ENERGY, MINING, AND ENVIRONMENTAL CONSULTANTS

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#910

The following pages of this report remain confidential under the terms of the Coal Act Regulation, and have been removed from the public version.

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http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/10_251_2004#section2

GEOLOGY AND COAL RESOURCES OF THE MURRAY RIVER COAL PROPERTY, PEACE RIVER COALFIELD, BRITISH COLUMBIA

Submitted to:
CANADIAN DEHUA INTERNATIONAL MINES GROUP INC.

June 30, 2010

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EXECUTIVE SUMMARY

This report has been prepared by Norwest for Canadian Dehua International Mines Group Inc. (Dehua) as the owner of coal licenses in northeast British Columbia known as the Murray River Coal Property.

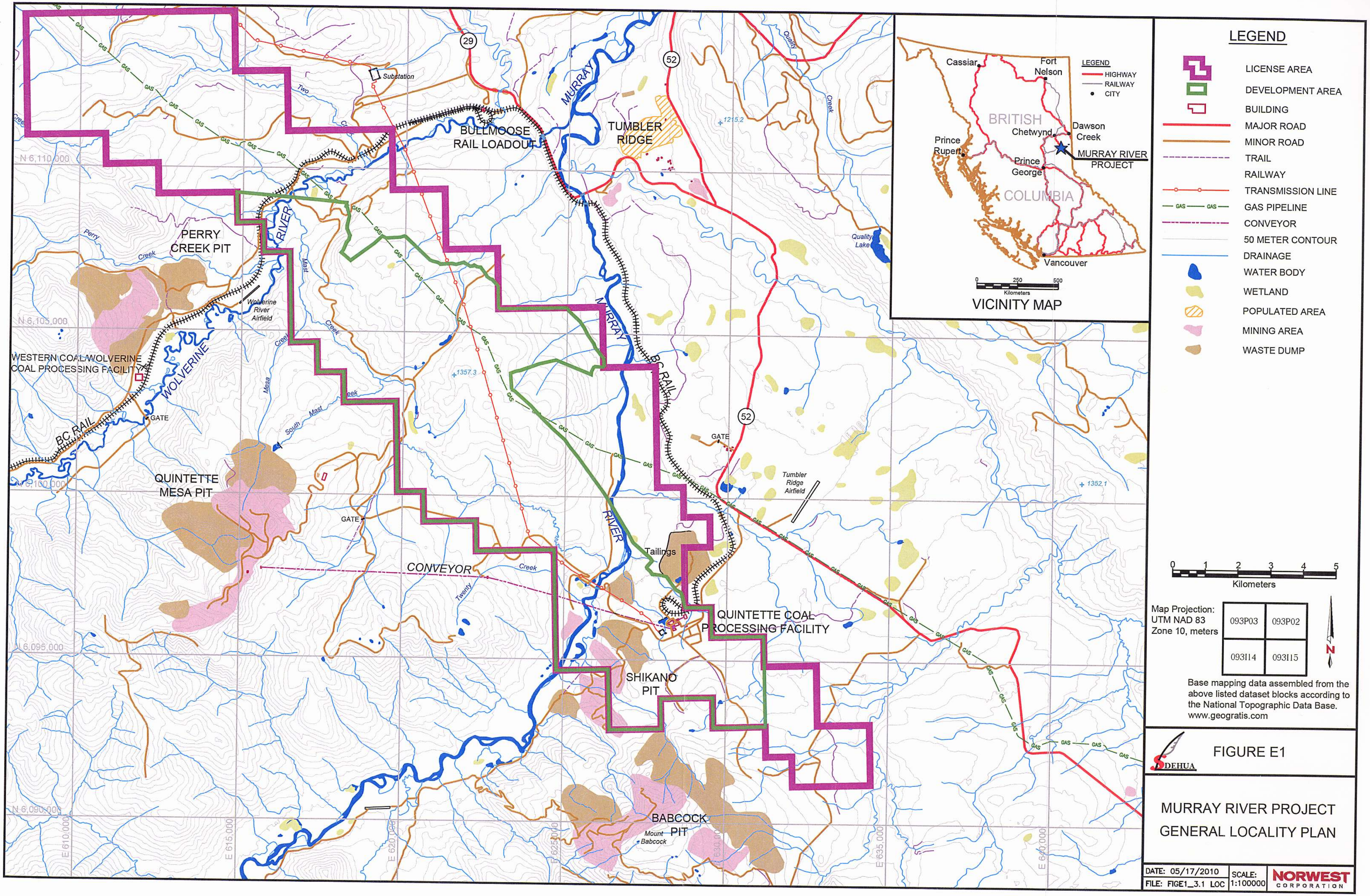
Norwest Corporation (Norwest) was recently engaged by Dehua for the purposes of producing this Geologic Report on the Murray River Coal Property. The purpose of this report is to summarize previous coal exploration work conducted within or nearby the Murray River property (Dehua license area), and to use this information to produce a geologic model from which to estimate coal resources and coal quality. The geologic model will form the basis for subsequent coal reserve estimation and pre-feasibility level mine planning. This report focuses on the coal geology and coal resources of the Murray River property. Aspects pertaining to the associated fields of geotechnical properties, coal mine methane potential, and hydrogeologic characterization are also addressed.

Three Norwest consultants conducted a site inspection of the Murray River property on April 26, 2010.

OVERVIEW OF PROPERTY

The Murray River property is a 15,998 ha coal exploration license area located south and west of Tumbler Ridge in northeastern British Columbia, Canada. Figure E.1 illustrates the location of the license area, having an approximate center location of 55°04'00" N and 121°05'00"W (UTM Z10, 6104600N and 622865E). The license area is located within the Peace River Coalfield in an area well known for producing metallurgical grade (hard coking) coal from predominantly surface mining operations.

The Murray River project area is situated within the eastern foothills (Inner Foothills Belt) of the Rocky Mountains. The topography is comprised of a belt of hills and low mountains dominated by a series of northeast to southwest elongated ridges. Two major water courses, namely the Murray River in the south and east, and Wolverime River in the north, flow through the project area and bisect the Inner Foothills Belt as indicated in Figure E.1.


LEGEND
LICENSE AREA
DEVELOPMENT AREA
BUILDING
MAJOR ROAD
MINOR ROAD
TRAIL
RAILWAY
TRANSMISSION LINE
GAS PIPELINE
CONVEYOR
50 METER CONTOUR
DRAINAGE
WATER BODY
WETLAND
POPULATED AREA
MINING AREA
WASTE DUMP
VICINITY MAP
LEGEND
HIGHWAY
RAILWAY
CITY
Cassiar
Fort Nelson
BRITISH
COLUMBIA
Chetwynd
Dawson Creek
Prince Rupert
Prince George
Vancouver
MURRAY RIVER PROJECT
0 250 500
Kilometers
Kilometers
Map Projection:
UTM NAD 83
Zone 10, meters
093P03 093P02
093I14 093I15
Base mapping data assembled from the above listed dataset blocks according to the National Topographic Data Base.
www.geogratis.com
FIGURE E1
DEHUA
MURRAY RIVER PROJECT
GENERAL LOCALITY PLAN
DATE: 05/17/2010
FILE: FIGE1_3.1 LOC
SCALE: 1:100000
NORWEST CORPORATION
BULLMOOSE RAIL LOADOUT
TUMBLER RIDGE
Substation
PERRY CREEK PIT
Wolverine River Airfield
WESTERN COAL WOLVERINE COAL PROCESSING FACILITY
BC RAIL
WOLVERINE
RIVER
MURRAY
MURRAY RIVER
QUINTETTE MESA PIT
CONVEYOR
Tailings
QUINTETTE COAL PROCESSING FACILITY
SHIKANO PIT
BABCOCK PIT
Mount Babcock
Tumbler Ridge Airfield
Quality Lake
GATE
GAS
N 6,110,000
N 6,105,000
N 6,100,000
N 6,095,000
N 6,090,000
E 610,000
E 615,000
E 620,000
E 625,000
E 630,000
E 635,000
E 640,000

The project area is located about 750km northeast of Vancouver, and lies within the Municipal District of Tumbler Ridge, which is part of the Peace River Regional District. Tumbler Ridge is a town of approximately 3,500 inhabitants. Nearby coal mines include the Quintette, Perry Creek and Bullmoose mines. Oil and natural gas exploration and development are active in the area, with producing gas wells and gas pipelines located throughout the project area. The location of the closed Quintette and operational Perry Creek pits and dumps, as well as Tumbler Ridge are illustrated in Figure E.1. Some of the Quintette-owned infrastructure remains within the license area and includes a 13km conveyor system from the Mesa Pit area to the currently mothballed Quintette coal processing facility.

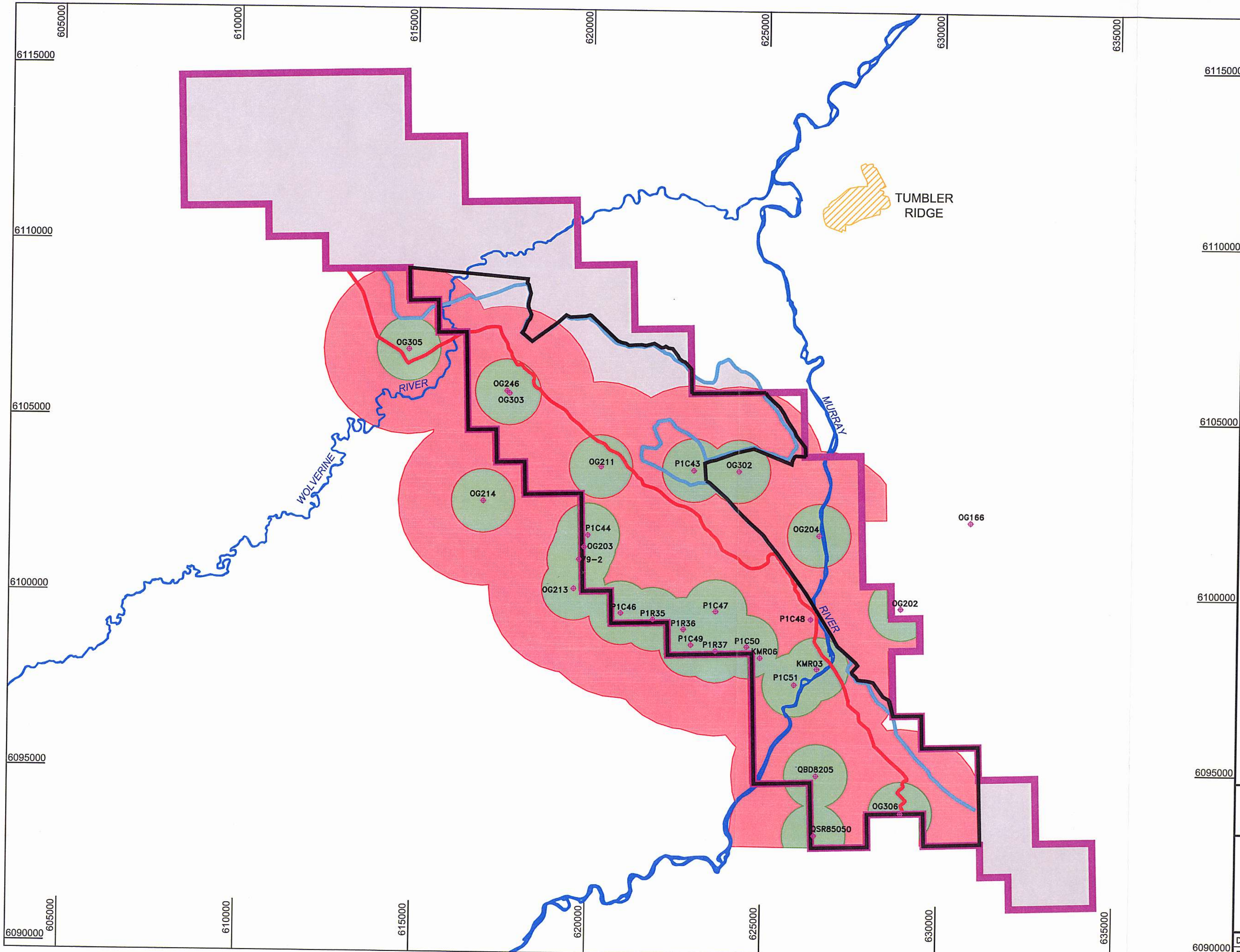
REGIONAL GEOLOGY AND STRATIGRAPHY

The Murray River property is located within the Peace River Coalfield (PRC) and forms part of the Rocky Mountain Foothills structural belt which lies to the east of the Canadian Rocky Mountain Trend. Exploration and mining in the PRC describes the coal seam geology as ranging from broad folds with bedding inclinations of less than 30 degrees to regions of extensive tectonic deformation characterized by tight folds and large fault off-sets. Coal seams of interest are contained within the Gates formation due to these coal measures being relatively shallow (<800m) in target areas and accessible for drilling and sampling. The majority of coal produced in the PRC is mined from this formation, mostly by surface extraction methods.

The Lower Cretaceous coals of the Gething and Gates formations are the two main coal-bearing units occurring throughout the Foothills region. These coal measures were subjected to varying depths of burial prior to Laramide deformation and mountain-building episodes. Five major Gates formation seams have been identified from the drillhole records in the license area. These are the J, G, F, D and E seams. Other minor seams that contribute to the coal resources in the license area are the K and F2 seams.

GEOLOGIC MODEL

The geologic data provided by Dehua and other public domain sources has enabled Norwest to compile a comprehensive geologic database and model of the license area. The model has been extended further west of the license area to provide geologic data that may be of assistance in evaluating neighboring mining properties. The completed geologic model is compromised of a



SDEHUA

FIGURE E2

MURRAY RIVER PROJECT
COAL RESOURCE
PLAN

DATE: 05/17/2010
FILE: MR_RESOURCE2
SCALE: 1:100000

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- Pump Testing
- Construct Groundwater Model
- Develop Mine Water Management.

RECOMMENDATIONS

Field Mapping Program
As part of the mining feasibility study it is recommended that a comprehensive field survey and mapping exercise be completed within the license area and surrounding properties. A high priority area would be the area surrounding the Quintette processing facility, Murray River and Shikano pit and/or the vicinity of the proposed portal site. This information can be fed into the geologic model and model updated. The time required to update the model would not negatively impact progress on the mining feasibility study. This information is viewed as critical in establishing potential portal or shaft sites, as well as improving the local accuracy of the geologic and geotechnical models.

Field Assistance with Hydrologic Testing
It is Norwest understanding the Dehua is planning an additional hydrologic test well in the vicinity of possible mine portal location near the Murray River. Norwest would like to be involved with the field supervision whilst completing this hole to ensure that the appropriate sampling and testing methods are followed. It is proposed that a Norwest hydrologist and geologist be present in the field during the completion of this hole. This will assist in the validation of the data as well as provide an opportunity for the geologist to conduct a basic field mapping survey of the region.

INTRODUCTION AND TERMS OF REFERENCE

This report has been prepared by Norwest for Canadian Dehua International Mines Group Inc. (Dehua) as the owner of coal licenses in northeast British Columbia known as the Murray River Coal Property.

Norwest Corporation (Norwest) was recently engaged by Dehua for the purposes of producing this Geologic Report on the Murray River Coal Property. The purpose of this report is to summarize previous coal exploration work conducted within or nearby the license area, and to use this information to produce a geologic model from which to estimate coal resources and coal quality. The geologic model will form the basis for subsequent coal reserve estimation and pre-feasibility level mine planning.

This report focuses on the coal geology and coal resources of the Murray River property. In particular, only those coal seams of the Gates formation are considered in this coal resource evaluations due to limited drillhole penetration[2] of the Gething formation coal measures, and excessive depth of cover of the seams for practical extraction using underground mining methods.

Aspects pertaining to the associated fields of geotechnical properties, coal mine methane potential, and hydrogeologic characterization are also addressed, at a level appropriate for a Geologic Report. Norwest did not participate in the field work or data collection in these areas, but has, at Dehua's request, reviewed appropriate data in each category and in the case of coal mine methane and hydrogeology reviewed reports prepared by other consulting firms. Norwest's comments and validation work are included in this report and the initial reports prepared by other firms attached as Appendices.

Additional work in associated areas such as hydrogeology, methane gas production potential, detailed geotechnical study and investigations into areas such as spontaneous combustion potential are commonly addressed in further development work. These studies should be incorporated as part of the project feasibility work following this report.

[2] Only one of the Dehua drillholes (P1C46) penetrated the Gething formation coal seams.

RELIANCE ON OTHER EXPERTS AND SOURCE DATA

The findings and conclusions in this report are based on Norwest's interpretation of previous exploration results and information procured from various public domain sources as well as data supplied by Dehua. Norwest's prior involvement with Dehua on the Murray River Project included compiling an Information Memorandum[3] in 2009 that included relevant geologic data as well as potential coal resources and recommendations for further exploration.

The data used for the information memorandum and this report is listed as follows:

- Assessment Report for Murray River Coal Property, Peace River District, Kennecott Canada Exploration, Inc., March 2007, provided by Dehua.
- Assessment Report for Murray River Coal Property Peace River District, Kennecott Canada Exploration, Inc., Granado and Hovis, December 2007, provided by Dehua.
- 1996 Babcock Geological Report, Quintette Operating Corporation, sourced from BC Ministry website.
- 1985 Shikano Geologic Report, Quintette Coal Limited, sourced from BC Ministry website.
- Various spreadsheets, images of geologic plans and sections, AutoCAD files, Geosoft and MapInfo files and other electronic data used by Kennecott Canada Exploration, Inc. in compiling their 2007 assessment reports, supplied by Dehua.
- Various satellite images, drainage, surface infrastructure, oil and gas well locations, and topography data were sourced from public domain websites and Dehua.
- Du Pont of Canada Exploration Limited, Report of 1979 Diamond Drilling Programme, Wolverine Project, provided by Dehua.
- Various public domain geologic reports describing neighboring mining and exploration ventures referenced and sourced by Cal Data Ltd, Kelowna, BC.

[3] Norwest Corporation, Murray River Coal Property Information Memorandum: Potential Coal Resources and Recommendations for Project Development, June 2009.

- Drillhole exploration results from Dehua's Murray River Phase 1 Drilling Program completed in 2009, supplied by Dehua.
- Four Dehua owned 2D seismic surveys interpreted by Milton P. Mansell, an independent geophysicist contracted to Dehua.
- Technical reports on Western Canadian Coal Corporations, EB, Perry Creek and Hermann coal projects located west of the license area. These reports were sourced from the public domain website Sedar.com.
- Oil and gas (O&G) drillhole data supplied by Dehua.

The accuracy of the information contained in this report has not been verified by independent sampling by Norwest. Verification of the data results is limited to a site visit of the property by the Norwest on April 26, 2010 and by means comparison of exploration results with previous technical reports within or neighboring the property.

The author has not relied on other experts in the preparation of this report. Legal entitlement to the claimed license area has not been confirmed. Other Norwest personnel assisted in the compilation and translation of the exploration reports and the information contained within.

PROPERTY DESCRIPTION AND PHYSIOGRAPHY

The Murray River property is a 15,998ha coal exploration license area located south and west of Tumbler Ridge in northeastern British Columbia, Canada. Figure 3.1 illustrates the location of the license area. The license area is located within the Peace River Coalfield in an area well known for produeing metallurgical grade (hard coking) coal from predominantly surface mining operations.

The Murray River project area is situated within the eastern foothills (Inner Foothills Belt) of the Rocky Mountains. The topography comprises a belt of hills and low mountains dominated by a series of northeast to southwest elongated ridges. Semi-perennial drainage in the form of small creeks run parallel to these ridges. Two major water courses, namely the Murray River in the south and east, and Wolverine River in the north, flow through the project area and bisect the Inner Foothills Belt as indicated in Figure 3.1.

In the general region of the Property, the topography comprises rolling hills in the east, forming gently sloping plateaus that flank moderate to steep-sided ridges in the central and western areas. The elevation above mean sea level (amsl) of the main rivers and surrounding lowlands is typically between 700m to 900m whilst the ridges are on the order of 1500m to 1800m amsl. Relief between bottomlands and mountain tops is on the order of 800m. The vegetation in the project area is predominantly spruces, pines and fir trees with lesser occurring deciduous species.

The project area is located about 750km northeast of Vancouver, and lies within the Municipal District of Tumbler Ridge, whieh is part of the Peace River Regional District. Tumbler Ridge can be reached by paved highway, either south from the town of Chetwynd (95km) using Highway 29, or southwest from Dawson Creek (105km) first via Highway 97, then Highway 52 (the Feller's Heights Highway). Tumbler Ridge is a town of approximately 3,500 inhabitants but has the infrastructure for a population of up to 6,000. It was originally chartered and constructed as a base to serve the upcoming mining industry in the early 1980's. The town is large enough to supply services needed for exploration and mine operation.

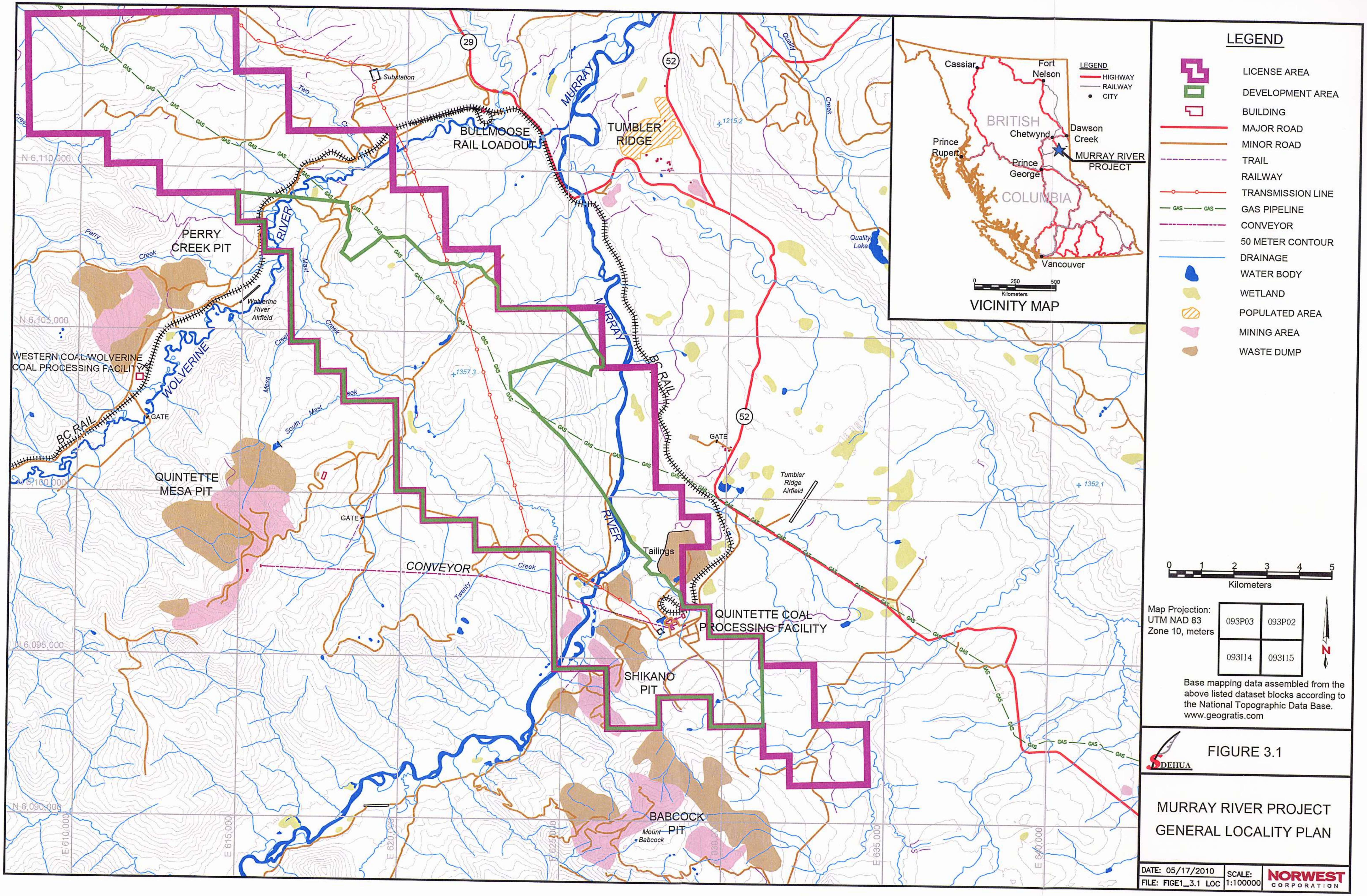


FIGURE 3.1

MURRAY RIVER PROJECT GENERAL LOCALITY PLAN

The central part of the project area can be accessed from Tumbler Ridge by traveling south approximately 15km to the Monkman Park Road, west 9km to the Quintette Mesa Pit Road, west 4km to the Quintette Coal Processing facilities. The Monkman Park and Quintette Mesa Pit roads are well-maintained as they service producing gas wells in the area. The Mast Creek Road traverses the western boundary of the property.

Commercial air service is available into Prince George, Fort St. John and Dawson Creek. Furthermore, an un-manned airfield with a 1,220m paved runway is located several kilometers south of Tumbler Ridge, and a grass landing strip of limited length is present along the valley bottom east of the Perry Creek licenses, providing general aviation access, should it be required.

The climate is typical of northeastern British Columbia and is characterized by short, warm summers and long, cold winters. At Tumbler Ridge, the average July and January temperatures are +21° C and –5° C, respectively. The winter temperatures are interspersed with periods of very cold temperatures, in the range of –15° C to –30° C. These cold spells usually occur between January and March. The town averages 334mm of rain and 1.85m of snow per year. Cooler summer and winter temperatures and higher precipitation can be expected in the mountainous areas that comprise most of the Project area. Frost can occur throughout the year, and the snow pack persists from October to June. The prevailing wind direction is from the southwest, and extended periods of high winds in excess of 20km/hour are common on ridge tops and exposed plateaus.

The Project area is located in a resource-rich area of the Province with a long history of coal mining from the nearby Quintette, Perry Creek and Bullmoose mines. Oil and natural gas exploration and development are active in the area, with producing gas wells and gas pipelines located throughout the project area. Forest harvesting, trapping, guide-outfitting and backcountry recreation are also active in and around the properties.

The property is controlled through 57 contiguous coal licenses issued by the BC Ministry of Energy, Mines and Petroleum Resources. Table 3.1 lists the Coal License number and corresponding Canadian National Topographic System map number.

Table 3.1 Murray River Coal Licenses Under Dehua Control

License #	NTS #	License #	NTS #	License #	NTS #
417404	093P014	417423	093P005	417442	093P005
417405	093P014	417424	093P005	417443	093P005
417406	093P014	417425	093P005	417444	093P005
417407	093P014	417426	093P005	417445	093P005
417408	093P014	417427	093P005	417446	093P005
417409	093P014	417428	093P005	417447	093I095
417410	093P014	417429	093P005	417448	093P005
417411	093P014	417430	093P005	417449	093I095
417412	093P014	417431	093P005	417452	093I095
417413	093P014	417432	093P005	417453	093I095
417414	093P014	417433	093P005	417454	093I095
417415	093P014	417434	093P005	417455	093I095
417416	093P005	417435	093P005	417456	093I095
417417	093P015	417436	093P005	417457	093I095
417418	093P005	417437	093P005	417458	093I096
417419	093P005	417438	093P005	417459	093I096
417420	093P015	417439	093P005	417460	093I096
417421	093P005	417440	093P005	417461	093I096
417422	093P005	417441	093P005	417462	093I096

The town of Tumbler Ridge supported local coal mining in the nearby Quintette, Perry Creek and Bullmoose mines. The Quintette mines closed in 2003; however a recent public announcement from mine owners Teck Resources Limited indicated a possibility for reopening of the Quintette mines[4].

A rail line (known as the Tumbler Ridge Branch Line), built by British Columbia Rail to service the Quintette and Bullmoose coal mines, extends along the north bank of the Wolverine River, past Western Canadian Coal Corporation (WCCC) load-out at Perry Creek, before swinging south to pass Tumbler Ridge. The line terminates at Quintette's coal load-out area in the center of the license area as indicated in Figure 3.1. This rail line joins the Canadian National Railway main line just north of Prince George and provides direct access to the ports of Vancouver and to Ridley Island, Prince Rupert. The Tumbler Ridge Branch Line, once electrified, now uses diesel locomotives.

[4] Information received on the Steelorbis.com website, an international steel news and trading website

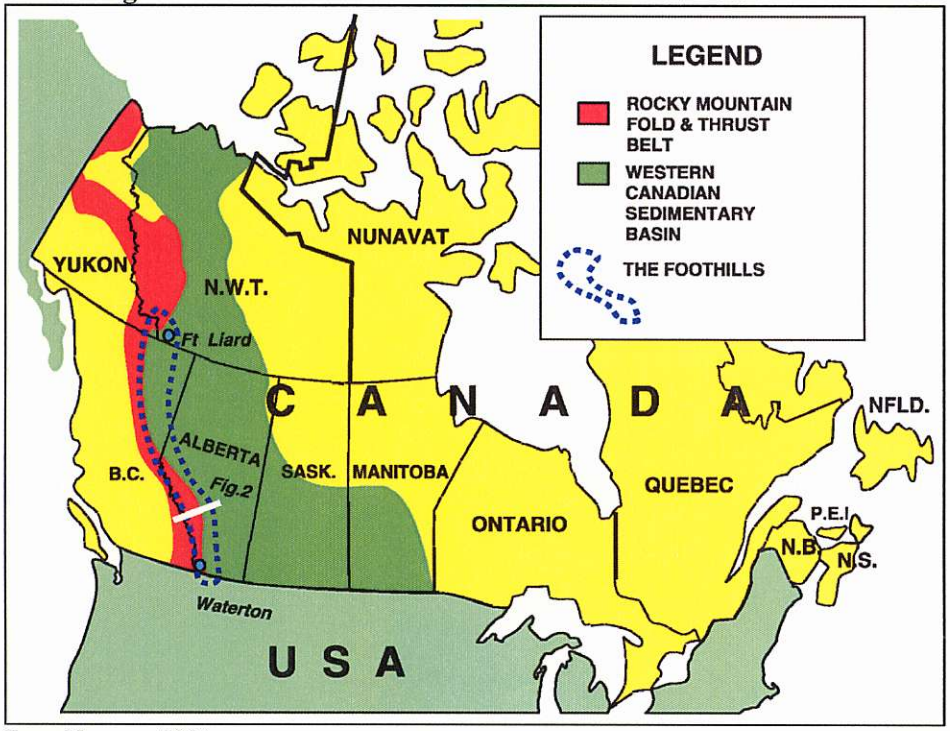
Some of the Quintette-owned infrastructure remains within the license area and includes a 13km conveyor system from the Mesa Pit area to the currently mothballed Quintette coal processing facility. The coal processing facility includes three raw and three product coal silos, a thermal dryer and unit train load out facility[5].

