases comprise one continuous pit covering a dipslope with a subsidiary syncline anticline pair at the south east phase bottom. Initial waste is dumped externally, on the slopes of the Beaverdam Creek valley. The initial pit phase, 16 East 1 splits into 16 East 2 and 3 below the 1705 elevation, with 16 East 2 mined first and the waste from 16 East 3 being backfilled into 16 East 2. 16 East 4 is mined contemporaneously with 16 East 3 and waste from this pit is dumped externally on the slopes north east of the pit.

Like 16 East, there are four 16 West pit phases, all mining one continuous north dipping monocline with some fault thickening of the coal seams. Like 16 East these pits mine a dipslope, although dips are steeper. Like 16 East the basis progression mines the phases south east to the north west. Some waste is external, dumped on the slopes of the Beaver Dam valley, below and to the south east of the pits. Backfilling of completed pit phases to the south east of active mining phases (including 16 East) is a large part of the waste allocation. The last phase of No. 16 Area, 16 West 4 is completed in 2046.





**NO. 9 PITS**

The No. 9 surface mining area consists of a series of pits following old surface and underground operations in a southeast-northwest direction. The pit designs, access and waste dump designs are shown in Figure 16.5.

The first phase to be mined is the most northwest pit, 9 WEX (West Extension), commencing in 2027. This pit is the north west continuation of the 1980s surface mines, on a structure known as the McEvoy Anticline. Waste from this pit is predominantly backfill into these 1980s pits to the south east of 9 WEX. Some waste is added onto previous dumps to the south of the pit.

The next pit phase of No. 9 is 9BN (Barrett North). This pit pushes back the highwall of a smaller pit from the early 1990s which mined the north limb of the Barrett Anticline. Waste from this pit is dumped in the gully immediately adjacent to the north east.

The 9G1 phase mines a syncline structure adjacent to previous underground mining and the 12 Bridge Sheep Creek haul crossing. Waste from this pit is backfilled to the complete 9BN pit and also the gully to the northeast of 9BN.

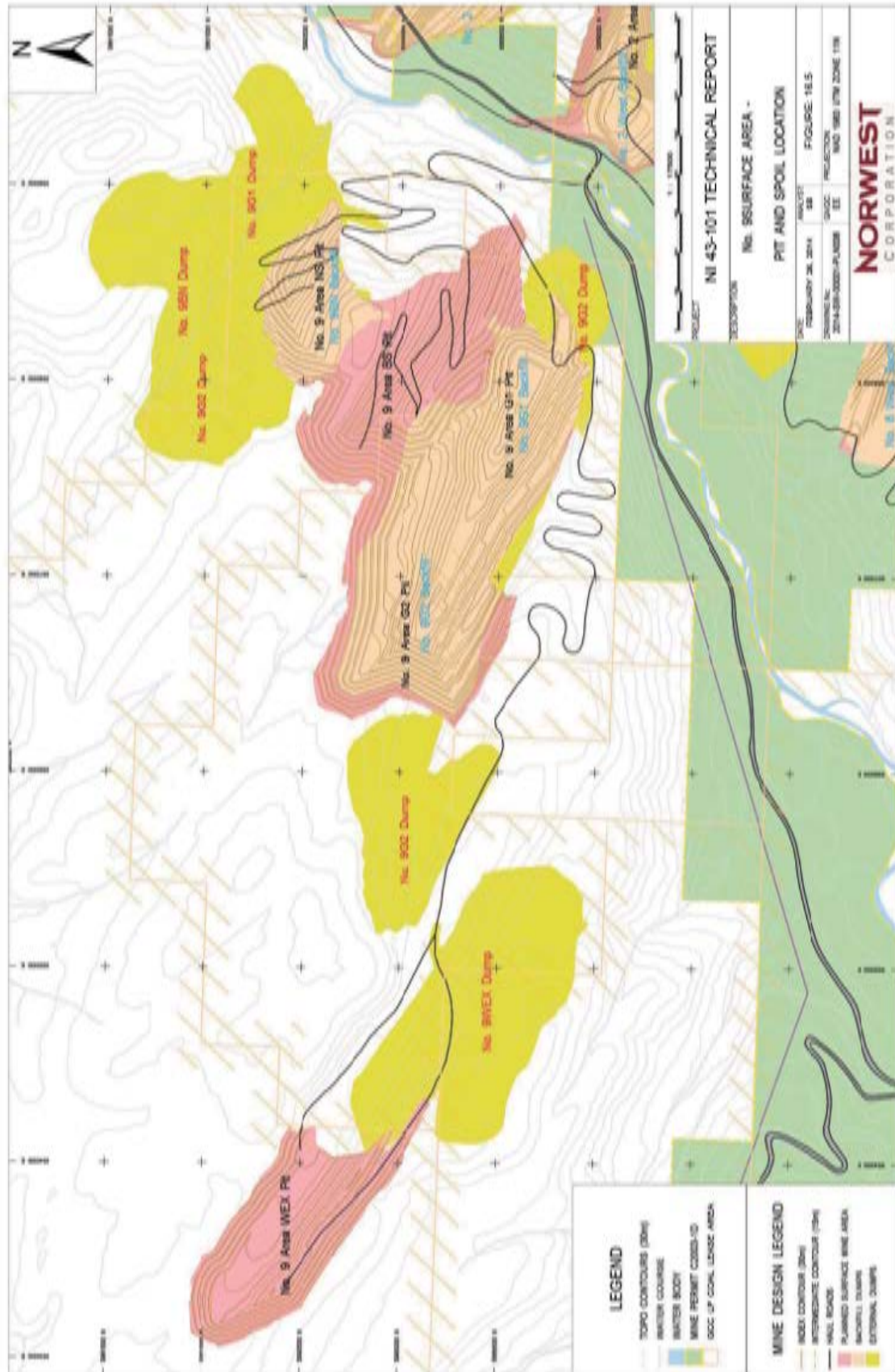
The 9G2 pit phase is a continuation of 9G1 to the northwest, mining in the same syncline. Waste from the upper benches of this pit is wrapped around the ridge under the Barrett Anticline to the north east and adds to the backfill and dumps of 9BN. The lower benches of waste from 9G2 are backfilled into 9G1.

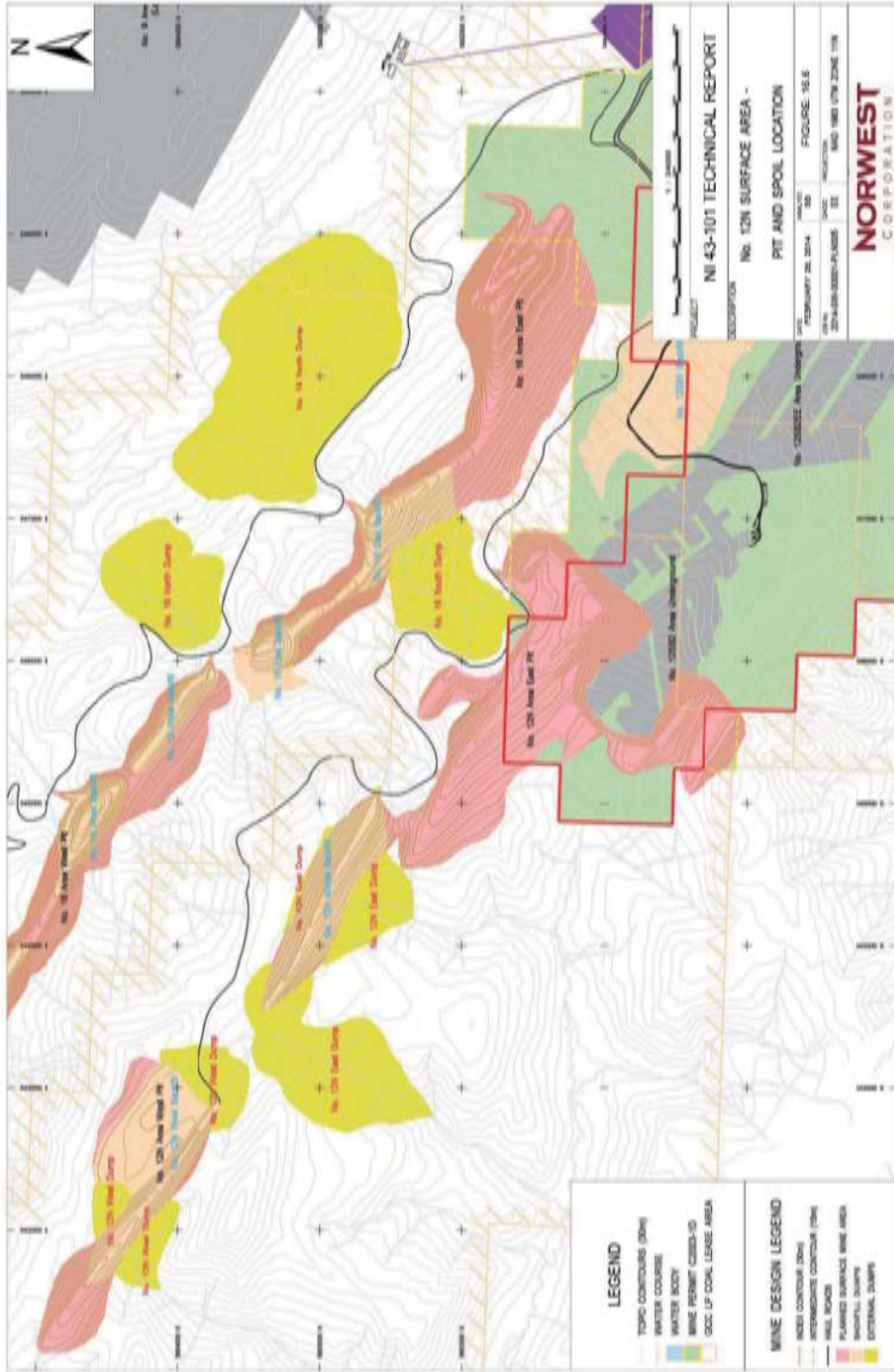
The last phase of No. 9 Area is No. 9BS (Barrett South). This pit mines the south west limb of the Barrett Anticline and backfills the waste into both the 9G1 and 9G2 pits. This pit phase is completed in 2051.

**NO. 12 NORTH PITS**

This area is the north west extension of the structures mined by No. 12 South B2 and No. 12 South A underground mining areas. Mine designs, including access roads and waste dumps for the No. 12 North area are shown in Figure 16.6.

Mining in No. 12 North commences in 2038 in the 12NE1A pit phase. This pit mines the middle area of the major flat bottomed faulted syncline structure which makes up the No. 12 North area. Waste from this phase is placed in external dumps on the ridge between No. 16 Area and No. 12 North, to the northeast of the pit. After 12NE2A phase, mining progresses to both the 12NE1B phase contiguous to the south east, and to the farthest north west pit, an outlier of the broad syncline, the 12NW pit phase. Waste from the former is dumped initially in external dumps to the northeast of this phase, and then when 12NE2A is complete, as backfill into this pit. Waste from the latter is dumped onto the slopes on both sides of the ridge this pit is situated on, and into the gully separating 12NW and 12NE1.





The final phase to be mined is 12NE1. The syncline structure is narrow and steeper than under the other phases of No. 12 North. Waste from this pit is backfilled into 12NE1A. Mining is contemporaneous with the 12NW lower benches, both being complete by 2055.

#### **16.4.2 Underground Mines**

##### **NO. 12 SOUTH B2 AND NO. 12 SOUTH A UNDERGROUND OPERATIONS**

The major underground mining design parameters and assumptions for the No. 12 South B2, No. 12 South B2 EE, and the No. 12 South A room and pillar operations are presented in Table 16.6 and include the following assumptions. Figures 16.7 through 16.11 show the mine plans for the 12SB2 7/8 Seam & 4 Seam, No. 12SB2 EE 7/8 Seam, and 12SA 7/8 Seam and 4 Seam.

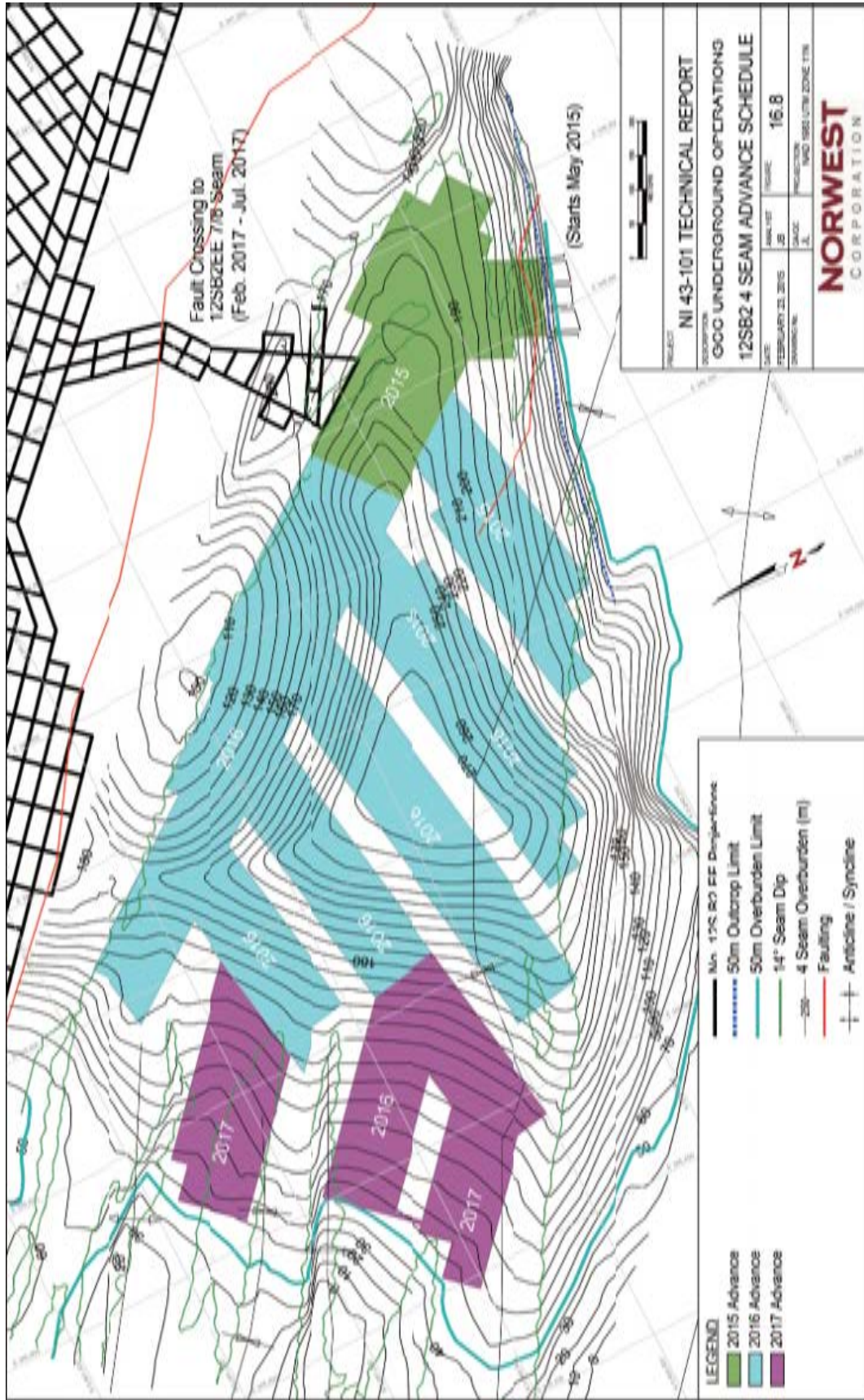
- The No. 12 South B2 and the No. 12 South B2 EE mine areas are planned to be operated as one mining area with shared operations, facilities, ventilation, and utility systems.
- The No. 12 South A mine is planned as an independent operation with separate operations, facilities, ventilation, and utility systems. The No. 12 South A mine requires the excavation of a 3,300,000 BCM trench from the historic No. 12 South A Surface Pit.
- The No. 12 South B2 4 Seam is planned to include an access route to the No. 12 South B2 EE 7/8 Seam via two rock declines.
- Production from the No. 12 South B2 Mine which includes the adjoining the No. 12 South B2 EE Area is based on two (2) 10-hour production shifts per day scheduled for 360 days per year. The No. 12 South A Mine is budgeted to be operated on the same schedule.
- Three to four production sections of mining equipment are scheduled for production through the LOM. For each mining area, typically one to two sections are planned to operate in the development mode while one to two sections are projected to operate in depillar (retreat) mode.
- Development productivity averages 1,000 tonnes per day (t/d) per section and the depillar section productivity averages 2,200t/d for the remaining No. 12 South B2 underground operation. Completion of the 7/8 Seam depillaring is projected to average 1,665t/d as crew training of additional underground personnel is completed to fully staff planned underground workforce. Maintaining production crew manpower levels and incorporation of planned new equipment upgrades possessing improved availability would allow planned increases in production.

- Access and transition of mining operations is based on timely development of portals and rock declines to maintain coal production as mining moves between coal seams and mining areas. Key transition dates are summarized follows:
  - With development complete in the No. 12 South B2 7/8 Seam, depillaring operations will continue and are projected to complete August 2015.
  - No. 12 South B2 development in the 4 Seam includes the initial portal construction and installation of the permanent ventilation and conveyor systems to be completed June 2015, with three active production sections in the 4 Seam in April 2016.
  - Fault crossing between No. 12 South B2 4 Seam and No. 12 South B2 EE 7/8 Seam completed February 2017.
  - Development in the No. 12 South B2 EE to commence March 2017.
  - Development mining in the No. 12 South B2 EE to be completed December 2017 and depillaring to be completed April 2018.
  - The 12 South A surface trench excavation, underground portal construction and all applicable permitting must be completed by April 2018 to allow development of the No. 12 South A 7/8 Seam according to the projected production schedule.
  - Transition of operations in the No. 12 South A mine area from the 7/8 Seam to the 4 Seam requires decline access development beginning August 2019 with development mining starting in the 4 Seam in May 2019.
- Development productivity rates for the No. 12 South A Area have been projected to indicate an improved production rate averaging 1,250 tonnes per day per development section. Depillaring productivity rates for the No. 12 South A Area remain the same at 2,200t/d per depillar section. These productivity rates are based on strategic equipment replacement and upgrades to currently available technology.
- A combination of horizontal and vertical holes near the decline from the No. 12 South B2 to the No. 12 South B2 EE is planned. This drilling program is necessary to provide information for the fault crossing design relative to roof control, methane and water issues, and the required decline construction gradient.
- An area of mains in the No. 12 South B2 4 Seam can not be depillared until the depillaring of the No. 12 South B2 EE is complete in April 2018. Depillaring in the No. 12 South B2 4 Seam is complete (January 2019).

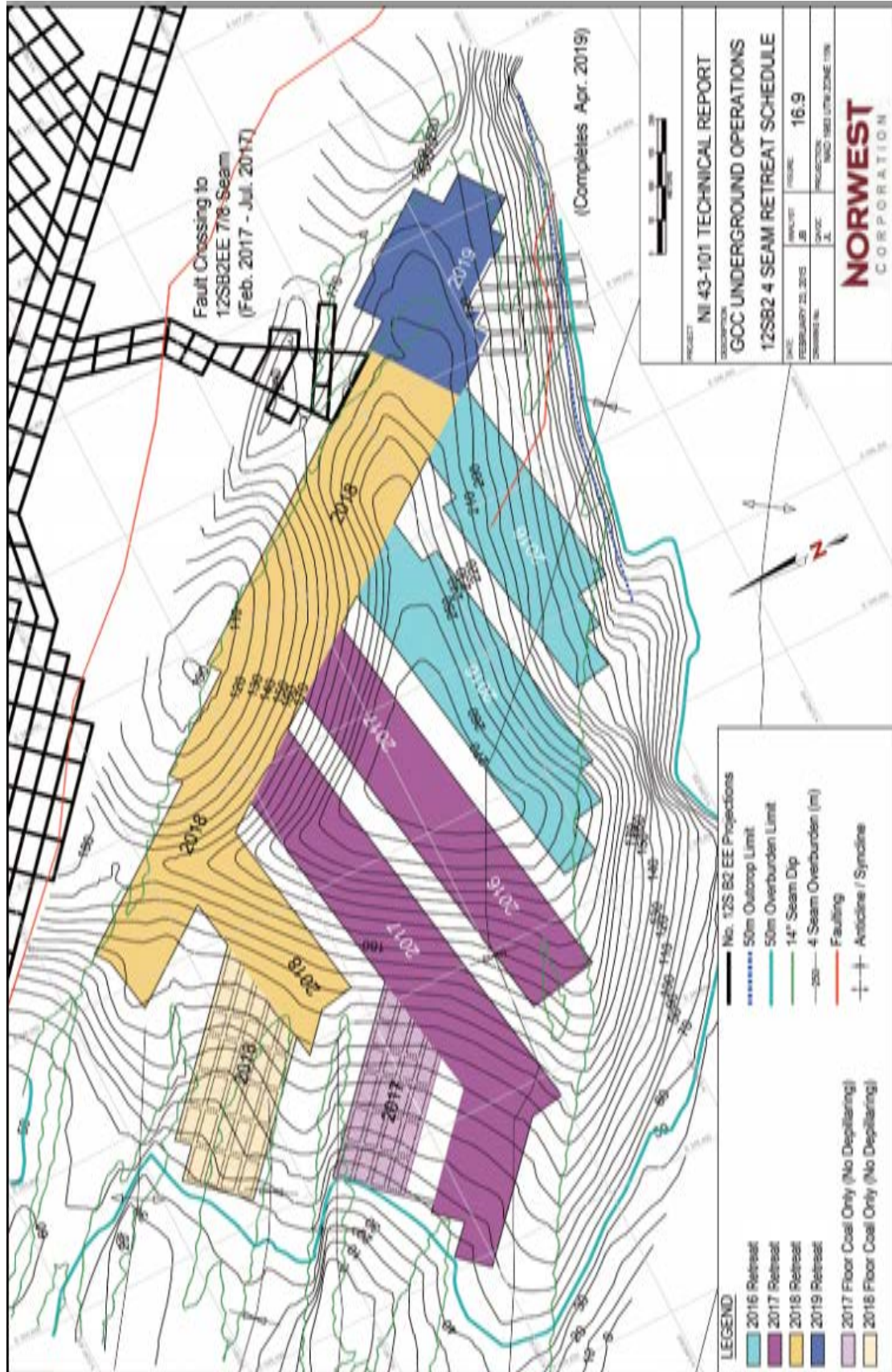
**TABLE 16.6 ROOM AND PILLAR DESIGN PARAMETERS NO. 12 SOUTH B2 / EE  
AND NO. 12 SOUTH A**

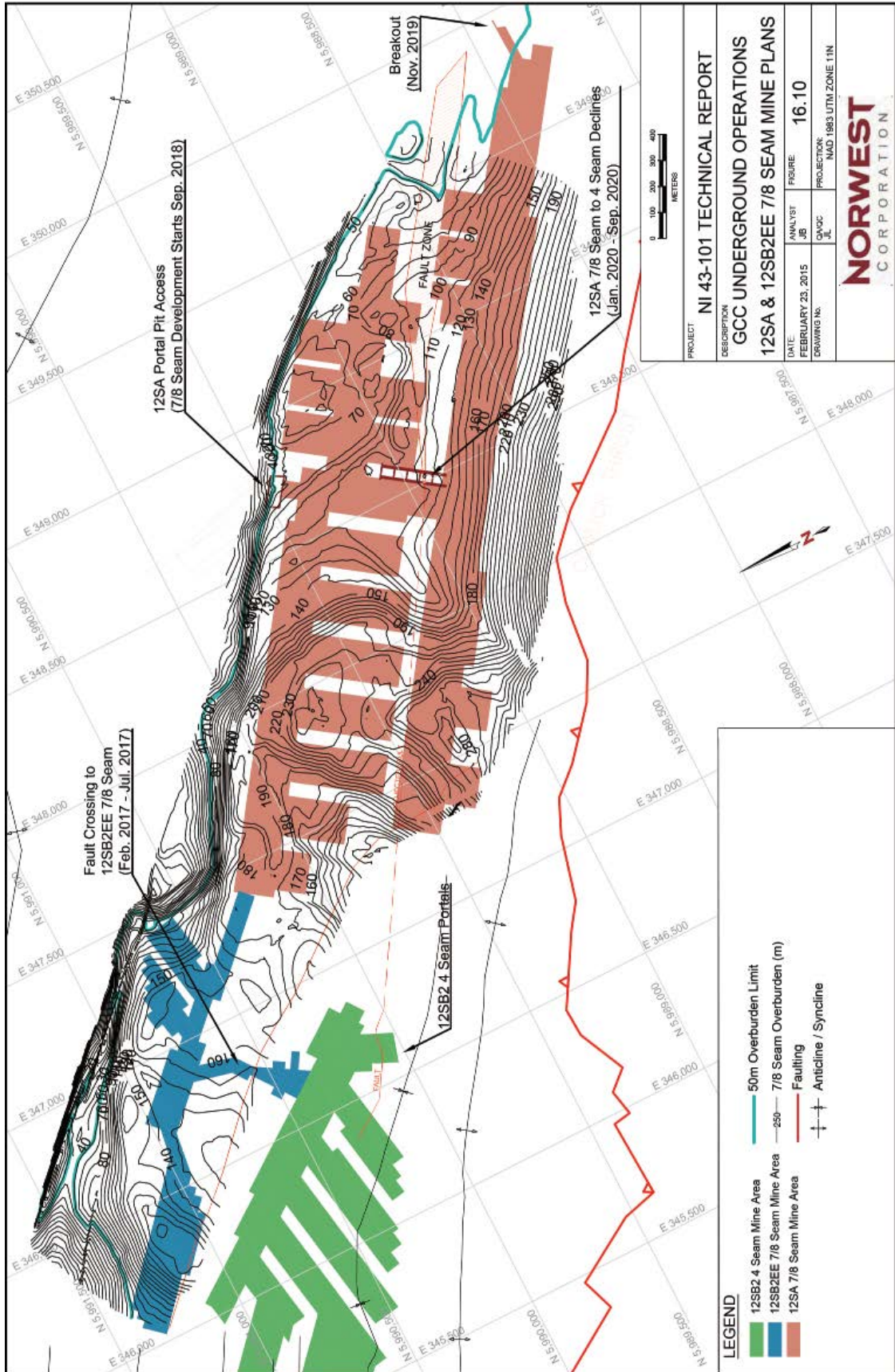
<b>Mining Horizon</b>	<b>7/8 Seam</b>	<b>4 Seam</b>
<b>Mining Horizon S.G including OSD</b>	1.46–1.55	1.40–1.51
<b>Development — Roadway Dimension (average)</b>	3.0m high by 6.1m wide	
<b>Depillaring — Floor Coal (variable)</b>		
No. 12 South B2	seam thickness to 5m max opening	
No. 12 South A	3.5	4.5
<b>Depillaring — Percentage Pillar Recovery (Planar basis)</b>		
No. 12 South B2	55%	
No. 12 South A (discounts all floor coal and applies this recovery to depillaring)	75%	