[5] Observations based on Norwest site visit in April 26, 2010.

GEOLOGIC SETTING

The license area is located within the Peace River Coalfield (PRC) and forms part of the Rocky Mountain foothills structural belt which lies to the east of the Canadian Rocky Mountain Trend. The Foothills belt is characterized by folded and faulted Mesozoic sediments that are in transition between the relatively gently-dipping, non-deformed formations of the Alberta Plateau to the east and the highly-deformed Rocky Mountain Trend to the west, as located in Figure 4.1. Typical deformation in the Rocky Mountain belt involves complex and severe faulting, with overturned and convoluted folding that makes mining operations extremely difficult in some places.

Figure 4.1 Western Canadian Structural Provinces



From Newson, 2004

The regional trend in the Foothills region, for both fold axes and thrust faulting, is northwest to southeast, with fault planes dipping to the southwest. The folding in the foothills is generally broad and gentle, with major fold set axes spaced on the order of 2km to 4km and dips less than 20 degrees. Smaller scale folds and undulations modify these larger structures. Faulting tends to be of the thrust variety and occurs with varying severity throughout the foothills.

The western margin of the Foothills belt is considered to be the easternmost major fault which thrusts Paleozoic strata over Mesozoic strata. The eastern margin is a series of en echelon thrust faults which separate the folded and faulted strata of the Foothills from the gently dipping strata of the Alberta Plateau to flat lying strata of the Alberta Plateau (Holland, 1976). Structural deformation is considerable near the western margin of the Foothills and diminishes in extent and complexity toward the eastern margin.

The two main coal-bearing units occurring throughout the Foothills region are the Gates formation and Gething formation. The Lower Cretaceous age coal seams from these two formations were subjected to varying depths of burial prior to Laramide[6] deformation and mountain-building episodes. The subsequent structural deformation during the mountain-building episodes resulted in increased pressures and heat flows that have imparted metallurgical properties to the coal seams as evidenced from the vitrinite reflectance, swelling characteristics and overall maturity of the coal seams.

STRATIGRAPHY

Coal seams of interest at the Murray River property are contained within the Lower Cretaceous Gates formation of the Fort Saint John Group, a significant unit of the Western Canadian Sedimentary Basin. The majority of coal produced in the PRC is mined from this formation, mostly by surface extraction methods. The Gething formation is targeted for mining primarily in the very northern portion of the Foothills mining trend.

The Gates formation represents the cyclical transgressions and regressions of the Late Cretaceous shoreline with the associated marine and non-marine environments of deposition. The lithotypes associated with the Gates formation include interbedded and intercalated sandstones, siltstones, mudstones, carbonaceous mudstones and coals.

[6] Most of the tectonic deformation in the area is result of the collision of the Pacific and North American plates between 70 and 40 million years ago and is generally referred to as Laramide orogeny.

A summary of the typical stratigraphy for the PRC can be found in Table 4.1. The primary units occurring within the Murray River property range between the Hasler and Gething formations. Units penetrated by drilling to date within the tenure typically begin in the Upper Fort St. John units and terminate in the Middle or Lower Gates. Dehua was successful in drilling one hole through into the Gething formation and intercepted a sequence of upper Gething coals at depth. The O&G wells, with targets in much lower Paleozoic units, penetrated the full Mesozoic sequence.

Coal seams from the Gething formation are between 250m and 450m below the Gates coal measures, and hence are for the most part beyond a practical mining depth within the property boundary based on drillhole records.

Table 4.1 Upper Jurassic-Upper Cretaceous Stratigraphy of NE British Columbia[1]

Upper Cretaceous		Dunvegan	Fine- to course-grained sandstone; conglomerate; carbonaceous shale; coal
Lower Cretaceous	Fort St. John	Cruiser	Dark grey marine shale with sideritic concretions; minor sandstone
		Goodrich	Fine-grained, cross-bedded sandstone; shale; mudstone
		Hasler	Silty dark grey marine shale with sideritic concretions; minor sandstone and pebble conglomerate; siltstone in lower part; basal pebble layer
		Boulder Creek	Fine-graned, well-sorted sandstone; carbonaceous sandstone; massive conglomerate; siltstone; marine and nonmarine mudstone; minor coal
		Hulcross	Dark grey marine shale and siltstone, with sideritic concretions
		Gates	Fine-grained, well-sorted marine and nonmarine sandstones; carbonaceous sandstone and mudstone; coal; shale; minor conglomerate
		Moosebar	Dark grey marine shale with sideritic concretions; siltstone; glauconitic sandstone; chert pebble conglomerate at base (Bluesky Member)
	Bullhead	Gething	Fine- to coarse-grained, brown, calcareous, carbonaceous sandstone; coal; carbonaceous shale and conglomerate; siltstone
		Cadomin	Massive conglomerate with chert and quartz pebbles; minor coarse-grained sandstone, carbonaceous shale, and coal
	Regional Erosional Unconformity		
Jurassic	Minnes		Quartzose sandstone; fine-grained sandstone; silty shale; mudstone; minor carbonaceous sediments

[1]Modified from Stott (1982) and Kelman & Hovis (2007)

The coal-bearing horizons are found both within the Gates formation and Gething formation. This report focuses on the Gates formation coal seams due to these coal measures being relatively shallow (<800m) in target areas and accessible for drilling and sampling.

Gates Formation Coal Seam Stratigraphy
Based on drillhole information in the neighboring Quintette property and KCEI[7]-Dehua drilling programs, the coal seams of the Gates formation comprise nine separate seams with designated letters A through K as illustrated in Figure 4.2. The seams may be split into two or more sub-seams (splits) which are typically designated with the nomenclature indicating individual upper and lower seams, such as the use of K1 and K2 seams in the Quintette property. Average seam thickness ranges from less than 0.5m thick for the ABC seams at the top of the formation to over 4m for the remaining seams. Where seams split into sub-seams the seam packages (including partings) may be in the order of 10m thick.

[7] Kennecott Coal Exploration Inc.

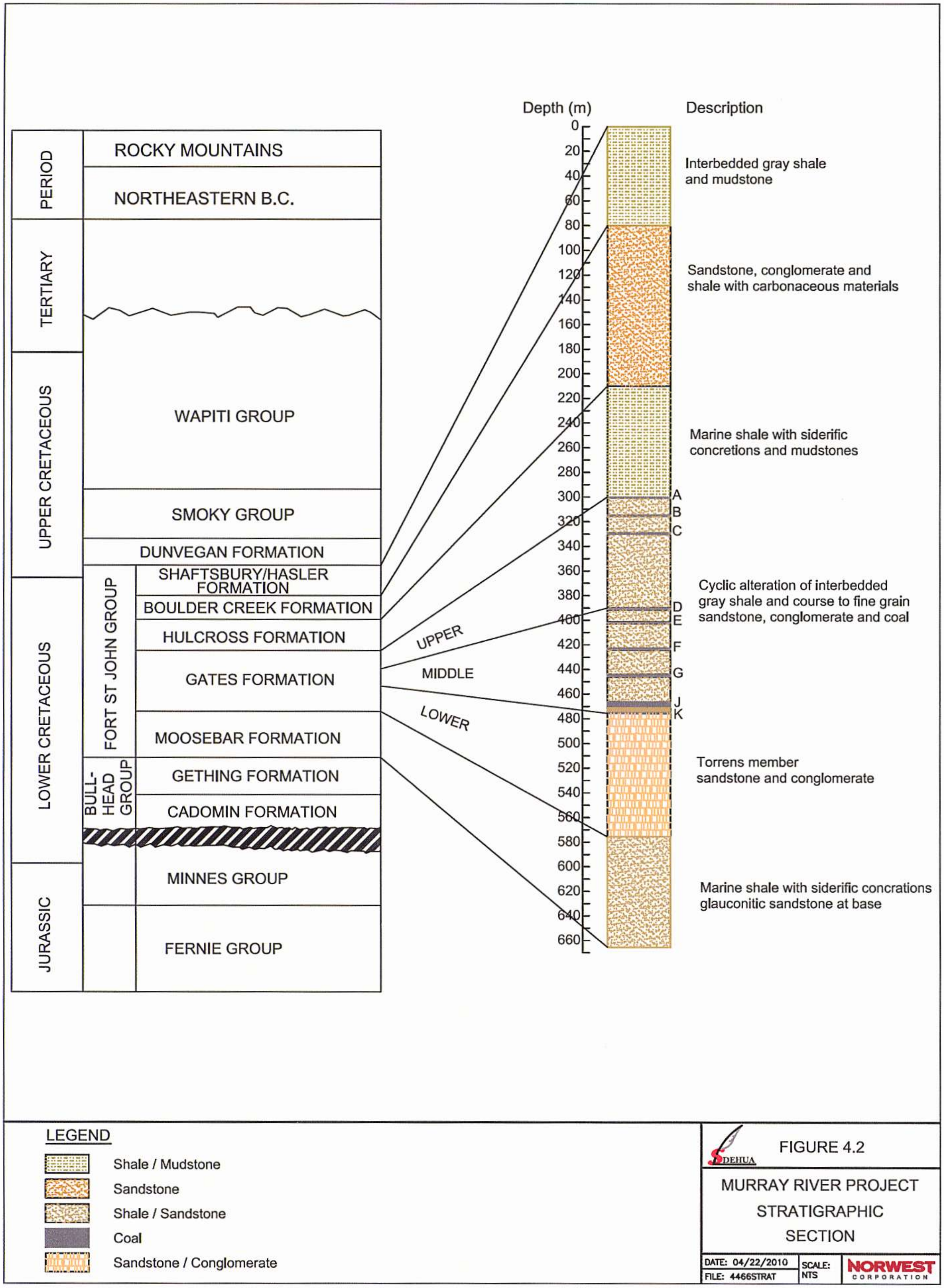
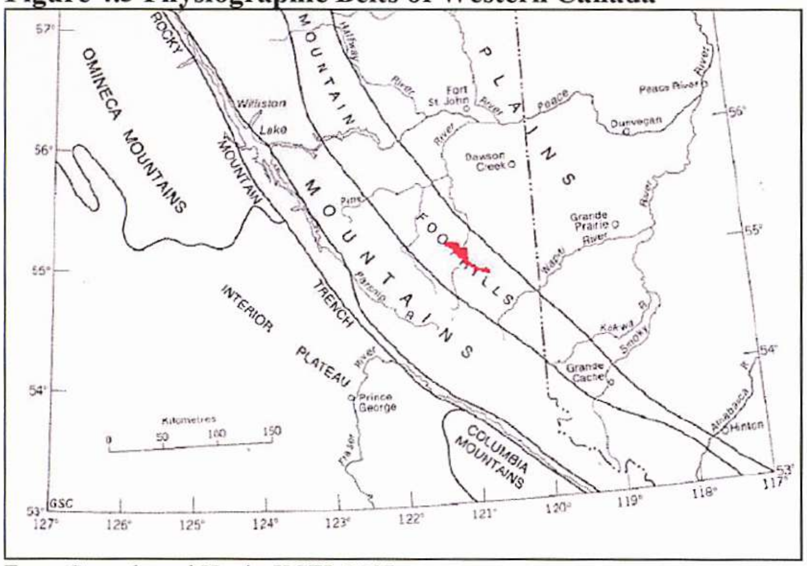


FIGURE 4.2
MURRAY RIVER PROJECT
STRATIGRAPHIC
SECTION

STRUCTURE

Exploration and mining in the PRC describes the coal seam geology as ranging from broad folds with bedding inclinations of less than 30 degrees to regions of extensive tectonic deformation characterized by tight folds and large fault off-sets. The Murray River property lies to along the eastern side of the Foothills belt and is therefore in the transition area from the more faulted and tightly folded areas to the west, as shown in Figure 4.3. It appears that the property is less severely affected structurally than the adjoining coal properties to the west.

Figure 4.3 Physiographic Belts of Western Canada



From Granado and Hovis, KCEI, 2007

A major northeast trending thrust structure referred to as the Mesa thrust has impacted coal mining in the region and occurs from 3km to 7km southwest of the property boundary. The Mesa thrust and associated en echelon faulting has resulted in the uplifting of Gates formation coal seams to the extent that surface extraction of the metallurgical grade coal has been possible from the Quintette's Mesa and Babcock pits.

The Gates formation coal seams within the license area are located within the eastern downthrown portions of the Mesa thrust. The downthrown Gates formation sediments along the border of the Mesa thrust and immediately west of the license area are highly deformed. However, it appears based on the comparison of structural mapping on nearby properties and observation of 2D seismic interpretations that the level of structural complexity decreases from the southwest to the northeast across the property.

Regional dip of the coal seams is towards the northeast with dip varying from more than 30 degrees along fold limbs west of the license area to less than 30 degrees within most of the license area. In terms of coal resource classification the coal resources in the area would be described as being moderate to complex as defined by Geological Survey of Canada Paper 88-21(1989).

EXPLORATION HISTORY

The Murray River Coal Exploration License (License Area) was acquired by Dehua from Kennecott Coal Exploration Inc. (KCEI) in the summer of 2009. The license area, drillhole locations, seismic lines, mining pit locations and surface mapping relevant to the interpretation of the coal geology is illustrated in Figure 5.1.

Previous exploration in the area has been conducted by various O&G companies in the 1970's. Coal specific exploration was completed by Du Pont in the 1970's, and Quintette (a division of Denison Mines) in the 1980's and 1990's. The most recent exploration programs include Kennecott Canada Exploration, Inc. (KCEI) between 2006 and 2007 and Dehua in 2009. The exploration programs conducted in the 1970's were generally regional in nature, comprised of widely spaced seismic lines and the drilling of a small number of primarily O&G wells. These programs assisted Quintette and KCEI in identifying target areas for more detailed coal exploration and eventual mining. The Quintette exploration programs were restricted to the vicinity of the currently closed Quintette mining pits as illustrated in Figure 5.1.

The following is a description of the coal explorations history and data acquired that is relevant to coal resource evaluation within the license area.

DRILLING PROGRAMS

Table 5.1 outlines the various coal as well as O&G drilling programs within or nearby the Murray River License Area. The coring programs used a combination of HQ[8] and NQ[9] size core through solid (unweathered) rock intervals, collectively referred to as slim coring. Each drilling programs is discussed briefly under separate headings below.

[8] 96.0mm hole diameter
[9] 75.7mm hole diameter

Table 5.1 Murray River Drilling Summary

Company	Number	Method	Year	Orientation[1]	Coal Samples
Various - Oil and Gas	25	Rotary	1973 to 2008	Vertical	No
Quintette	100	Core and rotary	1985 to 1995	Vertical	Yes
Du Pont	2	Core	1979	Vertical	Yes
KCEI	3	Core and rotary	2006 to 2007	Vertical	Yes
Dehua	12	Core	2009	Vertical	Yes

[1] Orientation through Gates formation coal seams

Oil and Gas Drilling

A total of 28 O&G wells have been identified by Norwest as having data of relevance to coal exploration in the area. The majority of these drillholes were completed between 2001 and 2008, with a few early wells completed in 1973. Total vertical depth of these drillholes varied from 1978.9m to 4348.4m from surface. The data acquired for these holes included: hole locations, deviations surveys, hardcopies of geophysical log profiles, approximate intervals of major formations and basic lithologic descriptions.

Although the gas-bearing target formations of these drillholes did not include the Gates formation coal seams, there was sufficient data in the form of density log and lithologic descriptions to be of use in coal resource evaluation. The locations of these drillholes are illustrated in Figure 5.1.

Du Pont Drilling

Du Pont completed two holes in 1979 along the western margin of the property as a preliminary investigation of the Gates formation coal. This program was only partially successful due to technical difficulties encountered in drilling and sampling the complete suite of Gates formation coal seams. Only one core hole penetrated the Gates coal measures, but had to be abandoned while coring in the J Seam.

Quintette Drilling

Drillhole data from in the vicinity of the Shikano and Babcock pits has been obtained by Norwest. A total of 100 drillholes were geo-referenced by Norwest from data observed in the Shikano (1985) and Babcock (1996) geologic reports. The location of these drillholes is illustrated in Figure 5.1. The drillholes were completed between 1982 and 1995 and represent only a portion[10] of the total number of holes described but not presented in the Shikano (1985) and Babcock (1996) reports. The drillholes data that could be digitized by Norwest comprised hole location and Gates formation seam intervals.

KCEI Drilling

The KCEI program consisted of one rotary and three core holes (two others were abandoned). Difficulties encountered during drilling left the program with only one core hole that penetrated the full section of Gates formation coal at a depth of approximately 500m and one core hole that penetrated only the uppermost of the mineable coal sequence (D Seam).

Dehua Phase 1 Drilling Program

The Dehua exploration program was comprised of 12 drillholes completed nearby the KCEI program holesin 2009 and early 2010. The drillholes were collared along the margins of forest service roads in a region identified by Norwest and Dehua as most prospective for development of an underground coal mining operation. This 12-hole program, referred to as the Phase 1 drilling program, included vertically orientated cored holes whose target seams were the Gates formation coal seams at depths of between 200m and 1300m from surface. One hole (P1C46) penetrated below the Gates formation, through the Moosebar Shale and into the upper Gething coal sequence.

2D SEISMIC PROGRAMS

Information on the interpreted structure of coal-bearing Gates formation has been observed by Norwest from eight 2D seismic lines in the region. Four of the eight 2D seismic lines were acquired by Dehua in 2009, of which two of the Seismic lines were interpreted by KCEI and two interpreted by independent geophysicist Milton P. Mansell. The remaining four 2D seismic line interpretations were digitized by Norwest from illustrations in the 1979 Du Pont report. The location of the seismic lines is indicated in Figure 5.1.

[10] The location and details of all historic drilling in the Shikano and Babcock pits is unclear from the geologic reports

SURFACE MAPPING

Gates formation surface crop locations, thrusts, faults, and folds have been recorded on plans illustrated in the Quintette (1985) and Hermann Project (2007) technical reports. This information is located west of the license area with some overlap in the Shikano pit area as indicated in Figure 5.1. It is assumed by Norwest that this information is derived from surface mapping and interpretation of subsurface geology from drillhole data by WCCC, Quintette, or derived from earlier studies.

The accuracy of the geologic mapping and interpretation of the subsurface structure could not be confirmed by Norwest, although the location of the seam crops and some folding and faulting did match trends observed by Norwest in the seismic interpretations and drillhole database. This information has been used by Norwest for structural modeling.

MINING PITS

The Shikano and Babcock mining pit locations illustrated in the Figure 5.1 were sourced from the 1995 Babcock Geological Report (1996). The surface mining operations from these pits ended in 2000. The location of theses pits follow regional structural trends observed in the surface mapping, drillhole and seismic interpretations. These locations have been used by Norwest in interpretation of regional scale structures along the western border of the license area.

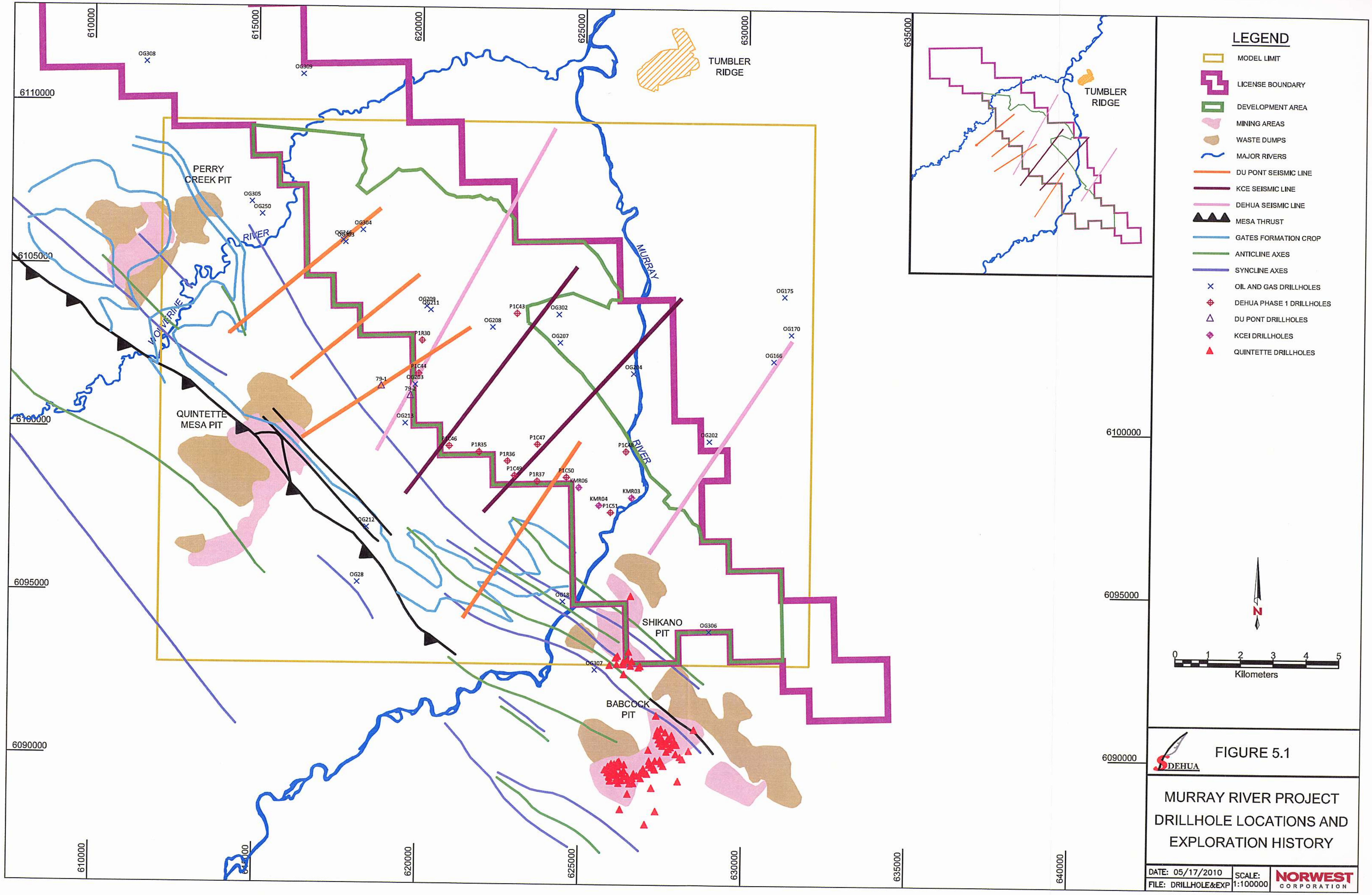


FIGURE 5.1

MURRAY RIVER PROJECT DRILLHOLE LOCATIONS AND EXPLORATION HISTORY

GEOLOGIC MODEL AND RESOURCES

This section describes the coal modeling process as well as data inputs, validation and model results. The model inputs and results are described with the aid of summary tables, geologic plans and cross-sections through the model. For practical purposes plans illustrating the model results have been placed in the attached Appendix A. This section concludes with a detailed compilation of coal resources and associated average coal qualities reported from the model.

APPROACH AND METHODOLOGY

Model Location

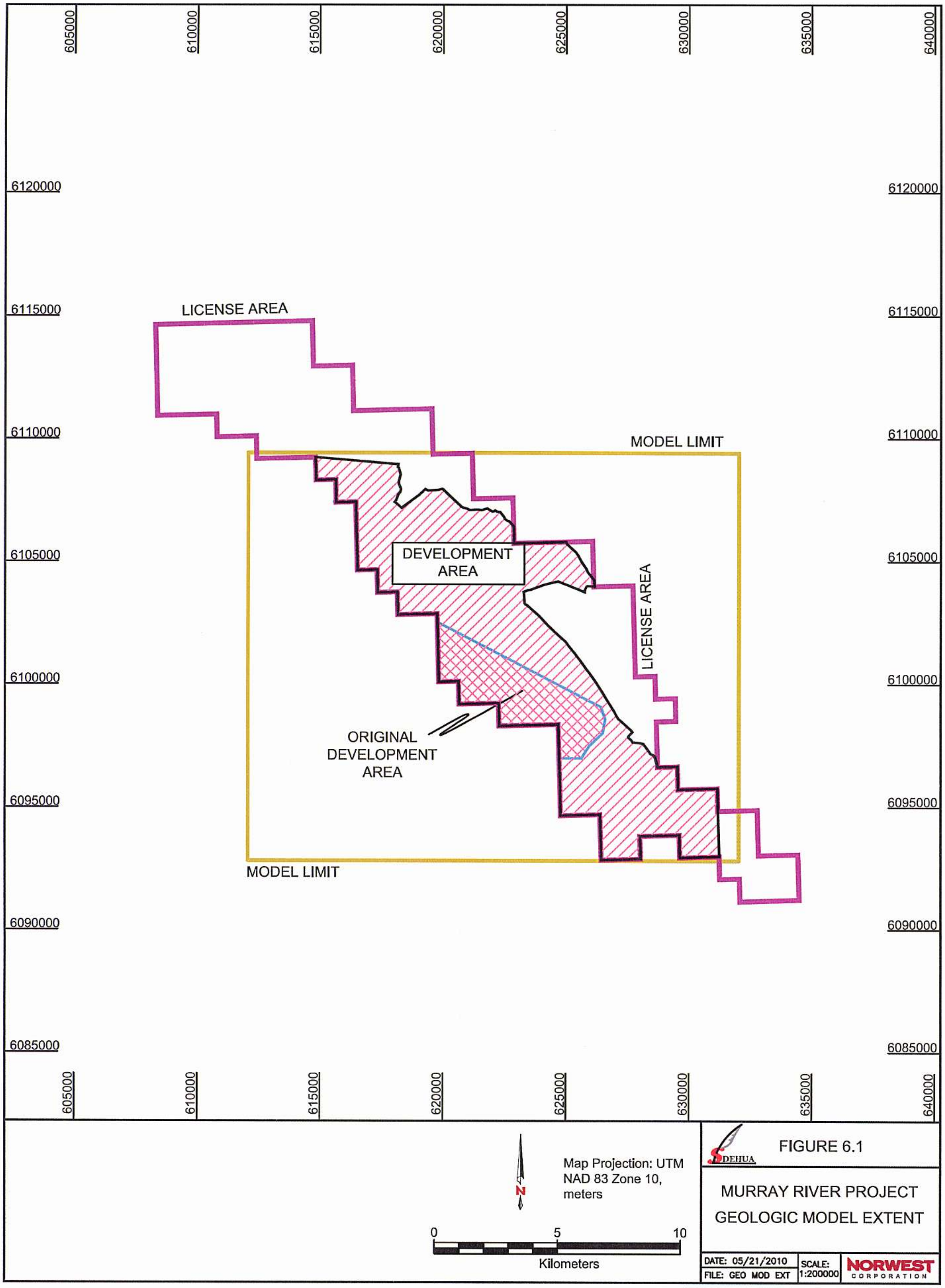
The geologic model is centered on the original development area and recently extended development area as indicated in Figure 6.1. Even though it is possible to produce a single geologic model of the entire license area, there is insufficient geologic data north and south of the model area to be included in a single model covering the entire license area. The model has however, been extended west of the development area up to and including projected Gates formation seam crop locations between the Wolverine River in the north and Murray River in the south. This area has been identified by Norwest as a potential site for accessing Gates formation coal seams from off-license by means of a decline as an alternative to constructing a vertical shaft within the license area.

Model Method

The geologic model comprises the integrated interpretation of drillhole log and sample data together with topographic data, surface mapping and 2D Seismic interpretations of structure. The process used in compiling, modeling and reporting this data involved the following five stages:

1. Data review and preparation
2. Data validation
3. Structural modeling
4. Quality modeling.

Each stage is discussed separately below.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MODEL LIMIT
Map Projection: UTM NAD 83 Zone 10, meters
N
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DEHUA
FIGURE 6.1
MURRAY RIVER PROJECT
GEOLOGIC MODEL EXTENT
DATE: 05/21/2010
FILE: GEO MOD EXT
SCALE: 1:200000
NORWEST CORPORATION

DATA REVIEW AND PREPARATION

The drillhole data from four separate coal exploration campaigns as well as O&G wells was compiled into a single Excel database that included:

- Collar locations
- Hole deviation surveys
- Lithologic descriptions
- Formation designations
- Seam and stratigraphic designations
- Raw coal quality
- Air dried density
- Washed coal quality (1.4RD).

Most of the drillhole data was digitized from hardcopy sources and in some instances seam intervals were interpreted from hardcopy reproductions of density log profiles[11] and/or collar locations determined from georeferenced plans[12] illustrating hole locations.

The O&G well data and Quintette data did not include coal analyses. The DuPont, KCEI and Dehua drillhole data was mostly complete and included coal analyses of most coal seams. Coal laboratories used for the DuPont, and KCEI drillholes was Birtley Laboratories based in Canada, whilst Dehua sample results were received from the Hebei Coalfield Research Institute[13] (Hebei Laboratories) based in China. For quality modeling purposes, Norwest has standardized the sample data into air dried raw proximate analyses and air dried washed proximate analyses at 1.4RD float.