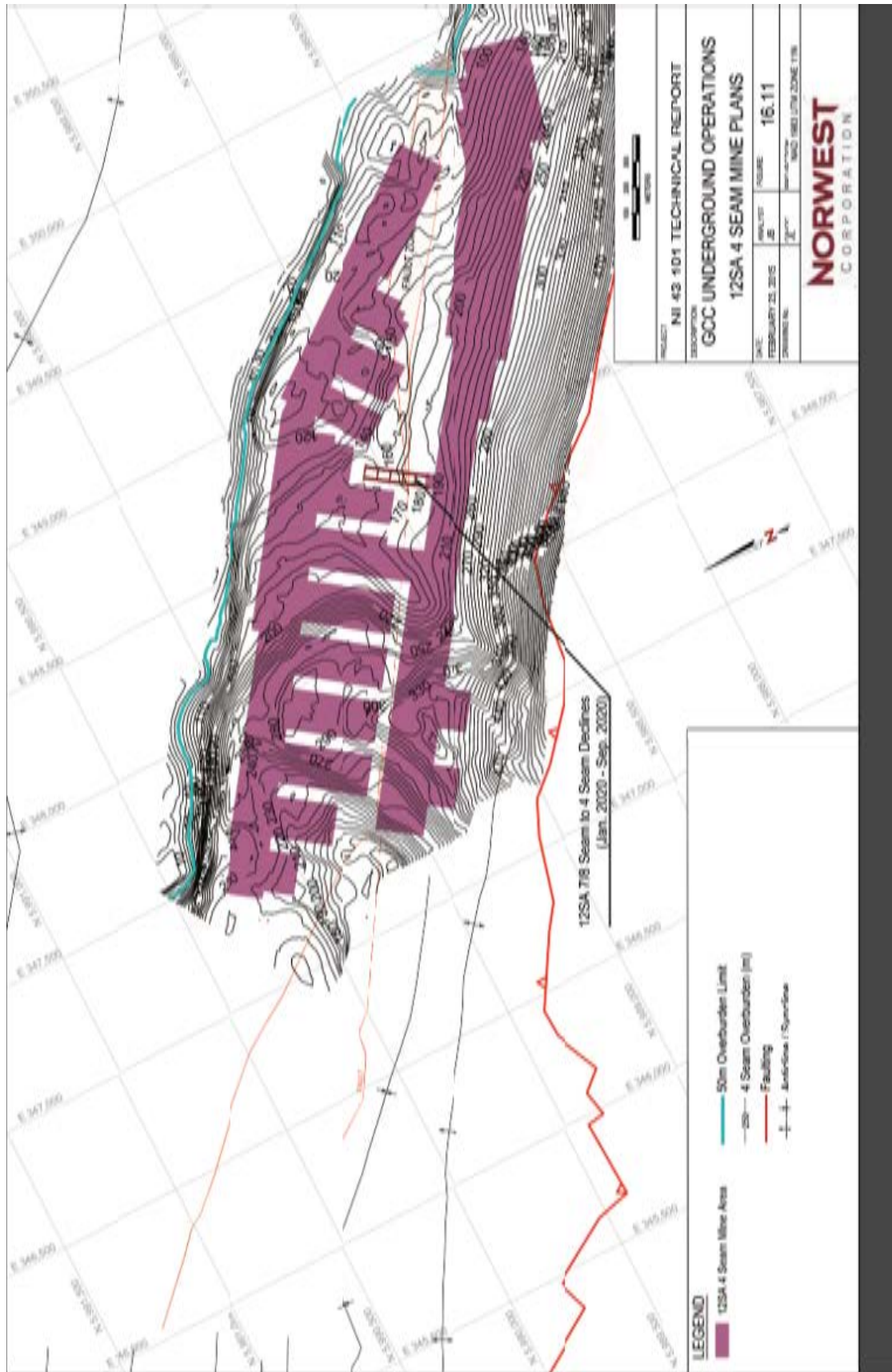












Norwest has reviewed GCC proposed mine plans and production schedules presented herein, with the following observations:

The production rates and productivities budgeted for the No. 12 South B2 7/8 Seam and 4 Seam are consistent with Norwest estimates. The timely completion of the portal and the development of the No. 12 South B2 4 Seam are critical to the continuation of operations for the No. 12 South B2. With No. 12 South B2 7/8 Seam depillaring reserves projected to exhaust in October 2015, the development of the initial mains allowing two development/depillar units in the 4 Seam is sensitive to any delay.

Access to the No. 12 South B2 EE 7/8 Seam is projected across a low angle fault zone from the No. 12 South B2 4 Seam. The exact displacement and orientation of this fault is not currently defined. With the proposed mine plan, the comparatively limited reserves of the No. 12 South B2 EE are predicated upon this inter-seam fault crossing introducing an additional factor of risk for this mining area.

Projected mineable reserves for the No. 12 South A mine areas appear conservative for both the 7/8 Seam and 4 Seam. This may be due to the conservative maximum depillaring height applied by GCC to both seams. A potential increase in reserves for the No. 12 South A 7/8 Seam and 4 Seam is possible if an increased maximum depillaring height can be achieved.

#### **NO. 9D UNDERGROUND OPERATION**

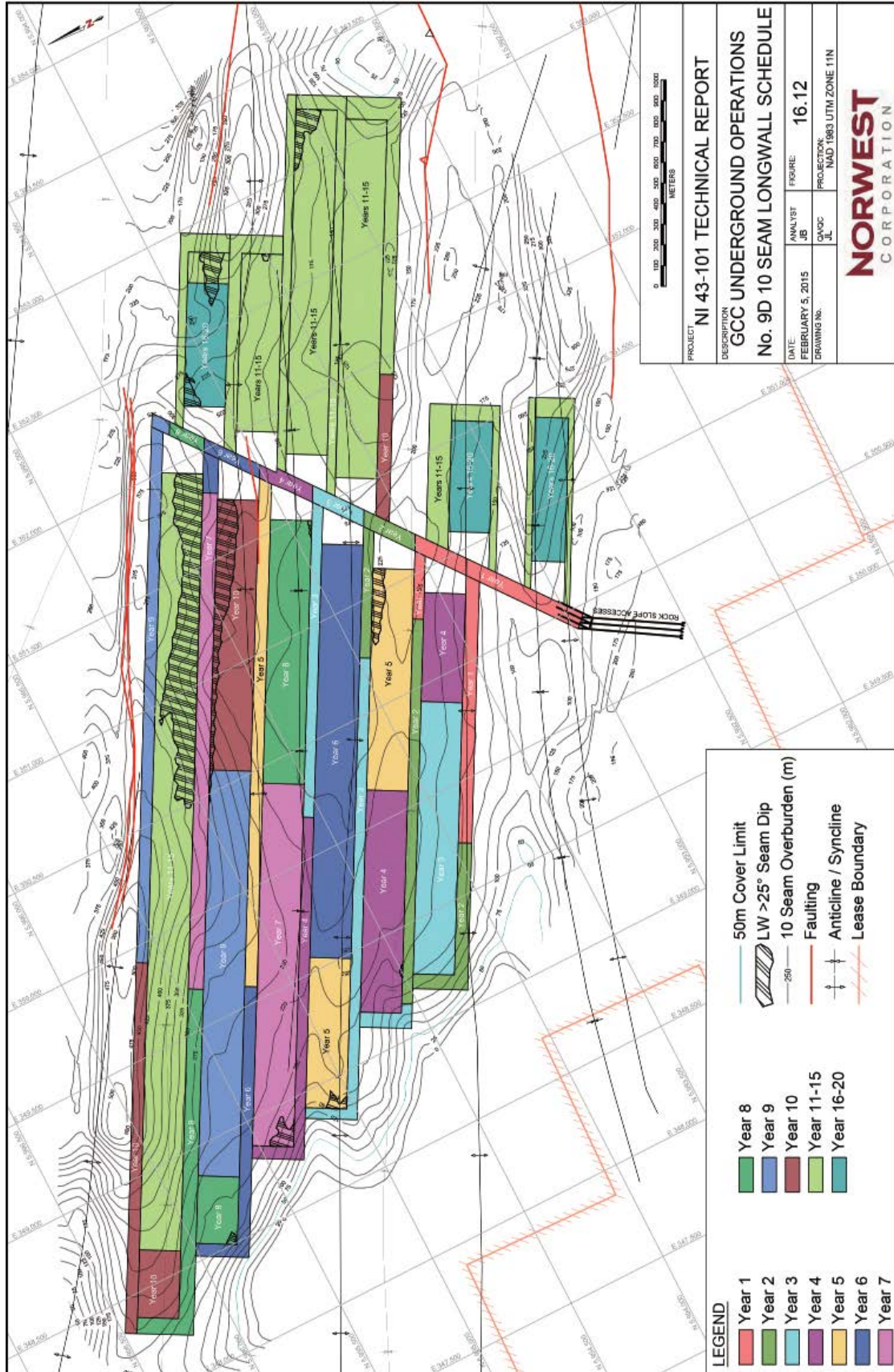
The major underground mining design parameters and assumptions projected for No. 9D longwall operations are presented in Table 6.7 and include the following assumptions. Figures 16.12 and 16.13 show the No. 9D 7/8 Seam and 4 Seam mine plans.

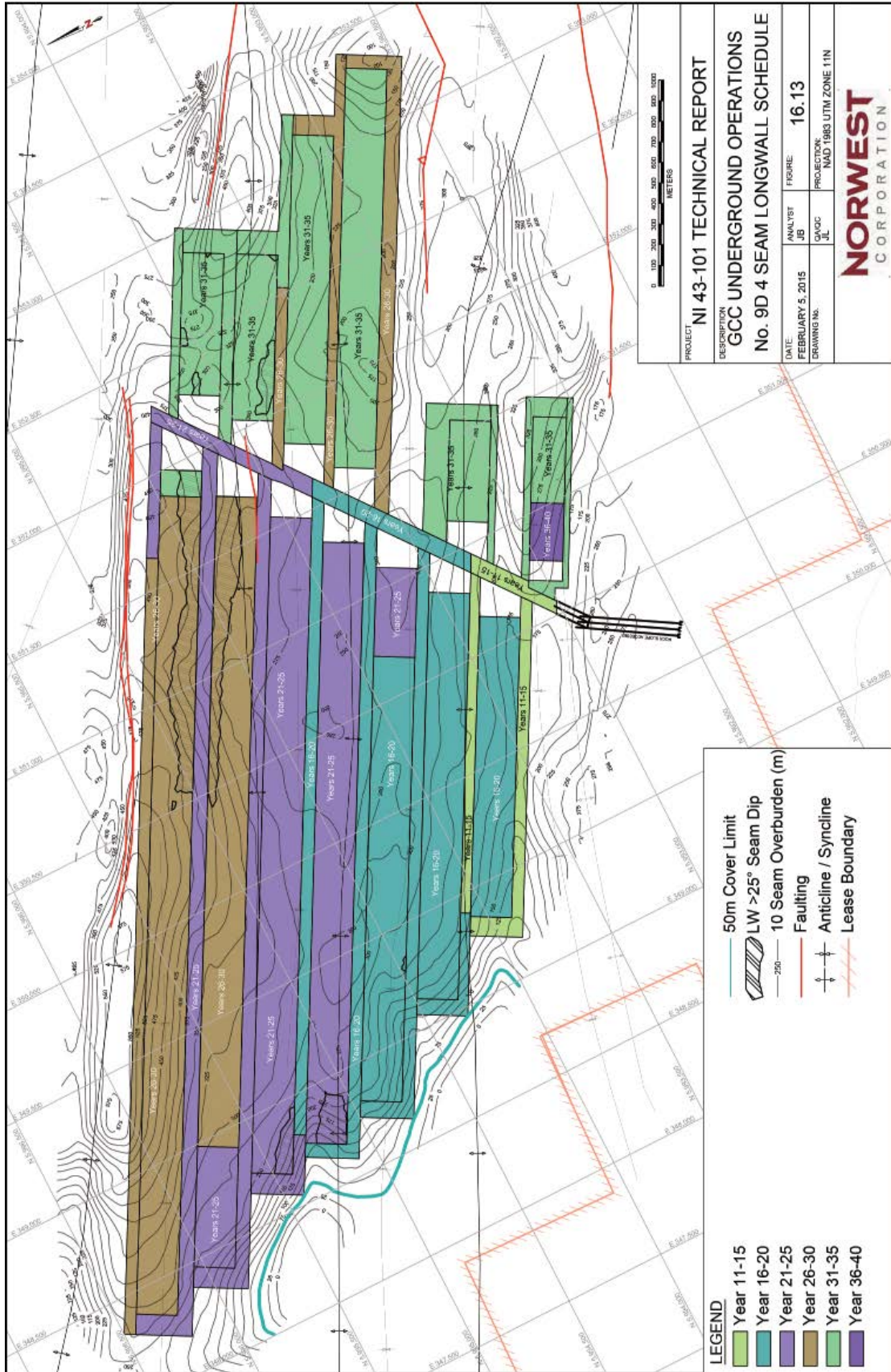
- The operational timeline for the No. 9D mine area as planned by Norwest was not based on a calendar year starting time as Norwest was not in a position to accurately predict acquisition of key regulatory approvals to allow for project development. Based on estimated regulatory and development timelines by GCC, the No. 9D mine was inserted into long range production plans starting in 2020.
- The production schedule is based on two (2) 10-hour production shifts per day scheduled for 360 days per year.
- Two to three sections of mining equipment develop bleeders and gate roads for the longwall and advance the main roadways as necessary to maintain adequate mining areas for the longwall system.
- Gradients greater than 16° reduce or eliminate efficient mining by the place change method. Development mining is projected with road headers instead of continuous miners at an average advance rate of 10m per day per road header.
- The longwall mining method is planned as the primary production system. Longwall mining systems are used worldwide in a wide range of variable applications including seam thickness and mining gradient. Planned longwall productivity for the 9D areas is varied based on the average mining gradient or dip across the longwall face. Longwall productivity based on average panel gradient ranges from approximately 6,000t/d between 15° to 20° down to approximately 4,400t/d at 25° to 30°. Application of automated steep gradient longwall equipment in Eastern Europe and China provides the basis of mining productivities for the No. 9D underground mine.

- A coal production ramp-up period for the period is planned to complete delineation of the first longwall panel and associated mains at 80% productivity for each development roadheader and a ramp-up for the longwall system within the first panel at 75% productivity.
- A production delay of 60 days is used for the longwall move to relocate the equipment from the completed panel to the next panel.
- Mining areas where multiple longwall panels are connected will have a wrap-around bleeder system for methane dilution and control with a bleeder shaft at the shallowest corner.
- Ventilation review for shaft size and placement and fans requirements necessary to ventilate a longwall and three to five operating roadheaders was conducted by Norwest using Ventsim Visual 3D™ by CHASM Consulting Pty Ltd to aid in capital and operating cost estimates.
- Roadway spacing(s) for longwall gate roads is designed using the National Institute for Occupational Safety and Health (NIOSH) design program “Analysis for Longwall Pillar Stability (ALPS)” using overburden depth and mining height.
- Roadway spacing for main development and protection barrier widths are designed using NIOSH design program “Analysis for Retreat Mining Pillar Stability (ARMPS)” using overburden depth and mining height.
- Production from the No. 9D underground mine area is projected to start 24 months after the start of portal pad construction, facility construction, and completion of rock tunnel construction to both the 10 Seam and the 4 Seam mining horizons. Initial development of the main roadways and the gate roads for the first longwall panel are projected to require 26 months, with the first longwall production occurring 50 months after site construction begins.

TABLE 16.7 LONGWALL DESIGN PARAMETERS — NO. 9D

<b>Mining Horizon</b>	<b>10 Seam</b>	<b>4 Seam</b>
<b>Mining Horizon S.G including 0.27m OSD</b>	1.42	1.4
<b>Development — Roadway Dimension (average)</b>	3m high by 6.1m wide	
Mains — 4 Roadway Centers with 40m crosscuts	25m	28m
Mains — 3 Roadway Centers with 40m crosscuts	30m	35m
Gate Road — 2 Roadway Centers with 100m crosscuts		
Depth -100m (headgate/tailgate)	13m/20m	13m/20m
Depth -200m (headgate/tailgate)	22m/45m	22m/45m
Depth -300m (headgate/tailgate)	30m/50m	30m/50m
Depth -400m (headgate/tailgate)	38m/62m	38m/62m
Depth -500m (headgate/tailgate)	N/A	41m/62m
<b>Protection Barriers</b>		
Mains 4 Roadway (depth/width)	240m/80m	310m/90m
Mains 3 Roadway (depth/width)	350m/96m	435m/107m
Bleeder barriers (depth/width)	100m/28m	
Bleeder barriers (depth/width)	200m/39m	
Bleeder barriers (depth/width)	300m/48m	
Bleeder barriers (depth/width)	400m/56m	
<b>Minimum Mining Depth — Development</b>	50m	
<b>Minimum Mining Depth — Longwall</b>	100m	
<b>Average Mining Height — Longwall (coal_plus OSD)</b>	3.3m/0.27m	4.5m/0.27m
<b>Maximum Panel Width — Longwall</b>	200m	
<b>Bleeder System — Multiple Panels</b>	2 Roadway Wrap Around System	







## 16.5 PRODUCTION PLANS

### 16.5.1 *Surface Mines*

This schedule meets annual production targets while maintaining mining operations on various benches throughout the mine life. Volumes and seam quality information were extracted from the geologic block model. Stripping ratios vary over the LOM, mainly as a result of the geology encountered during mining advance. During the mining operations at GCC there are multiple fluctuations in strip ratios. The strip ratio range and mine production schedule is shown below in Table 16.8. The variability in strip ratios are primary due to the nature of the deposit. As mining progresses from one pit area to another, the strip ratio increases as a new box-cut is excavated. The location of mining throughout the various years can be seen in Figures 16.2 through Figure 16.6.

Since GCC resumed operations at the property, production has gradually increased to a level in the range of 1.7 to 1.9M clean tonnes of coal per year. GCC is planning to reduce this production rate in 2015 with the shutdown of the surface mine until early 2017. With very low strip ratio reserves available in 2017 from the No. 8 surface and running 3 CM sections in No. 12 South B2 4 Seam, and No. 12 South A (7 Seam northwest), production in 2017 will be more than 4.6M ROM tonnes (3.2M saleable tonnes), close to the rated preparation plant capacity of 3.5M clean tonnes of coal annually. Production stays in this range until 2021 after which the 2nd CPP in the Beaverdam Creek valley is commissioned and saleable production rises to 3.6M tonnes. This plan is achievable if the planned second No. 12 South A underground operation commences production within the next 2.5 years.

The planned rate of production increase will require a considerable effort to achieve. Potentially the planned rate of production may be delayed by a year, which will affect the economics, but not likely to the point of impacting the viability of any of the reserves.

The schedule allows for blending the higher quality coal from the No. 8 and No. 2 Areas with the coal from No. 12 and No. 16 Areas over the life of mine plan, resulting in the vast majority of the product meeting the contracted specifications of Hard Coking Coal, until after 2045 when the high ranked low strip ratio source of No. 12 North begins production and reduces the volatile matter of the metallurgical blend to below 17.5% (db).

Table 16.8 shows the proposed surface production plan for 41 years in more detail.

### 16.5.2 *Underground Mines*

Underground coal mining in No. 12 South B2 and No. 12 South A mining operations is planned to provide an average annual production of 1.4M ROM tonnes with maximum annual production peaks of 2.1M ROM tonnes. This provides an average 1.0M clean tonnes of coal from the 7/8 Seam and 4 Seam for 12 years with maximum annual peaks approaching 1.6M clean tonnes of coal. Development of the No. 9D longwall mining operation is projected to begin in the year 2020 and would provide an average annual production from the 10 Seam and 4 Seam of approximately 1.9M ROM tonnes providing 1.22M clean tonnes of coal for 36 years. Table 16.8 shows the proposed underground production plan for 41 years in more detail. The underground mine plans are illustrated in Figure 16.7 through Figure 16.13.

**TABLE 16.8 GRANDE CACHE COAL PRODUCTION PLAN**

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025-29	FY 2030-34	FY 2035-39	FY 2040-55
<b>Total Waste (kbcm)</b>	760	0	15,330	16,608	19,279	18,878	19,641	18,672	20,085	18,828	164,139	172,585	171,491	455,075
<b>Run-of-Mine (ktROM)</b>														
<b>Surface Areas</b>														
No. 8	116	0	2,373	2,524	2,472	1,955	865	682	1,232	1,418	0	0	0	0
No. 2	0	0	0	0	81	378	1,641	822	323	940	7,562	3,452	802	0
No. 9	0	0	0	0	0	0	0	0	0	0	999	5,182	5,413	13,776
No.12 North	0	0	0	0	0	0	0	0	0	0	0	0	0	46,137
No.16	0	0	0	0	0	0	0	0	0	0	8,003	7,202	9,166	10,476
<b>Total O/P</b>	<b>116</b>	<b>0</b>	<b>2,373</b>	<b>2,524</b>	<b>2,553</b>	<b>2,332</b>	<b>2,507</b>	<b>1,504</b>	<b>1,555</b>	<b>2,358</b>	<b>16,564</b>	<b>15,836</b>	<b>15,381</b>	<b>70,389</b>
<b>Underground</b>														
No.12 South B2	521	—	—	—	—	—	—	—	—	—	—	—	—	—
No.12 South B2	135	1,023	947	750	220	—	—	—	—	—	—	—	—	—
No.12 South B2EE	—	47	207	630	—	—	—	—	—	—	—	—	—	—
No.12 South A	—	—	—	328	1,409	1,624	1,500	706	—	—	260	—	—	—
No.12 South A	—	—	—	—	—	111	560	1,403	1,991	1,935	2,187	—	—	—
No. 9D	—	—	—	—	—	273	352	1,729	1,757	1,973	9,929	9,538	9,813	28,119
<b>Total U/G</b>	<b>656</b>	<b>1,070</b>	<b>1,155</b>	<b>1,708</b>	<b>1,629</b>	<b>2,008</b>	<b>2,412</b>	<b>3,838</b>	<b>3,748</b>	<b>3,908</b>	<b>12,376</b>	<b>9,538</b>	<b>9,813</b>	<b>28,119</b>
<b>Grand Total</b>	<b>772</b>	<b>1,070</b>	<b>3,528</b>	<b>4,232</b>	<b>4,181</b>	<b>4,340</b>	<b>4,918</b>	<b>5,342</b>	<b>5,303</b>	<b>6,266</b>	<b>28,940</b>	<b>25,374</b>	<b>25,194</b>	<b>98,507</b>
Clean Met. Coal (ktcc)	531	793	2,495	2,850	2,552	2,617	3,428	3,574	3,624	4,265	17,733	16,617	17,227	68,999
Clean Thermal (ktce)	1	0	71	178	247	203	73	129	154	137	2,263	1,044	950	2,866
<b>Total Clean Coal (ktcc)</b>	<b>532</b>	<b>793</b>	<b>2,566</b>	<b>3,028</b>	<b>2,799</b>	<b>2,820</b>	<b>3,502</b>	<b>3,703</b>	<b>3,778</b>	<b>4,402</b>	<b>19,997</b>	<b>17,661</b>	<b>18,177</b>	<b>71,865</b>
Strip Ratio (bcm/tcc)	10.5	0.0	9.0	9.1	11.2	12.2	10.8	17.8	18.1	11.7	14.0	14.9	15.4	8.9

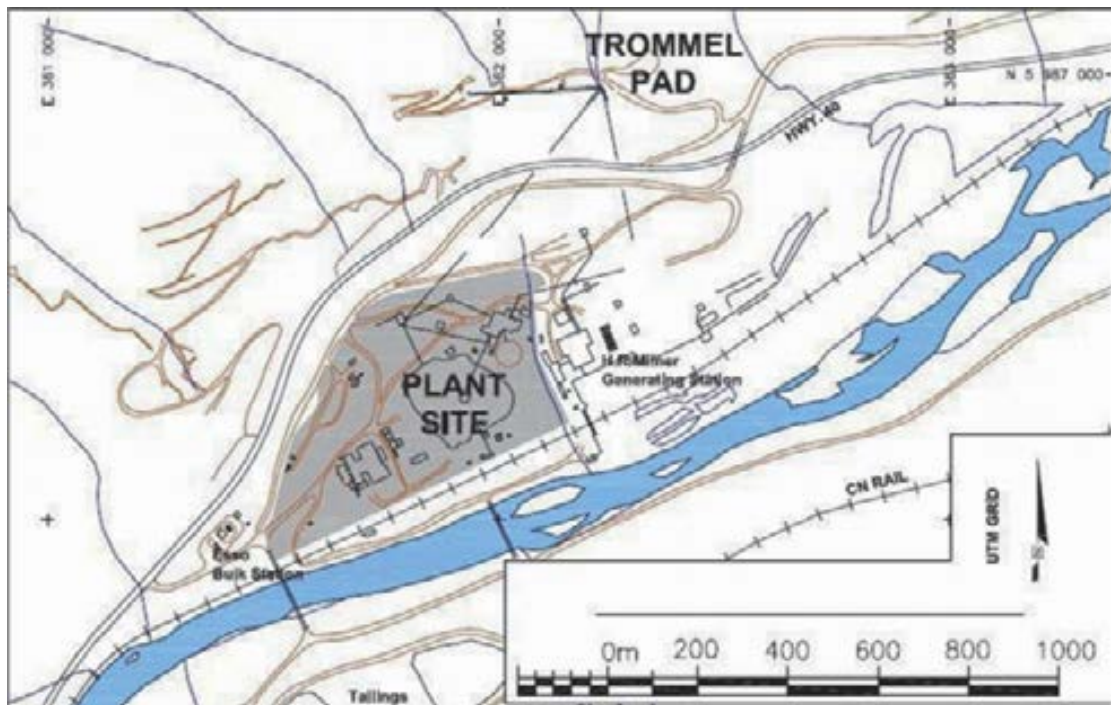
Note: Does not include pond coal and does not list total saleable coal tonnes

## 17 RECOVERY METHODS

### 17.1 INTRODUCTION

The coal preparation plant (CPP), located in the Smoky River valley next to Highway 40 and the CNR, and is currently processing coal from the No. 12 underground operation and the No. 8 Area surface operations. The plant area and facilities include ROM coal stockpiles and reclaim platform, a screening and crushing station, a coal washing plant, a clean coal thermal drying station, clean coal stockpiles, fine refuse ponds, mine-dry and administration buildings, pump stations, roads and conveyors as well as a train load-out system. Refer to Figure 17.1. for the plant site location and layout.

FIGURE 17.1 PLANT SITE PLAN



The coal processing plant was constructed during the late 1960s and started up in 1969. Under previous owners it has produced at rates up to 3M clean tonnes of coal per year. GCC has the ability to market a range of products. The low volatile hard coking coal product has an ash and moisture specification of 8.5%. Since GCC commenced operations the processing plant has produced at levels from 1.2 up to 1.8M clean tonnes of coal. During the last few years the CPP throughput was largely constrained by the capacity of the mining operations.

## 17.2 COAL PROCESSING PLANT DESCRIPTION

The CPP circuitry is generally typical for Western Canadian metallurgical coal. Stockpiled ROM coal is first processed through a rotary breaker where 2% to 10% of the feed is rejected as lump refuse consisting mostly of dilution rock and parting material. The breaker undersize product (smaller than 50mm) material is transferred to the CPP, where the coarser fraction reports to the heavy medium (HM) cyclone circuit for separation and the finer coal reports to the froth flotation banks for cleaning. The HM cyclone overflow goes to clean coal which, if required, is dried to reduce moisture content to product specifications, while the HM cyclone underflow goes to rejects.

GCC has a bypass facility at its pre-screening circuit (rotary breaker station) for the size fraction smaller than 3.0mm. Depending on the ash content, this material can be blended with the clean coal product from the plant without a need for washing and drying, which reduces operating costs and increases the product yield. This system has not been used since 2010, due to high ash contents in the feed. In addition the installed mechanical dewatering system for the fine rejects allows it to be combined with the coarse rejects, minimizing the need for fine refuse storage facilities in the restricted area available near the river valley.

### 17.2.1 Recent Plant Modifications

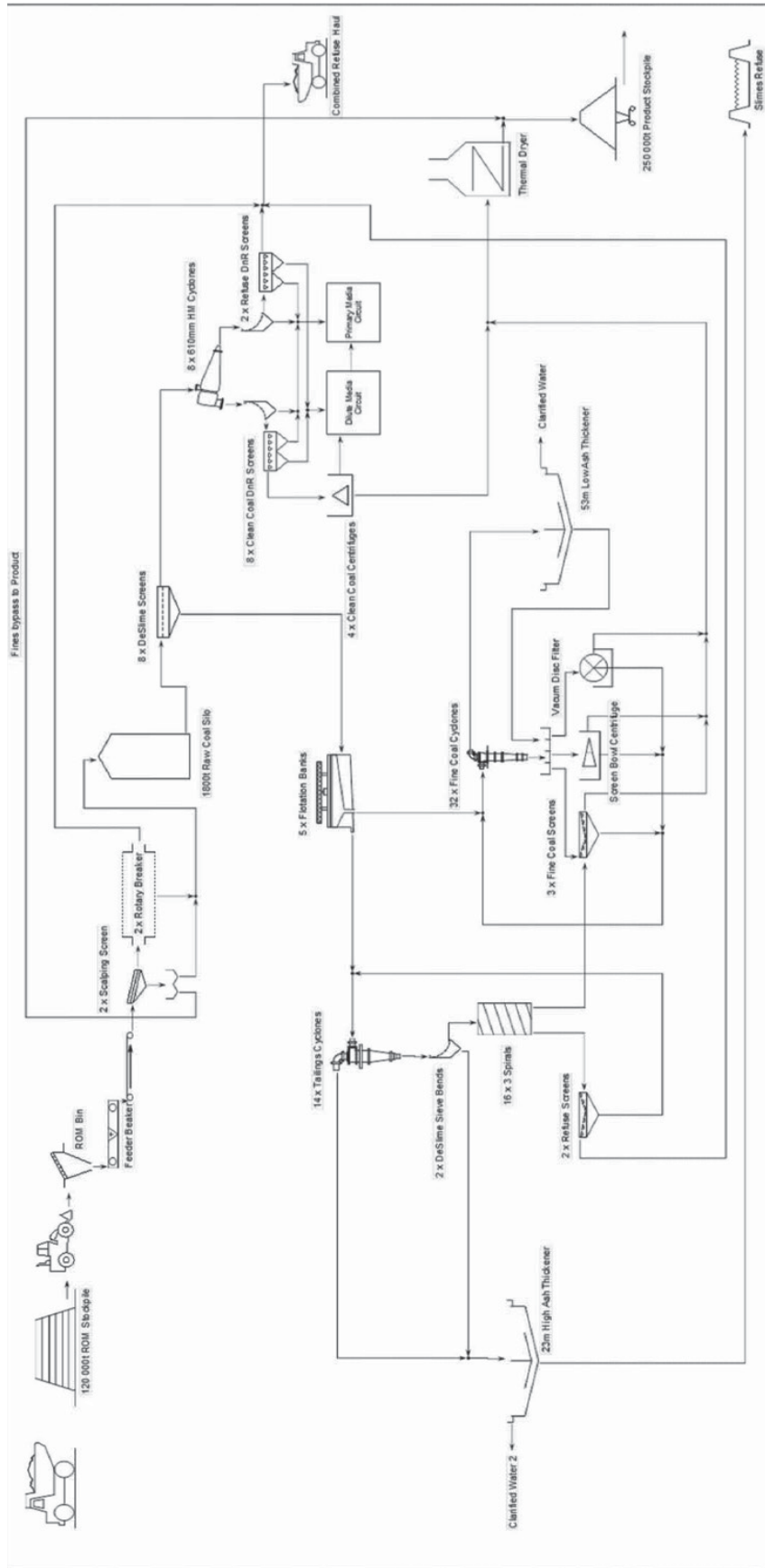
The more than 40-year old CPP process circuits have had only minor modifications over the years; however, the following modifications to the CPP have enabled improvements to plant availability and operating efficiencies:

- Modification of the dilute medium circuit flow sheet to enhance magnetite recovery and stabilize correct density medium specific gravity.
- Installation of deslime sieve bends on the existing spiral scavenging circuit to improve spiral throughput and product ash.
- Engineering of the addition of new mid-size (1mm x 0.25mm) reflux classifier processing circuit to alleviate inefficiencies of the both HMC and flotation circuits in this same size range is complete. A reflux classifier has been purchased and delivered to site. Construction and installation is incomplete at this time.

### 17.2.2 Current Process Description

A simplified schematic process flow diagram of the CPP is shown in Figure 17.2.

FIGURE 17.2 SIMPLIFIED GCC PROCESS FLOW DIAGRAM



ROM coal is delivered by truck from the No. 12 and No. 8 mining operations to either a 75,000t ROM coal stockpile adjacent to the Breaker Station, or a recently constructed ROM stockpile on the north side of Highway 40 northwest of the CPP. From the south stockpile, the coal is reclaimed using vibratory feeders, located in a reclaim tunnel. The feeders load the ROM coal onto a reclaim conveyor that transfers the coal into the breaker station. On the north side of Highway 40, a new feeder and conveyor system has been installed, comprising a 120,000t ROM stockpile, from where ROM coal is fed into an 80t feed bin and then extracted with a feeder breaker system that feeds an overland conveyor to the breaker station. The new feeder and conveyor system is used preferentially due to the savings in personnel and equipment hours it allows, with the old feeder system serving as a back-up to provide flexibility for maintenance on the new system.

At the breaker station, two double-deck vibratory scalping screens size the coal with the minus 3.0mm screen undersize being directed to the raw coal silo feed conveyor. A by-pass system is also installed here to by-pass the screen undersize to the clean coal stockpile as dry product. When the by-pass system is not operational due to high feed ash (as is currently the case), a much coarser cut-point up to 25.4mm is targeted on the scalping screens. The scalping screen oversize reports to two (3.2m Ø × 6.7m long) rotary breakers that break the more friable coarse coal and reject the harder, higher ash coarse material.

The rotary breakers are fitted with 50mm aperture panels, which allow the minus, 50mm raw coal to pass through and discharge onto the raw coal silo feed conveyor from where it is conveyed to a 1,800t capacity raw coal silo. Breaker oversize material is discharged onto an open storage pile and then trucked to on-site mine construction projects.

Raw coal is reclaimed from the silo by three vibratory feeders and one reciprocating pan feeder onto the coal processing plant feed conveyor, which is equipped with a tramp iron magnet and a belt scale, and conveyed to the desliming circuit of the CPP.

The raw coal feed is wet with process water in a two-way splitter box and discharged into two four-way distributors that distribute the flow evenly over eight sieve bends and directly to the eight desliming screens fitted with 0.5mm aperture panels. The deslimed coarse coal (50mm x 0.5mm) then passes to a mixing box where it is mixed with correct magnetite medium and fed to eight 600mm diameter heavy media cyclones (HMC). The fine coal (-0.5mm) screen undersize is gravity fed to a distribution box which then feeds the froth flotation circuit.

The heavy media cyclones separate the raw coal into clean coal and rejects at a separation specific gravity of between 1.55 and 1.70, depending on the ROM feed blend. The correct magnetite media is recovered from each product on eight clean coal and two reject drain-and-rinse screens and then re-circulated back to the mixing box directly for re-use. The dilute media underflow from these screens is passed through four primary and two secondary magnetic separators for recovering the magnetite. The recovered dense magnetite is returned to the media circuit for making the correct media.

The non-magnetic materials are removed from this circuit to prevent a build-up of fines. The drained coarse clean coal is dewatered in four centrifuges and discharged to the clean coal conveyor. The drained coarse reject material is conveyed to the discard bin for removal by truck to be utilized in construction projects or alternatively hauled to the No. 8 waste rock dumps.

The minus 0.5mm raw coal slurry is fed into five banks of Wemco flotation cells in rougher duty. Each bank contains 4 x 8.5m<sup>3</sup> mechanical flotation cells. Frother and collector reagents are dosed to the flotation process to enable fine clean coal and refuse to be separated.

The flotation tailings are pumped to a cyclone pack of 12 water-only 260mm Ø cyclones for tailings densification, with the underflow then pumped to a single stage bank of sixteen triple start spirals. After this gravity separation step the spiral refuse is then dewatered on two high frequency dewatering screens. The dewatered screen overs are discharged onto the tailings rejects conveyor. The flotation concentrate as well as the spiral coal product is densified using a water-only cyclone pack with 32 x 150mm Ø cyclones and the cyclone underflow is dewatered by a combination of three high frequency dewatering screens and a screen bowl centrifuge.

The high ash overflow from the flotation tailings water-only cyclone is directed to a 23m diameter thickener. The low ash overflow from the product water-only cyclones is directed to a 53m thickener. The low ash thickener underflow is pumped to a vacuum disc filter and a screen bowl centrifuge with the centrifuged solids and filter cake being discharged onto the clean coal conveyor containing both coarse and fine clean coal, centrate and filtrate water are directed back to the tailings thickener. The underflow from the high ash thickener is pumped to the fine tailings disposal pond.

Clarified water is recycled to the plant as process water. The fluidized bed thermal dryer is located in a separate building adjoining the coal processing plant and has a maximum rated capacity of 41m<sup>3</sup>/h of water evaporation. The clean coal from the dryer has a moisture content of up to 8.5% and is conveyed to the 250 000t capacity clean coal stockpile.

Clean coal is reclaimed using a bulldozer and two Cogar flat back feeders, rated at 3,000 tonnes per hour (tph) each, located in the reclaim tunnel under the stockpile, and then transferred by conveyor to a load-out bin for loading into rail cars. After loading, the top surface of the coal is sprayed with a latex solution to inhibit dusting and coal losses during rail transport.

### ***17.2.3 Future CPP Plans***

GCC recognizes the shortcomings of the existing CPP and the need to replace it at some point in the future given long remaining life of the project. While no definitive studies have been conducted for a new CPP, GCC has allocated capital monies for the construction of a new plant commencing year 2020. A suggested location has been the Beaverdam Creek area coupled with an overland conveyor to transport clean coal part of the way to the existing rail loading area.

## **17.3 COAL PREPARATION PLANT CAPACITY AND OPERATION**

The annual CPP ROM capacity depends on the feed quality and the product blend being produced. Given the age of the GCC CPP, a reasonable limit on annual operating hours is 6,800, which equates to ~77% utilization of the facility. GCC has exceeded this number for some months in its operating history, but not consistently for a full year's production.

For low volatile hard coking coal product, the nominal feed capacity of the GCC CPP is 600tph to 650tph, resulting in an estimated annual ROM capacity of 4.1 to 4.4M tonnes. Applying the average 2013 yield of 63% to these ROM figures imply a nominal clean coal capacity between 2.57 and 2.77M tonnes.

For high ash product blends, GCC can achieve ROM throughput rates of 800tph, at yields greater than 90%, implying CPP capacities of ~5.44 and ~4.9M tonnes for ROM and product coal respectively. GCC therefore has a flexible operating and marketing environment that is amenable to changes in mining capacities and market conditions.

GCC is in the process of evaluating further capacity enhancing options, such as construction of a new CPP facility at Beaverdam Creek. In addition to enhanced capacity, such a facility will also have lower operating and maintenance cost and improved metallurgical efficiency, and may possibly be located more favorably to reduce the cost of CPP refuse disposal.

## **18 PROJECT INFRASTRUCTURE**

### **18.1 INTRODUCTION**

Alberta Provincial Highway 40 is a paved, two-lane road that connects the property with the town of Grande Cache and with the communities of Grande Prairie to the north and Hinton to the southeast. The area is served by an existing branch line of the Canadian National Railroad (CNR), which connects with the main lines, allowing access to the three major coal export terminals in British Columbia and the Great Lakes. The mining operations were previously owned and operated by Smoky River Coal Ltd. (SRCL) and its predecessor-company McIntyre Porcupine Mines which initiated mining in 1969.

### **18.2 CENTRAL OPERATIONS INFRASTRUCTURE**

The operation uses the existing coal processing, coal loading, rail and waste storage infrastructure as well as a central office, bathhouse, warehouse and maintenance complex. These are located along the north bank of the Smoky River and the local CNR trackage. The central operations complex is shown in Figure 18.1.

New main pit access roads have been constructed on the east slopes of Horse Mountain Ridge to support the development of the No. 8 pits. Sufficient surface area and infrastructure facilities are available to support the planned increase in production.

As mining operations are developed to the north, GCC is planning to construct shop, warehouse and office facilities in conjunction with the proposed Beaverdam Creek CPP. A conveyor system to transport clean coal from the Beaverdam Creek CPP is proposed as well. This system is planned to be 12.2km long and will consist of a 9km segment that will run from the Beaverdam Creek CPP to just north of the No. 8 mine area. The next segment will go underground in a tunnel to be constructed in the 10 seam. This tunnel will be approximately 3km long from the 12km Bridge to the Smoky River Coal Pad and loadout area. As coal is mined during construction of this tunnel, the cost of constructing the tunnel will be covered by the value of the coal being mined. This had been done in the past in the same area but the tunnel was in the 11 seam. That tunnel was abandoned in the 1990s.

### **18.3 ELECTRIC SUPPLY**

Electrical power is available at the plant site from the Alberta Interconnected Electrical grid system. The location of the key distribution lines in the central complex are shown in Figure 18.2. A transmission line currently runs to the No. 8 mining area from the plant site. A new transmission line to supply electrical power to the No. 12 South B2 underground and No. 12 South A areas was completed in 2011.



**18.4 COAL REJECT FACILITIES**

Three existing ponds have been used for the storage of fine coal reject. Recent reviews indicated no immediate stability concerns with any of the impoundment dykes. GCC monitors stability and groundwater conditions.

GCC has installed a dewatering circuit for the fine rejects and combines most of this material with the coarse rejects using truck haulage. Currently the operation is hauling this material for co-disposal on the active No. 8 waste rock dumps. The continued monitoring and evaluation of the geotechnical and practical feasibility of this method for the management of the plant reject is a critical factor to ensure the continued operation of GCC.

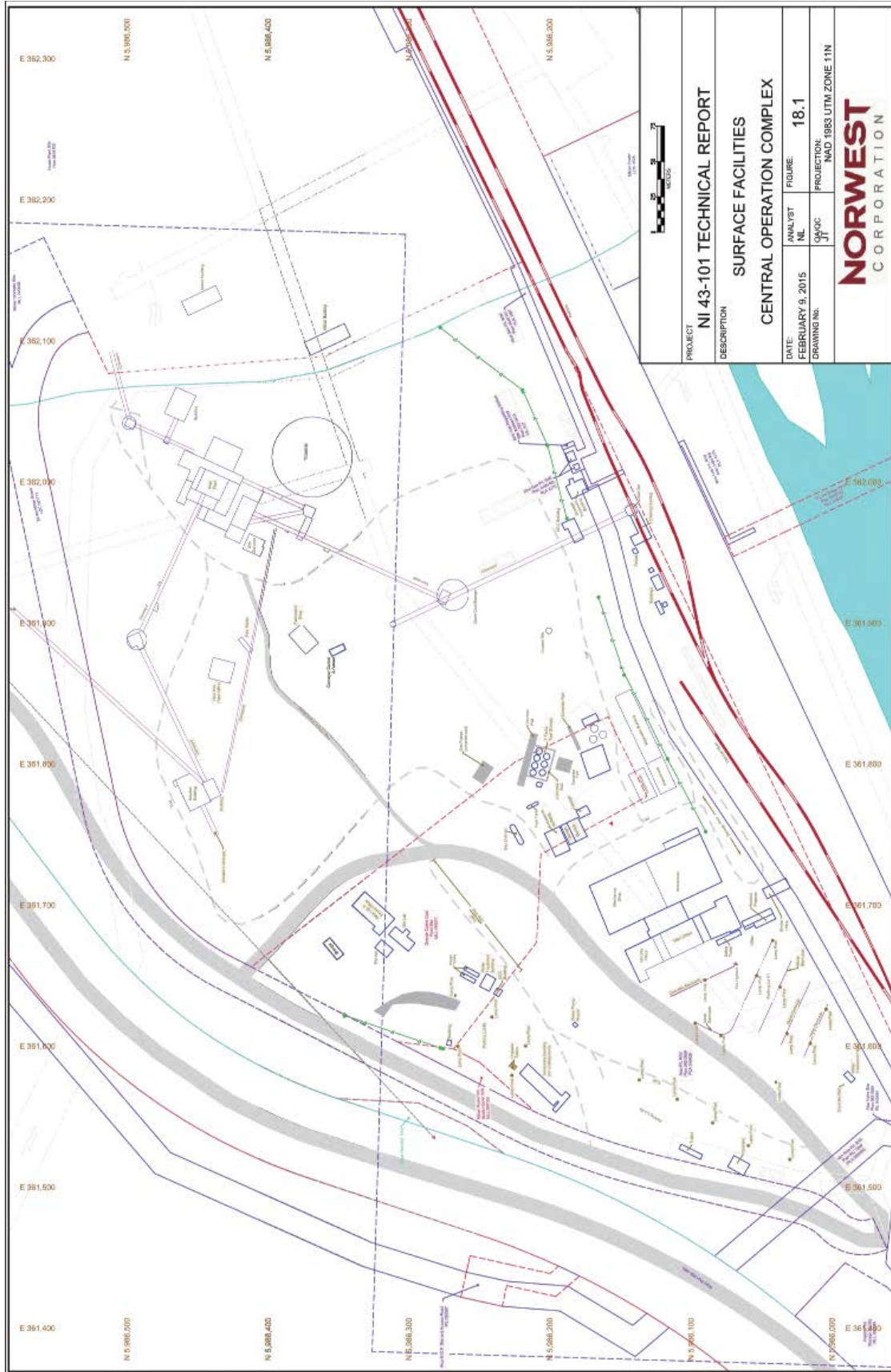
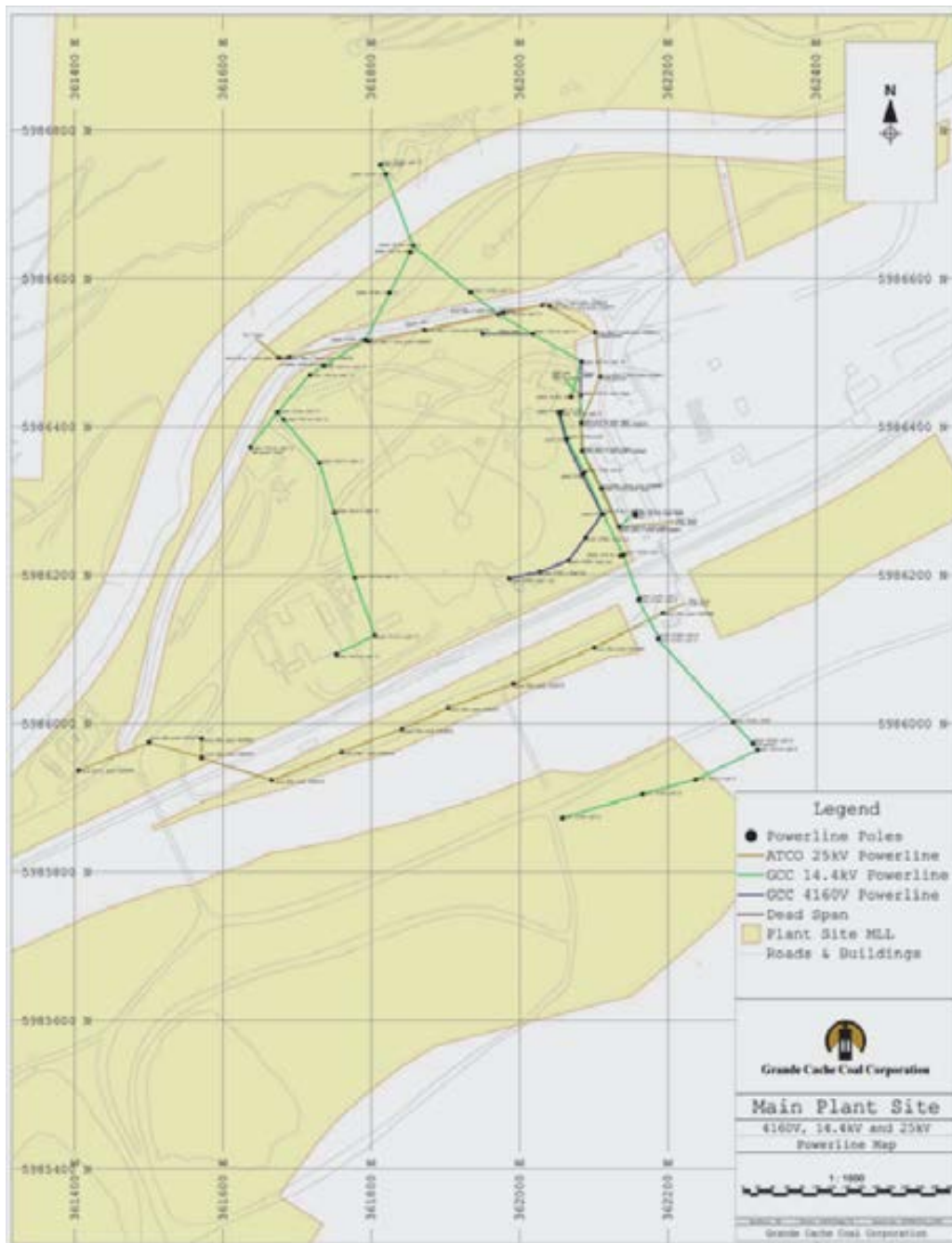


FIGURE 18.2 CENTRAL COMPLEX POWER DISTRIBUTION MAP



## 19 MARKETS AND CONTRACTS

Grande Cache coking coal is the only high rank, low volatile (LV) coking coal produced in Canada. As such it competes with LV coking coals from the Appalachian region of the United States, and with low volatile coking coals from Queensland.