A summary of the drillhole data incorporated into the master Excel database used in the model is outlined in Table 6.1.

Table 6.1 Drillhole Data Used in Geologic Model

Company	Number	Deviation Surveys	Seam Intervals	Lithologic Descriptions	Raw Quality	Washed Quality
Various - Oil and Gas	25	yes	yes	no	no	no
Quintette	100 (2)	no	yes	no	no	no
Du Pont	2	no	yes	yes	yes	no
KCEI	3	yes	yes	yes	yes	yes[2]
Dehua	12	no[1]	yes	yes	yes	yes

[1]limited deviation surveys observed in hole P1C46 and P1C47
[2]no yield data observed, wash data not included in model

[11] Most seam interval data from the O&G wells was obtained using this method
[12] Quintette drillhole collar locations were determined using this method
[13] Some raw coal analyses was received from Birtley labs from coal gas samples

Geophysical log data was observed for most drillholes, but was of varying quality and use. The O&G, Du Pont and Quintette drillholes had gamma-density profiles in hardcopy format only and was mostly used for recognizing major seam and parting intervals. Some of the hardcopy reproductions were not very clear and only approximate seam intervals could be interpreted from this data.

The KCEI and Dehua drillhole data was supplied with electronic LAS files, from which Norwest produced profiles of gamma, density, resistivity and caliper readings using Strater® software. This data was used for validating field log and sample intervals, identifying depth of weathering and as an aid for the correlation of coal seams between drillholes.

Surface topography contours at 50m intervals were provided to Norwest in dxf format. Surface mapping of seam crop locations, faults, thrusts, fold and fault locations was digitized into AutoCADD from plans in the Hermann (2007) and Quintette geologic reports. Surface infrastructural features, drainage, closed mining pits and mining dump locations were either digitized from plans in the Quintette geologic reports or sourced from the website[14] http://www.geogratis.ca/geogratis/en/index.html. Software used for compiling this surface data included ArcView® and AutoCADD®.

Cross-sections of the 2D Seismic line interpretations were geo-referenced in 3D space using MineSight3D® software. Select features best illustrating the structural deformation of the Gates formation coal seams were digitized from the seismic profiles for subsequent integration into the geologic model.

All geospatial[15] data used in the geologic model has been converted into the UTM Zone 10 NAD 83 coordinate system.

Data Validation

Validation of the drillhole database prior to modeling included the following routine checks:

- Collar elevations compared with topographic contour elevations.
- Independent validation of hole locations from site inspections using a hand-held GPS.

[14] The same data source is being used by RESCAN in their environmental studies at Murray River

[15] Includes drillhole locations, surface mapping, topography contours and infrastructure

- Review of drillhole deviation surveys for verticality.
- Overlapping from-to intervals in lithologic logs and sample intervals.
- Seam, parting and sample from-to intervals compared with density log profiles.
- Raw ash analyses compared with density log profiles.
- Raw ash analyses compared with calorific value (MJ/kg).
- Raw ash analyses compared with air dried density (g/cm^3).
- Correlations of seams and interburden extents between neighboring drillholes.
- Comparison of drillhole records with regional structural interpretation and 2D Seismic interpretations.

Norwest conducted a site inspection of the project area on April 26, 2010 and most of the Dehua drillhole locations were validated in the field using a hand-held GPS unit. Access to the O&G and Quintette holes was not possible due to security restrictions imposed by owner companies.

The most comprehensive drillhole data was received from the KCEI and Dehua drilling programs. Overall the data received from these programs appears to be of an aceeptable standard for coal seam and coal quality modeling. Deviation surveys from the O&G wells and KCEI drillholes did not reveal any significant deviation from the vertical at depths where the Gate formation seams were penetrated. No adjustments were deemed necessary to account for hole drift.

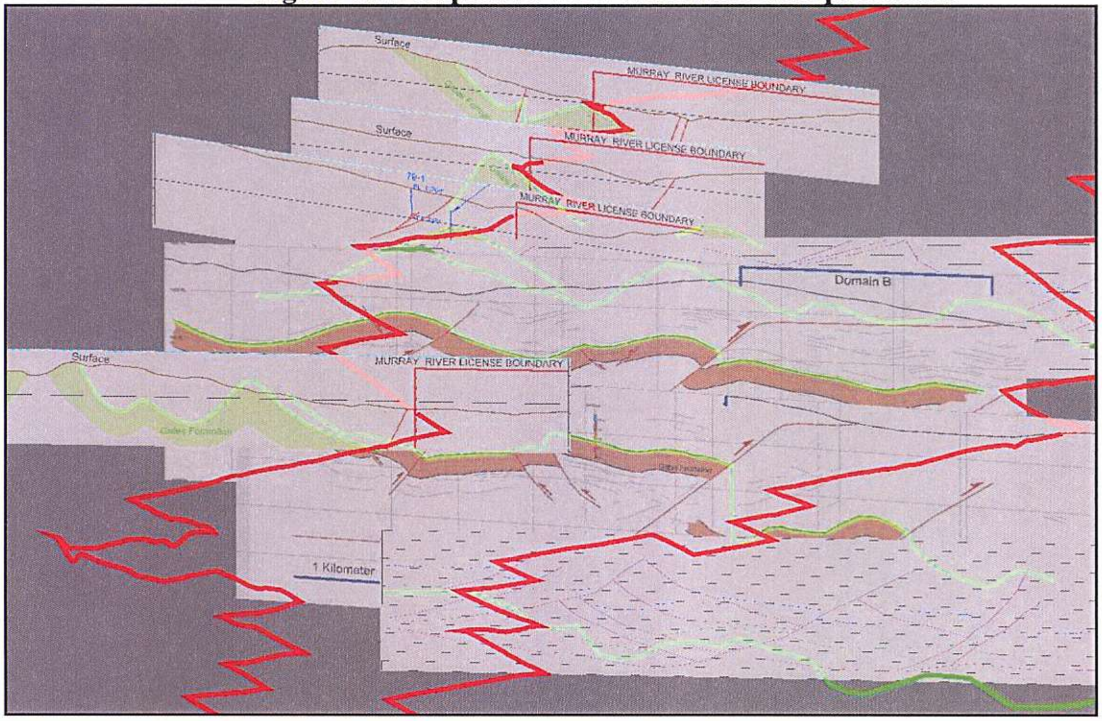
Minor adjustments were made for seam, parting and sample from-to intervals due to depth discrepancies between the field log records and density log profiles produced from the LAS files using Strater® software. These adjustments are standard practice coal drilling programs and are not viewed as significant.

The Du Pont, KCE and Dehua calorific value (MJ/kg) and density measurements (g/cm^3) all showed a good correlation with ash content and no significant outliers were observed. Scatter plots of ash content versus calorific value (MJ/kg) can be observed in Figure 6.2 and ash content versus density (g/cm^3) can be observed in Figure 6.3.

surface[17]. The base of weathering surface was projected to 50m below the topographic surface based on averaged depths of weathering observed in the drillhole record.

The following figures include perspective views of the geologic model that best illustrate the structural modeling process using MineSight3D® software. Figure 6.4 illustrates the location of the 2D Seismic line interpretations orientated in 3D space. Figure 6.5 illustrates a perspective view of the topographic surface and location of the Quintette mining pits and Gates seam crop. Figure 6.6 illustrates the J seam floor surface together with drillhole traces and Figure 6.7 illustrates the extension of the J Seam floor above the base of weathering surface.

Figure 6.4 Perspective View of Seismic Interpretations



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[17] Contact between weathered rock (usually till) and hard unweathered rock.

Figure 6.5 Perspective View of Surface Topography

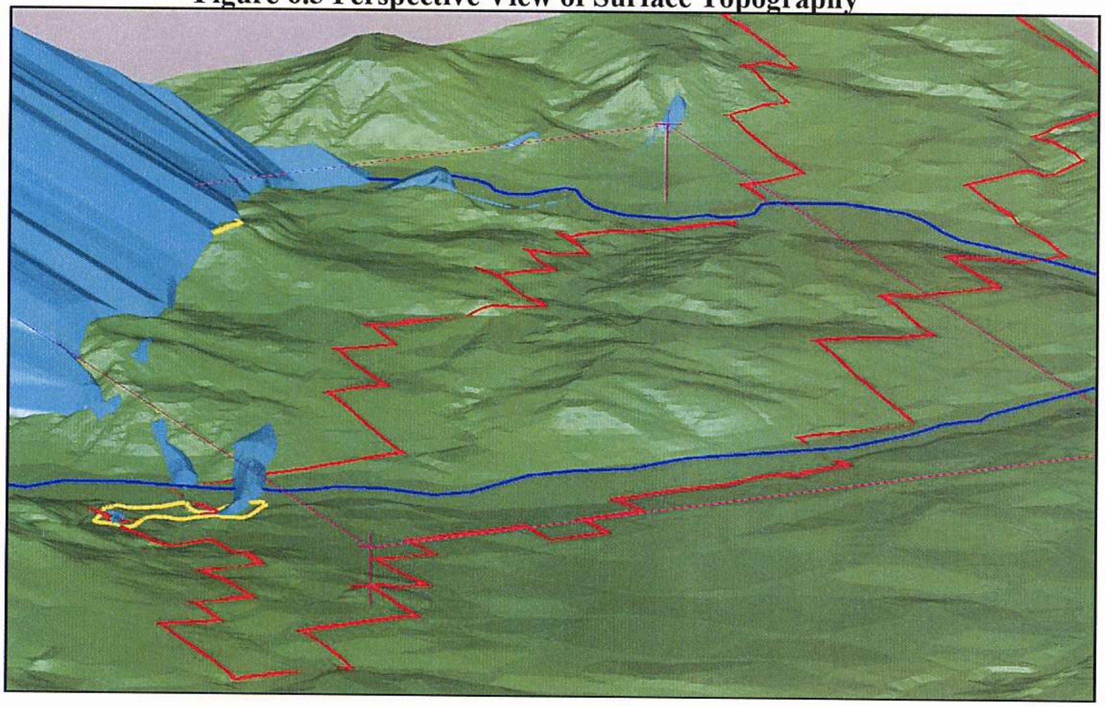


Figure 6.6 Perspective View of J Seam Floor

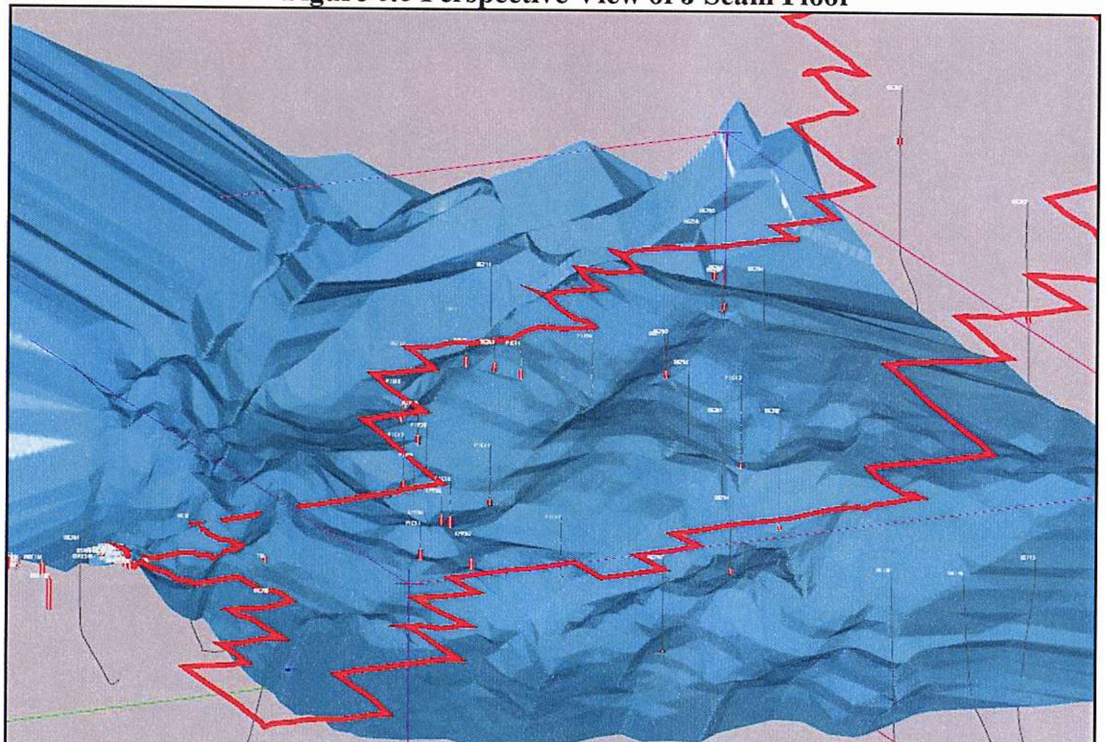
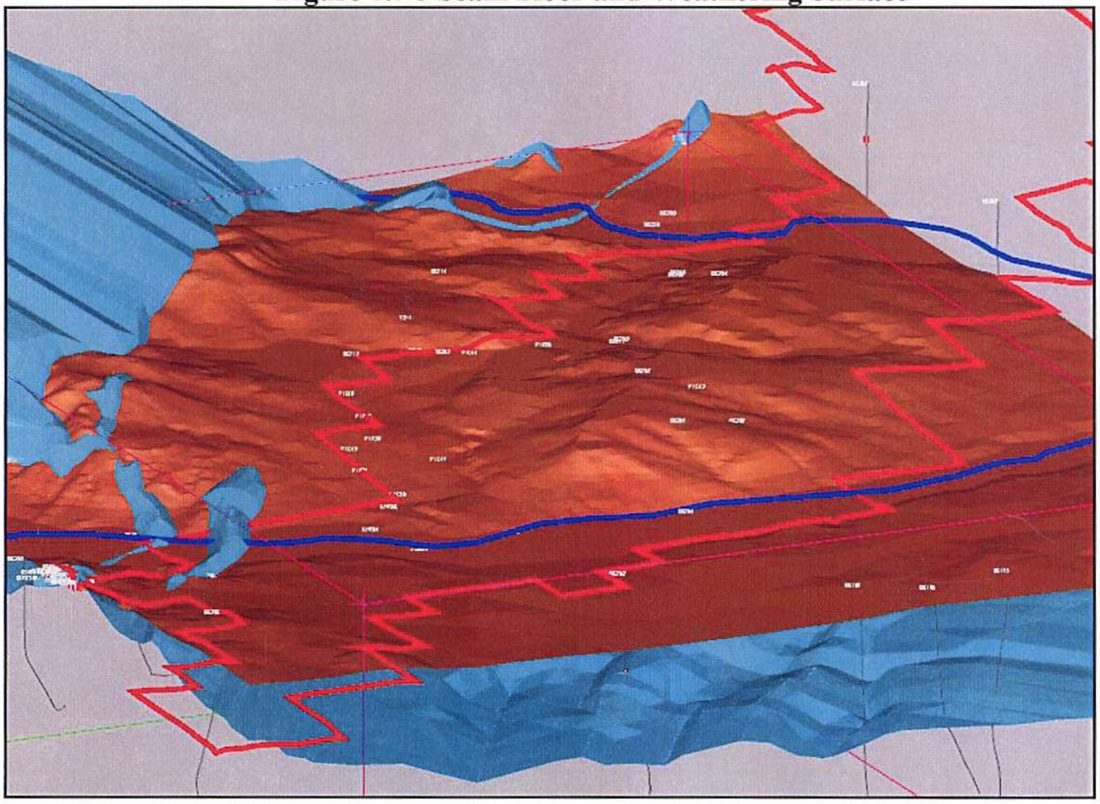


Figure 6.7 J Seam Floor and Weathering Surface



Fault displacements were modeled using steeply inclined wireframe surfaces. The 2D seismic interpretations were used as guidelines for the interpretation of seam structure, however all potential faults were interpreted by Norwest as vertically displaced faults due to the inherent uncertainties associated with 3D seismic interpretations. Many of the smaller fault displacements interpreted in the 2D seismic profiles have been modeled as steeply dipping folds to represent areas of either potential fault displacements or tight folding of the beds.

The J seam floor surface formed the basal surface from which all overlaying and underlying seams were referenced using seam and interburden measurements obtained from the drillhole records. Seam thickness and interburden thickness were estimated into 2D grids nodes using Carlson® software. At each grid node the estimated seam, parting and interburden thicknesses are stacked above and below the J Seam floor reference grid[18] using Carlson®

[18] Sourced from Minesight 3D wireframe surface

software macros. The resultant structural model comprises a series gridded data points containing estimates of seam and parting contact elevation estimates as well as associated seam, partings and interburden thickness data. Grids of representing surface topography and base of weathering elevation complete the structural model.

All grid data was standardized to a 40m by 40m grid node spacing and all grid estimates were completed using a combination of triangulation and inverse distance algorithms.

QUALITY MODELING

Coal quality modeling was completed using Carlson® software and all coal quality data was sourced from standard size drillcore samples, also referred to as slim core samples. Coal quality data was estimated into grids using the same grid node spacing employed for the structural model and an inverse distance estimation algorithm was used throughout the quality modeling process. The coal quality data was estimated from full seam composites including rock partings less than 0.5m thick.

Table 6.2 lists the modeled coal quality parameters based on quantity of available data, validity of the data and data deemed most suitable the spatial representation of the thermal and metallurgical properties of the coal.

Table 6.2 Modeled Coal Quality Parameters

Parameter (air dried)	Raw Coal	Washed Coal (1.40 RD)
Moisture (%)	yes	yes
Ash (%)	yes	yes
Volatile (%)	yes	yes
Total Sulfur (%)	yes	yes
Calorific Value (MJ/kg)	yes	no
Caking Index	no	yes
CSN	no	yes
Y (mm)	no	yes
X (mm)	no	yes
Theoretical Yields (%)	no	yes

MODEL INTERPRETATION

The J Seam has been identified by Norwest as the primary seam of interest due to the seam's thickness, continuity and overall favorable metallurgical properties. For these reasons figures describing coal seam structure and coal quality place a greater emphases on the J Seam. The remaining seams that have good potential for mineability are illustrated in the attached plans and include the G, F, E and D seams. All figures relating to the model interpretation can be found in Appendix A.

Stratigraphic Model Interpretation

Correlation of the coals oceurring within the Gates formation is shown as the leading figure in Appendix A. This cross-section uses the base of the J Seam as a stratigraphic datum from which the other seams and stratigraphic units stack depending on their individual interburden thicknesses. The use of stratigraphic datum for correlation exercises is a commonly used technique as it removes the structural variability component from the equation of coal seam geometry.

There is generally good correlation of the seams throughout the property with only a few difficult interpretations. Several unique log signatures and seam geometry patterns were key to identifying correct correlation. The occurrence of the top coals of the Gates formation (A, B, and C Seams) below the uniform mudstones of the Hulcross formation was typically obvious. The geometry of the F Seam and its leader F2 Seam was usually recognizable, as was the relatively thick J Seam with its K Seam leader. The occurrence of the Boulder Creek and Moosebar Shale formations fit well with the overall stratigraphic interpretation of the property.

It can be seen from the stratigraphic section that the coal seams experience thickening, thinning and occasional pinch outs characteristic of the fluvial-dominated depositional environment of the middle Gates formation. Drillhole P1C43 shows the pinchouts of seams A, B, C, D and F, for instance. These pinehouts are typically the result of paleo-erosion of the deposited peat (proto-coal) by meandering watercourses depositing sandstones and siltstones in their respective channels.

The interpretation of drillhole P1C30 is somewhat problematic in that no coal was encountered in this hole. Careful review of structural sections incorporating nearby holes shows no dramatic structural features that wonld displace the horizons where coal occurrence would be expected. It is thought that two possible explanations may account for this phenomenon; first, that all seams have been channeled out in the location of this hole, or second, that no coal was recovered due to improper coring techniques of the drilling contractor.

This second explanation seems more probable than the first, in that it would be extremely coincidental for all seams to have been affected by paleo-erosion at the same location. This being the first hole drilled during the program, by an untried contractor, and requiring seven weeks to complete indicate that there were significant problems with the hole and likely with the drilling techniques employed. The possibility that this led to the non-recovery of the softer, more friable coal strata must be considered. The fact that there is no geophysical log for the hole makes it impossible to confirm this theory however.

Structural Model Interpretation

The model representation of the J seam floor elevation provides the best overview of the interpreted structural controls affecting both the J seam and overlying G through D seams. Figure A1 located in Appendix A illustrates the J Seam floor elevation contours as interpreted from the provided data. Locations of major faults and potential fault locations as well as fold axes are also illustrated in Figure A1. Geologic cross-sections perpendicular to the regional strike can be found in Figure A2 located in Appendix A.

Structural complexity tends to increase from southeast to northwest across the property with most severe postulated faulting and folding being interpreted to west of the license area. The sympathetic folding and faulting is interpreted by Norwest to be associated with the Mesa thrust located three to seven km's to the west of the property. Strike of the major structural features appears to be parallel to the regional strike of the coal seams, i.e. from northwest to southeast.

Figure A3 located in Appendix A illustrates the modeled interburden thickness of the major seams. Local areas of thinning and thickening of the interburden is likely associated with fold structures and/or induced by shallow angle faulting. The drillhole spacing is insufficient to accurately determine exact location of the structural controls affecting the seam interburdens, however the drilling together with the seismic interpretations has identified major structural controls that may be replicated in a smaller scale structures. Table 6.3 outlines the apparent interburden thickness between major seams as derived from the drillhole record used in geologic model.

Table 6.3 Summary of Apparent Interburden Thickness (m)

Seam	Count	Apparent Thickness (m)		
		Average	Minimum	Maximum
ABCS to D	28	60.69	6.70	115.09
D to E	27	21.29	1.49	90.90
E to F	27	22.85	2.10	83.71
F to F2	27	1.07	0.00	10.70
F2 to G	27	29.39	5.12	84.15
G to J	27	28.36	6.34	67.44
J to K	22	4.88	1.53	17.56

In an effort to obtain a better understanding of the gradient of the J seam floor, as wells as overlying seams, Norwest has plotted average seam gradient for the J Seam in Figure A4 located in Appendix A. This slope zone analysis involved color coding of the average J seam floor gradient to illustrate those areas where the J Seam floor exceeds 60% slope (30°). Those areas highlight in the insert of Figure A4 represent areas of geologic model where the J Seam floor has more than 30° slope. Areas highlighted in the insert are interpreted as areas of increased likelihood of faulting. It is clear from Figure A4 that the majority of the steeply dipping J Seam is west of the current license area nearby the Mesa thrust.

Figure A5 located in Appendix A illustrates the depth of cover to the J Seam. For the most part the J Seam outcrops west of the license area in a region of tight folding and associated faulting as indicated in Figure A1 and cross sections in Figure A2. Projected crop locations within the license area appear to be in the vicinity of the Murray River and currently closed Shikano pit located west of the Quintette processing facilities. The location of surface infrastructure and Murray River in this area may negate the potential for mining access via a surface decline. Additional surface mapping of this area is recommended given that surface exposure of rock formations has been noted by Norwest[19] along the banks of the Murray River and access to ihe Shikano pit area is likely to provide pertinent information on local structural controls and seam extent.

[19] Norwest conducted a site inspection of the area on April 26, 2010.

Seam Thickness Model

Table 6.4 outlines the apparent seam thickness for all seams as derived from the drillhole record and used in geologic model. Figure A6 located in Appendix A illnstrates the spatial variation of the apparent J Seam thickness acrass the property. Color coded isopachs displaying the spatial variations in apparent seam thickness for major seams G, F, E and D are illustrated in Figure A7 located in Appendix A. The seam thickness data illustrated in Table 6.4 and Figure A6 includes rock partings less than 0.5m thick.

Table 6.4 Apparent Seam Thickness from Drillhole Database

Seam	Count	Apparent Thickness (m)		
		Average	Minimum	Maximum
ABCS	26	1.11	0.01	2.80
D	28	1.82	0.01	5.86
E	27	1.61	0.01	5.30
F	27	2.93	0.01	5.45
F2	27	0.22	0.00	1.67
G	27	1.46	0.01	4.00
J	27	4.66	1.85	8.65
K	22	0.73	0.01	2.40

Important observations of the data presented in Table 6.4 and Figures A6 and Figure A7 is described below.

ABC Seams

The ABC Seam thickness in Table 6.4 represents the thickest of the three seam splits that was encountered in the drillhole records. These seams are generally poor in coal quality (high ash) at seam heights greater than 0.8m or are too thin to be considered for mining. These seams are not considered for resource reporting.

D Seam

Average apparent D Seam thickness is above a theoretical minimum mining height of 0.8m. The D Seam was not identified in two of Dehua series holes (P1R36 and P1C43) and O&G well OG204. Where missing, the D Seam has been modeled with a zero thickness to account for either a washout or fault induced losses.

E Seam

Average apparent E Seam thickness is above a theoretical minimum mining height of 0.8m. The E Seam was not identified in three Dehua series holes (P1R35, P1R36 and P1C48). Where missing the E Seam has been modeled with a zero thickness to account for either a washout or fault induced losses.

F Seam

Average apparent F Seam thickness is above a theoretical minimum mining height of 0.8m. The F Seam was not identified in two of Dehua series holes (P1R36 and P1C43). Where missing the F Seam has been modeled with a zero thickness to account for either a washout or fault induced losses.

F2 Seam

The F2 Seam was identified as a distinct split from the overlying F Seam and was encountered in the majority of drillholes. As the seam is relatively thin, always thinner than the main F Seam, and occurs very close to the upper split in was not included in resource calculations.

G Seam

Average apparent G Seam thickness is above a theoretical minimum mining height of 0.8m. The G Seam was not identified in two of Dehua series holes (P1C50 and P1R36) and three O&G wells (OG214, OG246 and OG303). Where missing the G Seam has been modeled with a zero thickness to account for either a washout or fault induced losses.

J Seam

Average apparent J Seam thickness is above a theoretical minimum mining height of 0.8m. The J Seam is the thickest of the five major seams of the Gates formation on the property. The J Seam was present in all holes that penetrated the Gates formation sediments. The J Seam shows apparent thicknesses ranging from approximately 2m to over 8m and it can be roughly estimated that average true thickness might be in the 3m to 4m range.

K Seam

The K seam is usually located a few meters below the J Seam and is below a minimum theoretical mining height of 0.8m in most areas. The K Seam, though considered a minor seam, is included in resources calculations due to the seams proximity to the J Seam and number of valid intercepts in the drillhole record. The K Seam was not identified in three O&G wells (OG166, OG204 and OG305). Where missing the K Seam has been modeled with a zero thickness to account for either a washout or fault induced losses.

Within seam rock partings were encountered in most of the Gates formation coal seams. The cumulative thickness of rock partings greater than 0.5m thick is illustrated in Table 6.5. The location and number of rock partings greater than 0.5m thick will be accounted for when identifying select mining horizons for coal reserve calculations, by selecting either the top or bottom coal split for mining. These partings are not included in overall coal thickness or quality estimations.

Table 6.5 Cumulative Rock Parting Thickness >0.5m Per Seam

Seam	Count	Apparent Thickness (m)		
		Average	Minimum	Maximum
ABCS	-	-	-	-
D	4	1.64	0.79	2.96
E	2	0.70	0.60	0.80
F	1	1.18	1.18	1.18
F2	-	-	-	-
G	3	0.64	0.50	0.83
J	7	1.33	0.83	2.34
K	1	1.00	1.00	1.00

Coal Quality Model

The raw and washed (1.4RD) coal quality data discussed in this section includes moisture content (%), ash content (%), volatile matter content (%), total sulfur content (%), calorific value (MJ/kg), CSN (FSI), theoretical yield (%) and density (g/cm^3). These parameters are viewed by Norwest as providing the most appropriate base line overview of coal quality within the license area. All coal quality data described in this section are full seam composites and include rock partings less than 0.5m thick. All quality data is reported on an air dried basis and all figures illustrating the spatial variation in modeled coal quality can be found in Appendix A.

MOISTURE

The Gates formation coal seams can be described as low-moisture coal seams. The full seam air dried moisture averages between 0.5% and 1.0% for all major coal seams. Air dried moisture also referred to as inherent moisture is not expected to negatively impact the thermal and metallurgical properties of the coal.

COAL RESOURCES AND RESERVE BASE

The coal resources within the development area are viewed by Norwest as being of the moderate to complex geology type as defined by Paper 88-21 of the Geological Survey of Canada, entitled "A Standardized Coal Resource/Reserve Reporting System for Canada (GSC 88-21)." The moderate geology type is described as structures with broad, open folds with bedding dips generally less than 30°; minor faulting may be present. Complex geology is described as structures with bedding inclinations which are steeply dipping or overturned. Faults are present with large displacements.

It is Norwest opinion that the majority of the in place coal resources within the license area is of the moderate geology type. As such, paper GSC 88-21 guidelines for data point (drillhole) spacing and minimum parting thickness have been used by Norwest for outlining demonstrated (measured plus indicated) and inferred resources. Other resource limiting factors include minimum seam thickness set at 0.8m and maximum depth of cover to the basal J Seam set at 1,200m from surface. The minimum seam thickness and maximum cover limits were provided on recommendation by Dehua. An alternate minimum seam thickness of 1.0m and maximum depth of cover of 900m has been proposed by Norwest and by way of comparison resources are reported using the Dehua limits and Norwest limits.

RESOURCES

The resource reporting criteria are summarized as follows:

- Demonstrated resources within 900m from nearest data point (drillhole)
- Inferred resources within 2,400m from nearest data point
- Rock partings less than 0.5m thick are included in the coal
- Minimum apparent seam height of 0.8m (Dehua)
- Alternate minimum apparent seam height of 1.0m
- Maximum depth of cover at 1,200m to J Seam (Dehua)
- Alternate depth of cover at 900m to J Seam
- All resources limited to within the development area.

Estimated geologic loss has been determined by Norwest for each gradient type as indicated in Table 7.7. When these losses are applied to the in place coal resources a theoretical mineable tonnage is determined. The mineable tonnes are referred to as the reserve base which is not a mining reserve but provides an indication of the potential coal tonnes available for mining. Note that in Table 7.7 the majority of the reserve base falls within the moderate geology type.

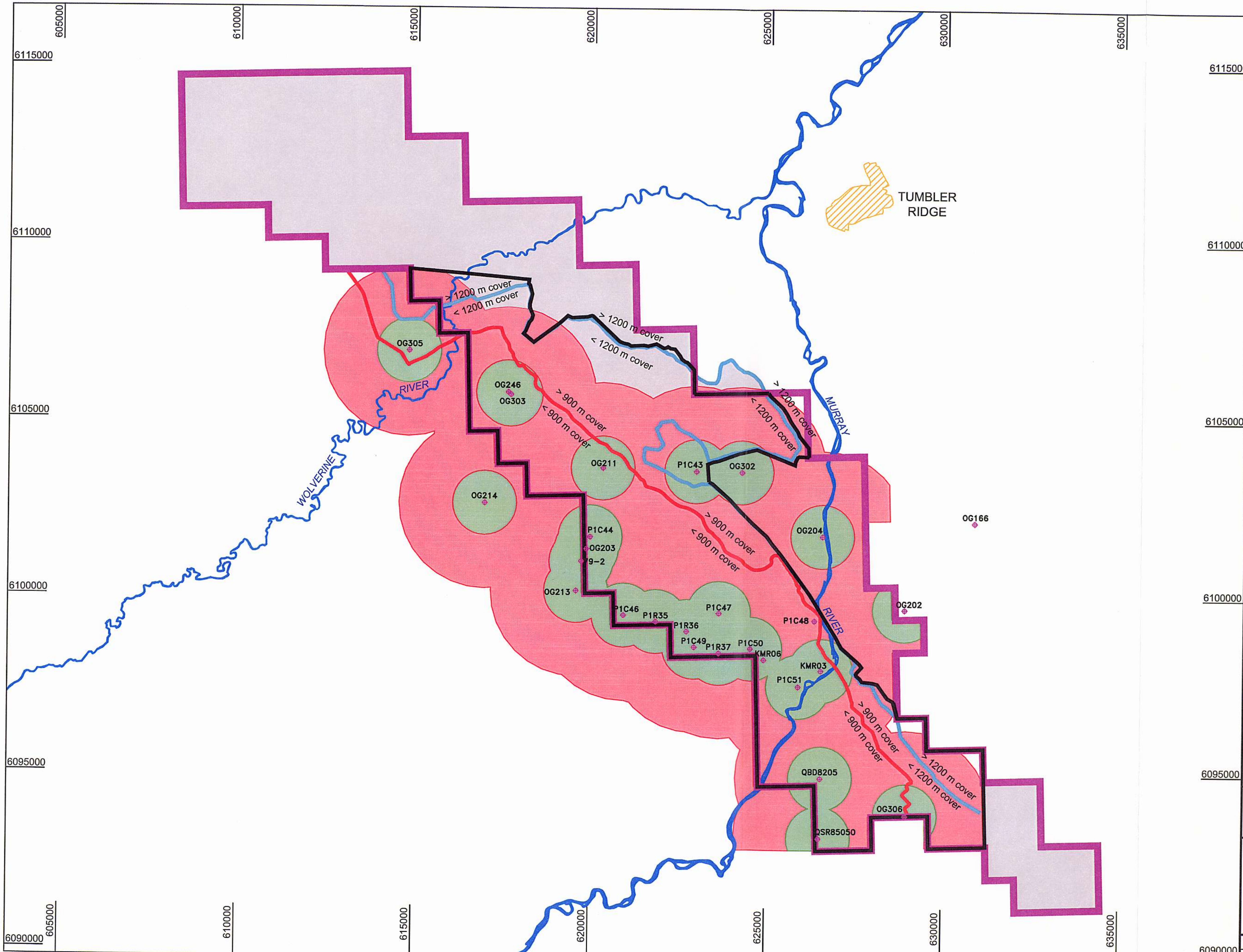


FIGURE 7.1

MURRAY RIVER PROJECT
COAL RESOURCE
PLAN

DATE: 05/17/2010
FILE: MR_RESOURCE2
SCALE: 1:100000
NORWEST CORPORATION

GEOTECHNICAL CONSIDERATIONS

Norwest conducted a review of the geotechnical testing results provided in Appendix D. Summarized in this section of the report are methods, opinions and recommendations based on the information available and evaluation conducted.

METHODOLOGY

Norwest conducted a comparison of the testing data by hole with the geology field logs to determlne the location of the testing results within the hole and identify the impact of the test results on the coal seams identified as mineable targets. No coal testing results were included in the materials tested.

A pillar stability analysis was conducted using an industry standard program developed by the National Institute for Occupational Safety and Health (NIOSH) in the United States. The stability program Analysis of Retreat Mining Pillar Stability (ARMPS) calculates stability factors based on estimates of the loads applied to, and the load bearing capacities of, pillars during the development and retreat mining operations. The program has been developed using 140 actual mine case histories and is used as a basis for initial feasibility reviews where no previous mining history is available. This analysis program is a single seam analysis package and helpful in identifying pillar size requirements based on depth, seam thickness, width of mined opening, and basic mining layout of pillar centers.

DATA REVIEW

The testing data review of seven holes:

- P1-C43
- P1-C44
- P1-C46
- P1-C47
- P1-C48
- P1-C49
- P1-C51.

The six holes fall within the development area boundary identified in the geologic portion of this report.

The review of the compressive strength looked at the range of average testing strength to note how variable roof and floor were and the interburden rock materials that would influence the potential of mining two or more seams in close proximity. Table 8.1 summarizes the geotechnical test result ranges for interburden, roof and floor provided by the testing and used to complete the ARMPS evaluation.

Table 8.1 Geotechnical Testing Summary

Seam	Roof		Floor		Interburden		Comments
	Low (Mpa)	High (Mpa)	Low (Mpa)	High (Mpa)	Low (Mpa)	High (Mpa)	
D	29.6	96.4	29.6	66.4	37.4	86.7	Roof compressive strength averages 64 Mpa; Competent floor; Interburden is adequate in thickness and strength to mine multiple seams
E	27.2	73.6	36	77.6	51.6	96.4	Roof compressive strength averages 50 Mpa some lower test readings may indicate some immediate roof issues; Competent floor; Interburden is adequate in thickness and strength to mine multiple seams
F	17.6	68	13.8	61.2	23.6	108	Roof compressive strength averages 47 Mpa some lower test readings may indicate some immediate roof issues; Competent floor; Interburden is adequate in thickness and strength to mine multiple seams
G	24.8	79.2	32	76.8	50.8	123	Roof compressive strength averages 49 Mpa some lower test readings may indicate some immediate roof issues; Competent floor; Interburden is adequate in thickness and strength to mine multiple seams
J	31.6	56.1	23.9	54.8	39.2	95.9	Roof compressive strength averages 44 Mpa some lower test readings may indicate some immediate roof issues; Competent floor; Interburden is adequate in thickness and strength to mine multiple seams
K	39.2	44.8	68.8	77.6			Limited roof compressive strength averages 41 Mpa - lower test readings may indicate some immediate roof issues; Competent floor; Interburden is adequate in thickness and strength to mine multiple seams

Potential mineable boundaries where coal thickness exceeds 0.8m were indentified in the five mineable seams. Figure 8.1 shows the areas where only one seam of mineable thickness occurs (green hatch), three mineable seams (light blue hatch), four mineable seams (light orange hatch), and five mineable seams (red hatch). Norwest recommends additional evaluation and geotechnical testing be considered in areas where two or more seams are considered mineable. Coal and interburden thickness and strength will determine the possibility of mining all potentially mineable seams.

PILLAR SIZING EVALUATION

The ARMPS program requires the collection of input parameters to complete the analysis of pillar stability. Three evaluation areas within each mineable seam were identified to determine the impact of seam thickness and depth. No multiple seam interactions were completed in this analysis, but should be considered in the future. The lack of coal strength testing results does not prevent the evaluation. The program has a default coal strength determined from historical analysis throughout the US.

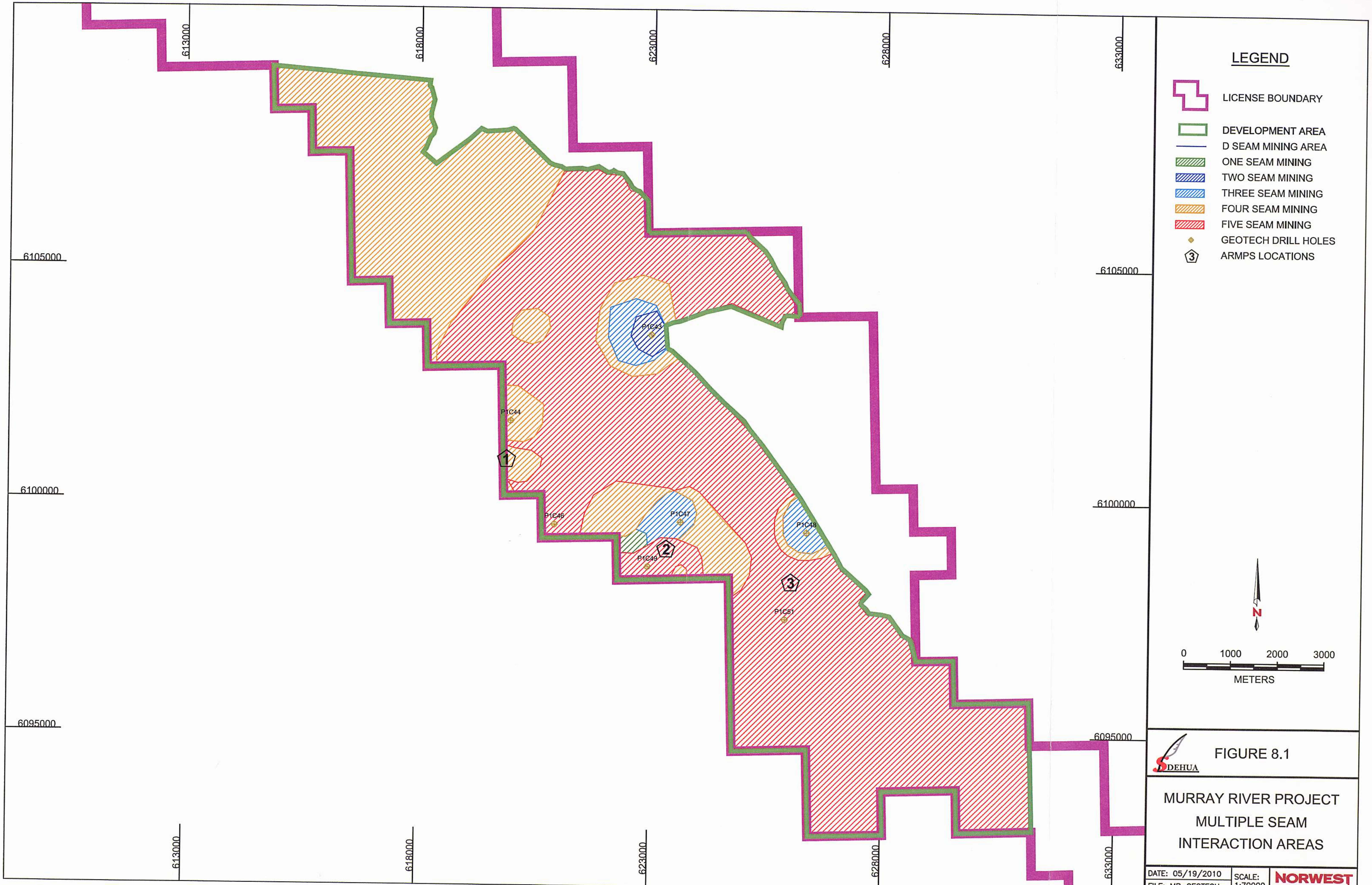
Figure 8.2 shows the D Seam and the three ARMPS areas selected for evaluation. The overburden thickness, and seam thickness at each evaluation area were used in the ARMPS program. The development mining boundary and the geotechnical testing holes are also identified in Figure 8.2.

Figure 8.3 shows the E Seam and the three ARMPS areas seleeted for evaluation. The overburden thickness, and seam thickness at each evaluation area were used in the ARMPS program. The potential mining boundary and the geotechnical testing holes are also identified in Figure 8.3.

Figure 8.4 shows the F Seam and the three ARMPS areas selected for evaluation. The overburden thickness, and seam thickness at each evaluation area were used in the ARMPS program. The potential mining boundary and the geotechnical testing holes are also identified in Figure 8.4.

Figure 8.5 shows the G Seam and the three ARMPS areas selected for evaluation. The overburden thiekness and seam thickness at each evaluation area were used in the ARMPS program. The potential mining boundary and the geotechnical testing holes are also identified in Figure 8.5.

Figure 8.6 shows the J Seam and the three ARMPS areas selected for evaluation. The overburden thickness, and seam thickness at each evaluation area were used in the ARMPS program. The potential mining boundary and the geotechnical testing holes are also identified in Figure 8.6.



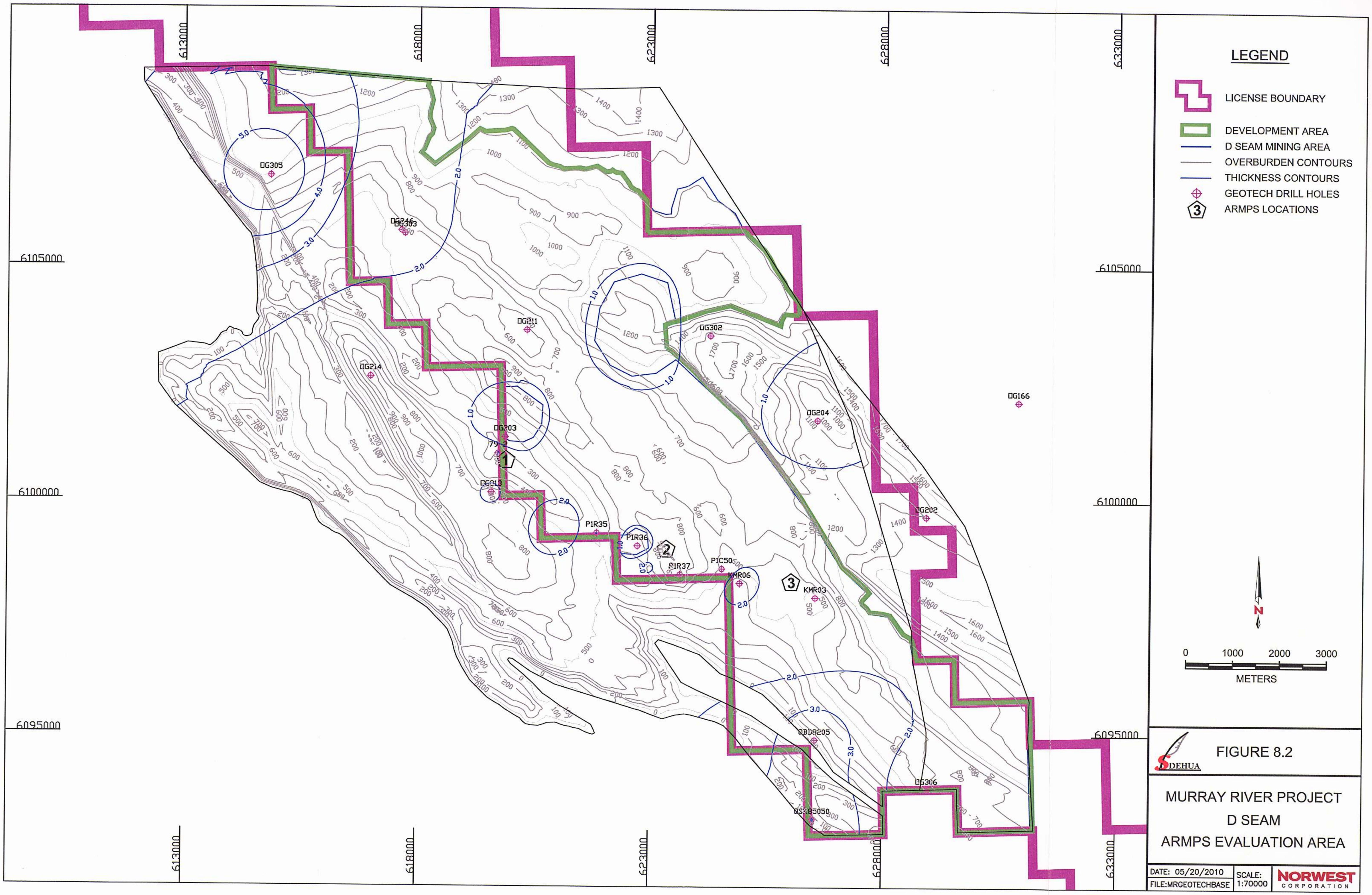
DEHUA

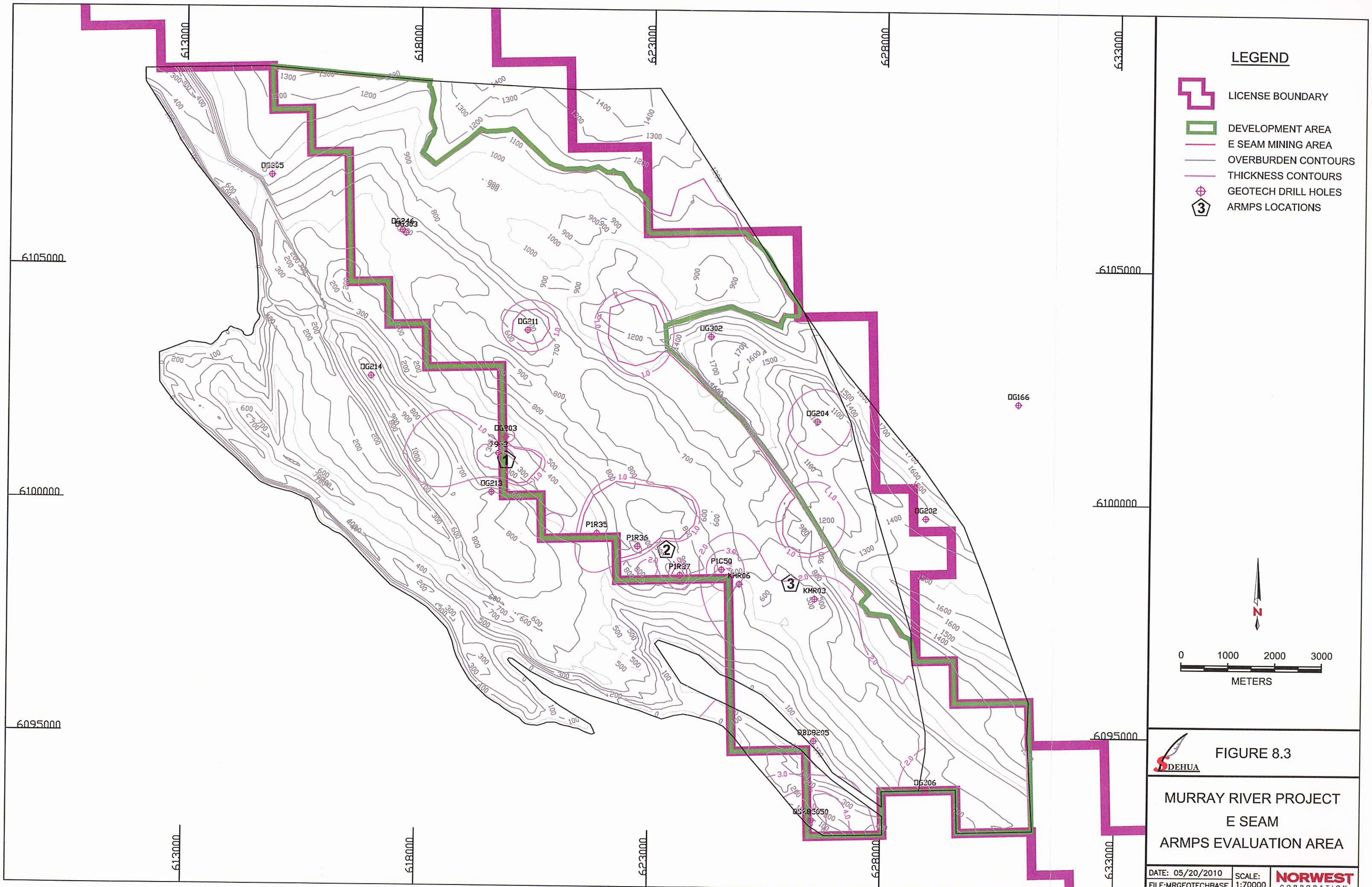
FIGURE 8.1

MURRAY RIVER PROJECT
MULTIPLE SEAM
INTERACTION AREAS

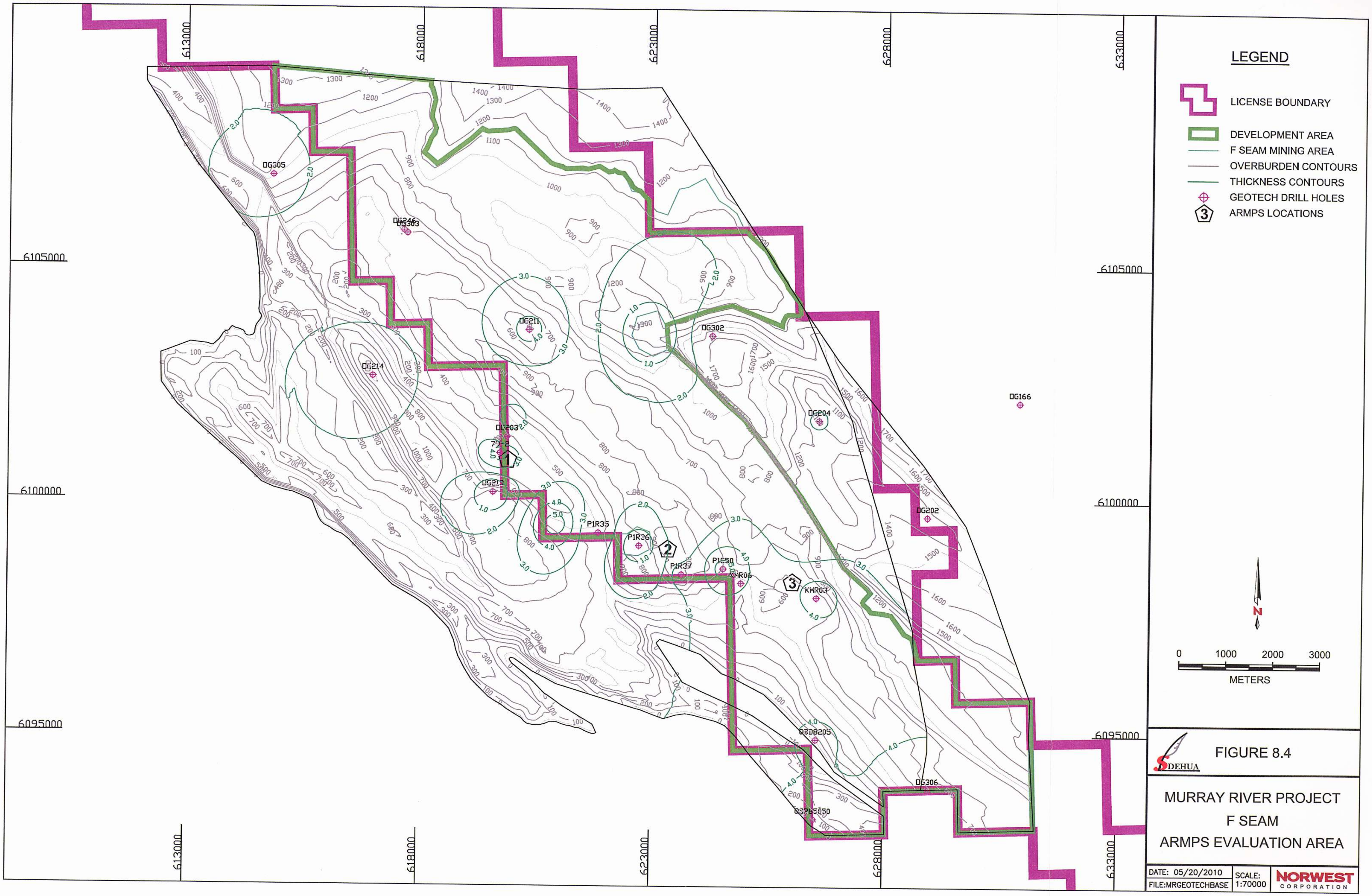
DATE: 05/19/2010
FILE: MR_GEOTECH
SCALE: 1:70000

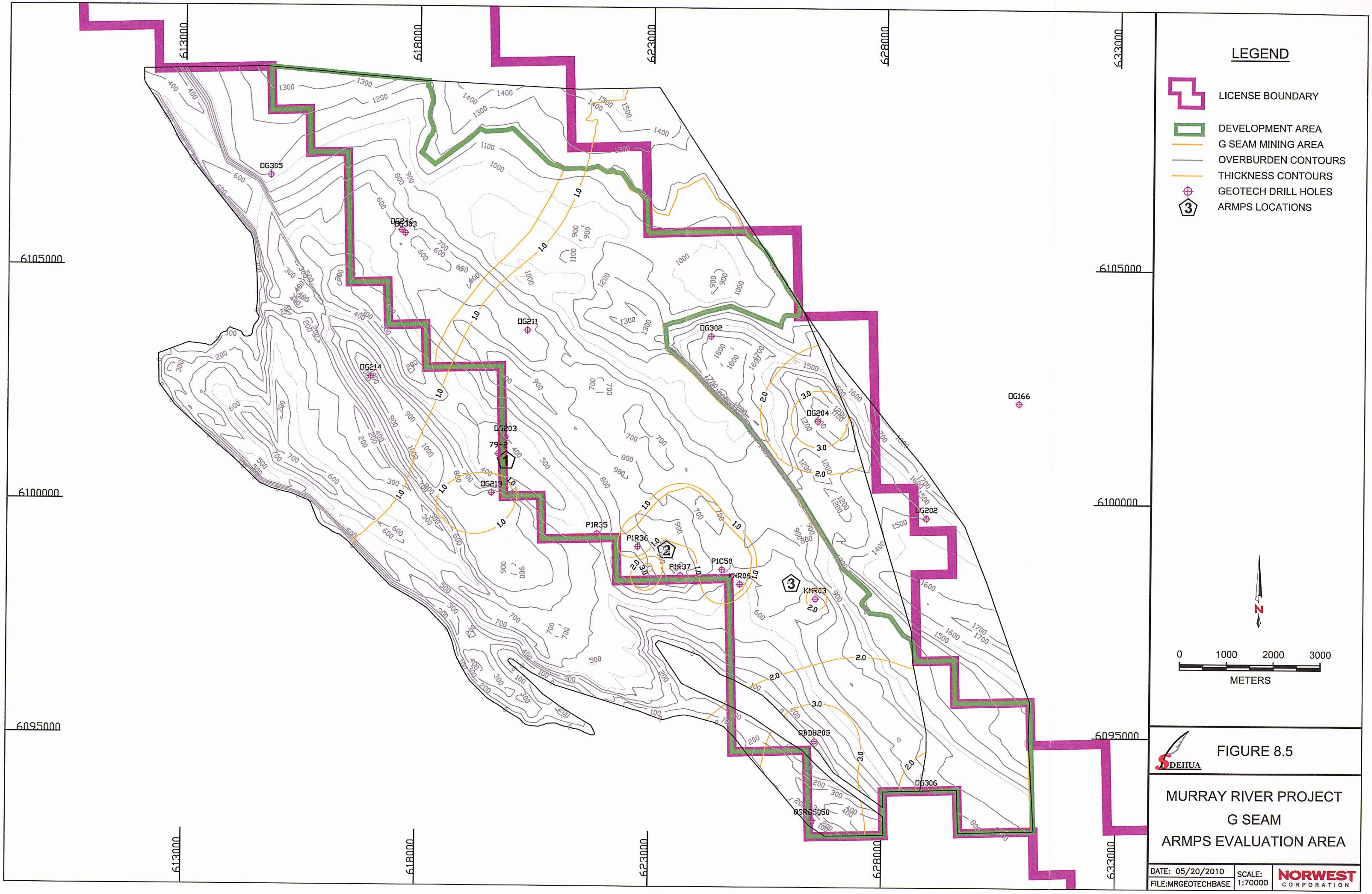
NORWEST CORPORATION


LEGEND
LICENSE BOUNDARY
DEVELOPMENT AREA
D SEAM MINING AREA
OVERBURDEN CONTOURS
THICKNESS CONTOURS
GEOTECH DRILL HOLES
ARMPS LOCATIONS
0 1000 2000 3000
METERS
N
613000
618000
623000
628000
633000
6105000
6100000
6095000
DG305
DG303
DG211
DG302
DG214
DG203
DG204
DG166
DG213
DG202
P1R35
P1R36
P1R37
P1C50
KMR06
KMR03
DG306
DEHUA
FIGURE 8.2
MURRAY RIVER PROJECT
D SEAM
ARMPS EVALUATION AREA
DATE: 05/20/2010
FILE:MRGEOTECHBASE
SCALE: 1:70000
NORWEST CORPORATION



LEGEND
LICENSE BOUNDARY
DEVELOPMENT AREA
E SEAM MINING AREA
OVERBURDEN CONTOURS
THICKNESS CONTOURS
GEOTECH DRILL HOLES
ARMPS LOCATIONS
613000
618000
623000
628000
633000
6105000
6100000
6095000
DG211
DG302
DG214
DG204
DG166
DG203
DG213
DG202
P1R35
P1R36
P1R37
P1C50
KMR06
KMR03
DG306
N
0
1000
2000
3000
METERS
DEHUA
FIGURE 8.3
MURRAY RIVER PROJECT
E SEAM
ARMPS EVALUATION AREA
DATE: 05/20/2010
FILE:MRGEOTECHBASE
SCALE:
1:70000
NORWEST
CORPORATION