Following a quality comparison of Grande Cache coal with selected US and Australian brands, price benchmarks were established for GCC, using a price index series that exists for US low volatile coking coal, together with an analysis of pricing for Tier 2 Australian coking coals.

The following price scenarios in Table 19.1 are arrived at for GCC based on assumptions around market pricing.

**TABLE 19.1 PRICE SCENARIOS FOR GRANDE CACHE COKING COAL**

(US\$ per Tonne in 2014\$)	Medium Term Price 2018–2020		Long Term Price 2021 on
	Assumptions on Benchmark Coking Coal Price	160's	170's
Likely Price Range For Grande Cache Coal	135–145	145–155	165–175

### 19.1 QUALITY AND PRICE ASSESSMENT FOR GRANDE CACHE COAL

#### 19.1.1 Review of Grande Cache Coal Quality

GCC is the only high rank, LV coking coal produced in Canada. As such it competes with LV coals from the Appalachian region of the United States, and with LV coals from Queensland.

This quality assessment is based on the commercial specifications for Grande Cache coking coal.

#### 19.1.2 Comparison of GCC Coal Quality with US and Australian Low Volatile Coals

As the only LV coal on the market from Canada, GCC will be compared with the LV coals from the US and Australia. While coals from the three regions are similar in carbon content and therefore give similar coke yield, there is considerable variation when comparing overall quality parameters.

Table 19.2 compares the quality of GCC coal with the LV coking coals from the US and Australia; these represent the most regularly traded low volatile coals on the seaborne market.

**TABLE 19.2 GRANDE CACHE COAL QUALITY COMPARED TO US  
AND AUSTRALIAN LOW VOL COKING COALS**

		<b>GCC</b>	<b>US LV HCC</b>	<b>Australian LV HCC</b>
<b>Proximate Analysis</b>	Total Moisture (%)	8.8	5.5–7	10–11
	Volatile Matter Dry (%)	18.2	16–19.5	17.5–19
	Ash Content Dry (%)	8.5	5.5–9	9–10
	Sulphur Content Dry (%)	0.50	0.65–0.85	0.60–0.65
	Free Swelling Index	6–8	7–9	7.5–9
<b>Rheology</b>	Maximum Fluidity (ddpm)	10–22	5–450	50–200
	Total Dilatation (%)	15	5–150	60–100
<b>Petrography</b>	Reflectance RoMax (%)	1.50–1.55	1.40–1.70	1.50–1.65
	Vitrinite Macerals (%)	55	60–76	65–75
	Total Reactives (%)	70	65–80	75–80
	Total Inerts (%)	30	20–35	20–25
<b>Ash Chemistry</b>	Base/Acid Ratio	0.14	0.11–0.55	0.09–0.12
	Phosphorus in Coal (%)	0.050	0.001–0.030	0.030–0.065
<b>Coking Characteristics</b>	Approx. Coke Yield (%)	82.4	81.5–84	82–83
	Ash in Coke (%)	10.3	6.5–8.5	11–12
	Sulphur in Coke (%)	0.45–0.50	0.60–0.80	0.55–0.60
	Coke Strength after Reaction	60+	45–65	65–74

Source: GCC, Industry sources

Typically for western Canadian coals, GCC coal exhibits higher inerts content, lower sulphur, lower alkali and lower plasticity than US low vols.

Sulphur is also lower than that of the Australian low vol coals. Lower sulphur in the coal leads to lower sulphur in the hot metal, and less flux material is required for sulphur removal.

Ash content of GCC is moderately high compared to US coals, but lower than the Australian coals. Higher coal ash translates to higher slag volumes that must be removed from the blast furnace; it also results in high coke ash, which increases coke consumption per tonne of hot metal.

The fluidity and dilatation of GCC is lower than most of the other low vol coals. Various studies have shown that Canadian coals with lower fluidity still produce strong cokes, and GCC is no exception, as seen in the Coke Strength after Reaction (CSR) figures, which are significantly higher than the bulk of the US export low volatile coals. Australian low vols are known for producing coke with high CSR, as a result of low alkali content, good rheology, and favourable petrography.

Petrographically, Grande Cache vitrinite content is low at 55%; this is typical of Canadian coals, which present excellent coke strength at these levels. In Canadian coals, the semifusinite macerals tend to be more reactive than those of the US and Australian coals. In the case of GCC, the reactive semifusinite contributes to total reactivities of 70%, which is similar to that of the US and Australian coals.

Canadian and Australian low volatile coking coal has higher phosphorus than US coal, resulting in higher downstream de-phosphorizing costs.

When GCC is compared directly to Australian low volatile coals, it is superior in terms of ash content and sulphur. GCC is also a more contracting coal, which will enhance coke removal from the oven, thereby resulting in longer coke battery life. Australian low volatile coking coal is superior to GCC in terms of rheology and CSR. The coals are similar as it relates to petrography, carbon content and ash chemistry.

### 19.1.3 Benchmarking of Grande Cache Coking Coal for Price Determination

The benchmark coking coal price is applied to only a small percentage of the coals traded on the seaborne market. The majority of coals are subject to price discounting based on the quality characteristics of each individual coal.

The approach to price benchmarking for Grande Cache coking coal is developed firstly from the pricing of Tier 2 Australian coking coals, and secondly from certain price indices for US Low Vol coals in relation to the benchmark coking coals from Australia.

Tables 19.3 and 19.4 track pricing for a selected range of coking coals on the seaborne market over the last three years. Table 19.3 is based on quarterly benchmark settlements for Australian coking coal, while Table 19.4 is derived from monthly price indices for both US Low Vol and Australian prime hard coking coal.

**TABLE 19.3 COKING COAL PRICING BASED ON AUSTRALIAN COALS**

(US\$ per tonne)	Q4 2011	Q3 2012	Q4 2012	Q1 2013	Q4 2013	Q4 2014	% of Prime HCC Price
Prime Hard Coking Coal	285	225	170	165	152	119	100%
Tier 2 Australian Coking Coal	250	205	145	140	135	102	85–91%

Source: Industry data

TABLE 19.4 COKING COAL PRICING BASED ON US LOW VOLATILE COALS

(US\$ per tonne)	Q4 2011	Q3 2012	Q4 2012	Q1 2013	Q4 2013	Q4 2014	% of Prime HCC Price
Prime Hard Coking Coal Index	244	180	155	168	144	113	100%
US Low Vol Coking Coal Index	233	151	145	150	139	109	84–97%

Source: McCloskey Coal

Based on the data above, US Low Vol coals have experienced a broader price range in relation to the Benchmark HCC Price, while the pricing for Tier 2 Australian coals has maintained a very tight range of 85–91% of the benchmark price.

Different scenarios for GCC pricing are developed on the basis of the price ranges seen. A best case would follow the high levels seen for US LV coals, while a more likely scenario would see GCC pricing in a similar range as the Tier 2 Australian coking coals. The author notes that there is no formal industry classification for “Tier 2” coking coals; the terminology is used here to designate certain coals which in the author’s determination fall within a similar commercial classification as GCC.

#### *19.1.4 Price Outlook for Grande Cache Coking Coal*

Coking coal prices are not expected to recover to any great extent over the next year or two. However, since the current low prices cannot be sustained indefinitely without severe supply disruption, a recovery is likely in the medium term (2018–2020).

For the long term, the potential for continued supply growth from current capacity expansions reaches a limit towards the end of the decade. Continued demand growth, which will likely be steady but not spectacular, is expected to result in demand exceeding the supply available from mines that are in operation today. New capacity will be needed after 2020, accompanied by the necessary price increase to encourage investment for the replacement tonnage.

Beyond 2020, a step increase in coking coal pricing is expected, not unlike previous price steps that have occurred: the period 2010–2012 saw a 33% step jump above the pricing for 2007–2009, which in itself represented a 75% increase over the 2004–2006 pricing levels. These price steps were essentially driven by supply shortages.

It is therefore reasonable to expect that in the medium term, the Benchmark HCC price could increase to the \$160–170/t level; from 2021 on, the long term Benchmark HCC price can be expected to reach a level of US\$190/t (in 2014 \$ terms).

Tables 19.5 and 19.6 indicate a range of prices for GCC based on different assumptions related to market pricing.

TABLE 19.5 PRICE OUTLOOK FOR GRANDE CACHE COKING COAL

(US\$ per Tonne in 2014\$)	Price as % of HCC	Current Market	Medium Term Price 2018–2020		Long Term Price 2021 on
			160's	170's	
Prime Hard Coking Coal	100%	117	160's	170's	190
Tier 2 Coking Coal Prices	85–91%	100	135–145	145–155	162–173
US LV Coking Coal Prices	84–97%	113	134–155	143–165	160–184

TABLE 19.6 PRICE SCENARIOS FOR GRANDE CACHE COKING COAL

(US\$ per Tonne in 2014\$)	Medium Term Price 2018–2020		Long Term Price 2021 on
	160's	170's	
<b>Assumptions on Benchmark Coking Coal Price</b>	<b>160's</b>	<b>170's</b>	<b>190</b>
Maximum Pricing	155	165	184
Minimum Pricing	134	143	160
<b>Likely Price Range For Grande Cache Coal</b>	<b>135–145</b>	<b>145–155</b>	<b>165–175</b>

## 20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

### 20.1 ENVIRONMENTAL STUDIES

GCC has collected the environmental data required by AER for the permitting of the current mine facilities. This is evidenced by the approved permits for the operations.

In October 2014, GCC submitted an application for renewal of its 10-year Environmental Protection and Enhancement Act (EPEA) Approval No. 155804-00-08. The application summarizes GCC's environmental performance for the previous 10 years and outlines environmental management programs to achieve compliance with current approval requirements.

GCC has developed a LOM plan for the future properties along with an anticipated schedule. GCC staff have developed an environmental schedule to ensure that collection of environmental data is accomplished in a timely manner to ensure that the permitting requirements can be met.



## 20.2 ENVIRONMENTAL AND PERMITTING CONSIDERATIONS

Mine sites in the Province of Alberta (the Province) require numerous permits, licenses and approvals in order to operate. Various regulatory authorities supervise mining operations to ensure that the conditions and standards, which apply to mining activities, are adhered to. Operation of GCC properties will require regular and open communication between management and regulatory authorities as existing permits, licenses and approvals require periodic updating, amendments and renewals.

The Responsible Energy Development Act (REDA), AR 90/2013) established the Alberta Energy Regulator (AER) as a single regulator for most aspects of energy development projects (including coal mining) in the Province. GCC has worked diligently to develop a good working relationship with the AER regulatory staff. Other regulatory agencies which must be consulted to gain the requisite mining approvals include the Occupational Health and Safety division of the Alberta provincial government, and the provincial Aboriginal Consultation Office.

New applications will be filed from time to time to commence and expand mining operations. In this regard, the No. 8 surface mining area and the No. 12 South B2 underground mining area are currently permitted and licensed for mining, environmental management and reclamation by the AER.

Approvals issued by AER and other government authorities ensure that the regulators are satisfied the mining area can be developed safely and efficiently, with an acceptable level of environmental protection through approved environmental management programs, and also detail the reclamation required at the end of the mine life. Similar mine plans and environmental assessment reports will be required prior to mining for future mining areas which include the No. 12 South A underground mining area, the No. 9 surface and underground mine, and the No. 2, No. 12 North and No. 16 surface mining areas.

In addition, the proposed new Beaverdam Creek processing plant and associated conveyor corridor will require a permit by the AER. Construction is anticipated to start in 2020. GCC anticipates that it will take approximately five to six years to obtain all necessary permits and approvals to initiate construction of the plant and the associated conveyor corridor.

As discussed previously, in October 2014, GCC submitted an application for renewal of its 10-year EPEA Approval No. 155804-00-08. Approval of this amendment of the current EPEA permit will give GCC regulatory certainty for the environmental aspects of existing operations for the next 10 years, although the amended approval will likely contain some new terms and conditions. It is anticipated that the new requirements will include: control of dust emanating from the coal processing plant, changes to ROM pad and haul roads, and required consultation with the public and the Aboriginal community. As part of on-going regulatory consultations, GCC has had several conversations with the AER in January 2015 to discuss any concerns with the renewal application. No major issues were identified and GCC is expecting AER's approval in April 2015.

The current EPEA Approval requires that land disturbed in connection with mining operations be reclaimed by GCC. A key component of the application for renewal of the EPEA Approval was submittal of a site-wide Integrated Reclamation Plan. GCC conducted consultations with the local community and other stakeholders to discuss the conceptual reclamation plan, as further discussed in Section 20.5.

Long-term mining plans will require permit amendments to expand existing permit and license areas. All projects within a greenfields area require an initial evaluation by the AER to determine if an Environmental Impact Assessment (EIA), as defined under EPEA is required. New greenfield surface mine projects should include a minimum one year/full season of EIA studies and public consultation in support of an application for regulatory approval.

Review and approval under the Canadian Environmental Assessment Act, 2012 (CEAA) is required for new projects in areas where federal jurisdiction is invoked. The physical activities that may trigger an EIA through the CEAA include, but are not limited to: the construction, operation, decommissioning and abandonment of a new coal mine with a coal production capacity of 3,000t/d or more and the expansion of an existing coal mine that would result in an increase in the area of mine operations of 50% or more and a total coal production capacity of 3,000t/d or more.

For large mining projects, this may require projects to be reviewed through a Joint Panel process with both federal and provincial authorities and require an EIA be prepared to evaluate environmental impacts.

GCC's operations in the Province are also subject to the Canada Fisheries Act, which prohibits the deposit of deleterious substances into waters that are inhabited by fish and the destruction of fish habitat. Provisions of the Canada Fisheries Act require that a permit be obtained to allow new activities or discharges that may impact aquatic habitats, including new operations at river and stream crossings. Further, new operations at rivers, streams or other bodies of water may require an approval under the Navigable Waters Protection Act (Canada).

Other federal statutes that apply to GCC's operations include the Canadian Environmental Protection Act, 1999, which regulates the use of substances that are considered to be toxic, and the Explosives Act (Canada), which regulates the use of explosives. Currently GCC holds all permits required for its active operations. GCC will develop appropriate plans to address these concerns in permit applications for new properties.

The time required for obtaining a permit or an approved amendment for the projects under application is difficult to predict with certainty. Approvals for new mining projects are subject to provisions for public hearings, which could extend the approval process by a number of months. GCC is consulting with public stakeholders and the Aboriginal community to address their concerns in its applications for regulatory approval. By working proactively with the various stakeholders, GCC hopes to address concerns before they become a hindrance.

GCC recognizes regulatory risk factors that could affect the timely acquisition of mining approvals and licenses and the orderly sequencing of projects. These risk factors include:

- Regulatory compliance standing with AER
- Environmental Impact Assessment
- Water Licences
- Selenium mitigation.

### *20.2.1 Regulatory Compliance*

On May 23, 2013, GCC received a High Risk Enforcement Action notice from the Energy Resource Conservation Board (ERCB, now AER) for failure to mine and operate in accordance with the mine licence related to the 7/8 Seam of the No. 12 South B2 underground operation. This was regarding a cross cut that was advanced on May 3, 2013 prior to AER approval. As a result of this, GCC was required to develop, implement and submit an action plan to address the noncompliance event and meet with AER staff to review the action plan to ensure that all mine operations are in accordance with the approved design. GCC completed these actions, as requested.

However, following another deviation from the design in the same mine that was not approved by AER, GCC was provided a following High Risk Enforcement Action (Failure to Comply) notice on November 26, 2013. At this time, GCC was elevated to “Focused Refer Status”, as GCC was deemed to have failed to successfully implement the action plan from the previous incident.

The Focused Refer enforcement status means that underground mining related applications will be subjected to a more rigorous review. This may include, on an application-by-application basis, GCC's applications being brought before the Regulatory Technical Authorization Committee for disposition. Upon further review, the AER may also impose additional terms or conditions on existing permits and licenses.

On December 2, 2013, GCC submitted an action plan to AER identifying steps being taken to revise its Change Management Process and restore the standing with AER necessary for efficient regulatory review and issuance of mining licenses and approvals. GCC must operate in compliance with no High Risk non-compliance events for 180 days from the acceptance of an action plan to regain a satisfactory compliance rating. Unless GCC succeeds in restoring satisfactory compliance status with AER, the scheduling of orderly mine licenses will be compromised.

On May 14, 2014, GCC received a Notice of Investigation from AER related to the May 3, 2013 incident. GCC was advised that AER was conducting an assessment to identify any other contraventions that may have occurred. At the time of this report, GCC has not received any further correspondence related to this investigation.

### 20.2.2 *Environmental Impact Assessment*

As discussed above, mining projects may trigger the need to complete a provincial EIA and possibly a joint federal/provincial EIA. The risk is that EIA studies including federal involvement or public intervention could extend the timetable or even approvability of any or all of the proposed mine operations.

Based on the current life of mine plans, future operations would include the development of the No. 2, 9, 12, and 16 surface mines. These operations will likely require evaluation through development of an EIA. From a permitting standpoint, the following efforts are required:

- No. 2 Surface Area will require a permit amendment. Based on review of the conceptual designs, No. 2 Surface Area will likely require only an “enhanced approval” process through the Province without the rigor of a formal EIA process. According to GCC, all of the environmental baseline studies necessary to support the permit amendment have been completed. GCC will likely obtain the Mine Licence and EPEA Approval within two years of final mine design. Current mine plans indicate that mining will occur in the No. 2 Surface Area in 2019.
- No. 9 Surface Area may require an EIA process, which could be a joint provincial/federal process. The major portion of No. 9 Surface is in a brownfield area, having been mined from the 1970’s through to the late 1980s. According to GCC, all of the environmental baseline studies necessary to support the permit and EIA have been completed. Based on review of the preliminary mine plan, GCC expects to obtain the mine license and EPEA Approval within three years of final mine design. Current plans show mining this area in 2027.
- No. 9 Underground, unlike the majority of No. 9 Surface, is in a greenfield area. While underground coal mining is not an activity which requires a mandatory EIA under provincial regulation, the scope of the project will likely trigger an EIA. Given that EIA level baseline studies of environmental and archeological factors in the area of the proposed longwall portal are not complete, expectations regarding the length of the EIA process are that it will take at least 5 years from initiation of data gathering. In addition, longwall mining is a mining method unfamiliar to the current AER regulator, and this will likely prolong the process relative to familiar mining methods like room and pillar mining.
- The requirement for an EIA is a certainty for No. 12 North Mine and No. 16 Mine, which could be a joint federal/provincial process. Current mine plans show development of the No. 16 Mine starting in 2025. GCC will meet with the Province prior to filing any formal communication to discuss and understand permitting requirements. GCC will formally submit a letter to AER per the requirements of Section 44 of the EPEA, requesting a determination for requirement of an EIA prior to filing an application for the No. 16 Mine. In addition, GCC will conduct a pre-assessment meeting with the CEAA in early 2015 with a formal letter being submitted in the fall of 2015. GCC will undergo the same permitting process for the No. 12 North Mine as the No. 16 Mine described above. However, production in the No. 12 Mine is not proposed to start until 2038.

- Obtaining permit approval and development of 12 South A Underground is a critical timing issue. Current development plans propose start of production in April of 2018. Prior to that occurring, GCC must procure a permit to excavate approving the surface access plan and obtain a permit to develop the underground mine.

Based on the above described permitting schedule, GCC's mine approvals are achievable. This schedule will require coordinated efforts for properly-scoped environmental studies, timely baseline data collection, adequate permit development, technically complete mine plans, and proactive public consultation

### *20.2.3 Water Licences*

GCC holds Water Licences issued by the Alberta Water Act, which allow GCC to divert water from the Smoky River into processing plant operations. The current water allotment under GCC's Water Licence is fitted to the design and licensed capacity of the coal processing plant, which is 3.86M tonnes of clean metallurgical coal. GCC participated in the Upper Smoky River Water Management Framework (WMF) process initiated by Alberta Environment and Sustainable Resource Development (AESRD, now AER). The WMF process was directed toward water conservation and protection of fisheries. In addition, the Province has developed new "In-stream flow" provisions. These provisions may increase the difficulty for GCC to expand or obtain additional water licences.

In response to these developing issues, GCC is planning to install filter presses at its existing processing plant operations to significantly reduce the amount of water required for operation.

In addition, the proposed Beaverdam Creek processing plant will also utilize filter presses. GCC has water licences in the area of the proposed Beaverdam Creek processing plant that can be converted for use at the plant. Also, GCC believes that there are groundwater resources in the area that can be used at the plant. Converting the existing licence and obtaining new licences will require at least one-year of hydrologic studies and one-year of agency review and approval.

### *20.2.4 Selenium*

Selenium is released from waste rock produced by some surface mining. In the GCC mine area, the levels released at mountain mines into the receiving waters have been associated with risk to fish populations. The background level of selenium in undisturbed streams is about 1 part per billion (ppb). The concentrations of selenium at a monitoring location downstream of No. 12 South B2 Surface Mine range from 35-40ppb. The No. 12 Area background selenium monitoring point has an average concentration of 4.1ppb, while the end pit lakes directly below previous No. 12 South B2 mining operations have selenium results that average 31ppb and 34ppb, respectively. Within the Sheep Creek watershed, the background selenium monitoring point is about 0.80ppb while the Sheep Creek downstream site is 0.80ppb. Significantly higher levels of Se are found in old end pits in the No. 9 Area.

In December 2012, Environment Canada initiated stakeholder consultations on the 10-year review of the Metal Mines Effluent Regulations (MMER). In addition to reviewing the requirements for metal mines, the MMER review proposed possible inclusion of coal and diamond mines. The MMER proposal includes adding proposed limits for arsenic, aluminum, iron, manganese, selenium, ammonia and TSS concentrations in effluent discharges to the environment. GCC has been involved with MMER through a Coal Association of Canada (CAC) working group. To date, no decisions have been made on these proposals and the MMER review is currently ongoing.

GCC's EPEA Approval renewal application included information regarding steps that GCC is taking to manage selenium. GCC has maintained a Selenium Management Plan (SMP) since 2005. In accordance with Alberta Selenium Working Group recommendations, one of the goals of GCC's SMP is to analyze concentration of selenium (and other parameters) in surface water and to evaluate loading (i.e. concentration x water volume). This program has been in operation for three years resulting in a database of selenium concentrations and loading throughout the area surrounding the mine. This information will assist GCC in determining sources of elevated selenium in their operations and potentially reducing them where possible. To date, the findings of the program include the observation that selenium concentrations vary seasonally and that the twice yearly monitoring efforts conducted in the past were not adequate. GCC has also discovered that selenium loadings vary widely between drainages, from 0.00062g/d into Two Camp Creek, to 981g/d to Beaverdam Creek. In net, these loadings may be locally elevated, but have not lead to exceedance of Canadian Council for Ministers of the Environment (CCME) guidelines in major rivers and creeks in the area of the mine.