LEGEND
LICENSE BOUNDARY
DEVELOPMENT AREA
F SEAM MINING AREA
OVERBURDEN CONTOURS
THICKNESS CONTOURS
GEOTECH DRILL HOLES
ARMPS LOCATIONS
N
0
1000
2000
3000
METERS
613000
618000
623000
628000
633000
6105000
6100000
6095000
DG305
DG246
DG303
DG211
DG214
DG302
DG166
DG204
DG203
DG213
DG202
P1R35
P1R36
P1R37
P1C50
KHR06
KHR03
DG306
FIGURE 8.4
SDEHUA
MURRAY RIVER PROJECT
F SEAM
ARMPS EVALUATION AREA
DATE: 05/20/2010
FILE:MRGEOTECHBASE
SCALE: 1:70000
NORWEST
CORPORATION


LEGEND
LICENSE BOUNDARY
DEVELOPMENT AREA
G SEAM MINING AREA
OVERBURDEN CONTOURS
THICKNESS CONTOURS
GEOTECH DRILL HOLES
ARMPS LOCATIONS
0 1000 2000 3000
METERS
N
613000
618000
623000
628000
633000
6105000
6100000
6095000
DG305
DG303
DG211
DG302
DG214
DG166
DG204
DG203
79-2
DG213
DG202
P1R35
P1R36
P1R37
P1C50
KMR06
KMR03
OBD8203
DG306
SDEHUA
FIGURE 8.5
MURRAY RIVER PROJECT
G SEAM
ARMPS EVALUATION AREA
DATE: 05/20/2010
FILE:MRGEOTECHBASE
SCALE: 1:70000
NORWEST CORPORATION

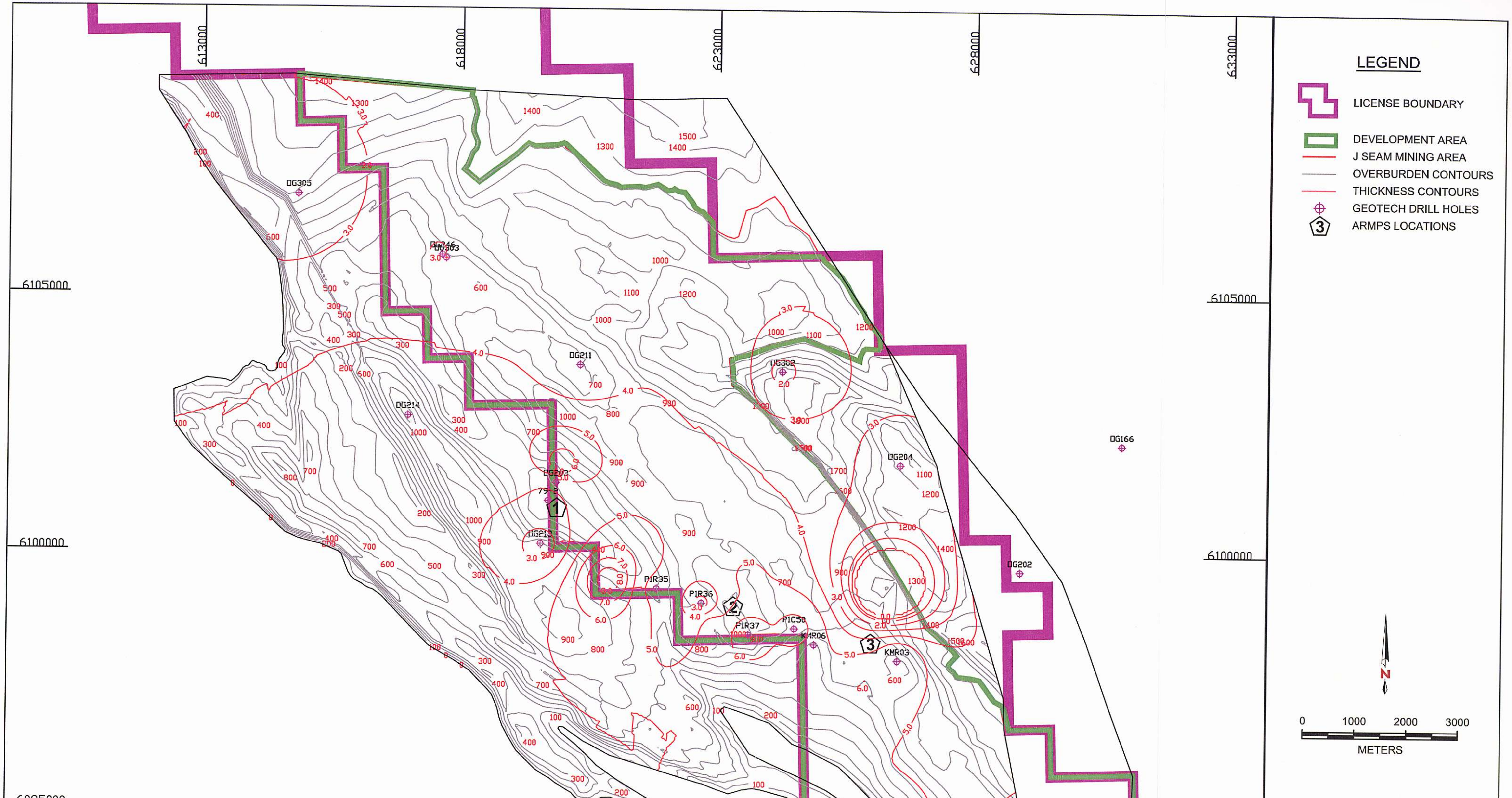


FIGURE 8.6

MURRAY RIVER PROJECT
J SEAM
ARMPS EVALUATION AREA

DATE: 05/20/2010
FILE:MRGEOTECHBASE
SCALE: 1:70000
NORWEST CORPORATION

The ARMPS evaluation for pillar stability sets some pre-evaluation standards when identifying pillar sizes in initial feasibility. Main development areas where expectations are to maintain these areas for the life of mine a minimum stability factor of 1.5 shoald be used. Areas with shorter term lives, like panel development areas should have a minimum 1.3 stability factor. Panel retreat (depillaring) should have a minimum 0.9 stability factor. The stability factor for protection barrier pillars is established at 2.0 as a minimum. These initial factors for pillar stability were used in the ARMPS evaluation for the development area as a basis for pillar size comparisons relative to depth and coal seam thickness. The results of the program analysis for single seam mining are presented in Table 8.2. Development layouts using five and seven entries were used to determine any impact.

The ARMPS single seam evaluation identifies some key parameters that impact potential seam recovery projections. The evaluation currently considers no subsidence and the percent extraction is the development extraction without consideration of larger barrier pillars. The first key impact on pillar stability is seam thickness depth and the second is seam depth. The impact of thickness is evident when looking at the F Seam (Area 1 and 3) and J Seam (Areas 1, 2, and 3) have seam thickness greater than 2.75m. A full seam thickness opening was compared to a 2.75m opening to show the impact of pillar size necessary to provide the goal pillars stability.

Development recoveries for a majority of these resources are most likely in the low 30% extraction. The use of retreat mining pillar recovery will increase the recovery of resources. However, the issue of subsidence on the surface and damage to any aquifers that are within 100m above the mineable seams must be addressed before retreat mining is considered.

Table 8.3 provides an example of the ARMPS program output and a picture of the mining layout used in that example. The J Seam – Area 2 is presented for example in Table 8.3. The mining opening was limited to 2.75m at a depth of 1000m.

Table 8.2 ARMPS Summary

Single Seam Evaluation					Goal Stability	Mains		1.5 minimum		3.281
						Panels		1.3 minimum		
						Panel Retreat		0.9 minimum		
						Barrier		2.0 minimum		
D Seam Test Areas - ARMPS										
	Depth		Thickness		Entry Width	# Entries	Centers		SF	% Extraction
Area 1	m	ft	m	ft	ft		Entry	Xcut		
Mains	300	984	1.2	3.9	20	5	65	65	1.87	52.1
							60	60	1.57	55.6
						7	60	60	1.57	55.6
Panels						7	60	85	1.45	49
Barrier							60		2.09	
Area 2										
Mains	900	2953	1.2	3.9	20	5	95	120	1.5	34.2
						7	95	120	1.5	34.2
Panels						7	85	140	1.42	34.5
Barrier							160		2.05	
Area 3										
Mains	580	1903	1.5	4.9	20	5	80	120	1.56	37.5
						7	80	120	1.56	37.5
Panels						7	80	120	1.1	37.5
Barrier							140		2.09	
E Seam Test Areas - ARMPS										
	Depth		Thickness		Entry Width	# Entries	Centers		SF	% Extraction
Area 1	m	ft	m	ft	ft		Entry	Xcut		
Mains	312	1024	1	3.3	20	5	60	60	1.74	55.6
						7	60	60	1.74	55.6
Panels						7	60	70	1.42	52.4
Barrier						7	60		2.33	
Area 2										
Mains	945	3101	1.2	3.9	20	5	95	140	1.55	32.3
						7	95	140	1.55	32.3
Panels						7	85	150	1.03	33.7
Barrier							165		2.03	
Area 3										
Mains	610	2001	2	6.6	20	5	95	140	1.49	32.3
						7	95	140	1.49	32.3
Panels						7	90	150	1.00	32.6
Barrier							190		2.02	
F Seam Test Areas - ARMPS										
	Depth		Thickness		Entry Width	# Entries	Centers		SF	% Extraction
Area 1	m	ft	m	ft	ft		Entry	Xcut		
Mains	323	1060	3.5	11.5	20	5	90	120	1.55	35.2
			2.75	9.0	20	5	75	120	1.54	38.9
						7	75	120	1.54	38.9
Panels						7	80	140	1.17	57.6
Barrier						7	140		2.1	
Area 2										
Mains	967	3173	2.0	6.6	20	5	150	160	1.53	24.2
						7	150	160	1.53	24.2
Panels						7	150	160	0.96	24.2
Barrier							360		2.05	
Area 3										
Mains	637	2090	3.6	11.8	20	5	155	180	1.51	22.6
			2.75	9.0	20	5	125	160	1.51	26.5
						7	125	160	1.51	26.5
Panels						7	125	160	0.93	26.5
Barrier							300		2.04	

Table 8.2 ARMPS Summary Table (continued)

Single Seam Evaluation	Goal Stability			
		Mains	1.5 minimum	3.281
		Panels	1.3 minimum	
		Panel Retreat	0.9 minimum	
		Barrier	2.0 minimum	

	Depth		Thickness		Entry Width	# Entries	Centers		SF	% Extraction
G Seam Test Areas - ARMPS										
Area 1	m	ft	m	ft	ft		Entry	Xcut		
Mains	349	1145	1.2	3.9	20	5	60	70	1.56	52.4
						7	60	70	1.56	52.4
Panels						7	60	100	1.38	46.7
Barrier						7	70		2.02	
Area 2										
Mains	1007	3304	1.5	4.9	20	5	120	150	1.54	27.8
						7	120	150	1.54	27.8
Panels						7	120	160	1.06	27.1
Barrier							230		2.04	
Area 3										
Mains	661	2169	1.5	4.9	20	5	80	160	1.53	34.4
						7	80	160	1.53	34.4
Panels						7	80	160	1.07	34.4
Barrier							160		2.04	
J Seam Test Areas - ARMPS										
	Depth		Thickness		Entry Width	# Entries	Centers		SF	% Extraction
Area 1	m	ft	m	ft	ft		Entry	Xcut		
Mains	380	1247	3.8	12.5	20	5	100	160	1.54	30.0
			2.75	9.0	20	5	80	140	1.5	35.7
						7	80	140	1.5	35.7
Panels						7	80	140	0.99	35.7
Barrier						7	170		2.06	
Area 2										
Mains	1000	3281	5.0	16.4	20	5	280	360	1.5	12.3
			2.75	9.0	20	5	180	220	1.51	19.2
						7	180	220	1.51	19.2
Panels						7	180	240	0.91	18.5
Barrier							480		2.07	
Area 3										
Mains	680	2231	4.5	14.8	20	5	180	260	1.52	17.9
			2.75	9.0	20	5	120	200	1.49	25.0
						7	120	200	1.49	25.0
Panels						7	120	200	0.93	25.0
Barrier							280		2.07	

Table 8.3-1 ARMPS Area 3 Example Program Output – J Seam

```
[DEVELOPMENT GEOMETRY PARAMETERS]
Entry Height....................................9 (ft)
Depth of Cover..................................3281 (ft)
Crosscut Angle..................................90 (deg)
Entry Width.....................................20 (ft)
Number of Entries...............................7
Crosscut Spacing................................240 (ft)
Center to Center Distance #1....................180 (ft)
Center to Center Distance #2....................180 (ft)
Center to Center Distance #3....................180 (ft)
Center to Center Distance #4....................180 (ft)
Center to Center Distance #5....................180 (ft)
Center to Center Distance #6....................180 (ft)

[DEFAULT PARAMETERS]
In Situ Coal Strength...........................900 (psi)
Unit Weight of Overburden.......................162 (pcf)
Breadth of AMZ..................................286 (ft)
AMZ set automatically

[RETREAT MINING PARAMETERS]
Loading Condition...............................ONE SIDE + ACTIVE GOB
Extend of Active Gob............................1320 (ft)
Abutment Angle of Active Gob....................21 (deg)
Extend of First Gob.............................2160 (ft)
Abutment Angle of 1st Gob.......................21 (deg)
Barrier Pillar Width of 1st Gob.................480 (ft)
Depth of Slab Cut in Barrier Pillar of 1st Gob....0 (ft)


[ARMPS STABILITY FACTORS]

DEVELOPMENT.......................1.57
ACTIVE GOB........................0.91
ONE SIDE + ACTIVE GOB.............0.91

[BARRIER PILLAR STABILITY FACTORS]

FIRST SIDE GOB....................2.07


[DATA ABOUT THE ACTIVE MINING ZONE (AMZ)]

AMZ Width...............................1080.0 (ft)
AMZ Breadth.............................286.0 (ft)
AMZ Area................................308880.0 (ft)*(ft)
Extraction Ratio Within AMZ.............0.19
Development Load on AMZ.................8.21E+07 (tons)
Front Abutment Load.....................129444 (tons)/(ft)
First Side Abutment Load................163960 (tons)/(ft)

R-FACTOR For Front Abutment.............0.901
R-FACTOR For First Side Abutment........0.999

TOTAL LOADINGS ON AMZ, INCLUDING TRANSFER FROM BARRIERS
          LOAD      ABUTMENT     LTRANSBAR     LTRANSREM        TOTAL
     CONDITION   LOAD (tons)      (tons)        (tons)         (tons)
   DEVELOPMENT      0.00E+00     0.00E+00      0.00E+00       8.21E+07
```

Table 8.3-2 ARMPS Area 3 Example Program Output – J Seam

ACTIVE GOB	5.98E+07	0.00E+00	0.00E+00	1.42E+08
1S + ACTIVE GOB	2.42E+04	0.00E+00	0.00E+00	1.42E+08

R-Factor for front abutment is the percent of the total front abutment load that is applied to the AMZ.

R-Factor for side abutment is the percent of the total side abutment load that is applied to the barrier pillar (the remainder is applied to the AMZ).

LTRANSBAR is the load transferred to the AMZ from the barrier pillar between the side and active gob if the barrier's SF is less than 1.5.

LTRANSREM is the load transferred to the AMZ from the remnant barrier between the side and active gob if the remnant's SF is less than 1.5.

[PILLAR PARAMETERS]

PILLAR	ENTRY CENTER (ft)	MINIMUM DIMENSION (ft)	MAXIMUM DIMENSION (ft)
1	180.00	160.00	220.00
2	180.00	160.00	220.00
3	180.00	160.00	220.00
4	180.00	160.00	220.00
5	180.00	160.00	220.00
6	180.00	160.00	220.00

PILLAR	AREA (ft)*(ft)	STRENGTH (psi)	LOAD-BEARING CAPACITY (tons)
1	3.52E+04	7.12E+03	1.80E+07
2	3.52E+04	7.12E+03	1.80E+07
3	3.52E+04	7.12E+03	1.80E+07
4	3.52E+04	7.12E+03	1.80E+07
5	3.52E+04	7.12E+03	1.80E+07
6	3.52E+04	7.12E+03	1.80E+07

TOTAL LOAD-BEARING CAPACITY OF PILLARS WITHIN AMZ: 1.29E+08 (tons)

To view the distribution of Pillar Load Bearing Capacity select 'View Plots->Settings->Pillar Load Bearing Capacity'

[BARRIER PILLAR PARAMETERS]

BARRIER PILLAR	WIDTH (ft)	STRENGTH (psi)	LOAD-BEARING CAPACITY (tons)
First	480.00	1.79e+04	1.76E+08

[BARRIER PILLAR LOADS]

BARRIER PILLAR	DEVELOPMENT LOAD (tons)	FRONT-ABUTMENT LOAD (tons)	SIDE-ABUTMENT LOAD (tons)
First	3.72E+07	1.17E+06	4.69E+07

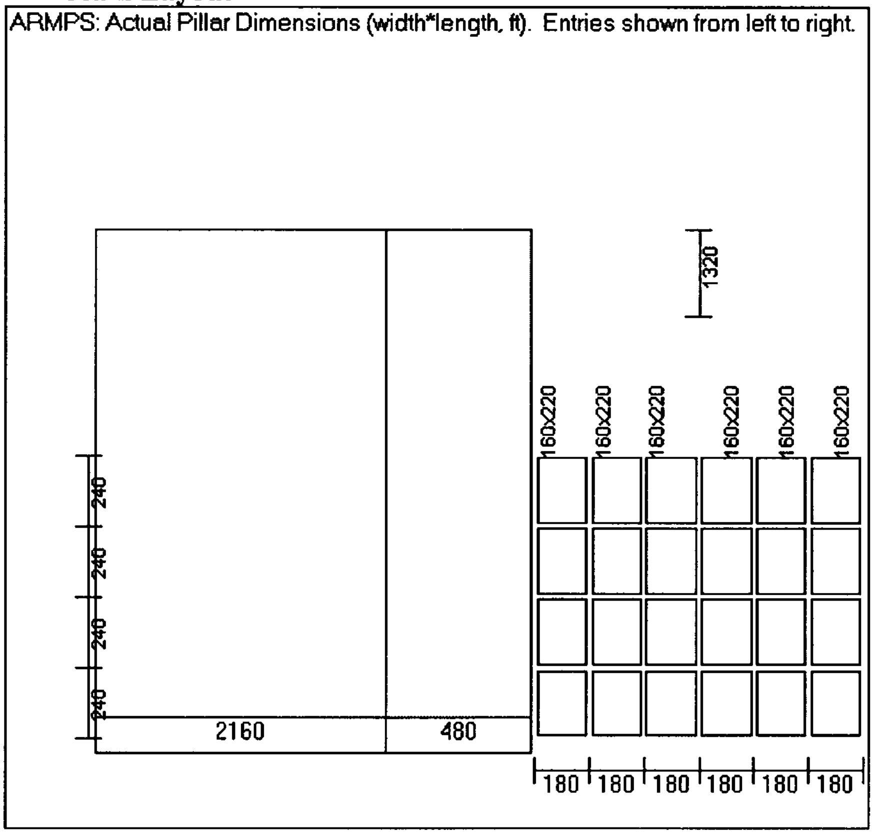
[BARRIER PILLAR LOADS (cont'd)]

BARRIER PILLAR	TOTAL LOAD (tons)	STABILITY FACTOR	LTRANSBAR (tons)
First	8.53E+07	2.07	0.00E+00

[BARRIER PILLAR STRESSES]

BARRIER PILLAR	DEVELOPMENT STRESS (psi)	FRONT-ABUTMENT STRESS (psi)	SIDE-ABUTMENT STRESS (psi)	TOTAL STRESS (psi)
First	3768	118	4742	8628

Table 8.3-3 ARMPS Area 3 Example Program Output – J Seam Layout



RECOMMENDATIONS

The potential of multiple seam mining over almost all of the development area boundary warrants additional testing of coal seam strength and interburden strength to provide essential design information to model critical areas where interburden thins and coal seam thickness increases. Multiple seam finite element analysis or at least a basic multiple seam evaluation should be completed to determine the impact of multiple seam interactions on the pillar designs and seam layouts. Seam extractions will be significantly impacted depending on the coal strength.

COAL MINE METHANE ANALYSIS

On March 1, 2010 Dehua received a report created by Petro-Logic Services of Calgary, AB titled "*Desorption & Analysis of Coals in Wells PIC 44 and PIC 50*" (PL Report). The PL report is attached to this document as Appendix E.

The PL Report outlines the following areas:

- Field sampling procedures
- Coal quality laboratory results and conclusions
- Gas content estimation methods, results, and conclusions
- Gas resource estimation results
- Gas composition methodology and results.

Upon receipt of Petro-Logic's report, Dehua requested Norwest to review the report and provide feedback regarding the procedures followed, the acquired data and interpretive results presented by Petro-Logic during their work on the P1C50 and P1C44 wells. Norwest obtained the original canister measurement data through Dehua and ran a series of validation exercises to determine the accuracy of the results obtained by Petro-Logic

The following is a review of the Petro-Logic Report with examples of the validation exercises and opinions on procedures and results.

OVERVIEW OF REPORT

Review of the Petro-Logic Report raised a number of questions within the different sections of the report. Some of the omissions and questioned items will be clarified in following sections of this report. Some issues that needed to be addressed include the following:

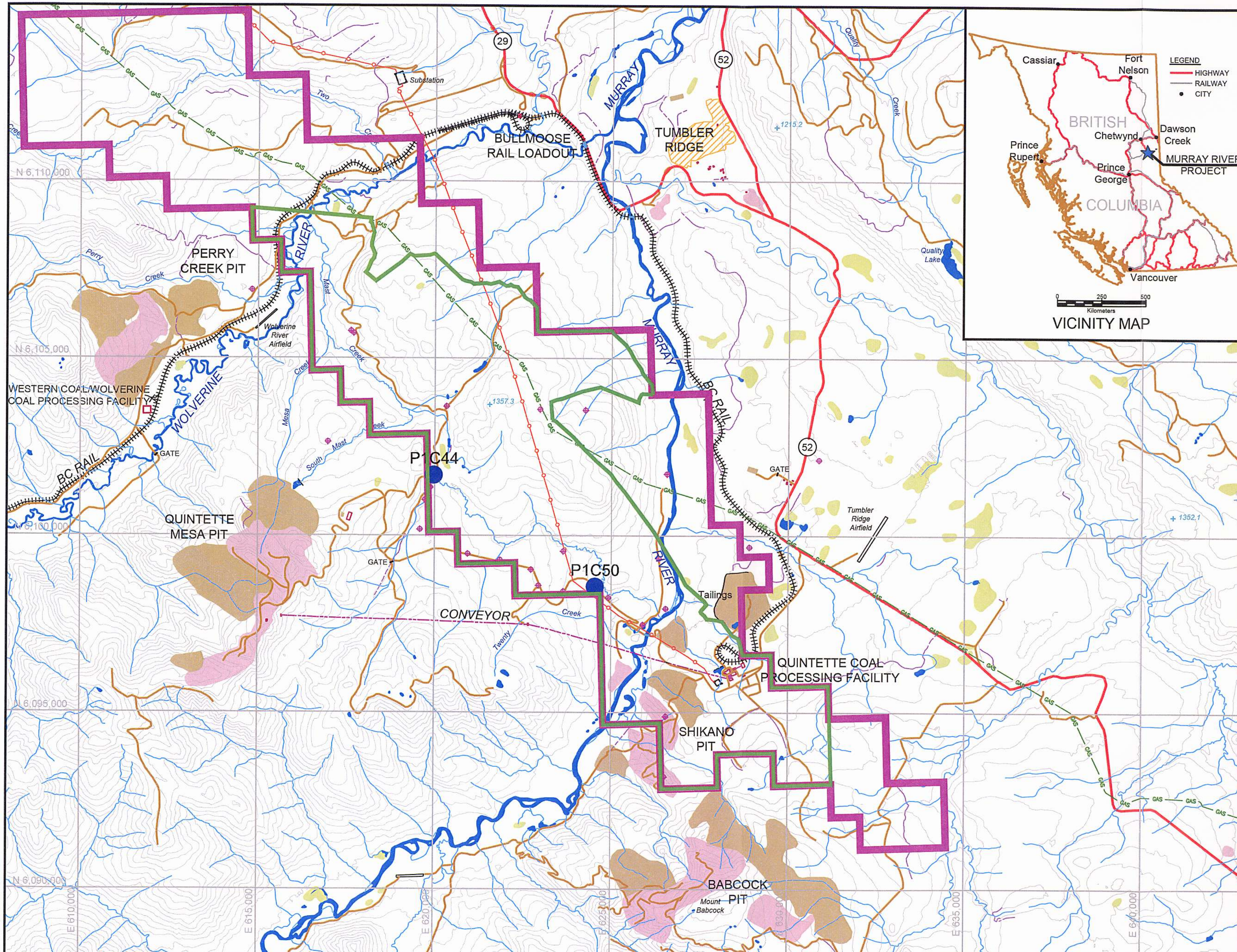
- General location map and position of the examined wells in relation to the area of interest.
- Clarification of the stratigraphic formation of the coal seams being tested.
- Identification of the coal seams tested.

Figure 9.1 shows the location of the core holes tested and reported by Petro-Logic, along with other drill hole locations and physiographic features of the Murray River coal license. The typical stratigraphic section encountered at Murray River has been previously introduced as Figure 4.1. The figure shows the stratigraphic relationship of the Lower Cretaceous Gates formation to the underlying Gething formation strata. The target coals seams for mine development are contained in the Gates formation, and are named Seams A through K in descending stratigraphic order. Table 9.1 illustrates the seams sampled for gas analysis and their lithologic descriptions.

To simplify the reviewing process, the following Norwest review of the Petro-Logic Report will reference the identical sections and identical section numbers as outlined in the original Petro-Logic Report itself. Norwest will use the correct hole numbers for those referenced by Petro-Logic throughout this report; namely the hole referenced by the Petro-Logic Report as PIC 44 will be called P1C44 and Petro-Logic's PIC 50 referred to as P1C50. This nomenclature is consistent with Dehua's Internal hole identification conventions.

Table 9.1 Methane Desorption Sample Summary

Sample #	Depth Top (m)	Depth Base (m)	Coal Seam ID	Lithology
Well: P1C44				
1	497.81	498.61	J	Coal, brt/sli dull
2	498.65	499.65	J	Coal, brt/sli dull
Well: P1C50				
1	675.78	676.28	E	Coal, blk, friable, shiny
2	679.48	679.88	E	Coal, blk, friable, shiny
3	704.27	704.88	F1	Coal,black,shiny,14cm parting
4	704.88	705.49	F1	Coal, blk, shiny
5	705.49	705.99	F1	Boney Coal, black, dull
6	707.02	707.32	F2	Boney Coal, black, dull
7	708.42	708.72	F2	Coal, black, bright
8	750.2	751.2	J	Coal, black, dull
9	752.13	753.05	J	Black, dull coal
10	753.46	755.26	J	Black, loose, detritus, mudstone parting



LEGEND

- LICENSE AREA
- DEVELOPMENT AREA
- BUILDING
- MAJOR ROAD
- MINOR ROAD
- TRAIL
- RAILWAY
- TRANSMISSION LINE
- GAS PIPELINE
- CONVEYOR
- 50 METER CONTOUR
- DRAINAGE
- WATER BODY
- WETLAND
- POPULATED AREA
- MINING AREA
- WASTE DUMP
- P1R35 METHANE TEST HOLES
- DRILLHOLES

0 1 2 3 4 5
Kilometers

Map Projection:
UTM NAD 83
Zone 10, meters

093P03	093P02
093I14	093I15

N

Base mapping data assembled from the above listed dataset blocks according to the National Topographic Data Base. www.geogratis.com

DEHUA

FIGURE 9.1

MURRAY RIVER PROJECT
METHANE GAS TEST
LOCATIONS

DATE: 05/17/2010
FILE: FIGE1_3.1 LOC
SCALE: 1:100000
NORWEST CORPORATION

COAL SAMPLING

Section 1.0 of the PL Report outlines that there were 12 samples taken from two wells, ten samples from the P1C50 well and two samples from the P1C44 well.

Within the "Summary" section of the PL Report the sampling methodology followed by Petro-Logic during the collection of the ten samples taken from the P1C50 well appears to have been performed correctly and to industry standards. It should also be noted that the amount of time taken to transfer the core samples into canisters at surface is also found acceptable. Samples from Well P1C50 took 46 minutes on average to retrieve, wash, photograph, describe, weigh and seal in a desorption canister. This is typical for samples retrieved at the depths found in these core holes.

There are issues, however, with the sample collection from Well P1C44 as described in the PL Report. Section 2.0 titled "Coal Sampling" states that "*In P1C44 two coal samples were selected by Dehua staff and were left at surface for several hours before being collected for desorption testing*". The fact that the two coal samples were desorbing at surface for several hours and combined with the lack of surface temperatures or pressure data during this time makes it is impossible to estimate lost gas values. Given these circumstances, Norwest would deem these two samples invalid.

Further reading of Section 2.0 of the PL Report reveals general statements about the core size being small, the core recovery being low and the actual core being highly fractured and sheared. It is common practice to quantify these observations to the extent possible to eliminate questions or confusion during interpretation. Highly fractured core could lead to inaccuracies in lost gas estimation due to the fact that a larger surface area of core is exposed, in turn creating artificial permeability. Additionally, it would have been helpful to have a record of the canister sizes used in the gas measurements.

GAS CONTENT

As a first step to validate Petro-Logic's total gas calculations, Norwest recalculated the measured and lost gas contents for three samples from the P1C50 well summarized in Table 3.1 of the PL Report. The samples that Norwest recalculated for Well P1C50 included Sample # 2, Sample # 6 and Sample #9, as well as Sample #1 from Well P1C44. The measured gas and lost gas values in all four cases were very similar to Petro-Logic's values.

HYDROGEOLOGY

Norwest was charged by Dehua with a review of the hydrology work done during the 2009-2010 exploration program at the Murray River site. All field operations, well equipment and original measurements were performed by AMEC Earth and Environmental (AMEC) of Prince George, BC. Norwest's role has been to comment on the methodology, interpretation and results of the work performed by AMEC for the project.

Norwest will use the hole number designations used by Dehua for this report. Those referenced by AMEC throughout their report were misinterpreted; namely the hole referenced by AMEC as PIR-35 will be referred to herein as P1R35. This nomenclature is consistent with Dehua's internal hole identification convention.

HYDROGEOLOGY REPORT

AMEC prepared a letter report dated April 1, 2010, from Tammera Kostya, Scott Green, and Dan Emerson addressed to James Luo titled "Packer Testing to Assess Bedrock Permeability, Tumbler Ridge, B.C." The report contains a description and results of four borehole packer permeability tests conducted in one 2010 exploration NQ diameter drill hole (P1R35). The drill hole location is shown on Figure 10.1. The drill hole is located approximately centrally on the southwest boundary of the License Area.

The four packer intervals tested at P1R35 are in a sequence logged as mudstones and sandstones. No coal seams were identified on the lithology log for P1R35. The packer intervals include a combination of sandstone and coal beds as shown in Table 10.1.

Table 10.1 Packer Test Interval Summary

Well	Test	Packer interval (m BGS)	Sandstones
P1R35	1	601-670	2
P1R35	2	552-600	1
P1R35	3	466-520	2
P1R35	4	272-355	3

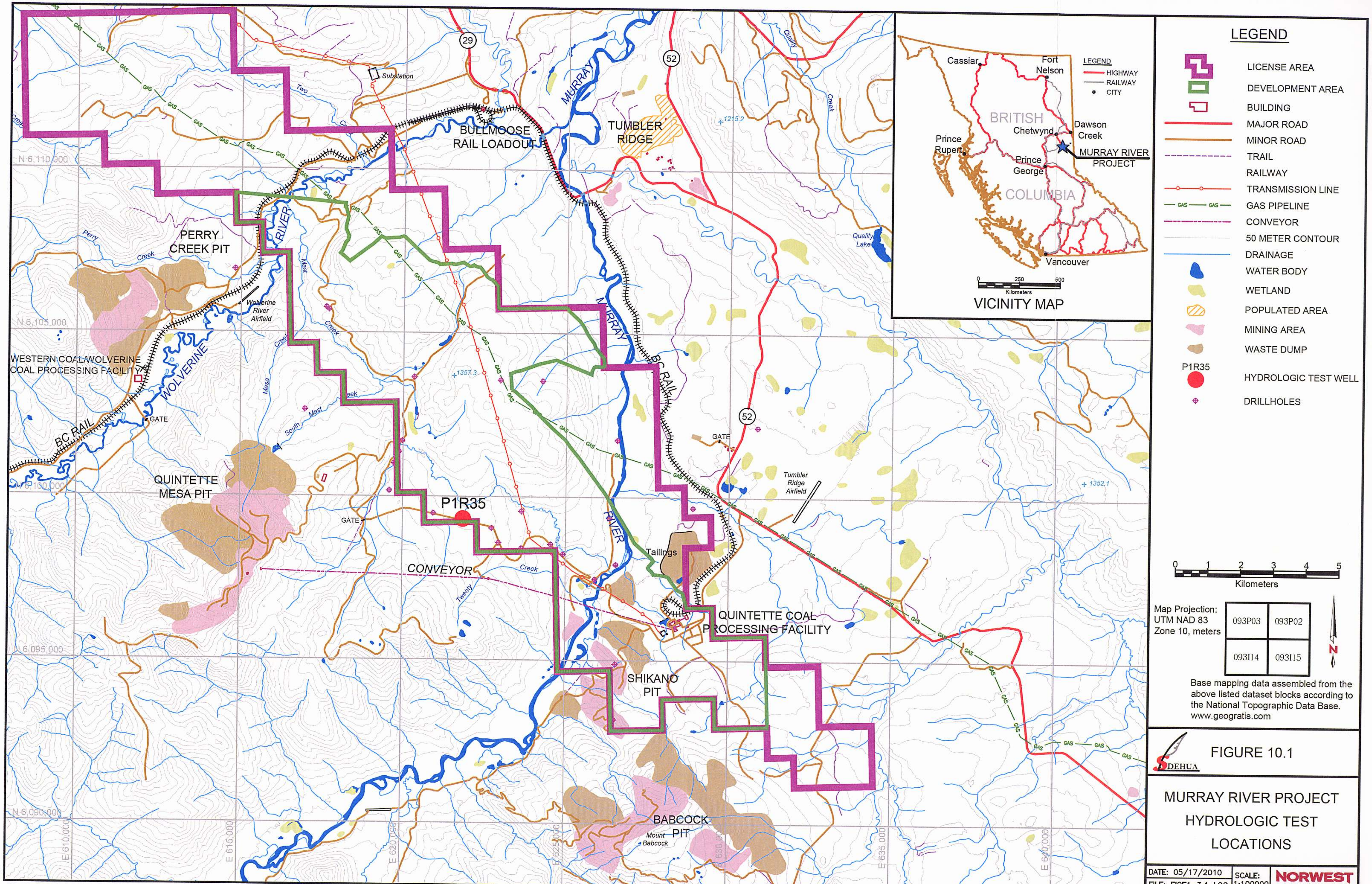


FIGURE 10.1

MURRAY RIVER PROJECT HYDROLOGIC TEST LOCATIONS

DATE: 05/17/2010
FILE: FIGE1_3.1 LOC
SCALE: 1:100000
NORWEST CORPORATION

Normally sandstones are significantly more permeable than mudstones. Testing across intervals of mixed high and low permeability lithologies will yield a transmissivity value (that is,permeability multiplied by saturated thickness) that translates into a composite permeability value (by dividing transmissivity by the packer interval) that is not representative of either lithology. The AMEC report indicates that the "broad-brush" transmissivity value will be augmented later with more detailed permeability estimates.

Drill hole P1R35 is reported as having a composite potentiometric head above ground level and thus it was a flowing open borehole after drilling to TD. Discrete test intervals were isolated using a single borehole top packer to seal the top of the interval, and the bottom of the borehole (Test 1), or the plugged back TD (Tests 2-4) to seal the bottom of the interval. An additional packer inside the drill string isolated the tubing pressure from the drill string pressure. A memory gauge in the test interval recorded pressure changes, and a digital flow meter recorded flows in the tubing.

The tests were performed using two methods, as follows:

Shut-In Pressure Buildup, Followed By Open Flow (Test 1)
In this test the interval was first isolated by setting the top packer. Then the tubing was shut in and the pressure buildup was recorded. There was no flow in the tubing during this period. The report refers to this test as a "recovery test". However, recovery tests usually follow pumping (also called discharge or drawdown) tests, which is not the case for this test interval. The term "shut-in" or "buildup" test is more appropriate. Following pressure equilibration, the tubing valve was opened and the pressure was allowed to fall. The report refers to this second stage as a "discharge test". However, it is normal to measure flow rates during a discharge test, and flows out of the test zone were not reported.

The method reported to interpret this test is very problematie. The method reported as used was the Cooper-Jacob method. However this method is intended for pumping tests, not shut-in tests. The equation presented resembles Jacob's simplification of the Theis equation. The graph presented has axes that match those normally used for the Theis residual recovery analysis. However, this method should not have been used for the data provided. The Theis residual recovery analysis is based on a period of pumping (at a constant discharge rate), followed by a period of recovery.

Conversely, for this test interval, the procedure was a period of equilibration (shut-in) followed by a period of discharge, unfortunately not reported. The analysis as presented requires a pumping rate, which during what the report refers to as "recovery" was zero. The report does state that the flow rate for this test interval was 0.17m^3/day. However, it is not clear when this was measured, and in context it appears to be before the shut-in period started. During what the report calls the "discharge period", test conditions are such that the discharge rate would have been variable and not suitable for a simple analytical-type test method.

One additional issue with this analysis (almost irrelevant as there are so many other problems) is that the buildup data shown in Appendix E do not appear to have completely equilibrated.

Step-Injection Specific Capacity Tests (Tests 2-4)
In these tests water was injected at a steady rate during 10-minute periods called "steps". The rate was increased and decreased in five successive steps. The pressure rate (i.e., test interval pressure relative to its original equilibrium pressure) at the end of each step was recorded. The ratio between the injection rate and the pressure increase was used to estimate transmissivity.

Again, interpretation of the data is problematic. Interpretations of this type are often referred to as "specific capacity" analyses, where specific capacity is defined as pumping rate divided by pressure change. The problem with all specific capacity methods is that they don't take pumping (or injection) duration into account. As drawdown (due to pumping) or buildup (due to injection) vary with time, methods that ignore time have limited validity. They are usually employed as semi-quantitative or comparative analyses, preferably with steps long enough for equilibration, i.e. from one to several hours. Using a specific capacity method after short steps of 10 minutes is very unlikely to produce useful results. The observation data graphs provided in the report are only 60mm x 25mm, almost illegible, and don't allow for equilibration to be assessed.

SUMMARY OF TESTING AND INTERPRETATION

In summary, the test data for all intervals may be useful, but none of the permeability interpretation is considered to be accurate or useful. These data may merit additional analysis and more useful interpretations may be possible, if performed correctly.

Additional hydrologic testing with correct procedures and applicable interpretation is warranted.

TASKS REQUIRED FOR MINE DESIGN AND PERMITTING

The following list is not intended to be a comprehensive summary of all activities required for mine design and permitting in BC, but covers the main issues that are usually required to be addressed:

1. **Establish Groundwater Piezometric Surface** - For each mappable/loggable unit (e.g. a coal seam), its outcrop elevations and perennial stream crossing elevations should be mapped, together with the results of water level observations by physically measuring water levels (e.g. using a hand-held electric well sounder), and any additional water level information that can be obtained from geophysical logs. These data should be used to create a potentiometric head map for each unit, to provide an initial indication of expected depth to water, directions of groundwater flow under non-pumping conditions, and locations of natural groundwater recharge and discharge.
2. **Increase Density of Tested Wells In Planned Mine Area** - Additional characterization of formation permeability on a tighter density commensurate with the scale of the mine. Test boreholes should be on 1,000 m spacing. Testing can be performed using exploration boreholes either converted to test wells with well casing and screens, or tested open hole using packers.
3. **Focus On Initial Area To Be Mined** - Characterization should initially focus on the shallower units as may produce the most water to a dewatering system, earlier in the mine development.
4. **Record Water Incursions and Levels During Drilling** - Observations of water levels, and water production (or losses) during drilling should be incorporated into any future drilling program, and the data compiled to support potentiometric head mapping, and mapping of the permeability distribution and its lithologic control.
5. **Overburden Sampling** - Overburden material should be sampled for leachability by rainwater/snowmelt, and for potential addition of metals and salts to surface waters.
6. **Pump Testing** - At least two interference-type pumping tests should be conducted using exploration boreholes converted to pumping wells (reamed to be able to accommodate a 4-inch electric submersible pump). These wells should be completed

at a depth that matches the shallower, higher-permeability coals, as determined from #1 and #2 above. Pressure tight pumping well seals will be required if wells exhibit artesian potentiometric heads.

a. Observation Wells With Pump Testing - Matching observation wells, which can be 2- or 4-inch piezometers, screened across the same depth interval, should be located approximately 20 m along strike from each pumping well.

b. Staged Well Tests - Well tests should be conducted in stages, with an initial pumping period to obtain samples for chemical analyses. Based on the groundwater analysis, water disposal permits for longer term pumping tests will be developed.

c. Well Instumentation and Monitoring - Each well should be instrumented as described below and background water table fluctuations monitored over at least 7 days to determine effects of precipitation events (if any), barometric changes, earth tides, etc. on background water levels.

d. Step Testing - Each well should then be step tested for 3 to 6 steps for a minimum of 1 hour per step, to determine the long-term pumping rate.

e. Presence of Methane - If there are any observations of gas production, all appropriate safety measures should be taken, the test program halted, and gas samples should be collected and tested for methane.

    i. If methane is present, the pumping program should be converted to an injection test program. The test analyses are very similar. However, injection pressures will have to be controlled to remain below frac pressure.

f. Pump Test Period - Each well should then be tested at the long-term pumping rate for a minimum of 3 days, followed by a period of recovery. The recovery period should be long enough to allow at least 90% water level recovery. Pumping and observation wells should be monitored using appropriately sized pressure transducers during both drawdown and recovery.

7. **Construct Groundwater Model** - Results of borehole characterization, well testing, and other permeability mapping techniques should be compiled into a digital 3-dimensional groundwater model, incorporating known recharge and

discharge areas, and used to design an advance dewatering program matching the proposed mine development plan. The model should be used to predict the probable volumes of water required to be removed by a dewatering system.

8. **Develop Mine Water Management Plan** - Predicted dewatering volumes should be compared with projected water requirements for coal washing or other mine activities, and a comprehensive Mine Water Management Plan developed that includes natural water flows, need for culverts and other surface water diversions, erosion control, produced water flows, water use in the mine plant, and both natural water and wastewater disposal.

CONCLUSION AND RECOMMENDATIONS

The purpose of this report was to summarize previous coal exploration work conducted within or nearby the Murray River property (Dehua license area), and to use this information to produce a geologic model from which to estimate coal resources and coal quality. The geologic model will form the basis for subsequent coal reserve estimation and pre-feasibility level mine planning to be conducted by Norwest. Aspects pertaining to the associated fields of geotechnical properties, coal mine methane potential, and hydrogeologic characterization were also addressed.

OVERVIEW OF GEOLOGY

The Murray River property is located within the Peace River Coalfield (PRC) and forms part of the Rocky Mountain foothills structural belt which lies to the east of the Canadian Rocky Mountain Trend. The Lower Cretaceous coals of the Gething and Gates formations, are the two main coal-bearing units occurring throughout the Foothills region. These coal measures were subjected to varying depths of burial prior to Laramide deformation and mountain-building episodes.

Exploration and mining in the PRC describes the coal seam geology as ranging from broad folds with bedding inclinations of less than 30 degrees to regions of extensive tectonic deformation characterized by tight folds and large fault off-sets. Coal seams of interest are contained within the Gates formation due to these coal measures being relatively shallow (<800m) in target areas and accessible for drilling and sampling. The majority of coal produced in the PRC is mined from this formation, mostly by surface extraction methods.

Five major Gates formation seams have been identified from the drillhole records in the license area. These are the J,G,F,D and E seams. Other minor seams that contribute to the coal resources in the license area are the K and F2 seams.

GEOLOGIC MODEL AND RESOURCES

The geologic data provided by Dehua and other public domain sources has enabled Norwest to compile a comprehensive geologic database and model of the license area. The model has been extended further west of the license area to provide geologic data

More detailed studies and comprehensive hydrologic studies are recommended for Dehua to proceed with a mine design and mining permit application in BC. These activities include:

- Establish Groundwater Piezometric Surface
- Increase Density of Tested Wells In Planned Mine Area
- Focus On Initial Area To Be Mined
- Record Water Incursions and Levels During Drilling
- Overburden Sampling
- Pump Testing
- Construct Groundwater Model
- Develop Mine Water Management.

RECOMMENDATIONS

Field Mapping

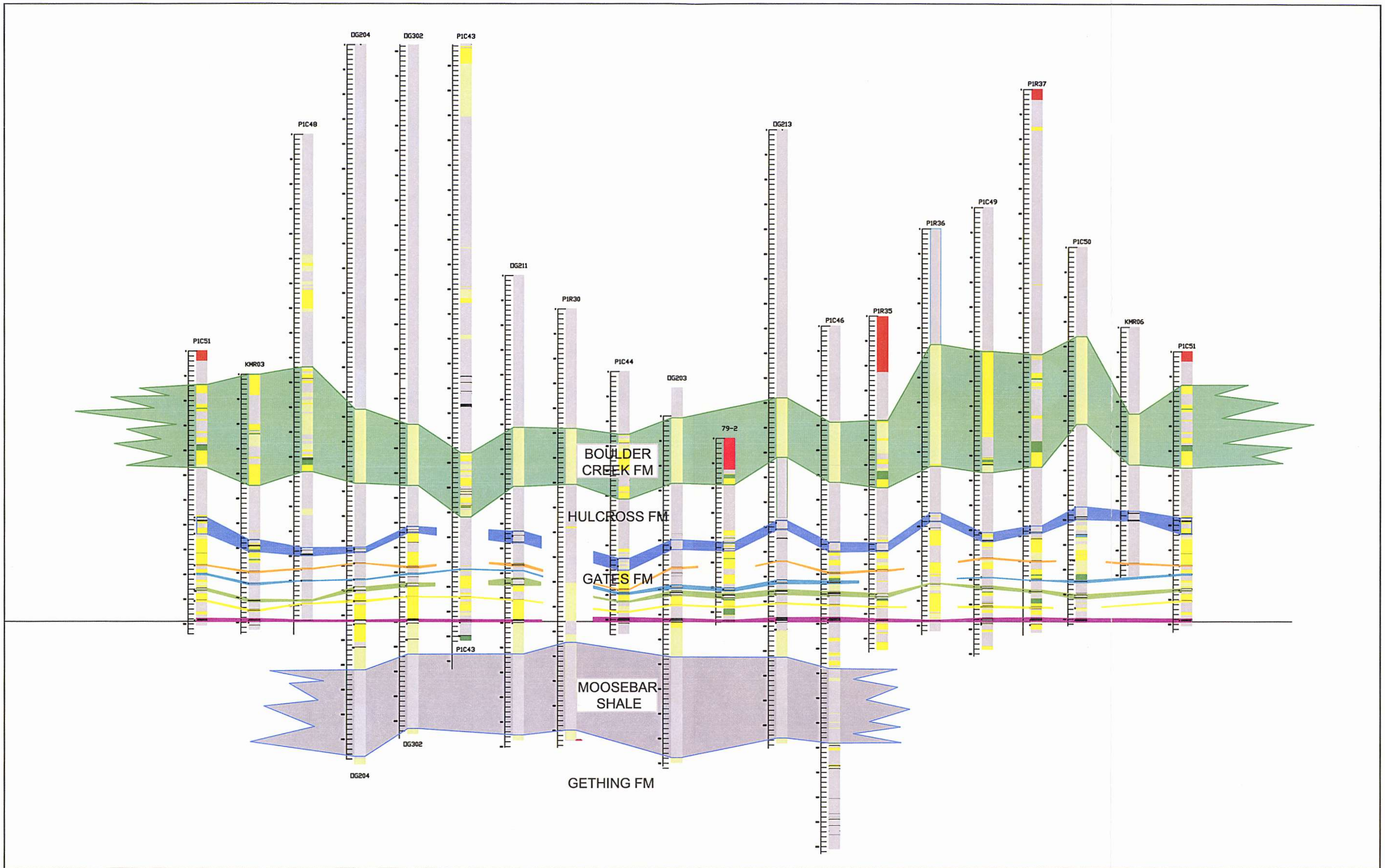
As part of the mining feasibility study it is recommended that a comprehensive field survey and mapping exercise be completed within the license area and surrounding properties. A high priority area would be the area surrounding the Quintette processing facility, Murray River and Shikano pit and/or the vicinity of the proposed portal site. Provided all the necessary permissions are obtained, Norwest would like to map this area to obtain a better understanding of the structure controls, geotechnical considerations and depth of weathering as well as locate seam crop (if present). This information can be fed into the geologic model and model updated. The time required to update the model would not negatively impact progress on the mining feasibility study. This information is viewed as critical in establishing potential portal or shaft sites, as well as improving the local accuracy of the geologic model and geotechnical model.

Field Assistance with Hydrologic Testing

It is Norwest understanding the Dehua planning an additional hydrologic test well in the vicinity their proposed mine portal location near the Murray River. Norwest would like to be involved with the field supervision whilst completing this hole to ensure that the appropriate sampling and testing methods are followed. It proposed that a Norwest hydrologist and geologist be present in the field during the completion of this hole. This will assist in the validation of the data as well as provide an opportunity for the geologist to conduct a basic field mapping survey of the region.

APPENDIX A

GEOLOGIC MODEL AND RESOURCE PLANS AND CROSS-SECTIONS



SEAMS

ABC	G	UNDEFINED	SILTSTONE
D	J	COAL	SANDSTONE
E	K	SHALE/ MUDSTONE	
F			

DATUM: BASE OF J SEAM

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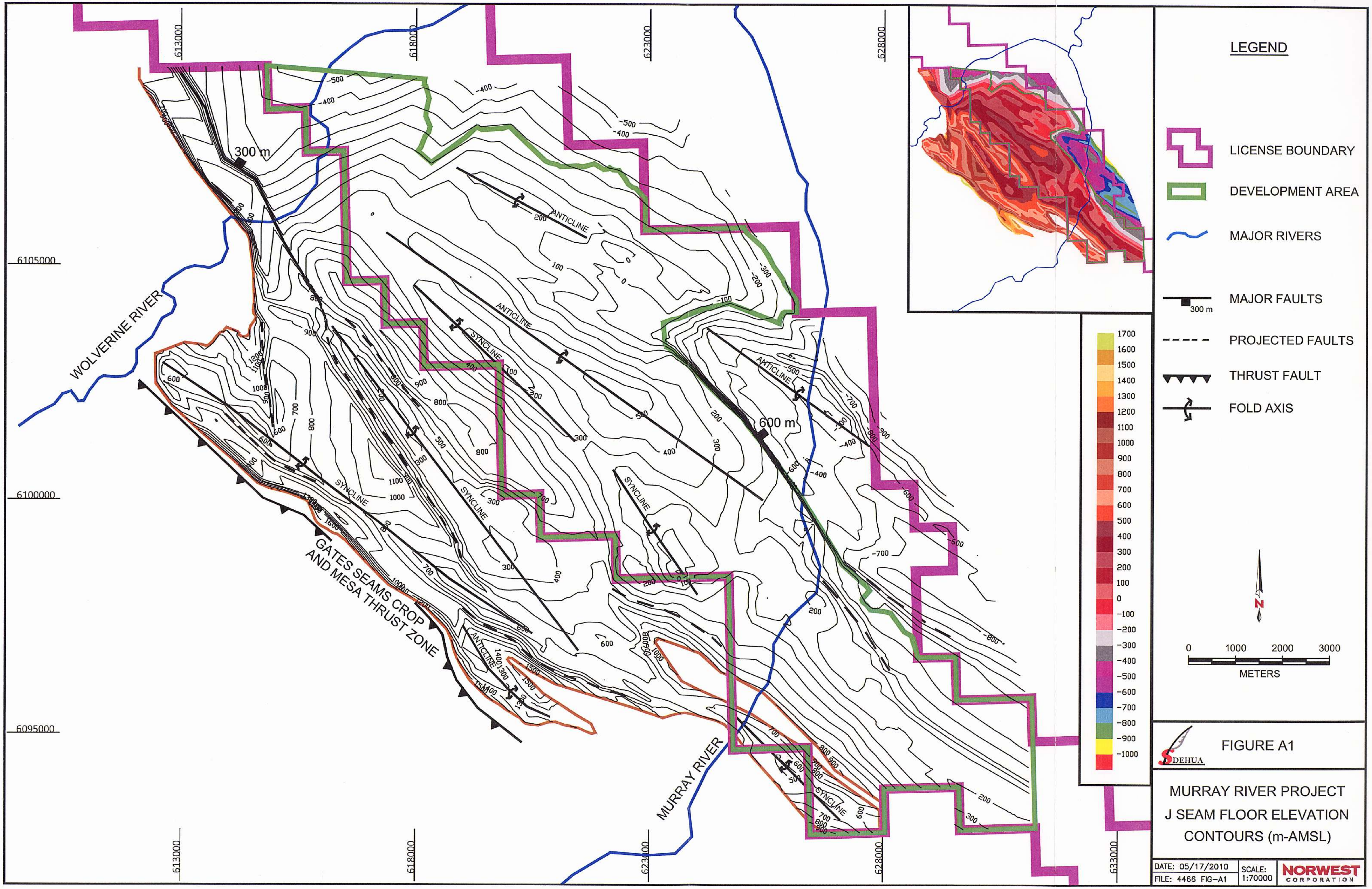
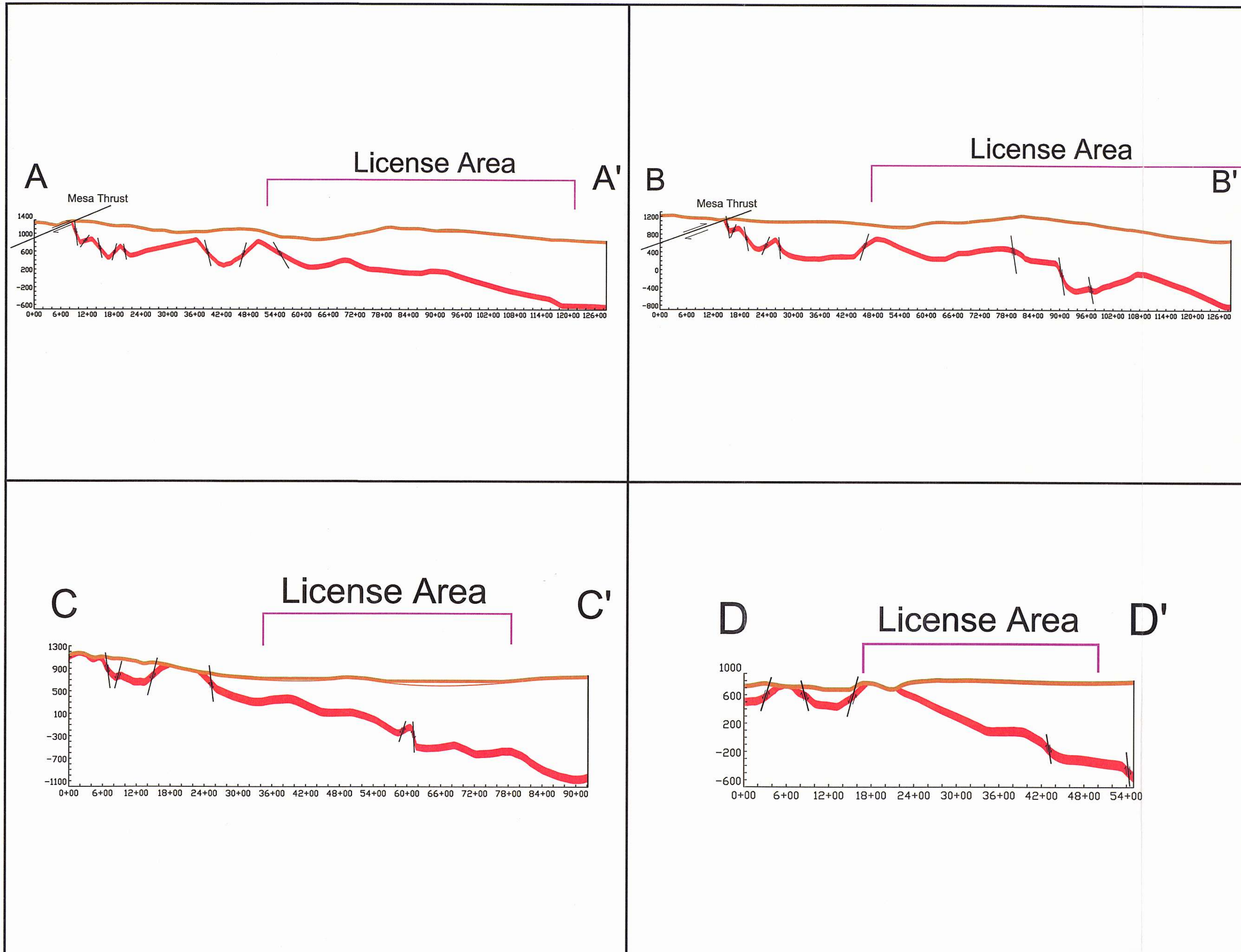
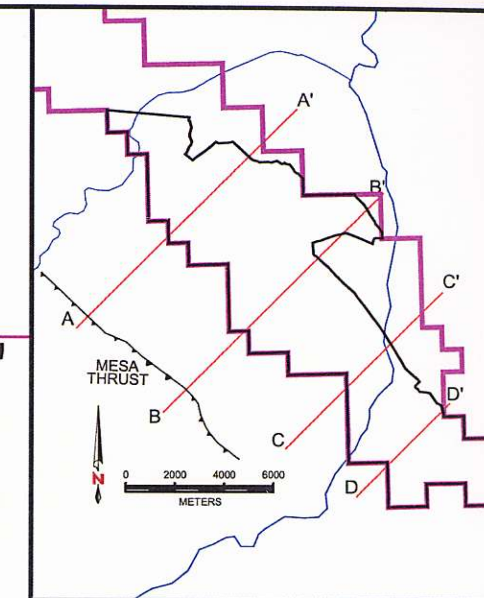
APPENDIX A

STRATIGRAPHIC CROSS-SECTION

DATE: 06/28/2010
FILE: 4466 APPENDIX A
SCALE: 1"=1500'
NORWEST CORPORATION


LEGEND
LICENSE BOUNDARY
DEVELOPMENT AREA
MAJOR RIVERS
MAJOR FAULTS
300 m
PROJECTED FAULTS
THRUST FAULT
FOLD AXIS
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
-100
-200
-300
-400
-500
-600
-700
-800
-900
-1000
N
0 1000 2000 3000
METERS
DEHUA
FIGURE A1
MURRAY RIVER PROJECT
J SEAM FLOOR ELEVATION
CONTOURS (m-AMSL)
DATE: 05/17/2010
FILE: 4466 FIG-A1
SCALE:
1:70000
NORWEST
CORPORATION
613000
618000
623000
628000
633000
6105000
6100000
6095000
WOLVERINE RIVER
MURRAY RIVER
GATES SEAMS CROP
AND MESA THRUST ZONE
ANTICLINE
SYNCLINE
300 m
600 m