### **20.3 WASTE/TAILINGS DISPOSAL, SITE MONITORING, & WATER MANAGEMENT**

Currently a portion of the fine coal refuse is dewatered and combined with the coarse refuse for disposal at the No. 8 area waste dumps. The remainder of the fine refuse is pumped in slurry form to the fine tailings facility. This splitting of the fine coal refuse stream means the slurry pumped to the tailings ponds typically is less than 25% ash, and hence retains a high thermal content when partially dried. Historically this material has been sold to the adjoining coal/natural gas-fired generating station. Currently plans are to blend this material with dryer ROM coal to make a shippable product with approximately 20GJ/tonne as received, at least until the stored inventory at the tailings ponds is depleted.

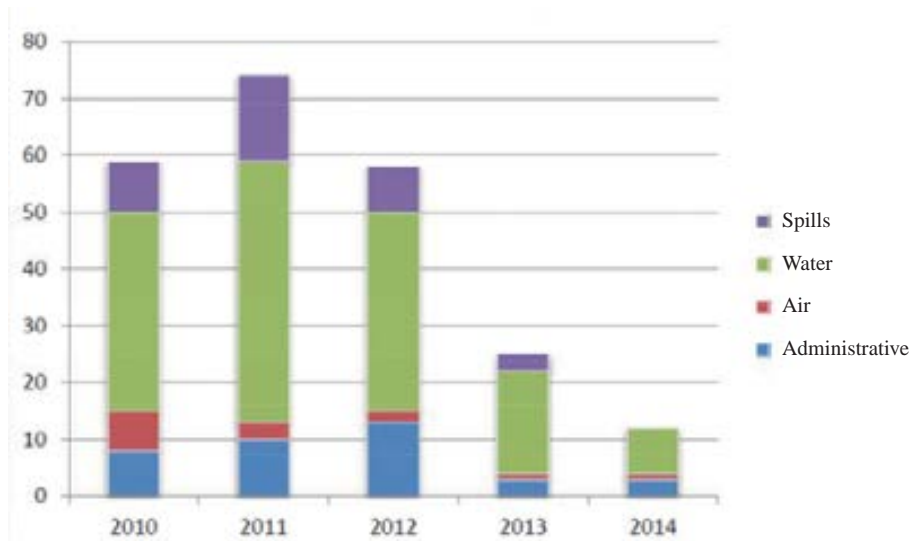
However, should this product not find ongoing market acceptance, continued operations and increasing coal production will require additional tailings storage capacity by either expanding the tailings footprint or raising the tailings embankments. The development of additional tailings pond capacity will require significant permitting efforts including an EIA, with low probability of success. This is due to the recent tailings pond failure at Obed Mountain (Sherritt) Operations.

Therefore, GCC is formulating an alternative plan to eliminate the need for additional tailings storage capacity. As mentioned above, GCC is going to install filter presses at its existing processing plant and the proposed new Beaverdam Creek processing plant, thereby eliminating the need for tailings disposal in slurry form. Filter cake produced at the processing plant operations could be disposed of in waste dumps or backfilled in pits pending regulatory approval. The GCC plan to excavate the current tailings pond materials and selling the mixed recovered coal fines with coal out of the mine to produce a thermal coal product would increase the storage in the tailings area until the filter presses are installed.

GCC has an extensive site water monitoring program to determine compliance with the regulatory requirements. GCC has developed Standard Operating Procedures for the operations, maintenance and monitoring of wastewater treatment systems, air emissions control and monitoring systems and settling pond systems. These also include standard procedures for monitoring the performance and compliance of the various wastewater treatment systems and emergency response. Spill management and prevention plans were developed and all spill containment structures were upgraded in 2013.

GCC has implemented these procedures and seen a substantial reduction in the number of AER non-compliances over the past three years.

FIGURE 20.1 AER NON-COMPLIANCES, 2010–2014



All surface water and groundwater that passes through the various mining areas is required to be treated to meet water quality limits set forth in the regulations and GCC's EPEA Approval before discharge to the environment. GCC has provided and implemented plans to collect and channel all surface water to settling ponds to ensure total suspended solids and other water quality parameters meet the limits set in the regulations. Likewise, GCC is implementing plans to ensure that groundwater collected in-pit will meet water quality guidelines before discharge to the environment. The GCC permit documents (Water Act and EPEA) detail the monitoring, maintenance and discharge water management plans for the No. 12 South B2 underground and the No. 8 surface operations. The EPEA Approval grants approval of these plans for the current operations. GCC is developing similar plans for all planned future operations.

Federal and provincial environmental legislation regulates the discharge or release of substances into the environment. Generally, these regulations prohibit unauthorized releases that have an adverse effect or potentially adverse effect on or otherwise impair the environment. GCC is developing an Environmental Management System ("EMS") that incorporates measures to prevent unauthorized releases and appropriate emergency response procedures and training programs to minimize any environmental impact from its operations. GCC has the elements of an EMS in place in accordance with EPEA Approval No. 155804-00-08. The EPEA Approval is very prescriptive in monitoring, reporting and data control requirements. GCC has a mine site based Environmental department to carry out the responsibilities, terms and conditions outlined under the EPEA Approval. Since implementing this program, GCC has seen a significant reduction in the environmental violations. Continued training and EMS direction from mine management will aid in ensuring that GCC continues to operate in regulatory compliance.

## 20.4 SOCIAL OR COMMUNITY FACTORS

In recent years, GCC successfully negotiated Community and Impact Benefit Agreements (CIBAs) with the Aseniwuche Winewak Nation of Canada (AWN) and the Métis Nation of Alberta (Grande Cache) Local Council #1994 (MNA). These CIBAs are considered industry-leading initiatives. These CIBAs provide for mutual support and the funding arrangements are linked with GCC's success.

Effective in July 2014, the Province of Alberta established an Aboriginal Consultation Policy (specifically the Guidelines on Consultation with First Nations on Land and Resource Management) that allows the government to identify which aboriginal groups may be allowed to review applications for mine approvals and assess whether a proper level of consultation and accommodation has been met in respect of the Province's constitutional duty to First Nations. The aboriginal consultation process is under the direction of the Aboriginal Consultation Office (ACO) within the Government of Alberta. Industry has expressed concerns that the new Policy could delay the timely issuance of approvals and licenses, due to timelines and opportunities for information requests given to aboriginal groups and may give these groups leverage for compensation (termed as "accommodation" or "mitigation"), which will increase the costs of mining.

In addition to the AWN and MNA, GCC has been advised that the Province recognizes Horse Lake First Nation (HLFN), located on an Indian Reserve near Grande Prairie, as directly affected by GCC's mine plans and operations. GCC has established a working relationship with HLFN to ensure that required consultation reviews do not hold up the approval and licensing process. While a CIBA has not yet been initiated with the HLFN, GCC has not had any opposition from the HLFN to date.

GCC is therefore well positioned to manage the risk of possible interventions from the local Aboriginal community to its applications for mining approvals.

## 20.5 RECLAMATION STATUS

GCC has approved reclamation plans for all current permits except the sub-alpine portions of the No.12 South B2 surface mine. AER is requiring GCC to demonstrate its ability to reclaim subalpine areas. This reclamation demonstration will be used as the basis for developing a mine permit for the No. 12 North area.

GCC submitted an Integrated Reclamation Plan to AER in October 2014 and anticipates the approval of this plan along with the EPEA Approval renewal in April 2015. GCC has started the process of reclamation planning and initiated the process with a Reclamation Foundation Workshop in November 2013, involving the Aboriginal community and selected stakeholders. According to GCC, they received positive feedback from the community (Aboriginal groups and stakeholders) following this workshop. Through this workshop, a plan was developed to consult with the community prior to development of final reclamation plans in order to get feedback and input early on in the planning process. AER is very supportive of this approach.



## 21 CAPITAL AND OPERATING COSTS

### 21.1 OPERATING COSTS ESTIMATES — GENERAL

All costs are stated in constant 2014 Canadian dollars. There is no provision for inflation. Direct mine cash operating costs for both the surface and underground mines were developed on a unit cost basis except for the 9D longwall mine which was developed from first principles in conjunction with Norwest's experience and knowledge of underground longwall mining operations in North America and Asia.

As further discussed below, the unit costs developed for this report were based on recent historical costs from Grande Cache Coal mines, from the 2014 Mine and Mill Equipment Cost Guide, and on Norwest's experience in surface and underground mining.

Based on a comparison of the resulting forecasted operating costs to recent actual costs at Grande Cache, the operating cost forecast developed for this report is a reasonable estimate of future operating costs. Table 21.1 summarizes the recent historical operating costs per ROM and clean tonne compared to the projected costs in this report for both surface and underground mining.

**TABLE 21.1 HISTORIC AND PROJECTED OPERATING COSTS**

	<b>Total Cash Production Cost</b>	<b>Cost per ROM Tonne</b>	<b>Cost per Clean Tonne</b>
<b>Actual</b>			
2012	\$216,406	\$80	\$128
2013	\$203,539	\$85	\$108
2014	\$125,045	\$57	\$80
<b>Forecast</b>			
2015	\$55,319	\$62	\$74
2016	\$79,070	\$59	\$75
2017	\$177,566	\$51	\$70
2018	\$226,151	\$52	\$69
2019	\$239,365	\$56	\$78
<b>Five Year Averages</b>			
2020–2024	\$318,292	\$61	\$86
2025–2029	\$326,053	\$56	\$79
2030–2034	\$338,567	\$67	\$96
2035–2039	\$321,353	\$63	\$87
2040–2044	\$332,198	\$57	\$75
2045–2049	\$354,363	\$53	\$72
2050–2054	\$289,301	\$42	\$57
<b>Total</b>	<b>\$12,259,750</b>	<b>\$56</b>	<b>\$77</b>

### 21.1.1 Surface Operating Cost Estimates

As noted above, the operating costs for surface operations were calculated by developing unit costs for overburden and coal and applying those unit costs to the overburden and coal movements required by the mine plan each year. Labor and equipment costs were calculated by applying unit costs for moving overburden and coal. Explosives costs were calculated based on the required powder factor and current explosives costs. Mine overhead and administration costs were then added to the labor and equipment costs and the explosives costs to arrive at direct cash mine operating costs for each year.

Equipment hours were derived from the mine plan described in Section 16. The hours were derived from the required material movement and the productivity of the various pieces of equipment. This included hours for each major excavator and coal loader and the related haul trucks for each mining area. Hours for the haul trucks were based on detailed haul profiles for both coal and overburden by year for each mining area. It also included hours for blasthole drills based on the required drilling patterns and drilling productivity rates. Hours for support equipment such as dozers, motor graders and water trucks are based on a factor of the units required to support the overburden and coal excavation fleets.

Equipment operating costs per hour include hourly operator and maintenance labor, fuel and/or power, tires, ground engaging tools, and maintenance parts including major overhauls. These hourly equipment operating costs are based on recent historical costs at GCC, on the 2014 Mine and Mill Equipment Cost Guide and on Norwest's knowledge of those costs in the North American mining industry. Diesel fuel used in these calculations was based on current prices. Table 21.2 summarizes the hourly operating costs for the major surface mining equipment.

**TABLE 21.2 OPERATING COST \$/HR FOR MAJOR SURFACE EQUIPMENT**

Shovels — P&H 2800XPC	\$643
Shovels — EX5500	\$521
Shovels — EX3600	\$370
Backhoe — PC3000	\$230
Loader — WA1200	\$230
Haultrucks — 830E AC	\$406

Explosives costs per BCM were developed using the powder factor required based on historical GCC factors and current explosives costs for ANFO and emulsion. Blasting components were added using a factor of 15% of the ANFO and emulsion costs. The typical powder factor at GCC is 0.70 for ANFO and 0.60 for emulsion; unit costs of explosives are \$0.44/kg for ANFO and \$0.71kg for emulsion.

Mine site level management, supervision, and administration labor and overhead costs are based on historical costs. These costs include all salaried wages and benefits at the mine location for the surface mine, office expenses, insurance, employee costs, training, consultants, and other administration expenses. The forecast uses a \$15M per year fixed rate for these costs plus \$0.50 per BCM to arrive at the annual cost.

Table 21.3 shows the direct costs for the labor, equipment and explosives costs for the surface mine. The mine site level administration expenses are not included in the summary presented in below. For purposes of the unit cost per BCM, the coal tonnes were converted to equivalent BCM using a factor of 1.4.

TABLE 21.3 SURFACE MINING LABOR, EQUIPMENT AND EXPLOSIVES COSTS

	Operating Waste (bcm)	ROM Tonnes	ROM Strip Ratio	Surface spend (includes trucking)	Cost per Equivalent BCM	Cost per ROM Tonne
<b>Actual</b>						
2012	21,687	2,006	10.8	\$105,764	\$4.57	\$52.73
2013	17,549	1,266	13.9	\$76,379	\$4.14	\$60.33
2014	11,011	1,426	7.7	\$53,404	\$4.44	\$37.44
<b>Forecast</b>						
2015	760	116	6.6	\$3,029	\$3.60	\$26.20
2016	—	—	—	\$0	\$0.00	\$0.00
2017	15,330	2,373	6.5	\$60,653	\$3.56	\$25.56
2018	16,608	2,524	6.6	\$65,363	\$3.55	\$25.90
2019	19,279	2,553	7.6	\$81,902	\$3.88	\$32.09
<b>Five Year Averages</b>						
2020–2024	19,221	2,051	9.8	\$86,256	\$4.17	\$43.62
2025–2029	32,828	3,313	10.0	\$143,387	\$4.08	\$43.24
2030–2034	34,517	3,167	11.1	\$149,175	\$4.06	\$48.22
2035–2039	34,298	3,076	11.6	\$162,179	\$4.44	\$54.60
2040–2044	34,458	3,913	9.2	\$164,615	\$4.42	\$44.00
2045–2049	34,266	4,660	7.4	\$166,943	\$4.43	\$35.96
2050–2054	22,208	5,298	4.3	\$119,968	\$4.73	\$22.92
<b>Total</b>	<b>1,111,372</b>	<b>135,991</b>	<b>8.2</b>	<b>\$5,182,652</b>	<b>\$4.29</b>	<b>\$38.11</b>

Table 21.4 combines the projected waste movement, coal haulage, haulage to the preparation plant, processing cost at the preparation plant, and a conveyor cost once the new plant is constructed. The G&A expenses are not included in the summary presented in below. The table shows the total projected surface mining operating costs and the relative cost per clean MET tonne from surface mining operations.

TABLE 21.4 SURFACE MINING OPERATING COST PROJECTION

	Waste Movement	Coal Haul	Mine Overhead	Conveyor	Processing	Total Surface	\$/Clean MET tonne
<b>Surface Mine Operating Cost</b>							
FY 2015	2,562	1,202	1,000	—	3,941	8,705	75.28
FY 2016	—	—	—	—	—	—	—
FY 2017	51,823	13,000	23,525	—	18,014	106,362	44.82
FY 2018	52,954	12,452	24,124	—	18,909	108,439	42.97
FY 2019	68,998	12,904	25,466	—	18,656	126,024	49.37
FY 2020	77,595	12,770	25,188	—	17,610	133,164	57.10
FY 2021	70,810	18,620	25,710	2,507	19,496	137,143	54.71
FY 2022	70,820	10,688	24,859	1,504	14,182	122,053	81.14
FY 2023	69,620	9,734	25,592	1,555	14,300	120,801	77.71
FY 2024	75,115	15,533	25,222	2,358	18,389	136,617	57.94
FY 2025–29	606,025	110,913	163,174	17,529	104,588	1,002,230	60.51
FY 2030–2034	649,145	96,740	167,210	16,408	109,226	1,038,730	65.59
FY 2035–2039	729,193	81,683	166,573	16,133	108,149	1,101,731	71.63
FY 2040–56	1,861,533	405,185	494,838	74,271	477,185	3,313,012	47.07
<b>Total</b>	<b>4,386,194</b>	<b>801,423</b>	<b>1,192,481</b>	<b>132,265</b>	<b>942,646</b>	<b>7,455,009</b>	<b>54.82</b>

Mine closure costs are included in the overall cash operating costs at rate of approximately C\$2.0M per year until production ceases with the remaining expenditure occurring in subsequent years. Total closure costs are estimated to be C\$86.3M which includes both current and future disturbed areas totaling approximately 4,300ha.

### 21.1.2 Underground Operating Cost Estimates

The historic production type balance for No. 12 South B2 by year with associated ROM tonnes and operating costs (OPEX) are shown in Table 21.5.

**TABLE 21.5 NO. 12 SOUTH B2 2012–2014 HISTORICAL ROM OPERATING COSTS (INCLUDING HAULAGE) AND PRODUCTION TYPE**

Year	Production Type		ROM Tonnes (M)	OPEX Cost (\$M)	OPEX (\$/t)
	Development	Depillaring			
2012	82%	14%	0.69	39.038	\$56.95
2013	52%	48%	1.13	58.52	\$51.58
2014	14%	86%	0.78	34.35	\$43.80
No. 12 South B2 Average OPEX (\$/t)			2.60	131.90	\$50.65

Norwest utilized experience in underground room and pillar mining operations in North America in reviewing historic operating costs provided by GCC. The projected operating costs for the No. 12 South B2 and No. 12 South A mines are based upon a unit cost model developed by GCC which utilizes historic 2014 operating costs. The projected capital costs for the No. 12 South B2 and No. 12 South A mines were provided by GCC and reviewed by Norwest. It is Norwest's opinion that future unit operating costs would be likely to fall between the actuals of 2013 and 2014.

Norwest has projected future operating costs on a unit basis at \$50.00/t ROM for development production, \$35.00/t ROM for depillaring production with a fixed annual operating cost of \$8.4M per mine. The remaining projected production type balance for No. 12 South B2 and No. 12 South A is 40% development tonnage and 60% depillaring tonnage. The Norwest OPEX model projects future Life-of-Mine costs for the combined 12 South B2 and 12 South A production at \$46.67/t ROM, excluding transportation and processing costs.

The No. 9D underground mine operating costs were developed by Norwest using first principles and Norwest's experience with longwall mining operations in North America and Asia. Steeper gradient operations are reflected in the operating costs, which average \$43.63/t ROM.

The operating costs for the No. 12 South B2 with the East Extension, the No. 12 South A, and the No. 9D Area combines the projected mine operating cost, the truck haulage to the preparation plant, processing cost at the preparation plant, and a conveyor cost once the new plant is constructed. The G&A expenses are not included in the summary presented in Table 21.6 showing the total projected underground operating costs and the relative cost per clean MET tonne.

**TABLE 21.6 UNDERGROUND MINING OPERATING COST PROJECTION**

	Operating Cost	Coal Haul	Conveyor	Processing	Total UG	\$/Clean MET tonne
<b>Underground Operating Cost</b>						
FY 2015	33,913	5,510	—	7,296	46,719	73.11
FY 2016	53,173	8,508	—	16,219	77,900	76.00
FY 2017	54,259	9,108	—	11,828	75,195	49.08
FY 2018	86,388	13,677	—	15,150	115,215	69.12
FY 2019	83,464	12,664	—	14,673	110,801	90.67
FY 2020	121,102	14,305	—	16,947	152,353	88.63
FY 2021	131,188	11,355	2,526	19,409	164,478	93.19
FY 2022	171,460	15,730	3,983	26,538	217,712	83.35
FY 2023	151,868	15,226	4,003	26,091	197,187	79.32
FY 2024	151,956	15,595	4,183	26,892	198,626	110.59
FY 2025–29	466,129	42,022	12,362	98,630	619,142	85.62
FY 2030–2034	527,089	28,613	9,076	84,438	649,216	107.29
FY 2035–2039	371,552	29,439	10,593	84,533	496,117	70.25
FY 2040–56	1,229,578	84,356	31,212	247,111	1,592,257	76.52
<b>Total</b>	<b>3,633,116</b>	<b>306,108</b>	<b>77,938</b>	<b>695,757</b>	<b>4,712,918</b>	<b>81.80</b>

### *21.1.3 Preparation Plant and Conveyor Operating Cost Estimates*

Processing unit costs through 2019 are based recent historical actual costs at the existing GCC plant. Costs in the forecast are calculated using an annual fixed cost of C\$9.8M plus variable costs of C\$6.00 per ROM tonne. In 2020 when the new plant is brought on line, there is an increase in fixed costs to reflect the fact that two plants will be in operation. Fixed costs were increased by 50% until 2035 when it is assumed that the existing plant will be shut down and all coal will be processed by the new plant. In addition, to reflect that operating costs for the new plant will be lower than for the existing plant, variable operating costs are reduced by C\$1.00 per ROM tonne from 2020 to the end of the mine life.

The current plant operating cost is in the upper quartile of costs in the industry. This is related to the high cost of operating supplies — notably magnetite — and maintenance (parts and labour) due to the fact that the plant has to run many aged, less efficient components to reach its capacity. The projected unit cost takes into account higher plant throughput rates and more efficient operation related to the planned upgrades. Capital expenditures for these upgrades have been allowed for in the cash flow calculation. Not achieving the higher throughput rates is a risk to the projected unit costs.

Beginning in year 2021 ROM surface coal will be transported via an overland conveyor from the active mining areas to the new processing plant that will be constructed in 2020. The clean coal will then be conveyed from the processing plant to an underground conveyor near Mine No. 2 which will convey the clean coal to the loadout facilities located adjacent to the highway. Conveyor operating costs are estimated to be C\$1.00 per ROM tonne from the 8, 2 and 9 surface mines and C\$1.50 per clean tonne from the 12SA and 9D underground mines and the 12 and 16 surface mines.

## **21.2 CAPITAL COST ESTIMATES**

As noted in Section 16, there are three primary mining methods, a coal preparation plant, and associated infrastructure and development costs. The mining methods are surface open pit mining, underground room and pillar and underground longwall mining.

Capital cost estimates are stated in constant 2014 Canadian dollars. There no provision for inflation.

Capital costs were developed based on the mine plan requirements for all mining methods. Table 21.7 below shows a summary of total mine capital requirements. Following that is a discussion of the basis for the capital cost estimates.

TABLE 21.7 TOTAL COMBINED CAPITAL COST PROJECTION

	Exploration	All Mines Infrastructure	Preproduction Expense & Development OP	Equipment Surface	Contingency Surface	Preproduction Expense & Development UG Longwall	Equipment UG Longwall	Longwall Infrastructure	Preproduction Expense & Development UG Room & Pillar	Equipment UG Room & Pillar	Room & Pillar Infrastructure	Total
<b>Total Capital</b>												
FY 2015	1,748	3,140	—	—	—	—	—	—	—	1,785	10,755	17,429
FY 2016	2,000	—	710	—	71	—	—	—	19,363	5,327	6,300	33,771
FY 2017	6,000	—	2,554	17,425	1,998	—	—	—	100	41,299	5,361	74,737
FY 2018	6,000	—	2,265	19,575	2,184	—	—	—	100	19,763	648	50,534
FY 2019	2,000	2,125	557	15,775	1,633	11,382	—	4,604	100	3,836	486	42,499
FY 2020	2,000	146,180	—	26,325	2,633	18,947	30,205	29,976	—	4,086	—	260,351
FY 2021	—	15,000	6,806	1,600	841	—	35,139	1,700	—	6,889	—	67,974
FY 2022	2,000	—	2,917	4,000	692	—	32,968	1,735	—	2,092	—	46,403
FY 2023	—	—	4,094	1,600	569	—	8,778	—	—	—	—	15,042
FY 2024	2,000	—	11,218	36,400	4,762	—	3,561	—	—	4,215	—	62,157
FY 2025-2029	4,000	—	9,007	117,800	12,681	—	47,347	—	—	—	—	190,835
FY 2030-2034	6,000	—	8,368	58,175	6,654	—	41,836	5,977	—	—	—	127,010
FY 2035-2039	4,000	—	10,329	84,700	9,503	—	81,070	—	—	—	—	189,601
FY 2040-2056	2,000	—	29,173	196,650	22,582	—	73,366	2,520	—	—	—	326,292
<b>Total</b>	<b>39,748</b>	<b>166,445</b>	<b>87,997</b>	<b>580,025</b>	<b>66,802</b>	<b>30,329</b>	<b>354,270</b>	<b>46,512</b>	<b>19,663</b>	<b>89,293</b>	<b>23,550</b>	<b>1,504,635</b>

### 21.2.1 Surface Mine Capital

Capital for the surface mine includes replacement of major mining equipment, additional stripping capacity, support and miscellaneous equipment, and mine development costs.

Major mining equipment such as shovels, excavators, loaders, drills, trucks, dozers, water trucks and graders are replaced based on the expected useful life in hours and the annual operating hours derived from the mine plan. When a machine reaches its expected life in hours, a provision for replacement is made in that year in the capital schedule. The replacement costs and the expected useful lives are based on recent experience at GCC and verified by the 2014 Mine and Mill Equipment Cost Guide.

Additional stripping capacity is added from 2025 to 2027 in the form of an additional P&H 2800 class shovel and a Hitachi 5600 class excavator, 11 additional Komatsu 830E 240 ton haul trucks and the requisite support equipment as the mine moves into the 2, 9 and 16 mine areas. This is required to meet the expected increase in overburden movement from approximately 20M BCM annually to approximately 35M BCM annually which increases ROM coal production from approximately 2.0M tonnes per year to approximately 3.0M tonnes per year. The capital cost for this increase in capacity is approximately C\$100M over the three year period from 2025 to 2027.