LEGEND

LICENSE BOUNDARY

DEVELOPMENT AREA

MAJOR RIVERS

D-J SEAM INTERVAL

WEATHERED ZONE

TOPOGRAPHY

POTENTIAL FAULTS

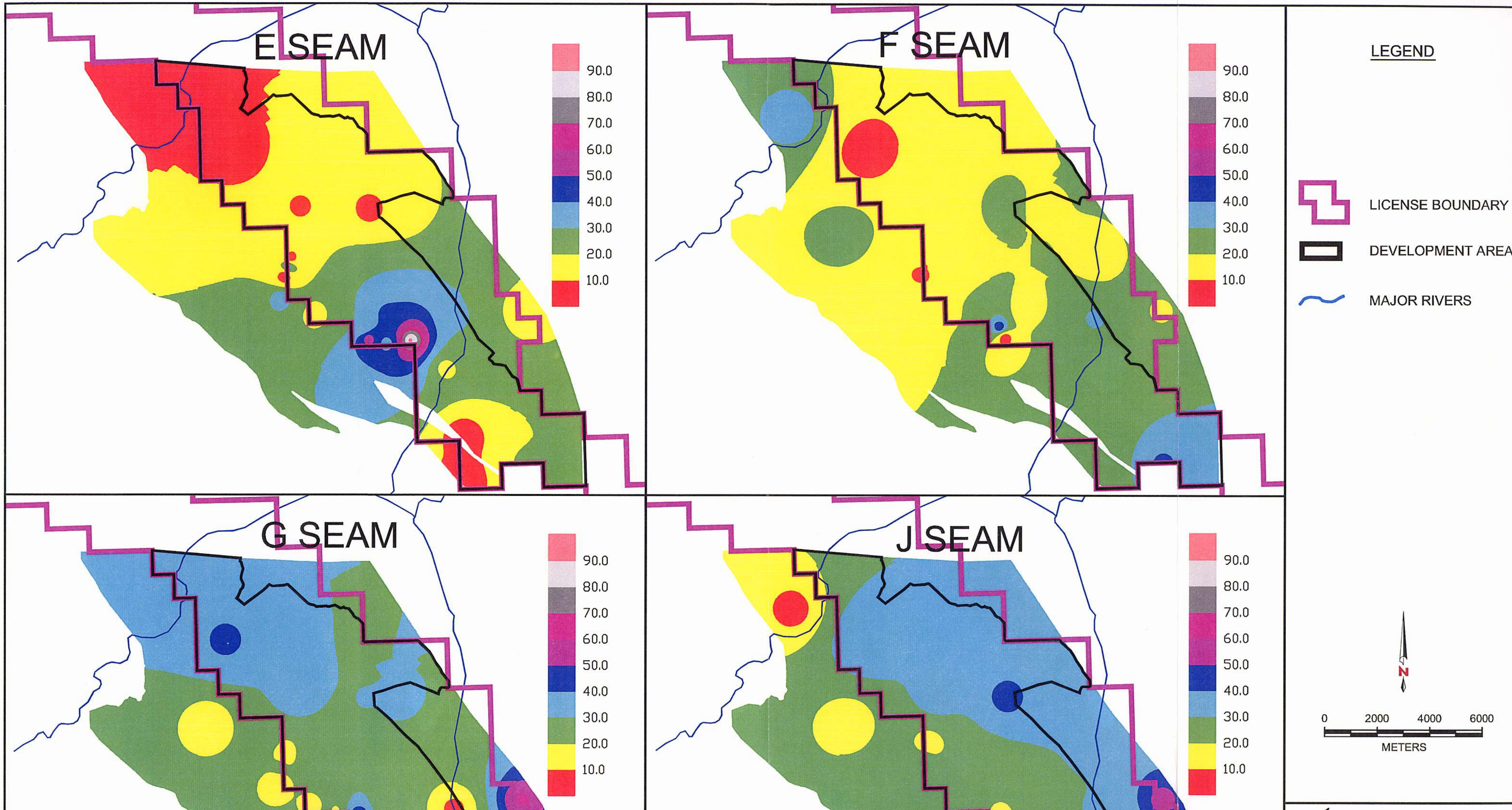
DEHUA

FIGURE A2

MURRAY RIVER PROJECT
WEST-EAST SECTIONS
THROUGH MODEL

DATE: 05/17/2010
FILE: 4466 FIG–A2

NORWEST
CORPORATION

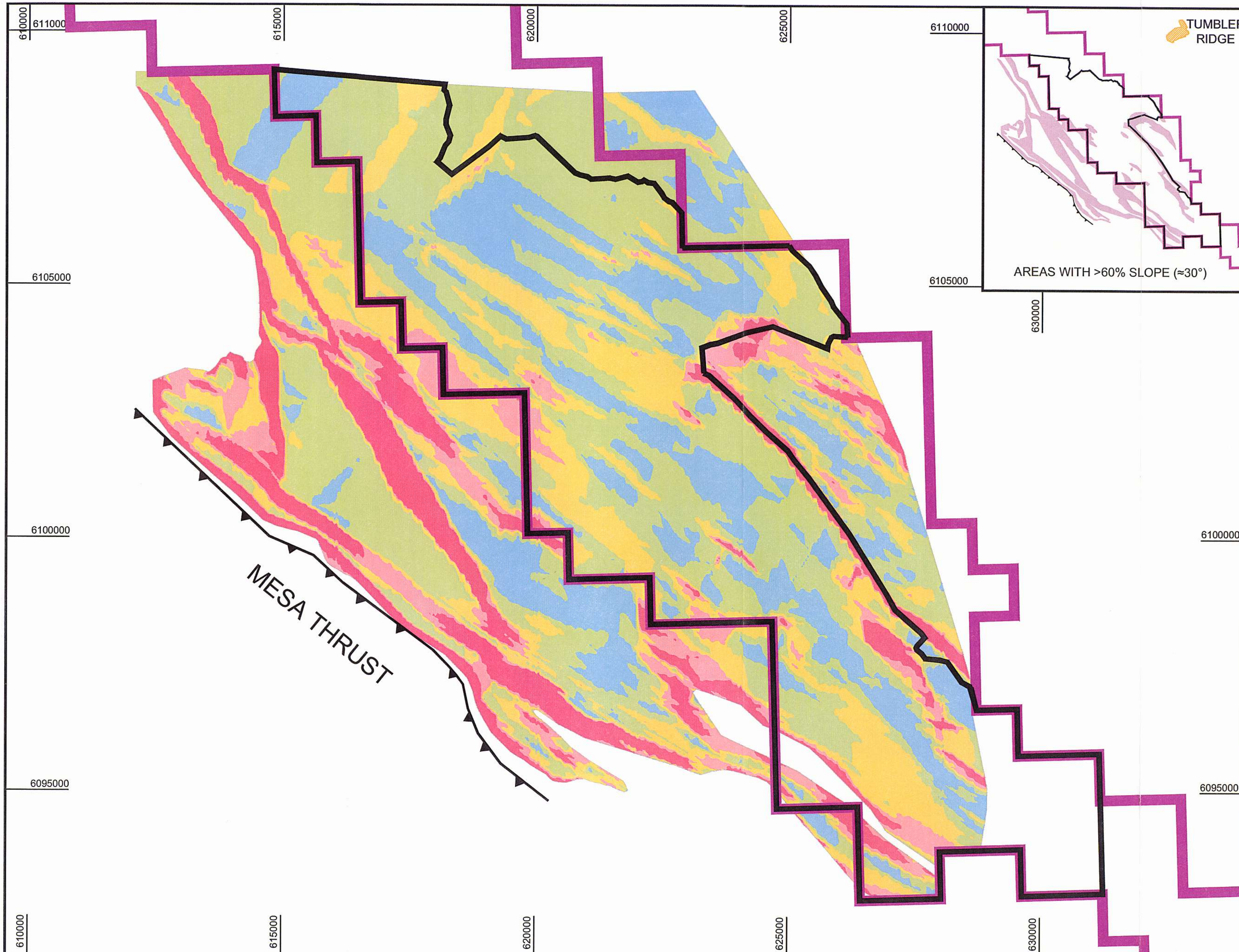


DEHUA

FIGURE A3

MURRAY RIVER PROJECT
MAJOR SEAM INTERBURDEN THICKNESS (m)

DATE: 05/17/2010	SCALE:	NORWEST CORPORATION
FILE: 4466 FIG-A3	1:140000	



LEGEND

80%
60%
40%
20%
% SLOPE

LICENSE BOUNDARY

DEVELOPMENT AREA

N

0 1000 2000 3000
Meters

DEHUA

FIGURE A4

MURRAY RIVER PROJECT
J SEAM
SLOPE ZONE ANALYSIS

DATE: 05/19/2010 FILE: MR_Slope_Anal	SCALE: 1:70000	NORWEST CORPORATION

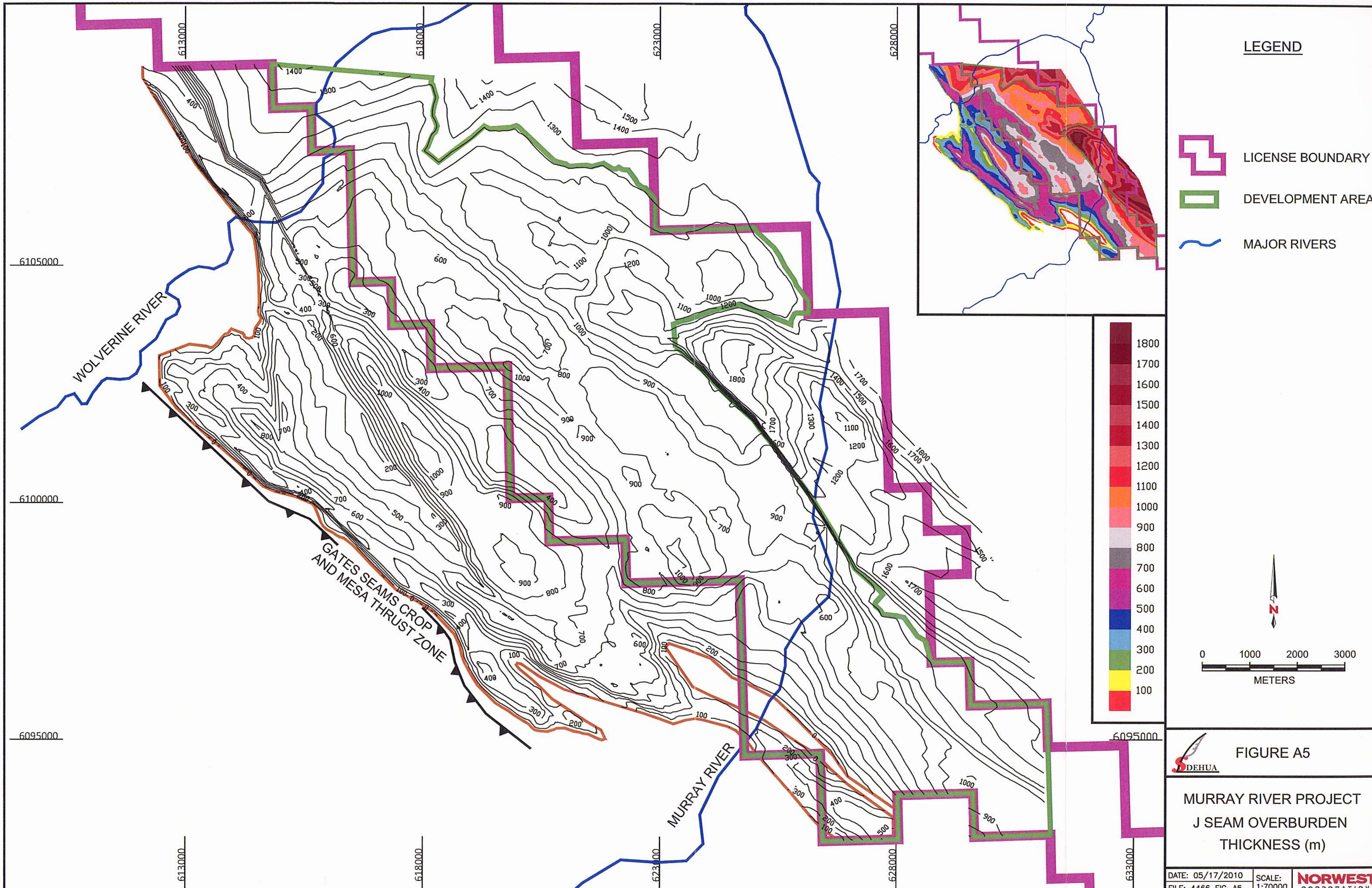
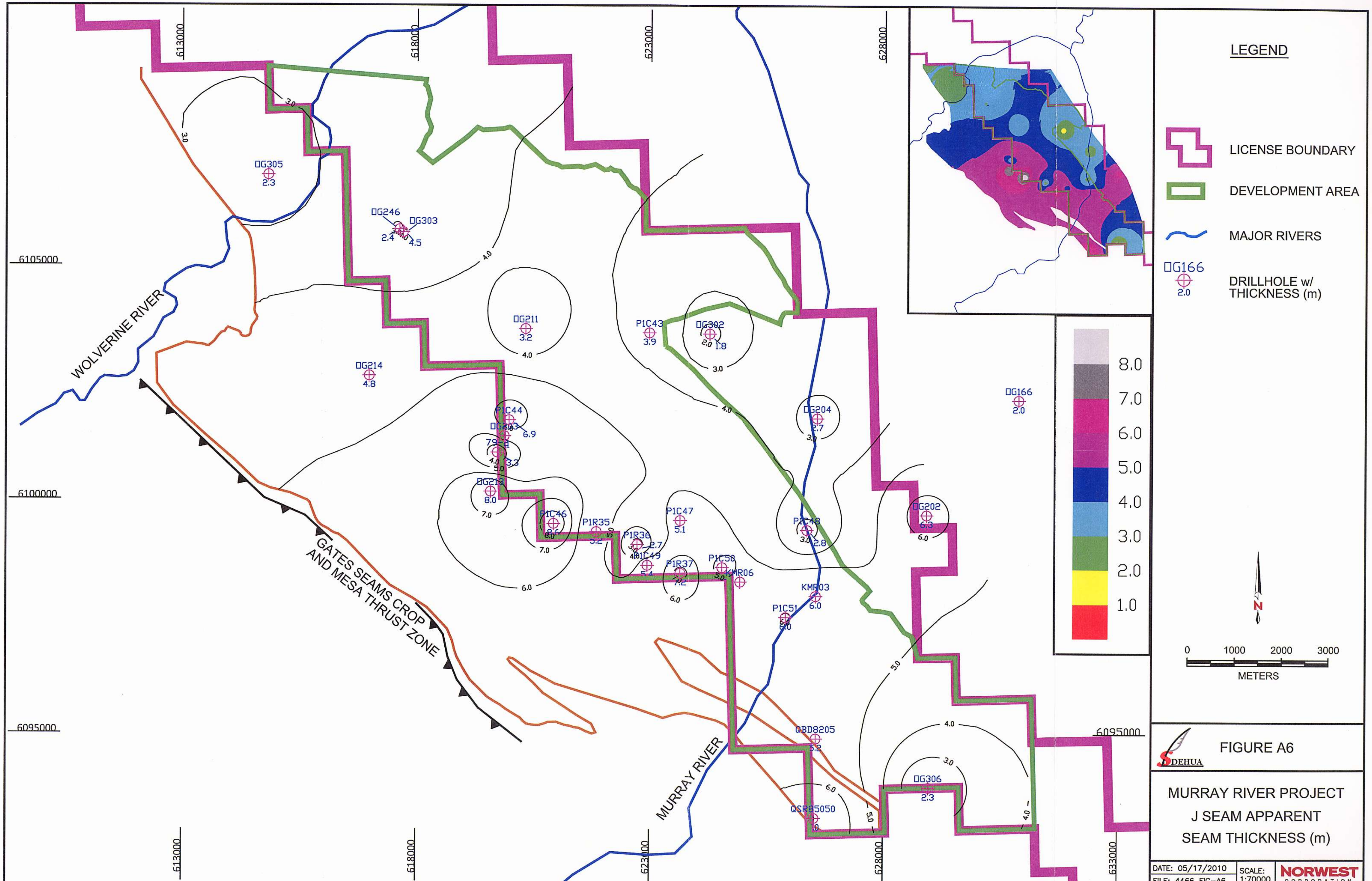


FIGURE A5

MURRAY RIVER PROJECT
J SEAM OVERBURDEN THICKNESS (m)


LEGEND
LICENSE BOUNDARY
DEVELOPMENT AREA
MAJOR RIVERS
DG166
2.0
DRILLHOLE w/ THICKNESS (m)
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
1000
2000
3000
METERS
N
WOLVERINE RIVER
GATES SEAMS CROP AND MESA THRUST ZONE
MURRAY RIVER
613000
618000
623000
628000
633000
6105000
6100000
6095000
DG305
2.3
DG246
2.4
DG303
4.5
DG211
3.2
DG214
4.8
P1C43
3.9
DG302
1.8
P1C44
6.9
DG204
2.7
DG166
2.0
DG213
8.0
P1C46
8.6
P1R35
5.2
P1C47
5.1
P1C48
2.8
DG202
6.3
KMR03
6.0
P1C51
DG306
2.3
QBD8205
5.2
QSR85050
SDEHUA
FIGURE A6
MURRAY RIVER PROJECT
J SEAM APPARENT
SEAM THICKNESS (m)
DATE: 05/17/2010
FILE: 4466 FIG–A6
SCALE: 1:70000
NORWEST CORPORATION

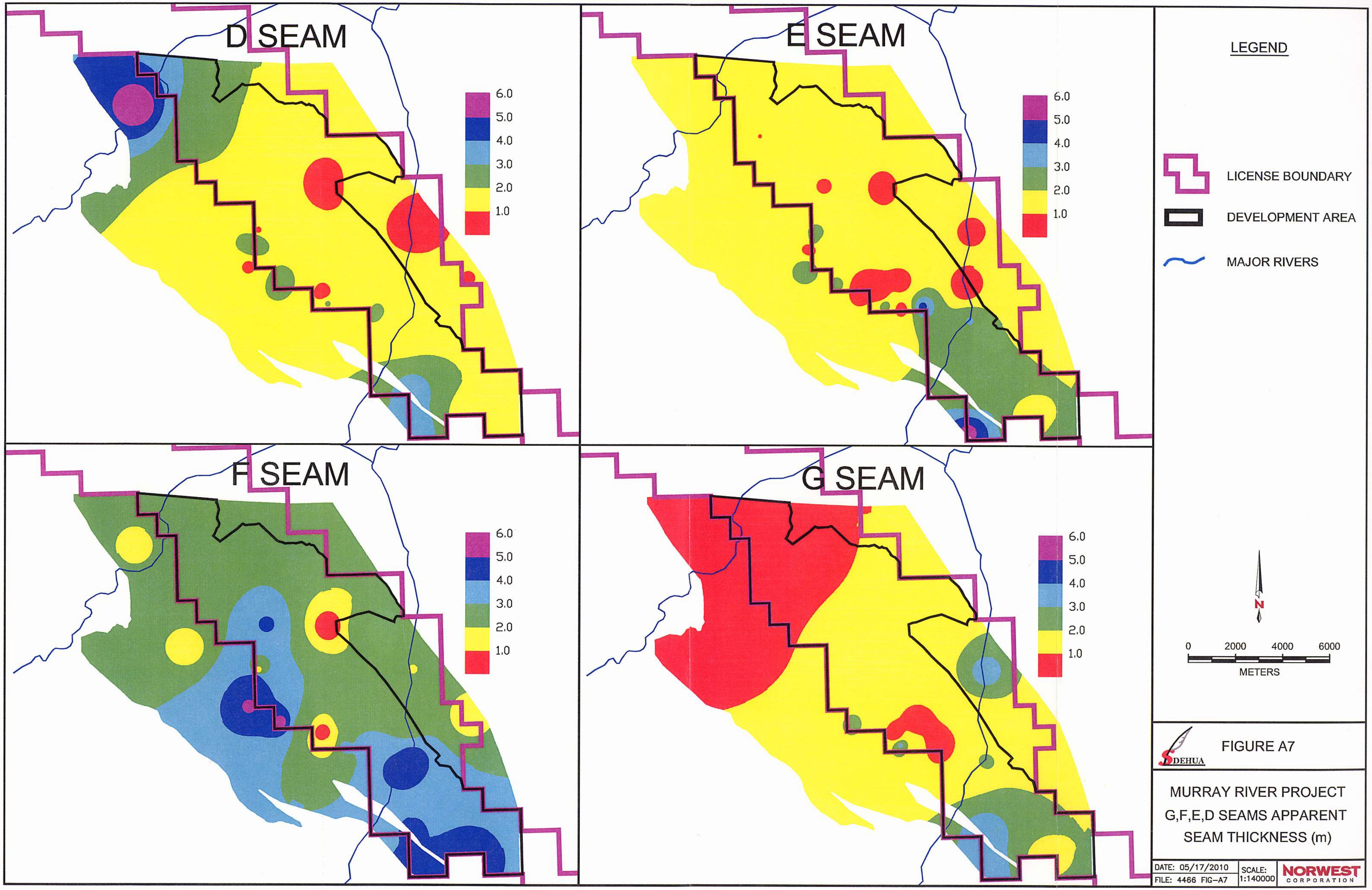


FIGURE A7

MURRAY RIVER PROJECT
G,F,E,D SEAMS APPARENT
SEAM THICKNESS (m)

APPENDIX D

GEOTECHNICAL TEST RESULTS

Hebei Coalfield Geological Research Institute

Rock Mechanical testing report

To: Canadian Dehua International Murray River Project P1-C51

Number	Sample Number	Depth M	GT sample Name	Ratio	Capacity	Water Ratio %	Water Absorption %	dilatancy %	Protodyakonov coefficient	Compression(Mpa) Average	Compression(Mpa) Variation range			Tensile(Mpa) Average	Tensile(Mpa) Variation range			Shear: angle of internal friction	Shear: Cohesion Coefficient	tangent modulus 10^5MPa	deformation parameter 10^5MPa	Poisson ratio
1041386	GT17	424.35-424.53	D coal seam roof1					0.10	7.2	72.5	68.8	72.8	76.0	4.5	4.0	4.6	5.0	42°45′	14.7	0.30	0.24	0.13
1041387	GT18	431.50-431.72	D coal seam direct roof2					0.10	6.3	62.7	63.6	58.8	65.6	3.5	3.0	3.5	4.0	40°39′	12.8	0.36	0.33	0.16
1041388	GT19	436.05-436.26	D coal seam direct floor3					0.10	6.4	64.5	66.4	63.2	64.0	4.5	3.9	4.6	5.0	42°12′	13.4	0.36	0.29	0.21
1041389	GT22	438.75-438.92	E coal seam roof4					0.30	4.0	40.3	43.2	40.0	37.6	1.4	1.5	1.4	1.3	37°24′	5.7	0.28	0.23	0.27
1041390	GT23	447.34-447.58	E coal seam direct roof5					0.60	3.1	31.1	30.4	30.8	32.0	1.1	1.2	1.1	1.0	36°40′	6.1	0.20	0.18	0.27
1041391	GT24-25	454.48-454.88	E coal seam direct floor6					0.50	3.7	37.3	36.0	36.8	39.2	1.8	2.0	1.7	1.6	37°14′	6.7	0.25	0.27	0.21
1041392	GT26	458.03-458.24	E coal seam floor7					1.10	2.2	22.0	22.0	24.0	20.0	1.8	1.7	1.9	1.9	34°20′	4.1	0.18	0.14	0.32
1041393	GT27	458.44-458.67	F coal seam roof8					0.80	2.8	28.1	31.2	26.0	27.2	1.3	1.5	1.2	1.1	34°39′	4.4	0.16	0.18	0.23
1041394	GT28	468.50-468.69	F coal seam roof9					0.20	5.4	54.5	51.6	55.6	56.4	3.3	3.6	3.0	3.4	41°49′	12.8	0.30	0.26	0.14
1041395	GT29	476.27-476.46	F coal seam direct roof10					0.10	5.8	57.9	60.0	58.8	54.8	3.2	3.0	2.9	3.6	37°28′	7.1	0.30	0.25	0.23
1041396	GT30-31	482.72-483.20	F coal seam direct floor11					0.30	3.9	39.2	38.4	40.0	39.2	1.8	2.0	1.9	1.6	37°24′	5.9	0.28	0.23	0.26
1041397	GT32	488.83-488.99	F coal seam floor12					0.50	2.5	24.9	24.8	23.2	26.8	1.1	0.9	1.1	1.2	34°33′	4.1	0.17	0.17	0.23
1041398	GT33	489.50-489.70	G coal seam roof13					0.10	10.3	102.8	108.0	101.6	98.8	6.3	5.6	6.1	7.2	43°48′	15.7	0.38	0.34	0.18
1041399	GT34	499.13-499.35	G coal seam direct roof14					0.10	7.8	77.9	75.2	77.6	79.2	5.1	5.0	5.4	4.9	41°49′	13.2	0.40	0.38	0.23
1041400	GT35-36	507.90-508.28	I coal seam direct floor15					0.10	7.5	75.1	76.0	76.8	72.4	6.0	6.8	5.8	5.5	41°55′	12.7	0.49	0.38	0.20
1041401	GT37-40	510.15-510.37	I coal seam floor16					0.10	5.6	55.9	58.8	56.0	52.8	3.3	3.7	3.2	3.0	39°41′	9.8	0.38	0.35	0.21
1041402	GT41	530.35-530.57	J coal seam roof17					0.40	3.3	32.9	32.0	31.6	35.2	1.1	1.0	1.1	1.1	37°28′	4.9	0.22	0.19	0.29
1041403	GT42	542.70-543.00	J coal seam direct roof18					0.80	2.2	22.5	20.8	22.8	24.0	0.9	1.0	0.9	0.8	33°20′	3.7	0.26	0.26	0.25
1041404	GT43	543.92-544.09	J coal seam direct roof19					0.50	4.4	34.9	42.8	44.0	44.8	1.6	1.5	1.6	1.7	37°34′	6.2	0.28	0.35	0.35
1041405	GT44	551.00-551.25	J coal seam direct floor20					0.20	4.6	46.0	46.4	44.0	47.6	1.9	2.2	1.7	1.8	38°17′	6.4	0.25	0.21	0.21
1041406	GT45	551.75-551.93	J coal seam direct floor21					0.30	3.3	32.8	31.2	32.0	35.2	1.4	1.6	1.4	1.2	35°29′	6.0	0.18	0.17	0.24

Technical supervisor : Verify : Table prepared by : Lanxin Li Date:

Hebei Coalfield Geological Research Institute

Rock Mechanical testing report

To: Canadian Dehua International Murray River Project P1-C49

Number	Sample Number	Depth M	GT sample Name	Ratio	Capacity	Water Ratio %	Water Absorption %	dilatancy %	Protodyakonov coefficient	Compression(Mpa)				Tensile(Mpa)				Shear		tangent modulus 10^5MPa	deformation parameter 10^5MPa	Poisson ratio
										Average	Variation range			Average	Variation range			angle of internal friction	Cohesion Coefficient			
1041364	GT19	678.30-687.50	D coal seam roof1					0.20	7.3	73.3	67.4	75.0	77.6	4.8	5.0	4.9	4.4	40°39′	8.2	0.40	0.32	0.27
1041365	GT20	698.17-698.40	D coal seam roof2					0.20	3.5	35.2	33.2	35.7	36.7	1.2	1.1	1.2	1.3	34°20′	5.2	0.18	0.18	0.16
1041366	GT21-22	707.32-708.20	D coal seam direct roof3					0.30	8.7	87.4	91.8	87.8	82.7	3.6	4.0	3.6	3.1	40°32′	8.9	0.50	0.43	0.30
1041367	GT23	710.47-741.64	D coal seam direct floor4					0.10	3.1	30.6	29.6	30.6	31.6	0.8	0.7	0.8	0.9	33°29′	4.4	0.14	0.14	0.20
1041368	GT24	711.37-711.59	D coal seam floor 5					0.30	8.4	84.2	86.7	84.2	81.6	3.3	2.7	3.1	4.1	39°27′	6.9	0.37	0.33	0.21
1041369	GT25	718.37-718.62	D coal seam floor 6					0.10	8.3	82.8	79.1	81.6	87.8	4.6	5.1	4.6	4.1	41°27′	11.8	0.33	0.28	0.20
1041370	GT29	743.12-743.35	F coal seam roof7					0.10	9.6	96.3	104.1	95.9	88.8	4.8	5.1	4.8	4.4	40°17′	10.2	0.32	0.28	0.25
1041371	Gt30	753.58-753.78	F coal seam roof8					0.10	6.0	59.9	60.2	63.3	56.1	2.7	3.0	2.6	2.5	37°29′	5.2	0.24	0.22	0.27
1041372	GT31-32	761.13-762.58	F coal seam direct roof9					0.20	7.4	74.5	77.6	75.0	70.9	2.7	2.5	2.7	2.9	39°27′	8.4	0.40	0.35	0.29
1041373	GT35-36	770.65-770.87	F coal seam direct floor10					0.10	5.5	54.6	55.6	56.1	52.0	2.6	3.2	2.5	2.1	37°29′	7.9	0.26	0.25	0.19
1041374	GT37-38	773.15-773.68	F coal seam floor 11					0.20	5.8	58.0	61.2	57.1	55.6	2.4	2.7	2.3	2.1	40°39′	9.2	0.25	0.21	0.17
1041375	GT40	778.30-778.94	G coal seam roof12					0.10	7.2	72.1	66.8	71.9	77.6	4.0	3.5	3.9	4.7	40°41′	8.9	0.28	0.23	0.17
1041376	GT41	796.23-796.41	G coal seam roof13					0.10	4.7	47.1	44.9	46.9	49.5	2.2	2.7	2.1	1.8	36°27′	5.1	0.19	0.19	0.21
1041377	GT42	796.41-796.73	G coal seam parting 14					0.30	4.8	48.5	48.5	51.0	45.9	2.7	2.3	2.7	3.1	37°49′	6.7	0.19	0.21	0.29
1041378	GT43-44	801.43-812.00	G coal seam floor 13					0.30	10.2	102.4	96.9	102.6	107.7	5.7	5.2	5.6	6.2	42°54′	12.4	0.31	0.28	0.24
1041379	GT45-46	805.91-806.63	I coal seam roof 16					0.10	6.9	69.2	69.4	71.9	66.3	2.6	2.5	2.8	2.6	37°49′	7.2	0.39	0.34	0.21
1041380	GT47-48	810.73-811.88	I coal seam direct floor17					0.10	11.0	109.7	123.0	102.0	104.1	6.1	6.4	6.1	5.8	41°27′	12.4	0.41	0.44	0.20
1041381	GT49	819.23-819.48	I coal seam floor18					0.10	9.5	95.1	86.7	97.5	101.0	5.0	4.5	5.0	5.4	40°39′	9.9	0.28	0.28	0.19
1041382	GT50	827.02-827.22	J coal seam roof19					0.10	4.4	43.9	45.9	44.9	40.8	1.4	1.5	1.5	1.1	35°42′	7.2	0.15	0.15	0.28
1041383	GT51	829.34-829.51	J coal seam direct roof20					0.70	2.8	28.4	28.1	23.9	33.2	0.9	0.9	0.9	1.0	34°27′	4.2	0.17	0.18	0.27
1041384	GT52-53	836.14-836.53	J coal seam direct floor21					0.10	8.6	85.7	87.8	86.7	82.7	3.6	3.5	3.4	3.8	37°42′	8.2	0.32	0.32	0.23
1041385	GT54	841.75-842.00	J coal seam floor22					0.10	10.2	101.9	104.6	102.0	98.9	5.0	4.5	5.0	5.5	42°50′	12.4	0.37	0.35	0.18