Support and miscellaneous equipment consists of light duty vehicles, light plants, mechanics trucks, equipment service trucks, utility backhoes and loaders and other small equipment. Capital expenditures for this equipment is estimated at C\$800,000 annually per operating mining area.

Mine development costs include tree clearing, coversoil stockpiling, pond construction and haul road construction. As new areas are developed costs are included in the capital schedule in the appropriate year. Costs are based on C\$2,500/ha for tree removal, C\$9.00 per BCM for coversoil stockpiling and C\$500,000 each for sediment ponds. Haul road construction is included at C\$507,000/km.

Table 21.8 Summarizes the capital cost projection for the surface mining operation.



TABLE 21.8 SURFACE MINING CAPITAL COST PROJECTION

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025-29	FY 2030-2034	FY 2035-2039	FY 2040-56	Total
<b>Surface Equipment Capital</b>															
Drills — P&H 320XPC	—	—	—	—	—	—	—	—	—	—	6,000	—	—	—	6,000
Drills — P&H 250	—	—	—	—	—	—	—	—	—	—	4,800	—	—	—	4,800
Drills — PV271	—	—	—	—	—	—	—	—	—	—	3,000	—	—	—	3,000
Shovels — P&H 2800XPC	—	—	—	—	—	—	—	—	—	20,800	—	—	20,800	—	62,400
Shovels — EX5500	—	—	—	—	—	—	—	—	—	12,100	12,100	—	—	—	48,400
Shovels — EX3600	—	—	—	—	—	—	—	—	—	9,400	9,400	—	—	9,400	18,800
Haultrucks — 830E AC	—	—	4,725	14,175	14,175	23,625	—	—	—	—	56,700	33,075	37,800	103,950	288,225
Dozers — D10T	—	—	1,100	3,300	—	—	—	1,100	—	1,100	6,600	4,400	2,200	12,100	31,900
Graders — 16G/H	—	—	—	—	—	1,100	—	—	—	—	3,300	1,100	2,200	4,400	12,100
RTD — 834	—	—	800	—	—	—	—	—	—	800	—	800	800	800	4,000
Water Truck — 777	0	0	0	1,300	0	0	0	1,300	0	0	0	1,300	0	1,300	5,200
Backhoe — PC3000	0	0	0	0	0	0	0	0	0	0	5,500	5,500	0	0	11,000
Loader — WA1200	0	0	0	0	0	0	0	0	0	0	0	0	0	4,600	4,600
Support Equipment	0	0	10,800	800	1,600	1,600	1,600	1,600	1,600	1,600	10,400	12,000	8,800	27,200	79,600
<b>Subtotal Surface Equipment Capital</b>	—	—	<b>17,425</b>	<b>19,575</b>	<b>15,775</b>	<b>26,325</b>	<b>1,600</b>	<b>4,000</b>	<b>1,600</b>	<b>36,400</b>	<b>117,800</b>	<b>58,175</b>	<b>84,700</b>	<b>196,650</b>	<b>580,025</b>
<b>Mine Development and Road Support</b>															
Surface Mine Development and Pre-Strip	—	—	1,185	1,276	329	—	4,676	2,004	3,384	9,140	5,864	5,174	4,752	17,512	55,296
Road Support	—	710	1,369	989	228	—	2,129	913	710	2,079	3,143	3,194	5,577	11,661	32,702
<b>Subtotal Surface Equipment Capital</b>	—	<b>710</b>	<b>2,554</b>	<b>2,265</b>	<b>557</b>	—	<b>6,806</b>	<b>2,917</b>	<b>4,094</b>	<b>11,218</b>	<b>9,007</b>	<b>8,368</b>	<b>10,329</b>	<b>29,173</b>	<b>87,997</b>
Surface Other/Contingency (10%)	—	71	1,998	2,184	1,633	2,633	841	692	569	4,762	12,681	6,654	9,503	22,582	66,802
<b>Exploration</b>															
Exploration	1,748	2,000	6,000	6,000	2,000	2,000	—	2,000	—	2,000	4,000	6,000	4,000	2,000	39,748
<b>Subtotal Exploration Capital</b>	<b>1,748</b>	<b>2,000</b>	<b>6,000</b>	<b>6,000</b>	<b>2,000</b>	<b>2,000</b>	—	<b>2,000</b>	—	<b>2,000</b>	<b>4,000</b>	<b>6,000</b>	<b>4,000</b>	<b>2,000</b>	<b>39,748</b>
<b>Total Surface Capital</b>	<b>1,748</b>	<b>2,781</b>	<b>27,977</b>	<b>30,024</b>	<b>19,966</b>	<b>30,958</b>	<b>9,246</b>	<b>9,608</b>	<b>6,263</b>	<b>54,380</b>	<b>143,488</b>	<b>79,197</b>	<b>108,532</b>	<b>250,405</b>	<b>774,573</b>

*21.2.2 Underground Capital Cost Estimates*

Norwest reviewed the capital cost projections provided by GCC for the No. 12 South B2 and No. 12 South A utilizing our experience in room and pillar mining operations. Key capital and construction projects are projected for the start of 4 Seam development at the No. 12 South B2 for \$12.5M in 2015 and for \$25.8M in 2016 for the No. 12 South A Area. Both projects are required to be completed prior to the projected start of coal production. Both require regulatory approval prior to commencing the construction projects and timely completion is necessary to meet the production schedule. The No. 12 South B2 maintains an ongoing equipment rebuild schedule throughout the completion of the 4 Seam and the 7/8 Seam in the East Extension.

The capitalization for the No. 12 South A Area peaks in 2016–2017 with the access installation and the addition of three new continuous miner units of equipment. The capitalization of the No. 9D Area longwall mining operation has an initial peak in 2019–2022 with the portal access facilities and new development equipment with a longwall for the steeper gradient seams. A later capitalization period is planned for 2035–2039 period as different longwall system is required for the 4 Seam.

Underground capital projected for the completion of the No. 12 South B2 and East Extension, the No. 12 South A Area, and the longwall operation in the No. 9D Area are summarized in Table 21.9.

TABLE 21.9 UNDERGROUND MINING CAPITAL COST PROJECTION

	Primary Underground Room and Pillar Equipment	Primary Underground Longwall Equipment	Conveyor, Power, Water, etc. Systems	Support Equipment	Surface Infrastructure and Construction	Fans, Shafts, Slopes	Equipment Rebuild	Surface Mobile Equipment	Total
<b>Underground Capital</b>									
FY 2015	—	—	—	—	10,755	—	1,785	—	12,540
FY 2016	—	—	4,627	—	19,363	6,300	700	—	30,990
FY 2017	20,246	—	18,365	—	100	5,361	1,400	1,288	46,760
FY 2018	9,124	—	8,851	—	100	648	500	1,288	20,511
FY 2019	1,700	—	2,136	—	11,482	5,090	—	—	20,408
FY 2020	17,457	—	10,644	—	18,947	29,976	1,350	4,840	83,214
FY 2021	9,134	—	30,194	—	—	1,700	2,700	—	43,728
FY 2022	—	14,404	20,656	—	—	1,735	—	—	36,795
FY 2023	390	—	7,753	—	—	—	636	—	8,779
FY 2024	1,512	—	4,885	—	—	—	636	744	7,777
FY 2025–2029	8,082	1,972	23,080	5,932	—	—	8,057	225	47,348
FY 2030–2034	9,212	—	9,522	14,820	—	5,977	8,057	225	47,813
FY 2035–2039	5,129	34,204	15,348	16,460	—	—	5,088	4,840	81,069
FY 2040–2056	—	—	13,767	23,281	—	2,520	35,644	675	75,887
<b>Total</b>	<b>81,986</b>	<b>50,580</b>	<b>169,828</b>	<b>60,493</b>	<b>60,747</b>	<b>59,307</b>	<b>66,553</b>	<b>14,125</b>	<b>563,619</b>

## 22 ECONOMIC ANALYSIS

### 22.1 PRINCIPAL ASSUMPTIONS

As noted in Section 21, all costs are stated in Canadian dollars. The cash flow and financial analysis is presented in constant 2014 dollars, there is no provision for inflation.

Since revenues are denominated in US dollars and the costs are in Canadian dollars, the model uses an assumed exchange rate for converting the US dollar denominated revenue to Canadian dollars. The exchange rate is based on recent five year futures quotes from several firms and a long range forecast using the last ten years actual exchange rates. The recent five year futures quotes are approximately C\$1 equals US\$0.80. The ten year historical average is C\$1 equals US\$0.93. The assumption in the model is that the exchange rate will be C\$1 equals US\$0.80 for the next five years and will then increase rateably over the next five years to the historical average of C\$1 equals US\$0.93 and remains at that level for the remaining life of the project.

Tonnes sold are from the reserve statements and mine plans provided in sections 15 and 16. Selling prices of the metallurgical coal are taken from the market analysis provided in Section 19. Norwest used the mid-point of the range provided in the market study for each time period. Selling prices for thermal coal are based on recently negotiated contracts. Table 22.1 below shows metallurgical coal prices in US\$.

**TABLE 22.1 PROJECTED METALLURGICAL COAL PRICES (US\$)**

Sales Price	Metallurgical Coal, US\$/t FOB West Coast
FY 2015	\$95
FY 2016	\$104
FY 2017	\$110
FY 2018	\$140
FY 2019	\$143
FY 2020	\$145
FY 2021	\$170
FY 2022	\$170
FY 2023	\$170
FY 2024	\$170
FY 2025–29	\$170
FY 2030–2034	\$170
FY 2035–2039	\$170
FY 2040–56	\$170

Selling expenses include wages for the GCC marketing staff, testing, weighing and demurrage and a 1.5% marketing fee. Loading and transportation costs include rail transport to Western Canadian ports and loading into ships. The loading and transportation costs average \$32/t. Port costs and rail rates are based on the agreements between GCC, the railroad and the ports.

Direct Mining Costs are described in detail in Section 21 of this report.

Corporate overhead is included at C\$12M annually which is based on an average of the last three years actual costs.

Royalties are based on provisions of the Alberta royalty structure which is 1% of mine mouth revenue until the mine operator achieves a return of capital and a 10% return when an additional 13% of net revenue is due.

Capital Expenditures are described in detail in Section 21 of this report.

The Change in Working Capital includes C\$8M for coal inventory at the mine site and approximately 45 days coal sales revenue during the period of restarting the mine in 2017 and the increase in production in 2021.

## **22.2 CASH FLOW**

Table 22.2 summarizes the cash flow from the mine.

As described in Section 16 of this report, the mine is planned to operate for an additional 41 years from 2014. As of January 2015, the surface operations are idle and are planned to remain so until 2017. During 2015 and 2016, the only mining activity is in the underground mine in the 12SB2 area. The coal produced during this time is largely blended with coal recovered from the tailings pond.

Surface mining operations are planned to be resumed in 2017 at a rate of approximately 2.0M ROM tonnes per year until 2026 when it is increased to approximately 3.0M tonnes per year. Production varies over the years due to changing strip ratios and the mining sequence in developing the 2, 9, 12, and 16 mines. In the last 11 years of the mine life, surface production increases to approximately 4.8M tonnes per year due to the lower strip ratio in the mine 12 area. Total surface mine production is 125M ROM tonnes and 90M clean tonnes over the 41 year remaining mine life.

TABLE 22.2 CASH FLOW SUMMARY, C\$ (000'S)

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025-29	FY 2030-2034	FY 2035-2039	FY 2040-56	Total
Coal Sales, Kt	751	1,048	2,526	3,282	3,053	3,094	3,541	3,744	3,819	4,447	20,776	18,087	18,635	73,355	160,159
Metallurgical Coal, Kt	751	1,048	2,415	2,986	2,689	2,753	3,428	3,574	3,624	4,265	17,733	16,617	17,227	68,999	148,112
Thermal Coal, Kt	0	0	111	296	364	340	113	170	195	182	3,043	1,470	1,408	4,356	12,047
Revenue, C\$K	\$89,236	\$136,137	\$340,447	\$542,960	\$504,021	\$505,604	\$690,284	\$701,033	\$691,319	\$787,638	\$3,409,423	\$3,113,395	\$3,220,925	\$12,824,811	\$27,557,231
Cost \$K	\$115,320	\$166,360	\$359,669	\$414,026	\$410,685	\$678,689	\$521,314	\$544,832	\$493,932	\$581,418	\$2,618,416	\$2,555,246	\$2,584,241	\$8,633,747	\$20,677,897
Cost of Sales	\$97,891	\$132,589	\$284,933	\$363,492	\$368,186	\$418,339	\$453,340	\$498,428	\$478,891	\$519,261	\$2,427,581	\$2,428,237	\$2,394,639	\$8,307,456	\$19,173,263
Royalty — Tier 1	\$593	\$956	\$2,476	\$4,218	\$3,911	\$3,913	\$5,583	\$5,622	\$5,501	\$6,240	\$26,991	\$24,927	\$25,819	\$103,228	\$219,978
Royalty — Tier 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$29,760	\$63,070	\$549,253	\$642,083
On Site Operating Costs, \$K	\$67,319	\$91,070	\$189,566	\$238,151	\$251,365	\$300,147	\$315,801	\$353,938	\$332,157	\$349,417	\$1,690,266	\$1,752,835	\$1,666,767	\$5,152,951	\$12,751,750
Off Site Operating Costs, \$K	\$29,980	\$40,564	\$92,891	\$121,122	\$112,910	\$114,278	\$131,956	\$138,869	\$141,233	\$163,604	\$710,324	\$620,715	\$638,982	\$2,502,024	\$5,559,452
Income Taxes	\$0	\$0	\$0	\$10,884	\$6,682	\$0	\$23,018	\$21,009	\$30,054	\$48,062	\$173,097	\$136,716	\$159,028	\$1,023,208	\$1,631,757
Total Capital Costs, \$K	\$17,429	\$33,771	\$74,737	\$50,534	\$42,499	\$260,351	\$67,974	\$46,403	\$15,042	\$62,157	\$190,835	\$127,010	\$189,601	\$326,292	\$1,504,635
After-Tax Net Cash Flow, \$K	(\$26,559)	(\$30,633)	(\$87,068)	\$116,777	\$81,326	(\$173,085)	\$117,825	\$133,654	\$164,816	\$156,931	\$616,558	\$421,657	\$479,869	\$3,304,511	\$5,276,577
Cumulative DCF@10.0%	\$622														\$622

Underground mining operations continue from 2015 through the end of the mine life in 2055. ROM production varies over the years from 1.2M to 3.8M tonnes as the different mine areas are developed and production changes from room and pillar mining to longwall mining. The average annual ROM production is 2.1M tonnes. A total of 82M ROM tonnes and 56M clean tonnes are planned to be produced from the underground mines. Combined surface and underground ROM production are estimated at 221M tonnes over the remaining 41 year mine life.

Clean metallurgical coal production ranges from 2.6M to 5.0M tonnes and totals 146M tonnes over the 41 year remaining mine life. Approximately 14M thermal tonnes are sold over the mine life.

Details regarding direct mining costs are described in Section 21 while details regarding overhead and taxes and royalties are described in Section 22.1. A summary of the unit average selling prices and unit costs are shown in Table 22.3 below.

**TABLE 22.3 UNIT REVENUE AND COST SUMMARY**

<b>Description</b>	<b>\$/Tonne</b>
Gross Revenue (Includes thermal coal)	\$172
Selling Expenses	\$3
Loading and Transportation Expenses	\$32
<b>Net Revenue FOB Mine</b>	<b>\$137</b>
Direct Mining Costs	\$80
Royalties	\$5
<b>Total Cash Costs of Production</b>	<b>\$85</b>
Margin	\$52
Income Taxes	\$10
<b>Cash Flow from Operations</b>	<b>\$42</b>
Capital Expenditures	\$9
<b>Net Cash Flow</b>	<b>\$33</b>

### 22.3 FINANCIAL ANALYSIS

Due to the low production volume in 2015 and 2016, low metallurgical coal prices and significant capital expenditures, cash flow from the mine is negative for the next three years. Cumulative EBITDA is C\$50M during that period while negative after tax cash flows total C\$144M due to the capital requirements in those years. Significant capital expenditures in 2020 result in a large negative cash flow that year of \$173M. Cumulative after tax cash flows turn positive in 2019, when metallurgical coal prices are projected to improve to the \$143/t level and clean coal production increases to the 3.1M level. Cumulative undiscounted cash flows over the 41 year project life are C\$5.3 billion (B).

The after tax internal rate of return for the project is approximately 40%. After tax net present values at 8%, 10%, 12% and 15% are shown in Table 22.4.

TABLE 22.4 NPV RESULTS (\$M)

Interest Rate	8%	10%	12%	15%
NPV	\$878	\$622	\$454	\$294

## 22.4 SENSITIVITY ANALYSIS

The economics of the project are extremely sensitive to the Canadian/US dollar exchange rate and the price of metallurgical coal. For example, if metallurgical coal prices do not recover in the next five years and then increase over the next five to the maximum projected price of US\$170 per tonne, the after tax NPV at 10% would be reduced to C\$266M and the IRR would be 15%. In that case, cumulative cash flows are negative until 2026 and peak at (C\$590) in 2021. Of course, if prices do not recover, some capital could be delayed. In addition, if the Canadian/US dollar exchange rate increases to the long term historical average in the next two years instead of over the next ten years, the after tax NPV at 10% decreases to C\$450M and the IRR decreases to 25%. Sensitivity of the economics regarding Canadian/US exchange rate, coal sales price, direct mining costs and capital expenditures were evaluated. The results are summarized in Table 22.5.

TABLE 22.5 SENSITIVITY ANALYSIS (\$M)

	IRR	NPV at 8%	NPV at 10%	NPV at 12%	NPV at 15%
1.0% Decrease in C\$ to \$US	35%	\$710	\$495	\$354	\$223
10% Increase in Met Coal Prices	75%	\$1,300	\$955	\$725	\$503
10% Decrease in Met Coal Prices	19%	\$427	\$260	\$156	\$63
10% Increase in Total Cash Costs	23%	\$517	\$336	\$220	\$114
10% Decrease in Total Cash Costs	71%	\$1,236	\$906	\$685	\$472
10% Increase in Capital Costs	35%	\$824	\$576	\$413	\$260
10% Decrease in Capital Costs	46%	\$931	\$669	\$495	\$329

## 23 ADJACENT PROPERTIES

GCC holds mineral leases for the majority of the coal bearing lands adjacent to GCC's mining areas. The major exceptions are Maxim Power Corp. (through Summit Coal Inc.) which owns a coal lease, originally called the No. 14 Mine lease, on the east side of the Smoky River and Highway 40 nearer to the town of Grande Cache. Additionally, Summit Coal acquired a lease located to the northwest of the No. 16/ No. 12 North Areas and Canadian Dehua International Mines Group Inc. holds a lease at the very north most end of No. 9D. The leases do not affect the operations of GCC.



## **24 OTHER RELEVANT DATA AND INFORMATION**

### **24.1 APPLICATION FOR PERMIT AMENDMENT**

Some coal reserves and resources are contingent on GCC successfully obtaining the required amendments to the mine permit from government regulators. GCC has already successfully obtained the original mine permit and subsequent amendments thereto. The methodology and procedure for obtaining amendments is well known by GCC.

The economic analysis and ultimately the total coal reserve estimate for these mining areas assume the successful and timely receipt of the necessary amendments to the permit. If these permit amendments are not received, or if the amendments contain stringent conditions, then this could materially affect the economic analysis and possibly the reserve estimate.

GCC has received all the licences to operate the current West Extension and North Pit of No. 8 surface operation and the 7/8 Seam of No. 12 South B2 underground operation. GCC, as of the effective date of this report, was in the process of preparing applications for amendment of licences for the East Pit and East Extension of No. 8 surface operation, and the 4 Seam No. 12 South B2 underground operation. GCC is still in the process of responding to Supplemental Information Requests for the 4 Seam No. 12 South B2, which is budgeted to begin mine development production in May 2015. GCC expects to submit the No. 12 South A underground operation application for regulatory approval in 2015, which is budgeted to begin development production in September 2018.

GCC is developing a long term mining strategic plan that will guide the licence application process.

### **24.2 NO. 12 SOUTH A SURFACE AREA**

The No. 12 South A Area was originally designed in 2011 as a surface operation to complete recovery of a coal reserve left un-mined by the previous operator. The geologic modelling and mining feasibility study performed by GCC and Norwest in 2013 indicated preferable economics by underground mining this area. In late 2014, GCC redesigned the underground mine plan for No.12 South A using a surface mined trench pit to the 7/8 Seam where portals will be installed. The No. 12 South A underground operation will replace the No. 12 South B2 operation and ensure coal availability and quality of underground coal. The No. 12 South A underground operation will be a room and pillar mine utilizing continuous miners. The projected average annual production capacity is 1.4Mtpa ROM with peak annual production of 2.0Mtpa ROM. GCC needs to finalize mine planning efforts and submit a permit application by mid-2015 to meet the budgeted production schedule which shows production from the No. 12 South A underground operation in September 2018.

### **24.3 NO. 9D UNDERGROUND MINE**

The geologic model of the No. 9D Mine within GCC's coal lease boundary covers over 90 km<sup>2</sup>. The northern part of No. 9D underground area is proposed to be longwall mined. Room and pillar potential exists in a smaller area in the middle of the No. 9 Area, but requires additional exploration to bring these resources into the "indicated" category. The No. 9D Area is designed primarily as a fully mechanized longwall retreat mining system. The No. 9D Mine is planned to begin development in 2018 with first coal production in 2020 and longwall operations in 2022. The No. 9D Mine contains sufficient longwall reserves in the 10 Seam and 4 Seam to support a 36 year mine life at an average 1.8Mt ROM production rate.

GCC is planning an exploration program to gain a better understanding of the coal quality, geotechnical properties, methane content and hydrologic conditions in the area planned for underground mining. Based upon the information collected from the exploration program, an engineering study is planned to be conducted by China Shenyang Design and Engineering Company.

### **24.4 NO. 9 SURFACE AREA**

The No. 9 Surface mining area is in proximity to the former mined-out No. 9A, No. 9B, No. 9G and No. 9H underground operations and No. 9 West Extension, North Limb and Barrett pits. It is the potential replacement for the No. 8 Surface operation. The No. 9 Surface operation is projected to be mined by the current fleet by shovels and trucks for stripping. Raw coal from No. 9 Surface operation can be hauled to current coal ROM Pad by truck or it could be fed to the Smoky River process plant by the same proposed belt system which carries clean coal from the proposed Beaverdam Creek process plant. Either way raw coal will be processed at the current coal processing plant.

### **24.5 FUTURE PLANNED MINING AREAS**

The No. 9, No. 2, No. 16, and No. 12 North surface pits are planned to supplement or succeed the No. 8 surface operations pits. The No. 16 and No. 12 North pits are located in an environmentally sensitive area, which will necessitate a rigorous approach to the permitting process expected to take several years.

At present, future underground mining is planned to start in the No. 12 South A operation in 2018, and the No. 9D Longwall operation in 2020. Feasibility studies for these developments are scheduled in 2015 for No. 12 South A and in 2016 for No. 9D.

GCC also is planning to undertake geologic model updates and pre-feasible studies for the No. 1, No. 5, and No. 11 Areas in 2014.

Norwest, on behalf of GCC, completed a highwall mining scoping feasibility study for 4 Seam at No. 7 Area and 10 Seam at No. 9 Area in 2012. A further exploration program has been planned to verify the geotechnical information in these seams. GCC will investigate additional potential highwall mining areas within current coal leases. The reserve for highwall mining has not been included in this report.

## 24.6 PLANT REJECTS DISPOSITION

In response to the limited availability of storage room for the fine plant rejects, GCC is now dewatering the majority of the fine coal refuse and co-disposing this with the coarse rejects. GCC is currently using the completed South Pit bottom of No. 8 Area as waste dump to co-mingle and store the mixed rejects.

A new coal preparation plant, with 5.4Mtpa ROM processing capacity and DMC processing technique, is planned near the proposed portal of No.9D underground located 4km south of No. 12 South B2, No. 16 and No. 12 North Mines. It will be the processing center for coal from the mine areas mentioned above. Rejects will backfill to No. 12 South A P1 pits, which is less than 1km from the plant.

Coal from No. 9 Mine Surface, No. 2 Mine and future mining areas will be processed in the current CPP based on current long term planning.

Reserve estimates for GCC are based on the assumption that this disposition system will remain suitable for the plant rejects, allowing coal processing to continue as planned in the mid- and long- term.

## 25 INTERPRETATION AND CONCLUSIONS

In summary, Norwest concludes that there are 147.6Mt of saleable metallurgical coal reserves that can be economically mined from the Grande Cache Coal project using a combination of both surface and underground mining methods. These coal reserves are projected to be mined at annual production rates ranging from 3.5Mt to 5.0Mt with a mine life of approximately 41 years. Capital costs required to develop both the surface and underground operations to full production is approximately C\$560M and is planned to be expended over approximately 8 years starting in 2015. Using all the assumptions discussed throughout this report, the project achieves an after tax IRR of approximately 46%. Risks associated with mining the reserves and achieving the projected financial results are discussed throughout the report and are summarized below.

The financial results presented in this report represent forward-looking information regarding future projections of mining operations and resulting cash flows. By its nature, forward-looking information involves a number of assumptions, known and unknown risks and uncertainties, which could cause actual results to differ materially from those forecasts. These risks include, but are not limited to the future price of coal, rail freight rates and availability of coal cars to transport the coal to port. There may be inflation of input costs such as diesel, steel, and labour as well as mining equipment. The potential for a high level of activity in the mining industry and other industries that rely on large earth moving equipment may cause delays in delivery of mining equipment, which could delay or impair GCC's ability to achieve budgeted production. The problem of retaining and recruiting skilled personnel is an industry wide issue. There can be delays in obtaining or renewing mining permits. Concerns over greenhouse gas emissions and compliance with greenhouse gas regulations may place additional costs on a coal mining operation or negatively impact the coal market.

There is risk involved in GCC's aggressive plans to increase the production rates used in the economic analysis. This includes the requirement for timely regulatory approvals, the practical aspects of establishing several new mining operations, along with a new process plant and the conveyor system in a short time period. Issues with timing and production rate however, would not have a significant impact on the reserves reported in this document in the opinion of the QPs.

GCC will be challenged to maintain a skilled and experienced underground workforce with the ramp up of mining sections along with the introduction of new equipment and conditions as operations begin in the No. 9D longwall mine. Manpower for a one unit operation in early 2015 quickly increases to two units in mid-2015 to three units in 2016 to four units in 2020, five units in 2021, and seven units in 2022 with the addition of a steep seam longwall production face.

In order to address this issue, GCC will need to incorporate an aggressive employee location and skill training plan and/or identify a contract workforce with available experience to offset manpower short falls.

GCC budgeted underground production rates may be challenged by the fact that there are currently no operating steep seam longwalls in North America. All equipment technology, experienced skilled personnel and training must be sourced from Asia or Eastern Europe where this technology and expertise is currently available. GCC should initiate discussions with potential equipment manufacturers to determine which providers will be willing to work with Alberta regulatory agencies to obtain necessary approvals.

A discussion of the following identified risks is contained in the relevant sections of this report.

- Timing of the improvement of metallurgical coal prices
- Foreign exchange movement, especially in the next five years
- Achieving permit timelines
- Selenium issues
- Ramp up of both surface and underground production
- Approval and success of longwall operation
- Tailings management
- Water rights
- Conveyor system with partial underground route
- Restarting the No. 8 Surface mine after being idle for two years.

## **26 RECOMMENDATIONS**

Recommendations are categorized with reference to underground and surface mining topics. In general, it is recommended that an optimization study be conducted to optimize the production, capital and economics for both the surface and underground operations in conjunction with each other.

### **26.1 UNDERGROUND MINING AREAS**

Norwest has the following recommendations regarding the underground mining operation at GCC.

### ***26.1.1 Development Drilling***

Horizontal and/or vertical drilling should be utilized to delineate and confirm the projected access from the No. 12 South B2 4 Seam to the No. 12 South B2 EE 7/8 Seam via rock declines. The No. 12 South A Area should incorporate additional horizontal and vertical drilling conducted along projected surface access locations to identify any geologic anomalies and confirm access, prior to excavation of the 3,300,000 BCM trench.

The No. 9D mine area should include a multi-year drilling program to eliminate inferred areas that limit the mineable boundary and improve confidence levels in the delineated areas. This program should include additional data adequacy covered in other topic areas.

### ***26.1.2 Mine Planning Refinement***

The No. 12 South A Area should include additional refinement of mine design based on 2014 drilling, and the resulting geological model update.

To increase the confidence level in the timeline required to bring the No. 9D Area into production and confirm the reserve base, additional exploration drilling and data collection must be conducted. The addition of such data will aid in the identification of key critical paths, including those subject to regulatory approvals.

### ***26.1.3 Washability — Saleable Yields***

Large diameter coring along with ROM stockpile sampling should be included on an ongoing basis. The 7/8 Seam horizon and the 10 Seam show a high potential for additional ash to be introduced in the mining process. The 7/8 Seam with the mined interburden rock and other OSD can affect the operation period of the No. 12 South B2 and the No. 12 South A Areas.

The estimated washing yield of 10 Seam in the No. 9D operation required refinement diameter and large core information would augment the limited currently available information.

### ***26.1.4 Geotechnical Studies***

The No. 12 South B2 and No. 12 South A Areas have testing information from the 2013 and 2014 drilling programs which should be incorporated into the ground control review and ongoing modeling for these mining operations. Mining operations in the No. 12 South B2 4 Seam are projected to begin April 2014. Geotechnical monitoring should be incorporated in the 4 Seam operations to verify seam interactions in this area of multiple seam mining. This information will assist in the ongoing No. 12 South A design work and finite element modeling.

The No. 9D mine area has limited geotechnical information. Geotechnical information including detailed core logging, coal mine roof rating (CMRR) and strength testing should be obtained to assist in further study, ground control design, and projection of OSD. In particular some areas of the 10 Seam appear to contain weaker immediate roof and therefore geotechnical investigations of the 10 Seam should be considered as priority.

### *26.1.5 Methane Liberation — Desorption Studies*

The No. 9D mine area will present the deepest underground mining considered by GCC with depths in excess of 500m. It is well established that with increased depth, increased methane content is likely. Norwest recommends that desorption testing be conducted on the seams to be mined (10 Seam and 4 Seam), including the coal seams and any carbonaceous shales above these seams as caving will fracture such seams/strata releasing methane into caved areas. Methane liberation parameters are necessary for the ventilation system design and if necessary methane degasification systems.

### *26.1.6 Hydrologic Studies*

Although the hydrology of the No. 9D mine area is expected to be similar to that of historic mining operations adjacent to this area, the No. 9D mine area will require hydrologic studies to better define water recovery, aquifer and ground water inflows prior to project implementation. The No. 9D drilling program will need to utilize planned development drilling to establish the hydrologic regime to establish water supply, and the impact that caving will have on the inflow of ground water for underground mine dewatering system design.

### *26.1.7 Preliminary Meetings with AER and OHS*

Although longwall mining has been done by prior operators in mines adjacent to the No. 9D mine area. It has been an issue how the AER and OHS understand the current regulations and their interpretations of electrical hazard zoning in regard to a cave (gob) line. Norwest recommends meetings with AER and OHS enforcement regulators be planned both as education and evaluation of the stance that the regulators will take in respect to longwall operation and the steeper grades present in the No. 9D mine area. These meetings should identify issues that need to be addressed in the mine licence application and possibly focus site visits to locations with longwall operations.

## **26.2 SURFACE MINING AREAS**

### *26.2.1 Regulatory Issues*

The priority regulatory issue for the surface mine is the licensing of both No. 8 East and No. 8 West areas. Areas not yet licensed in No. 8 Mine are scheduled for production in the proposed cash flow analysis in Section 22 commencing as early as 2nd quarter 2017. Submission for these licence applications should be targeted for 1st quarter 2015 at the latest.

The long lead time for the regulatory approval of greenfield areas above the treeline such as No. 12 North Area and No. 16 Area requires initiation of the process very shortly in order to achieve the proposed production schedule.

### *26.2.2 Planning Parameters*

Adjustments to reserves in the No. 8 Area in this report compared to previous NI43-101 Technical Reports are based on changes in mining economics and in particular the economics of waste haulage. Therefore, a reconciliation of actual haul performance versus projected haul economics is recommended.

This report has reduced the reserves in the No. 8 Area. This reduction is primarily in the area of No. 8 East. More detailed study and refinement of the most appropriate plan for mining this area is recommended to determine the net present value of the various No.8 East Area mining options.

### *26.2.3 Coal Preparation Plant and Capital Projects*

The new coal preparation plant, the mine infrastructure and the conveyor system projects should be studied in more detail along with feasibility level designs and cost estimates. Conveyor systems proposed in this report have a major impact on operating costs. Details of the proposed system are significant to capital spending projections. Detailed feasibility study for surface belt systems, including options to extend them to the No. 9D Area, would add confidence to projections of future economics. This would include the proposed underground conveyor that is part of the proposed conveyor system from the Beaverdam Creek CPP to the existing train loadout.

### *26.2.4 Engineering*

Studies are ongoing to evaluate upgrade options to the current plant circuitry, with the objective to improve the throughput rate, reliability and efficiency of the facility. These studies should be integrated with the proposed new process plant design.

Opportunity exists to improve processing economics by the co-disposal method of mixing the plant refuse streams with mine waste material. Further study is warranted in defining the applicability of this method relative to environmental, geotechnical and operational considerations.

### *26.2.5 Regulatory*

The new coal process plant proposed for this report is sufficiently well understood from a capital and performance perspective for the purposes of the cash flow analysis. However, the current sensitivity to water use and other environmental considerations mean the details of location and process must be resolved to start the regulatory process within the next 2 years.

## **26.3 GEOLOGY**

### *26.3.1 Exploration*

A number of areas would, with minimal additional exploration, convert resources currently classed as “inferred” to “indicated”. These areas include parts of No. 12 North, No. 12 South A, and a potential room and pillar area in the No. 9D Area. Exploration either by drilling or, in the case of the No. 12 North, trenching at previous trench locations from the 1970s would infill these areas with sufficient surveyed coal thickness data points to expand the reserve areas to match proposed mining areas, and hence inclusion into financial analysis.

The reserves in this report, as qualified, meet the standards of data point density required based on the complexity of the geology, as classed under the recommended guideline, GSC Paper 88-21. However, detailed mine planning in coal mines in thrust and fold belts such as on the GCC property requires additional exploration beyond the essential confidence in the in-situ coal volume and coal rank as required by the guidelines. The areas that should be prioritized for additional exploration based on their proposed timing and current data point density are: No. 8, northwest area; No. 2, Maskwa and Muskeg pits; and No. 12 South A, northwest area.

The current exploration data base covers adequately the basic coal quality parameters such as proximate and basic rheology. Future quality projections would benefit from acquisition of additional petrographic and ash chemistry data, particularly phosphorus, and the organization of existing data into forms suitable for observing at property trends in these parameters.

#### **26.4 FUTURE RESOURCE AREAS**

Historic data for the No. 1, No. 5, and No. 11 Areas should be evaluated for the potential to expand the resource base into these areas, which are within the current coal leases of GCC.

Shallow reflection seismic data in the area northeast of the No. 9D Area should be reviewed to evaluate the potential of this area for expansion of the resource base for underground mining in an area interpreted to be of shallow and dip suitable for either room and pillar or longwall mining.

The current analysis of highwall mining opportunities should be completed, and included in future resource updates.

#### **26.5 PLANNING PARAMETERS RECONCILIATION**

Key planning parameters such as coal recovery are based on historical analysis. The planning process would benefit from a reconciliation between the projections of quality parameters, dilution and loss from exploration data and the current as-mined quality and seam recovery from both surface and underground operations. ROM ash from the current operations is in agreement with projections from the block modeling, but information on recovery by seam would benefit from more detailed analysis.

The confidence in the current methods and exploration density would benefit from reconciliation between the in-situ coal volume models and the as-mined coal seams using all available survey control from trenches, to blast hole intersections, to excavated seam hangingwall and footwall survey data.

The current practice of interpolating yield using ash balance equations is adequate, being as it is based on an extensive processing data base to estimate reject stream volume and ash. However, the database of both actual plant performance and adit and core wash testing on the property is extensive and the accuracy of yield projections would benefit from more sophisticated yield analysis in the planning process.



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## 27.2 ABBREVIATIONS, DEFINITIONS, AND ACRONYMS

" <i>adit</i> "	a horizontal opening to access a coal seam.
" <i>anticline</i> "	a fold, generally convex upward, whose core contains the stratigraphically older rocks.
" <i>ash</i> "	ash forming constituents which may be subdivided into two basic classes: those that are structurally a part of the coal and hence inseparably mixed with it and segregated impurities that can be eliminated to a greater or lesser extent by ordinary cleaning methods.
" <i>as-received</i> "	represents an analysis of a sample as received at a laboratory.
" <i>ASTM</i> "	the American Society for Testing Materials.
" <i>BCM</i> "	bank cubic metre, which represents one cubic metre of material measured prior to disturbance.
" <i>bedrock</i> "	consolidated rock underlying the Earth's surface.
" <i>bituminous coal</i> "	a class of coal having heat values, calculated on an ash-free basis, typically ranging from 24,400 to 32,600 KJ/kg, commonly used for utility and industrial steam purposes and in the steel-making industry, for making coke or for pulverized coal injection into the blast furnace.
" <i>BTU</i> "	British thermal unit; the amount of heat needed to raise the temperature of one pound of water by one degree Fahrenheit.
" <i>BTU/lb</i> "	BTUs per pound, an imperial unit of measure used to describe the amount of heat released on combustion of a pound of material, such as coal, under specific conditions.
" <i>clean coal</i> "	coal that has been processed to meet metallurgical coal market specifications.
" <i>climate</i> "	the statistical description of the weather of a region averaged over a period of, typically, 30 years.

<i>“coal”</i>	readily combustible rock containing more than 50% by weight and more than 70% by volume of carbonaceous material, including inherent moisture, formed from compaction and alteration of various plant remains.
<i>“coal field”</i>	region in which deposits of coal occur.
<i>“coal rank”</i>	the qualitative classification of coal from lignite to anthracite based on calorific content and other qualitative and quantitative characteristics.
<i>“coal washability”</i>	the analysis of the specific gravity distribution of chemical and physical characteristics of coal.
<i>“coke”</i>	a hard, dry carbon substance produced by heating coal to a very high temperature in the absence of air, used primarily in the manufacture of iron and steel.
<i>“coking coal”</i>	metallurgical coal that exhibits the physical and chemical properties that are necessary to form coke.
<i>“continuous miner”</i>	a mining machine designed to remove coal from the face and to load that coal into cars or conveyors without the use of cutting machines, drills or explosives.
<i>“cross-section”</i>	diagram of a vertical section through a volume of the Earth's subsurface generally drawn normal to the strike direction the retreat mining of pillars left in place during development.
<i>“dip”</i>	the angle at which a stratum is inclined from the horizontal, measured perpendicular to the strike and in the vertical-plane.
<i>“drainage basin”</i>	area that gathers water which contributes to a body of water.
<i>“drillhole”</i>	a circular hole made by drilling either to explore for minerals or to obtain geological information.
<i>“dry basis”</i>	coal that has moisture removed by prescribed laboratory procedure or excluded by calculation.
<i>“excavator”</i>	see “shovel”.
<i>“fault”</i>	a fracture in rock along which the adjacent rock surfaces are differentially displaced.
<i>“fixed carbon”</i>	the solid residue, other than ash, remaining after the volatile matter has been liberated from coal during combustion.
<i>float/sink”</i>	a laboratory procedure which measures the floating and sinking of particles of material of various size fractions in heavy liquids at various specific gravities.

<i>“free swelling index” or “FSI”</i>	a number assigned to particular coal used in determining its suitability for coke making or other uses. The index, from one to nine, is determined by tests established by ASTM standards.
<i>“front end loader”</i>	a wheel loader with a digging bucket mounted on the front end that dumps.
<i>“froth flotation”</i>	a process for recovering particles of coal or other minerals, in which the particles adhere to bubbles and can be removed as part of the froth.
<i>“geophysical log”</i>	a graphic record of the measured or computed physical characteristics of the rock section encountered in a borehole, plotted as a continuous function of depth.
<i>“groundwater”</i>	water present below the surface of the Earth.
<i>“highwall”</i>	the unexcavated face of exposed overburden and coal or ore in an open-cast mine or the face or bank of the uphill side of a contour strip-mine excavation.
<i>“interburden”</i>	the waste material located between economically recoverable resources.
<i>“ISO”</i>	International Organization for Standardization, a worldwide federation of national standards bodies.
<i>“isopach”</i>	the a real extent and thickness variation of a stratigraphic unit in geology.
	kilojoules per kilogram, a metric unit of measure used to describe the amount of heat released on combustion of a kilogram of combustible material, such as coal, under specific conditions;
<i>“lease”</i>	a contract between a landowner and a lessee, granting the lessee the right to search for and produce coal upon payment of an agreed rental, bonus and/or royalty;
<i>“LOM Plan”</i>	Life of Mine Plan, referred to the production schedule for the entire mine as designed;
<i>“long wall mining”</i>	a coal mining method for miners, namely excavating a U-shape mining work face in the coal seam with exits arranged at both upper and lower ends. The length of the mining work face ranges from 100m to 300m and on the work face the coal mining equipment mines coal back and forth.
<i>“MBCM”</i>	million BCM.

<i>“metallurgical coal”</i>	the various grades of coal suitable for making steel and includes coking coal and PCI coal.
<i>“mineable”</i>	capable of being mined under current mining technology and environmental and legal restrictions, rules and regulations.
<i>“out-of-seam dilution” or “OSD”</i>	the contamination of mined coal with rock outside of the coal seam being mined.
<i>“outcrop”</i>	coal which appears at the surface; the intersection of a coal seam with the surface.
<i>“overburden”</i>	materials that overlie a mineral deposit.
<i>“parting”</i>	layer of non-coal material between separate coal seams.
<i>“preparation stage of mine construction”</i>	It is the period for mine construction from completion of land expropriation, access of constructors to the date of official commencement of mine openings.
<i>“PCI”</i>	pulverized coal injection, a process in which coal is pulverized and injected into a blast furnace. Those grades of coal used in the PCI process are generally non-coking. However, since such grades are utilized by the metallurgical industry, they are considered to be a metallurgical coal. PCI grade coal is used primarily as a heat source in the steel making process in partial replacement of high quality coking coals which are typically more expensive.
<i>“pit”</i>	an open excavation from which the raw mineral being mined is extracted.
<i>“place change mining method”</i>	a mining cycle which requires relocation of the coal cutting machine from roadway to roadway as the location where coal was recently removed by the cutting machine must be supported by installing roof bolts using a roof bolting machine. The relocation time required to relocate the cutting machine from roadway to roadway subsequent to installation of roof support results in a production delay where coal cannot be mined.
<i>“processing plant”</i>	a facility where coal is prepared for market or other usage. It consists of equipment that separates coal from impurities. Coal is washed, thermally or mechanically dried, sized, stored and loaded for shipment or conveyed to use point.
<i>“proximate analysis”</i>	a laboratory analysis to determine the percentage by prescribed methods of moisture, volatile matter, fixed carbon and ash.
<i>“raw coal”</i>	coal from the breaker that has not been processed in a processing plant.

<i>“reclamation”</i>	the rehabilitation of land at a mining site after the coal is extracted to a standard of land capability as existed before mining. Reclamation operations are usually conducted as production operations are taking place elsewhere at the site. This process commonly includes recontouring or reshaping the land to its approximate original appearance, restoring topsoil and planting native grasses, trees and ground covers.
<i>“retractable belt conveyor”</i>	it is a belt conveyor equipped with storage belt and capable of adjusting belt length by adapting itself to changeable location of excavation working face.
<i>“room-and-pillar mining”</i>	a system of mining in which the coal is mined in rooms separated by pillars, which are subsequently mined.
<i>“rotary drill”</i>	a drill machine that rotates a rigid, tubular string of rods to which is attached a bit for cutting rock to produce boreholes.
<i>“royalty”</i>	a share of the product or profit reserved by the owner for permitting another to use the property.
<i>“run of mine coal” or “ROM”</i>	the coal produced from the mine before it is processed.
<i>“saleable coal”</i>	the shippable product of a coal mine or processing plant. Depending on customer specifications, saleable coal may be ROM, crushed- and-screened (sized) coal, or the clean coal from a processing plant.
<i>“seaborne metallurgical coal”</i>	metallurgical coal that is exported by ocean going ship from the producing country to the consuming country.
<i>“seam”</i>	large deposit or layer of coal.
<i>“shovel”</i>	a large electric or diesel powered machine used in the open pit mining process to remove and load overburden or coal.
<i>“shuttle car”</i>	self-discharging underground equipment used for receiving coal from the mining machine and transferring it to an underground loading point or belt conveyor system.
<i>“Shearer”</i>	coal mining machinery that breaks coal by rotary working mechanism and loads broken coal to the conveyor or other transportation equipment.
<i>“Shield”</i>	equipment that is lifted, forwarded by hydraulic power, to provide strength for roof support.

<i>“strike”</i>	the course or bearing of an inclined bed, vein or fault plane on a level surface; the direction of a horizontal line perpendicular to the direction of the dip.
<i>“strip ratio”</i>	the ratio of the volume of overburden moved to the tonnage of coal produced, measured in terms of BCM of overburden per tonne of coal produced. A lower strip ratio is an operational advantage because less overburden has to be removed in order to expose the raw coal.
<i>“surface mine”</i>	a mine in which the mineral deposit lies sufficiently near the surface to be extracted by removing the overburden.
<i>“service area”</i>	a site occupied by surface buildings, facilities as well as administrative offices which provides services for surface and auxiliary production system of a colliery.
<i>“syncline”</i>	a series of flat-lying rock strata that has been folded into a trough-like geological structure.
<i>“thrust fault”</i>	a fault with a dip of 45° or less over much of its extent, on which the hanging wall appears to have moved upward relative to the footwall.
<i>“tonne”</i>	a metric tonne, which is approximately 2,205 pounds, as compared to a “short” ton, which is 2,000 pounds, or a “long” ton, which is 2,240 pounds. Unless expressly stated otherwise, the metric tonne is the unit of measure used in this document.
<i>“tunnel way”</i>	a long, narrow, horizontal or nearly horizontal underground passage that is open to the atmosphere at both ends.
<i>“underground mine”</i>	a mine that is located below the earth's surface. Coal is removed mechanically and transferred by shuttle car or conveyor to the surface.
<i>“volatile matter”</i>	those products, exclusive of moisture, given off by a material such as gas or vapour, determined by definite prescribed methods, which may vary according to the nature of the material.
<i>“yield”</i>	the ratio of the clean coal product to the raw coal plant feed, expressed as a percentage.



Above mean sea level	amsl
Annum (year)	a
Billion years ago	Ga
British thermal unit	Btu
Centimetre	cm
Cubic centimeter	cm <sup>3</sup>
Cubic metre	m <sup>3</sup>
Day	d
Days per week	d/wk
Days per year (annum)	d/a
Degree	°
Degrees Celsius	°C
Diameters	∅
Dry metric ton	dmt
Gigajoule.	GJ
Gram	g
Grams per litre	g/L
Grams per tonne	g/t
Greater than	>
Hectare (10,000 m <sup>2</sup> )	ha
Hertz	Hz
Horsepower	hp
Hour	h
Hours per day	h/d
Hours per week	h/wk

Hours per year	h/a
Kilo (thousand)	k
Kilocalorie	kcal
Kilogram	kg
Kilograms per cubic metre	kg/m <sup>3</sup>
Kilograms per hour	kg/h
Kilograms per square metre	kg/m <sup>2</sup>
Kilometre	km
Kilometres per hour	km/h
Kilonewton	kN
Kilopascal	kPa
Kilovolt	kV
Kilovolt-ampere	kVA
Kilovolts	kV
Kilowatt	kW
Kilowatt hour	kWh
Kilowatt hours per tonne (metric ton)	kWh/t
Kilowatt hours per year k	Wh/a
Less than	<
Litre	L
Litres per minute	L/m
Megavolt-ampere	MVA
Megawatt	MW
Metre	m
Metres above sea level	masl

Metres per minute	m/min
Metres per second	m/s
Metric ton (tonne)	t
Micrometre (micron)	$\mu\text{m}$
Milliamperes	mA
Milligram	mg
Milligrams per litre	mg/L
Millilitre	mL
Millimetre	mm
Million	M
Million tonnes	Mt
Minute (plane angle)	'
Minute (time)	min
Percent	%
Second (plane angle)	"
Specific gravity	SG
Square centimeter	$\text{cm}^2$
Square kilometer	$\text{km}^2$
Square metre	$\text{m}^2$
Thousand tonnes	kt
Tonne	t
Tonnes per day	t/d
Tonnes per hour	t/h
Tonnes per year	t/a
Year (annum)	A

## 1. RESPONSIBILITY STATEMENT

This circular, for which the Directors collectively and individually accept full responsibility, includes particulars given in compliance with the Listing Rules for the purpose of giving information with regard to the Group. The Directors, having made all reasonable enquiries, confirm that to the best of their knowledge and belief the information contained in this circular is accurate and complete in all material respects and not misleading or deceptive, and there are no other matters the omission of which would make any statement herein or this circular misleading.

## 2. DISCLOSURE OF INTEREST

### (a) Directors' and Chief Executive's Interests and Short Positions in Shares, Underlying Shares and Debentures

As of the Latest Practicable Date, the interests and short positions of the Directors and chief executive of the Company in the Shares and underlying Shares and debentures of the Company or its associated corporations (within the meaning of Part XV of the SFO) which (a) were required to be notified to the Company and the Stock Exchange pursuant to Divisions 7 and 8 of Part XV of the SFO (including interests and short positions which they were taken or deemed to have under such provisions of the SFO) or (b) were required, pursuant to section 352 of the SFO, to be entered in the register referred to therein or (c) were required, pursuant to the Model Code, to be notified to the Company and the Stock Exchange, were as follows:

Name of Directors	Name of corporation	Nature of interest	Aggregate number of Shares or underlying Shares	Approximate percentage of interest in the corporation <sup>(5)</sup>
Wang Xingchun <sup>(1)</sup>	The Company	Personal interest and interest of controlled corporation	1,535,584,109	40.70%
	Winsway Mongolian Transportation Pte. Ltd.	Beneficial owner	1	10%
Zhu Hongchan <sup>(2)</sup>	The Company	Personal Interest	23,345,000	0.62%
Ma Li <sup>(3)</sup>	The Company	Personal Interest	21,276,000	0.56%
Wang Changqing <sup>(4)</sup>	The Company	Personal Interest	10,000,000	0.27%
Liu Qingchun	The Company	Personal Interest	150,000	0.004%
		Interest of Spouse	29,000	0.001%
James Downing	The Company	Personal Interest	329,000	0.01%
George Jay Hambro	The Company	Personal Interest	573,000	0.02%

*Notes:*

- (1) Mr. Wang indirectly holds the entire issued share capital of Winsway International Petroleum & Chemicals and Winsway Resources Holdings and is deemed to be interested in the 208,106,421 Shares and 1,310,143,688 Shares held by Winsway International Petroleum & Chemicals and Winsway Resources Holdings, respectively. In addition, Mr. Wang holds an option to subscribe for 17,334,000 Shares under the Pre-IPO Option Scheme. On 15 July 2014, Mr. Wang pledged 208,106,421 Shares and 920,079,989 Shares respectively (together the “**July Pledged Shares**”) through his indirectly wholly owned companies Winsway International Petroleum & Chemicals and Winsway Resources Holdings in favour of Shanxi Coal International Energy Group Xinyuan Trading Co., Ltd, an independent third party which is a state-owned enterprise in the PRC as security for the performance of certain contractual obligation of a company indirectly owned by Mr. Wang. On 30 September 2014, Mr. Wang further pledged 390,000,000 Shares (the “**September Pledged Shares**”) through his indirectly wholly owned company Winsway Resources Holdings in favour of Poly Legend International Limited (“**Poly Legend**”), an independent third party of the Company, under a bona fide commercial agreement. The July Pledged Shares and September Pledged Shares represent approximately 29.90% and 10.34% of the issued shares of the Company as at the Latest Practicable Date, respectively. For further details, please refer to the announcement of the Company dated 15 July 2014 and 30 September 2014, respectively. On 27 March 2015, Mr. Wang pledged 316,900,000 Shares through his indirectly wholly owned company Winsway Resources Holdings in favour of Zhuhai Chengzhi Tong Development Co., Ltd. (the “**March 2015 Pledge**”), an independent third party of the Company, as security for the performance of certain contractual obligation of Beijing Winsway Investment Co., Ltd., a company indirectly owned by Mr. Wang, under a bona fide commercial agreement. On 2 June 2015, the pledgee has exercised its rights under the March 2015 Pledge and the underlying Shares have been transferred. For further details, please refer to the Company’s announcements dated 29 March 2015 and 3 June 2015.
- (2) Ms. Zhu Hong Chan’s options to subscribe for 10,345,000 Shares and 13,000,000 Shares were granted under the Pre-IPO Share Option Scheme and 2014 Share Option Scheme, respectively.
- (3) Ms. Ma Li’s options to subscribe for 8,276,000 Shares and 13,000,000 Shares were granted under the Pre-IPO Share Option Scheme and 2014 Share Option Scheme, respectively.
- (4) Mr. Wang Changqing’s options to subscribe for 10,000,000 Shares were granted under the 2014 Share Option Scheme.
- (5) The percentage shareholding of the Company is calculated on the basis of 3,773,198,693 Shares in issue as at the Latest Practicable Date.

Save as disclosed above, as of the Latest Practicable Date, so far as is known to any Directors or chief executive of the Company, none of the Directors or chief executive of the Company had any interests or short positions in the Shares or underlying Shares or debentures of the Company or its associated corporations (within the meaning of Part XV of the SFO) which (a) were required to be notified to the Company and the Stock Exchange pursuant to Divisions 7 and 8 of Part XV of the SFO (including interests and short positions which they were taken or deemed to have under such provisions of the SFO) or (b) were required, pursuant to sections 352 of the SFO, to be entered in the register referred to therein or (c) were required, pursuant to the Model Code, to be notified to the Company and the Stock Exchange.

**(b) Substantial Shareholders who have interests or short positions which are discloseable under Division 2 and 3 of Part XV of the SFO**

As of the Latest Practicable Date, Shareholders who had interests or short positions in the Shares or underlying Shares which would fall to be disclosed to the Company under the provisions of Divisions 2 and 3 of Part XV of the SFO, or which were recorded in the register required to be kept by the Company under Section 336 of the SFO were as follows:

<b>Name of Shareholder</b>	<b>Name of Corporation</b>	<b>Nature of interest</b>	<b>Aggregate number of Shares</b>	<b>Approximate percentage of interest in the corporation<sup>(7)</sup></b>
Mr. Wang <sup>(1)(4)</sup>	The Company	Personal interest and interest of controlled corporation	1,535,584,109	40.70%
Winsway Group Holdings Limited <sup>(2)</sup>	The Company	Interest of controlled corporation	1,518,250,109	40.24%
Great Start Development Limited <sup>(3)</sup>	The Company	Interest of controlled corporation	208,106,421	5.52%
Winsway International Petroleum & Chemicals <sup>(4)</sup>	The Company	Beneficial owner	208,106,421	5.52%
Winsway Resources Holdings <sup>(4)</sup>	The Company	Beneficial owner	1,310,143,688	34.72%
Poly Legend International <sup>(4)(5)</sup>	The Company	Person having a security interest in shares	390,000,000	10.34%
Yang Peilin <sup>(5)</sup>	The Company	Interest of controlled corporation	390,000,000	10.34%
Zhuhai Chengzhi Tong Development Co., Ltd. <sup>(6)</sup>	The Company	Beneficial owner	316,900,000	8.40%
Su Songqing <sup>(6)</sup>	The Company	Nominee for another person (other than above trustee)	316,900,000	8.40%
Shanxi Coal International Energy Group Xinyuan Trading Co., Ltd. <sup>(4)</sup>	The Company	Person having a security interest in shares	1,128,186,410	29.90%

*Notes:*

- (1) Mr. Wang indirectly holds the entire issued share capital of Winsway International Petroleum & Chemicals and Winsway Resources Holdings and is deemed to be interested in the 208,106,421 Shares and 1,310,143,688 Shares held by Winsway International Petroleum & Chemicals and Winsway Resources Holdings, respectively. In addition, Mr. Wang holds an option to subscribe for 17,334,000 Shares under the Pre-IPO Option Scheme.
- (2) Winsway Group Holdings indirectly holds the entire issued share capital of Winsway International Petroleum & Chemicals and directly holds the entire issued share capital of Winsway Resources Holdings and is deemed to be interested in the 208,106,421 Shares and 1,310,143,688 Shares held by Winsway International Petroleum & Chemicals and Winsway Resources Holdings, respectively. Mr. Wang is the sole director of Winsway Group Holdings.
- (3) Great Start Development holds the entire issued share capital of Winsway International Petroleum & Chemicals and is deemed to be interested in the 208,106,421 Shares held by Winsway International Petroleum & Chemicals. Mr. Wang is the sole director of Great Start Development.
- (4) On 15 July 2014, Mr. Wang pledged 208,106,421 Shares and 920,079,989 Shares respectively (together the “**July Pledged Shares**”) through his indirectly wholly owned companies Winsway International Petroleum & Chemicals and Winsway Resources Holdings in favour of Shanxi Coal International Energy Group Xinyuan Trading Co., Ltd, an independent third party which is a state-owned enterprise in the PRC, as security for the performance of certain contractual obligation of a company indirectly owned by Mr. Wang. On 30 September 2014, Mr. Wang further pledged 390,000,000 Shares (the “**September Pledged Shares**”) through his indirectly wholly owned company Winsway Resources Holdings in favour of Poly Legend International, an independent third party of the Company, under a bona fide commercial agreement. The July Pledged Shares and September Pledged Shares represent approximately 29.90% and 10.34% of the issued shares of the Company as at the Latest Practicable Date, respectively. For further details, please refer to the announcement of the Company dated 15 July 2014 and 30 September 2014, respectively. Mr. Wang is the sole director of both Winsway International Petroleum & Chemicals and Winsway Resources Holdings.
- (5) Yang Peilin controls 90% of Poly Legend International and is deemed to be interested in 390,000,000 Shares held by Poly Legend International.
- (6) On 27 March 2015, Mr. Wang pledged 316,900,000 Shares through his indirectly wholly owned company Winsway Resources Holdings in favour of Zhuhai Chengzhi Tong Development Co., Ltd. (the “**March 2015 Pledge**”), an independent third party of the Company, as security for the performance of certain contractual obligation of Beijing Winsway Investment Co., Ltd., a company indirectly owned by Mr. Wang, under a bona fide commercial agreement. On 2 June 2015, the pledgee has exercised its rights under the March 2015 Pledge and the underlying Shares have been transferred. For further details, please refer to the Company’s announcements dated 29 March 2015 and 3 June 2015.
- (7) The percentage shareholding of the Company is calculated on the basis of 3,773,198,693 Shares in issue as at the Latest Practicable Date.

Save as disclosed above, as of the Latest Practicable Date, the Company had not been notified by any persons (other than the Directors or chief executives of the Company) who had interests or short positions representing 5% or more of the issued share capital of the Company which would fall to be disclosed to the Company under the provisions of Divisions 2 and 3 of Part XV of the SFO, or which were recorded in the register required to be kept by the Company under Section 336 of the SFO.

### 3. SHARE OPTIONS

The Company adopted the Pre-IPO Option Scheme before its listing on the Stock Exchange, on 30 June 2010, to recognise the contribution of certain of the Directors and employees of the Company and of its parent company group whom the Board considers to have contributed to the growth of the Group and/or to the listing of Shares of the Company on the Stock Exchange.

According to the rules of the Pre-IPO Option Scheme (the “**Scheme Rules**”), the Pre-IPO Option Scheme shall be valid and effective for a period of 5 years from 30 June 2010 (the “**Adoption Date**”).

Pursuant to the Pre-IPO Option Scheme, options to subscribe for 107,945,000 Shares were granted on 30 June 2010, representing approximately 2.86% of the issued share capital of the Company as of the Latest Practicable Date. Among these options, options to subscribe for 35,955,000 Shares were granted to the Directors. A summary of the movements of the outstanding Share options granted under the Pre-IPO Option Scheme from 1 January 2015 up to the Latest Practicable Date were as follows:

<b>Grantee</b>	<b>Options granted as at 1 January 2015</b>	<b>Options exercised during the period</b>	<b>Options lapsed/ cancelled during the period</b>	<b>Options held as of the Latest Practicable Date</b>
<b>Directors</b>				
Wang Xingchun	17,334,000	—	—	17,334,000
Zhu Hongchan	10,345,000	—	—	10,345,000
Ma Li	8,276,000	—	—	8,276,000
<b>Others</b>				
Employees	35,396,000	—	8,069,000	30,327,000
Total	<u>74,351,000</u>	<u>—</u>	<u>8,069,000</u>	<u>66,282,000</u>

#### Restricted Share Unit Scheme

Under the restricted share unit scheme (“**RSU Scheme**”) adopted by the Company on 11 June 2012, the Company may grant restricted share unit awards (“**RSU Awards**”) to directors (including executive directors, non-executive directors and independent non-executive directors), officers and full-time employees of the Company or any of its subsidiaries. An RSU Award gives a participant in the RSU Scheme a conditional right when the RSU Award vests to obtain either Shares (existing Shares in issue or new Shares to be issued by the Company) or an equivalent value in cash with reference to the value of the Shares on or about the date of vesting, as determined by the Board in its absolute discretion. The Board may determine the vesting criteria, conditions and the time when the RSU Awards will vest.

The purposes of the RSU Scheme are to retain and motivate its participants to make contributions to the long term growth and profits of the Company with a view to achieving the objective of increasing the value of the Group and to promote a greater alignment of interests between the participants and the shareholders of the Company. The Board will select participants to receive RSU Awards under the RSU scheme at its discretion. During the period from 1 January 2015 up to the Latest Practicable Date, no RSU Awards were granted by the Company under the RSU Scheme.



**2014 Share Option Scheme**

The Company adopted a new share option scheme (the “**2014 Share Option Scheme**”) in the annual general meeting of the Company held on 6 June 2014. The purpose of the 2014 Share Option Scheme is to reward persons who have contributed to the Group and to encourage such persons to work towards enhancing the value of the Company. The eligible participants of the 2014 Share Option Scheme include Directors (including executive Directors, non-executive Directors and independent non-executive Directors) and employees of the Group. The 2014 Share Option Scheme, unless otherwise terminated or amended, will remain in force for a period of 5 years from 6 June 2014. A summary of the movements of the outstanding options granted under the 2014 Share Option Scheme from 1 January 2015 up to the Latest Practicable Date were as follows:

<b>Grantee</b>	<b>Options granted as at 1 January 2015</b>	<b>Options granted during the period</b>	<b>Options exercised during the period</b>	<b>Options lapsed/ cancelled during the period</b>	<b>Options held as of the Latest Practicable Date</b>
<b>Directors</b>					
Zhu Hongchan	13,000,000	—	—	—	13,000,000
Ma Li	13,000,000	—	—	—	13,000,000
Wang Changqing	10,000,000	—	—	—	10,000,000
<b>Others</b>					
Employees	<u>75,400,000</u>	<u>—</u>	<u>—</u>	<u>8,750,000</u>	<u>66,650,000</u>
Total	<u>111,400,000</u>	<u>—</u>	<u>—</u>	<u>8,750,000</u>	<u>102,650,000</u>

Save as disclosed above, as of the Latest Practicable Date, the Company, its holding companies or any of its subsidiaries or fellow subsidiaries, was not a party to any arrangements to enable the Directors to acquire benefits by means of the acquisition of Shares in, or debentures of, the Company or any other body corporate.

**4. DIRECTORS' SERVICE CONTRACTS**

Each of the executive Directors entered into a service contract with the Company for a term set out as follows:

<b>Director</b>	<b>Date of Service Contract</b>	<b>Expiry Date</b>
Mr. Wang	7 September 2013	5 September 2016
Zhu Hong Chan	7 September 2013	5 September 2016
Ma Li	28 June 2013	27 June 2016
Andreas Werner	26 August 2014	25 August 2017
Wang Changqing	30 December 2013	Resignation to take effect upon closing of the Sale and Purchase Agreement

Each of the non-executive Directors entered into a letter of appointment with the Company for a term set out as follows:

<b>Director</b>	<b>Date of Service Contract</b>	<b>Expiry Date</b>
Liu Qingchun	6 September 2013	5 September 2016
Lu Chuan	6 September 2013	5 September 2016

Each of the independent non-executive Directors entered into a letter of appointment with the Company for a term set out as follows:

<b>Director</b>	<b>Date of Service Contract</b>	<b>Expiry Date</b>
James Downing	18 June 2013	31 May 2016
Ng Yuk Keung	11 October 2013	31 May 2016
Wang Wenfu	11 October 2013	31 May 2016
George Jay Hambro	20 August 2013	31 May 2016

## **5. DIRECTORS' INTEREST IN THE GROUP'S ASSETS OR CONTRACTS OR ARRANGEMENTS SIGNIFICANT TO THE GROUP**

As of the Latest Practicable Date:

- (a) none of the Directors, directly or indirectly, had any interest in any assets which have since 31 December 2014 (being the date to which the latest published audited financial statements of the Group were made up) been acquired or disposed of by or leased to any member of the Group, or are proposed to be acquired or disposed of by or leased to any member of the Group; and
- (b) none of the Directors is materially interested in any contract or arrangement subsisting at the date of this circular which is significant to the business of the Group.

## **6. COMPETING INTERESTS**

As at the Latest Practicable Date, none of the Directors and their respective associates had any interest in any business which competes or likely to compete, either directly or indirectly, with our Group.

## **7. QUALIFICATIONS AND CONSENTS OF EXPERT**

The following are the qualifications of the expert who has given opinions or advice which are contained in this circular:

<b>Name</b>	<b>Qualification</b>
Norwest Corporation	Independent technical advisor and Competent Person

The expert has given and has not withdrawn its written consent to the issue of this circular with the inclusion of its report/letter and/or reference to its name or opinion in the form and context in which it appears.

The expert had no direct or indirect interest in any assets which had been, since 31 December 2014 (being the date which the latest published audited consolidated financial statements of the Group were made up), acquired, disposed of by, or leased to any member of the Group, or were proposed to be acquired, disposed of by, or leased to any member of the Group.

As at the Latest Practicable Date, the expert was not beneficially interested in the share capital of any member of the Group nor did it has any right (whether legally enforceable or not) to subscribe for or to nominate persons to subscribe for securities in any member of the Group.

## **8. MATERIAL CONTRACTS**

Save as disclosed below, no material contracts (not being contracts entered into in the ordinary course of business carried out by the Group) had been entered into by any member of the Group within the two years preceding the Latest Practicable Date:

- (a) Bridge Loan Agreement;
- (b) Sale and Purchase Agreement;
- (c) Interim Support Agreement; and
- (d) Amended and Restated Bridge Loan Agreement.

## **9. LITIGATION**

As at the Latest Practicable Date, neither the Company nor any of its subsidiaries was engaged in any litigation, arbitration or claim of material importance and no litigation, arbitration or claim of material importance is known to the Directors to be pending or threatened against the Group as at the Latest Practicable Date.

**10. DOCUMENTS AVAILABLE FOR INSPECTION**

Copies of the following documents will be available for inspection during business hours at the Company's principal place of the business in Hong Kong at Suites 2104–05, Hutchison House, 10 Harcourt Road, Hong Kong from the date of this circular for a period of 14 days:

- (a) the memorandum of association and articles of association of the Company;
- (b) the material contracts referred to in the paragraph headed “Material Contracts” in this appendix;
- (c) the published annual report of the Company for each of the financial years ended 31 December 2012, 2013 and 2014;
- (d) the Competent Person's Report prepared by the Competent Person as set out in Appendix II to this circular;
- (e) the letters of consent referred to in the paragraph headed “Qualifications and Consents of Experts” in this appendix;
- (f) the service contracts of Directors referred to in the paragraph headed “Directors' Service Contracts” in this appendix; and
- (g) this circular.

**11. MISCELLANEOUS**

- (a) The secretary of the Company is Ms. Cao Xinyi, a member of the Hong Kong Institute of Certified Public Accountants.
- (b) The registered office of the Company is stated at Akara Bldg., 24 De Castro Street, Wickhams Cay 1, Road Town, Tortola, BVI.
- (c) The head office and principal place of business of the Company in Hong Kong is situated at Suites 2104–05, Hutchison House, 10 Harcourt Road, Hong Kong.
- (d) The head office and principal place of business of the Company in PRC is situated at No. 10 Hongdazhonglu, Business Development Area, Beijing, 100176, PRC.
- (e) The principal share registrar of the Company is Maples Fund Services (Cayman) Limited at PO Box 1093, Boundary Hall, Cricket Square, Grand Cayman, KY1-1102, Cayman Islands.
- (f) The branch share registrar and transfer office of the Company in Hong Kong is Computershare Hong Kong Investor Services Limited, Shops 1712–1716, 17th Floor, Hopewell Centre, 183 Queen's Road East Wanchai, Hong Kong.
- (g) This circular is prepared in both English and Chinese. In the event of inconsistency, the English text shall prevail.

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## NOTICE OF EGM

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# WINSWAY®

## WINSWAY ENTERPRISES HOLDINGS LIMITED

### 永暉實業控股股份有限公司

(formerly known as “WINSWAY COKING COAL HOLDINGS LIMITED 永暉焦煤股份有限公司”)

(Incorporated in the British Virgin Islands with limited liability)

(Stock Code: 1733)

**NOTICE IS HEREBY GIVEN** that an extraordinary general meeting of Winsway Enterprises Holdings Limited (the “**Company**”) will be held at Room 2, 10/F, United Centre, 95 Queensway, Admiralty, Hong Kong on 17 July 2015 at 2:00 p.m. to consider as special business and, if thought fit, approve the following resolutions as ordinary resolutions of members of the Company, with or without amendments:

### ORDINARY RESOLUTIONS OF MEMBERS

#### 1. “**THAT:**

- (A) the sale and purchase agreement dated 14 November 2014 entered into between 0925165 B.C. Ltd (the “**Seller**”), a non wholly-owned subsidiary of the Company, Up Energy Resources Company Limited (the “**Purchaser**”) and Up Energy Development Group Limited (the “**Purchaser Guarantor**”) in relation to the disposal (the “**Disposal**”) by the Seller of 42.74% interest in Grande Cache Coal Corporation and Grande Cache Coal LP (“**Sale and Purchase Agreement**”) (a copy of which has been produced to this meeting marked “A” and initialed by the chairman of this meeting for the purpose of identification) and all the transactions contemplated thereunder and agreements entered into by the Company in connection therewith, including but not limited to, the Buy-back Right Agreement, Marketing Agency Agreement, Amended and Restated Partnership Agreement and Amended and Restated USA set out in the circular to shareholders of the Company dated 30 June 2015 (“**Circular**”), be and are hereby confirmed, approved and ratified (as the case may be); and
- (B) the directors of the Company be and are hereby authorised, for and on behalf of the Company, and any member of its subsidiaries, to approve, execute, deliver and exercise all documents, and to affix the seal of the Company or the relevant subsidiary thereon where required in accordance with the articles of association of the Company or the relevant subsidiary, and do all such acts, matters and things as they in their absolute discretion consider necessary, desirable or expedient to carry out and give effect to any or all transactions contemplated, and the exercise or enforcement of rights, under the Sale and Purchase Agreement or documents contemplated thereunder or in connection therewith, including but not limited to, the Buy-back Right Agreement, Marketing Agency Agreement, Amended and Restated Partnership Agreement and Amended and Restated USA set out in the Circular, and to make and agree such variations to the

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## NOTICE OF EGM

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Sale and Purchase Agreement or documents contemplated thereunder or in connection therewith, including but not limited to, the Buy-back Right Agreement, Marketing Agency Agreement, Amended and Restated Partnership Agreement and Amended and Restated USA set out in the Circular, as they in their absolute discretion may deem necessary, desirable or appropriate and in the interests of the Company.

By Order of the Board of  
**Winsway Enterprises Holdings Limited**  
**Cao Xinyi**  
*Company Secretary*

Hong Kong, 30 June 2015

*Principal place of business in Hong Kong:*  
Suites 2104–05, Hutchison House  
10 Harcourt Road  
Hong Kong

*Registered Office:*  
Akara Bldg.  
24 De Castro Street  
Wickhams Cay 1  
Road Town, Tortola  
British Virgin Islands

*Notes:*

1. Any member entitled to attend and vote at the above meeting may appoint one or more proxies to attend and, on a poll, vote instead of him. A proxy need not be a member of the Company.
2. A form of proxy is enclosed. In order to be valid, a form of proxy together with the power of attorney or other authority (if any) under which it is signed, or a notarially certified copy thereof, must be deposited at the Company's Hong Kong share registrar, Computershare Hong Kong Investor Limited at 17M Floor, Hopewell Centre, 183 Queen's Road East, Wanchai, Hong Kong not less than 48 hours before the time appointed for holding the meeting. Completion and return of a form of proxy will not preclude you from attending and voting in person if you are subsequently able to be present.
3. In the case of joint shareholders, the vote of the senior who tenders a vote, whether in person, or by proxy, shall be accepted to the exclusion of the votes of the other joint holders, and for this purpose seniority will be determined by the order in which the names stand in the Company's register of shareholders in respect of the joint holding.
4. The register of members of the Company will be closed from 16 July 2015 to 17 July 2015, both days inclusive, during which period no transfer of shares of the Company will be effected. In order to qualify for the attendance at the EGM, all transfers accompanied by the relevant share certificates must be lodged with the Company's Hong Kong share registrar, Computershare Hong Kong Investor Services Limited at 17M Floor, Hopewell Centre, 183 Queen's Road East, Wanchai, Hong Kong not later than 4:30 p.m. on 16 July 2015.
5. As at the date of this notice, the Executive Directors of the Company are Mr. Wang Xingchun, Ms. Zhu Hongchan, Ms. Ma Li, Mr. Andreas Werner and Mr. Wang Changqing, the Non-executive Directors of the Company are Mr. Liu Qingchun and Mr. Lu Chuan, and the Independent Non-executive Directors of the Company are Mr. James Downing, Mr. Ng Yuk Keung, Mr. Wang Wenfu and Mr. George Jay Hambro.