Technical supervisor : Verify : Table prepared by: Lanxin Li Date:

Hebei Coalfield Geological Research Institute

Rock Mechanical testing report

To: Canadian Dehua International Murray River Project P1-C47

Number	Sample Number	Depth M	GT sample Name	Ratio	Capacity	Water Ratio %	Water Absorption %	dilatancy %	Protodyakonov coefficient	Compression(Mpa) Average	Compression(Mpa) Variation range			Tensile(Mpa) Average	Tensile(Mpa) Variation range			Shear angle of internal friction	Shear Cohesion Coefficient	tangent modulus 10^5MPa	deformation parameter 10^5MPa	Poisson ratio
1041342	GT9-10	704.69-705.23	C coal seam roof1					0.10	7.2	72.2	71.8	72.8	72.0	4.8	5.0	4.9	4.6	41°49′	11.8	0.34	0.32	0.24
1041343	GT11	720.61-720.81	C coal seam roof 2					0.10	6.5	65.5	62.0	66.8	67.8	4.5	4.0	4.6	4.9	42°12′	11.9	0.39	0.35	0.24
1041344	GT12	727.30-727.50	C coal seam floor3					0.10	6.1	60.8	56.8	60.8	64.8	3.5	3.0	3.6	4.0	40°32′	10.0	0.36	0.35	0.31
1041345	GT15	753.28-753.46	D coal seam roof4					0.10	5.4	54.3	54.4	56.4	52.0	2.7	2.7	3.0	2.4	39°30′	9.0	0.38	0.32	0.24
1041346	GT16	759.14-759.33	D coal seam roof5					0.10	6.9	69.2	72.4	69.6	65.6	3.6	3.5	4.0	3.4	41°32′	10.2	0.31	0.30	0.29
1041347	GT17-18	768.74-769.12	D coal seam direct roof6					0.40	4.0	39.7	37.6	40.0	41.6	2.2	3.0	2.1	1.6	38°39′	6.2	0.22	0.20	0.26
1041348	GT19-20	771.16-771.72	D coal seam direct floor7					0.20	4.8	47.7	45.6	48.0	49.6	3.6	3.6	3.1	4.0	39°27′	6.7	0.33	0.23	0.22
1041349	GT21	778.80-779.05	D coal seam floor8					0.20	4.7	47.5	46.0	46.8	49.6	2.7	3.3	2.2	2.6	37°34′	6.2	0.32	0.28	0.21
1041350	GT25	807.20-807.43	E coal seam roof 9					0.10	7.0	69.9	68.8	67.2	73.6	4.7	4.4	4.6	5.0	43°29′	15.8	0.39	0.35	0.27
1041351	GT26	816.96-817.18	E coal seam roof 10					0.30	4.2	42.5	44.8	42.8	40.0	1.6	1.6	1.7	1.5	39°37′	7.2	0.21	0.19	0.29
1041352	GT27-28	824.43-825.12	F coal seam direct roof11					0.60	2.2	22.5	22.0	24.8	20.8	0.7	0.7	0.7	0.8	34°27′	4.2	0.24	0.16	0.32
1041353	GT29-30	828.22-828.62	F coal seam direct floor12					0.10	5.3	53.3	54.4	56.0	49.6	4.3	4.2	4.6	4.1	38°24′	7.0	0.37	0.34	0.20
1041354	GT31	837.36-837.53	F coal seam floor13					0.10	3.7	37.2	36.8	35.2	39.6	1.8	2.2	1.6	1.7	37°42′	5.7	0.21	0.23	0.16
1041355	GT32	837.78-838.01	G coal seam roof 14					0.50	1.9	18.8	17.6	18.8	20.0	0.7	0.7	0.8	0.6	34°33′	4.1	0.19	0.16	0.32
1041356	GT33-34	841.68-842.64	G coal seam direct floor15					0.10	5.4	53.9	54.4	56.4	50.8	3.3	3.7	3.1	3.0	37°24′	7.9	0.39	0.33	0.20
1041357	GT35	852.25-852.45	G coal seam floor16					0.10	6.2	61.9	58.8	62.0	64.8	4.0	3.5	4.0	4.6	40°39′	10.2	0.25	0.25	0.16
1041358	GT36	860.19-860.39	Jcoal seam direct roof 17					0.10	4.6	46.3	47.2	48.0	43.6	1.8	2.0	1.7	1.6	37°50′	6.2	0.31	0.26	0.26
1041359	GT37	862.59-862.85	J coal seam floor 18					0.20	4.0	40.3	42.0	40.0	38.8	5.7	2.0	1.6	1.5	39°20′	5.8	0.31	0.27	0.22
1041360	GT38	871.00-871.28	J coal seam roof19					0.10	6.6	66.1	62.8	64.8	70.8	4.8	4.5	4.9	5.0	42°38′	13.1	0.27	0.24	0.26
1041361	GT39	878.08-878.31	J coal seam direct roof20					0.10	5.2	51.7	56.4	50.8	48.0	2.7	2.5	2.7	3.0	39°40′	9.1	0.43	0.38	0.24
1041362	GT40-41	881.40-881.85	J coal seam direct roof21					0.30	2.5	25.1	24.8	26.4	24.0	1.7	2.1	1.6	1.4	34°21′	4.1	0.18	0.17	0.30
1041363	GT42-43	888.80-889.45	J coal seam direct floor22					0.50	2.7	26.8	25.2	27.2	28.0	1.1	1.2	1.2	1.0	35°49′	4.4	0.15	0.14	0.24

Technical supervisor : Verify : Table prepared by : Lanxin Li Date:

Hebei Coalfield Geological Research Institute

Rock Mechanical testing report

To: Canadian Dehua International Murray River Project P1-C43 (This hole is not standard testing sample, the data only be used for reference)

Number	Sample Number	Depth M	GT sample Name	Ratio	Capacity	Water Ratio %	Water Absorption %	dilatancy %	Protodyakonov coefficient	Compression(Mpa)				Tensile(Mpa)				Shear		tangent modulus 10^5MPa	deformation parameter 10^5MPa	Poisson ratio
										Average	Variation range			Average	Variation range			angle of internal friction	Cohesion Coefficient			
1041209	GT1-2	1056.60-1057.52	A coal seam direct roof 1					0.10	5.0	50.4	52.4	50.8	48.0	1.4	1.3	1.4	1.5	38°39′	7.9	0.28	0.27	0.20
1041210	GT3-4	1059.48-1060.00	A coal seam direct floor 2					0.30	4.2	42.0	42.0	44.0	40.0	1.5	1.4	1.5	1.6	37°40′	6.2	0.28	0.25	0.30
1041211	GT5-6	1062.95-1063.60	B coal seam direct roof 3					0.20	4.7	47.5	49.6	48.0	44.8	1.5	1.2	1.6	1.7	36°50′	6.7	0.35	0.36	0.22
1041212	GT7-8	1065.30-1066.35	B coal seam direct floor 4					0.70	3.3	32.9	30.0	32.0	36.8	1.4	1.2	1.4	1.5	35°12′	4.7	0.18	0.17	0.30
1041213	GT9-10	1074.48-1080.24	B coal seam floor 5					0.10	5.7	56.7	54.8	56.4	58.8	3.0	2.3	2.8	3.8	42°41′	13.0	0.37	0.33	0.23
1041214	GT11-29	1085.82-1196.00	C coal seam roof 6					0.40	3.8	37.6	38.0	35.2	39.6	1.5	1.2	1.6	1.7	37°21′	6.2	0.23	0.22	0.21
1041215	GT29-1	1202.24-1202.51	C coal seam roof 7					1.30	1.8	17.7	17.6	18.8	16.8	0.9	0.9	0.9	1.0	33°27′	4.1	0.13	0.11	0.27
1041216	GT30	1208.57-1208.79	C coal seam direct roof 8					0.40	3.3	33.1	32.4	31.6	35.2	1.4	1.3	1.4	1.5	37°34′	6.2	0.29	0.24	0.35
1041217	GT32	1213.85-1214.15	C coal seam direct roof 9					0.50	3.3	33.1	31.6	32.0	35.6	1.0	0.9	1.0	1.1	37°42′	5.8	0.25	0.24	0.30
1041218	GT33	1214.99-1215.23	C coal seam direct floor 10					0.70	3.6	36.1	32.0	36.8	39.6	1.2	1.0	1.2	1.4	34°39′	5.6	0.21	0.21	0.17
1041219	GT34	1216.60-1216.93	C coal seam direct floor 11					0.50	3.2	32.0	30.0	32.0	34.0	1.1	1.0	1.1	1.2	36°27′	5.2	0.20	0.18	0.23
1041220	GT35	1222.54-1222.74	C coal seam direct floor 12					0.40	4.3	42.5	40.0	42.8	44.8	1.9	2.0	1.9	1.9	37°17′	6.2	0.26	0.25	0.18
1041221	GT36-40	1228.46-1248.23	D coal seam roof 13					0.20	3.4	33.9	32.0	32.8	36.8	1.4	1.5	1.4	1.2	34°59′	6.2	0.26	0.22	0.31
1041222	GT43-44	1269.01-1269.50	D coal seam direct roof 14					0.50	5.0	50.3	50.8	48.0	52.0	2.1	2.2	2.2	2.0	38°27′	6.9	0.36	0.38	0.22
1041223	GT45-46	1271.30-1272.54	D coal seam direct floor 15					0.10	4.8	48.1	46.0	47.6	50.8	1.6	1.5	1.6	1.8	39°40′	6.8	0.24	0.21	0.23
1041224	GT47	1278.47-1278.69	D coal seam direct floor 16					0.40	2.7	26.8	26.0	28.0	26.4	1.2	1.1	1.2	1.2	37°24′	4.2	0.19	0.16	0.25
1041225	GT48	1285.22-1285.50	D coal seam floor 17					0.50	3.5	34.7	32.0	35.2	36.8	1.7	1.5	1.6	2.0	37°28′	6.2	0.20	0.20	0.24
1041226	GT50	1298.83-1299.13	D coal seam roof 18					0.10	5.7	57.1	52.4	58.8	60.0	3.3	2.7	3.0	4.1	40°27′	12.1	0.36	0.31	0.21
1041227	GT51	1305.30-1305.77	E coal seam roof 19					0.20	4.2	41.9	40.0	40.8	44.8	2.4	2.0	2.1	3.0	39°49′	7.2	0.24	0.23	0.17
1041228	GT52	1310.50-1310.85	E coal seam roof 20					0.20	5.0	49.7	47.2	49.6	52.4	3.1	3.2	3.4	2.6	40°12′	9.9	0.39	0.26	0.23
1041229	GT53-54	1314.93-1315.34	E coal seam direct roof 21					0.80	2.3	23.5	22.0	24.0	24.4	1.5	1.4	1.5	1.5	37°41′	4.2	0.17	0.16	0.39
1041230	GT55-56	1320.30-1320.83	E coal seam direct floor 22					0.30	3.8	38.3	38.0	40.0	36.8	2.0	2.0	2.1	1.9	37°50′	6.2	0.23	0.21	0.26
1041231	GT57-58	1321.11-1321.61	F coal seam direct roof 23					0.50	1.8	18.1	16.4	18.8	19.2	1.3	1.1	1.2	1.5	35°27′	4.7	0.15	0.12	0.38
1041232	GT59-60	1322.41-1322.84	F coal seam direct roof 24					0.10	3.2	32.1	32.0	31.6	32.8	1.7	2.0	1.6	1.5	35°30′	6.2	0.25	0.21	0.26
1041233	GT61	1332.90-1333.20	F coal seam floor 25					0.20	3.1	31.3	30.8	31.2	32.0	1.3	1.5	1.4	1.1	35°29′	6.5	0.27	0.26	0.27
1041234	GT62	1342.10-1342.40	G/I coal seam roof 26					0.60	3.8	37.9	40.0	38.8	34.8	1.7	1.5	1.7	2.0	35°50′	6.2	0.30	0.29	0.32
1041235	GT63-64	1347.00-1347.43	G/I coal seam direct roof 27					0.10	3.1	31.1	30.4	30.8	32.0	1.4	1.2	1.4	1.5	34°29′	4.7	0.26	0.27	0.19
1041236	GT65-66	1350.24-1350.78	G/I coal seam direct floor 28					0.20	5.4	53.7	52.0	56.0	53.2	3.1	2.5	3.1	3.6	40°17′	9.7	0.37	0.33	0.23

Technical supervisor : Verify : Table prepared by : Lanxin Li Date:

Hebei Coalfield Geological Research Institute

Rock Mechanical testing report

To: Canadian Dehua International   Murray River Project P1-C44

Number	Sample Number	Depth M	GT sample Name	Ratio	Capacity	Water Ratio %	Water Absorption %	dilatancy %	Protodyakonov coefficient	Compression(Mpa)				Tensile(Mpa)				Shear		tangent modulus 10^5MPa	deformation parameter 10^5MPa	Poisson ratio
										Average	Variation range			Average	Variation range			angle of internal friction	Cohesion Coefficient			
1041237	GT1-2	376.60-377.04	A coal seam direct roof1					0.20	4.7	47.4	45.9	46.9	49.5	1.3	1.3	1.3	1.4	34°27′	6.2	0.25	0.26	0.18
1041238	GT3-4	378.14-378.60	A coal seam direct floor2					0.10	6.3	62.8	60.2	63.3	64.8	1.3	1.2	1.3	1.4	35°24′	7.2	0.39	0.31	0.26
1041239	GT5-9	386.18-420.02	A coal seam floor3					0.10	8.2	82.3	86.7	82.7	77.6	4.6	4.0	5.0	4.9	41°37′	14.1	0.51	0.54	0.19
1041240	GT10	427.02-427.27	F coal seam roof 4					0.10	7.8	78.2	82.1	76.0	76.5	2.9	2.7	3.0	3.1	40°39′	12.4	0.31	0.30	0.27
1041241	GT11	434.95-435.19	F coal seam roof 5					0.20	8.3	83.3	82.1	79.1	88.8	5.6	5.0	5.5	6.3	43°40′	14.7	0.31	0.31	0.20
1041242	GT12	442.17-442.41	F coal seam direct roof6					0.10	3.8	38.3	38.3	40.8	35.7	1.0	1.0	1.0	1.1	34°47′	5.7	0.20	0.21	0.14
1041243	GT13（1-2）	445.45-445.90	F coal seam direct roof7					0.10	6.3	63.3	63.8	64.8	61.2	2.0	2.0	2.0	2.1	39°27′	11.7	0.35	0.35	0.19
1041244	GT13（-3）	448.67-449.15	F coal seam direct floor8					0.10	5.3	53.4	51.0	53.1	56.1	1.4	1.2	1.4	1.5	37°20′	7.8	0.28	0.21	0.14
1041245	GT14	456.94-457.24	F coal seam floor9					0.10	8.4	83.7	79.1	85.2	86.7	4.1	3.6	4.6	4.1	42°41′	12.1	0.41	0.40	0.22
1041246	GT15-16	461.78-462.38	G/I coal seam direct roof10					0.10	5.6	56.5	53.6	56.1	59.7	2.0	2.0	1.8	2.1	40°17′	9.2	0.28	0.35	0.18
1041247	GT17-18	463.98-464.40	G/I coal seam direct floor11					0.10	1.5	14.6	14.8	13.8	15.3	0.3	0.3	0.3	0.2	30°39′	2.7	0.09	0.07	0.35
1041248	GT19	476.20-476.50	G/I coal seam floor12					0.10	4.8	48.5	48.5	45.9	51.0	1.4	1.3	1.4	1.5	37°24′	7.1	0.27	0.28	0.25
1041249	GT20	482.52-482.72	J1 coal seam direct roof13					0.10	4.8	47.8	57.1	45.4	40.8	1.0	0.9	0.8	1.3	32°49′	4.2	0.27	0.28	0.19
1041250	GT21	483.57-483.72	J1coal seam parting14					0.20	3.9	38.9	35.7	39.3	41.8	1.0	1.2	1.0	0.9	31°41′	3.9	0.16	0.12	0.25
1041251	GT22-23	485.20-485.68	J1 coal seam direct floor15					0.10	5.1	51.4	53.6	51.0	49.5	1.3	1.7	1.2	0.9	34°24′	5.1	0.29	0.23	0.17
1041252	GT24	487.66-487.96	J2 coal seam roof 16					0.10	6.6	66.0	71.4	65.3	61.2	2.4	2.2	2.5	2.6	35°24′	7.0	0.24	0.21	0.20
1041253	GT25-26	494.16-494.56	J2 coal seam direct roof17					0.10	5.3	52.9	55.6	56.1	46.9	1.2	1.3	1.2	1.0	34°30′	4.2	0.31	0.28	0.23
1041254	GT27-28	502.50-503.10	J2 coal seam direct floor18					0.20	4.9	48.8	49.5	51.0	45.9	1.5	1.2	1.5	1.7	37°24′	6.1	0.27	0.28	0.28
1041255	GT29	515.00-515.23	J2 coal seam floor 19					0.10	9.2	92.0	87.8	92.4	95.9	4.9	4.6	5.1	4.9	43°27′	15.4	0.37	0.36	0.17

Technical supervisor：   Verify：   Table prepared by： Lanxin Li   Date:

Hebei Coalfield Geological Research Institute

Rock Mechanical testing report

To: Canadian Dehua International　　　　Murray River Project P1-C46

Number	Sample Number	Depth M	GT sample Name	Ratio	Capacity	Water Ratio %	Water Absorption %	dilatancy %	Protodyakonov coefficient	Compression(Mpa) Average	Compression(Mpa) Variation range			Tensile(Mpa) Average	Tensile(Mpa) Variation range			Shear angle of internal friction	Shear Cohesion Coefficient	tangent modulus 10^5MPa	deformation parameter 10^5MPa	Poisson ratio
1041256	GT1-9	153.44-401.24	B coal seam roof1					0.10	5.4	54.3	56.8	54.8	51.2	1.7	1.7	1.7	1.6	37°24′	6.2	0.34	0.31	0.21
1041257	GT10-11	435.25-435.83	B coal seam direct roof 2					0.10	5.6	56.3	54.0	58.8	56.0	2.0	2.4	2.1	1.6	39°41′	10.2	0.39	0.38	0.25
1041258	GT12-13	437.10-437.70	B coal seam direct floor 3					0.10	7.3	73.1	72.8	76.8	69.6	4.4	3.6	4.5	5.0	41°39′	12.1	0.40	0.35	0.25
1041259	GT14-15	454.60-455.10	C coal seam direct floor 4					0.20	5.7	56.8	59.6	56.0	54.8	1.6	1.5	1.5	1.7	40°39′	9.7	0.42	0.39	0.24
1041260	GT16-19	458.26-498.46	D coal seam parting6					0.10	8.6	86.0	80.4	84.4	93.2	4.7	4.3	4.6	5.2	42°30′	13.1	0.37	0.34	0.22
1041261	GT20	495.75-496.00	D coal seam direct roof 5					0.10	9.1	90.8	91.6	84.4	96.4	5.2	5.2	5.4	5.0	40°43′	12.7	0.29	0.30	0.12
1041262	GT21	499.45-499.73	D coal seam direct floor 7					0.30	4.7	46.8	47.2	43.6	49.6	2.3	2.5	2.1	2.3	39°31′	9.2	0.31	0.36	0.17
1041263	GT22	508.71-509.00	E coal seam roof 8					0.10	5.2	51.9	50.0	50.8	54.8	1.9	2.0	1.9	1.7	40°39′	11.2	0.28	0.30	0.15
1041264	GT23	512.85-513.13	E coal seam direct roof 9					0.40	3.7	36.9	38.0	35.2	37.6	1.1	1.3	1.0	0.9	37°24′	6.0	0.30	0.31	0.20
1041265	GT24	513.77-513.95	E coal seam direct roof 10					0.08	2.8	27.9	27.2	28.0	28.4	0.9	0.8	0.9	0.9	34°30′	4.2	0.18	0.18	0.23
1041266	GT25	517.00-517.30	E coal seam parting11					0.60	3.3	33.2	32.4	32.0	35.2	1.2	1.2	1.2	1.2	33°27′	4.2	0.21	0.20	0.19
1041267	GT26	518.17-519.16	E coal seam direct floor 10					0.20	4.6	46.3	46.8	48.0	44.0	2.0	2.2	2.0	1.9	34°43′	6.2	0.37	0.35	0.20
1041268	GT27	528.17-528.40	F coal seam roof 11					0.10	9.4	94.3	91.6	96.4	94.8	4.3	4.9	4.1	3.8	43°27′	15.7	0.37	0.37	0.18
1041269	GT28	534.02-534.38	F coal seam direct roof 12					0.10	5.3	53.5	56.0	54.8	49.6	2.1	2.3	2.1	2.0	34°40′	6.2	0.34	0.31	0.19
1041270	GT29	540.37-540.80	F coal seam direct floor 13					0.20	4.4	44.3	42.0	44.0	46.8	2.2	2.0	1.9	2.6	39°54′	8.2	0.20	0.19	0.16
1041271	GT30	543.00-543.30	F coal seam direct floor 14					0.40	3.2	31.9	31.2	32.0	32.4	1.2	1.2	1.2	1.3	33°24′	4.1	0.18	0.18	0.22
1041272	GT31	544.85-545.15	F coal seam floor 15					0.10	8.6	86.3	82.0	87.2	89.6	4.7	4.3	4.8	4.9	42°34′	13.0	0.40	0.34	0.22
1041273	GT32	557.00-557.23	G/I coal seam roof 16					0.10	10.2	101.6	99.6	100.4	104.8	5.6	5.0	5.8	6.0	43°17′	14.8	0.36	0.35	0.20
1041274	GT33-34	560.18-560.65	G/I coal seam direct roof 17					0.30	4.8	47.9	46.0	49.6	48.0	3.8	4.0	4.5	2.8	35°30′	6.7	0.31	0.35	0.26
1041275	GT35	562.33-562.62	G/I coal seam parting18					0.10	5.1	50.5	50.8	52.4	48.4	3.2	3.6	3.1	2.9	39°29′	9.7	0.29	0.25	0.20
1041276	GT36	563.88-564.20	G/I coal seam direct floor 19					0.10	6.2	61.9	64.0	62.8	58.8	3.9	3.8	3.8	4.0	40°39′	10.2	0.29	0.27	0.13
1041277	GT37	573.64-574.00	J coal seam roof 20					0.10	9.0	89.6	84.0	89.6	95.2	4.6	4.0	4.9	5.0	42°40′	13.9	0.40	0.41	0.22
1041278	GT38	586.20-586.50	J coal seam direct roof 21					0.30	4.1	41.2	40.8	44.0	38.8	2.3	2.2	2.2	2.5	33°20′	4.1	0.35	0.28	0.28
1041279	GT39-40	595.70-596.26	J coal seam direct floor 22					0.50	5.1	50.7	50.0	47.2	54.8	2.5	2.4	2.5	2.6	39°17′	7.1	0.23	0.21	0.27
1041280	GT41	597.00-597.20	K coal seam direct roof 23					0.20	4.1	41.3	44.8	39.2	40.0	2.3	2.6	2.4	2.0	34°33′	6.2	0.33	0.31	0.27
1041281	GT42-43	598.30-598.85	K coal seam direct floor 24					0.10	7.4	73.9	68.8	75.2	77.6	5.1	4.9	5.0	5.5	42°34′	14.7	0.37	0.33	0.24
1041282	GT44-64	612.27-822.00	K coal seam direct floor 25					0.10	7.4	73.9	71.6	73.6	76.4	3.5	3.4	3.5	3.6	39°41′	10.7	0.28	0.27	0.19

Technical supervisor :　　　Verify :　　　Table prepared by :　Lanxin Li　　　Date:

Hebei Coalfield Geological Research Institute

Rock Mechanical testing report

To: Canadian Dehua International Murray River Project P1-C46

Number	Sample Number	Depth	GT sample	Ratio	Capacity	Water Ratio	Water Absorption	ilatanc	odyako efficie	Compression(Mpa)				Tensile(Mpa)				Shear		tangent modulus	eformatio paramete	oisson rati
		M	Name			%	%	%		Average	Variation range			Average	Variation range			angle of nternal frictio	ohesio efficie	10^5MPa	10^5MPa	
1041283	GT65-66	830.60-840.52	Sup coal seam direct roof26					0.10	7.0	70.3	68.8	66.8	75.2	3.4	2.6	3.6	4.0	39°54′	11.2	0.32	0.27	0.19
1041284	GT67	846.34-846.58	Sup coal seam direct roof27					0.10	6.6	66.0	62.0	68.8	67.2	5.5	5.0	5.5	5.9	41°27′	13.0	0.36	0.32	0.17
1041285	GT68	848.33-848.54	Sup coal seam direct floor28					0.30	3.7	37.2	39.2	36.0	36.4	1.4	1.3	1.4	1.5	34°33′	4.2	0.18	0.16	0.19
1041286	GT69-73	856.57-866.45	Sup coal seam floor29					0.10	5.1	50.9	55.2	49.6	48.0	2.7	2.4	2.6	3.1	34°50′	6.2	0.25	0.24	0.22
1041287	GT74	871.75-872.00	Tro coal seam roof30					0.20	4.1	41.2	40.0	44.0	39.6	1.9	2.1	1.9	1.6	33°29′	5.1	0.29	0.33	0.25
1041288	GT75	877.43-877.68	Tro coal seam roof31					0.10	5.7	56.9	55.6	56.4	58.8	3.2	2.6	3.8	3.1	38°27′	7.9	0.36	0.33	0.17
1041289	GT76	886.00-886.25	Tro coal seam direct roof32					0.30	3.5	34.9	32.8	35.2	36.8	1.8	2.1	1.6	1.7	35°17′	7.0	0.32	0.27	0.32
1041290	GT77	888.61-889.10	Tro coal seam direct floor33					0.80	2.8	28.1	27.6	28.0	28.8	0.9	0.9	0.7	1.0	34°30′	4.2	0.19	0.17	0.26
1041291	GT78	892.45-892.67	Ltro coal seam direct roof34					0.20	4.0	40.4	41.6	40.0	39.6	1.6	1.3	1.5	2.1	35°27′	7.2	0.31	0.26	0.26
1041292	GT79-80	894.57-895.03	Ltro coal seam direct floor33					0.10	7.1	71.2	67.6	69.6	76.4	5.0	4.6	5.5	5.0	43°20′	14.7	0.39	0.35	0.15
1041293	GT81-85	902.40-930.25	LTro coal seam floor36					0.20	8.7	87.1	80.4	84.4	96.4	5.6	5.5	6.0	5.3	42°24′	14.8	0.37	0.33	0.19
1041294	GT86	939.60-939.90	Tit coal seam roof37					0.10	7.9	78.9	74.8	77.6	84.4	4.3	4.4	4.0	4.5	40°55′	13.0	0.45	0.36	0.21
1041295	GT87-88	952.39-952.85	Tit coal seam direct roof38					0.10	9.4	94.4	91.6	96.4	95.2	5.4	5.0	5.5	5.7	43°42′	15.9	0.52	0.48	0.22
1041296	GT91	960.67-960.95	Tit coal seam floor39					0.10	9.6	96.0	100.4	96.4	91.2	4.5	4.0	4.0	5.6	41°29′	13.9	0.36	0.38	0.23
1041297	GT92	970.21-970.45	Fal coal seam roof40					0.10	8.0	80.1	76.4	79.6	84.4	5.3	5.4	5.9	4.6	42°37′	13.8	0.37	0.41	0.23
1041298	GT93	978.50-978.74	Fal coal seam roof41					0.10	9.5	95.3	89.6	96.4	100.0	7.3	7.8	7.0	7.0	42°49′	16.1	0.40	0.40	0.16
1041299	GT94-95	983.24-983.66	Fal coal seam direct roof42					0.10	6.2	62.3	62.0	60.0	64.8	3.7	4.0	3.6	3.6	39°40′	9.8	0.32	0.29	0.22
1041300	GT96-97	985.60-982.02	Fal coal seam direct floor43					0.30	3.2	32.0	28.0	32.8	35.2	1.1	1.0	1.1	1.1	36°27′	7.2	0.17	0.17	0.23
1041301	GT98-108	929.28-1019.85	Fal coal seam floor44					0.40	3.7	36.8	35.2	36.8	38.4	1.3	1.2	1.3	1.4	34°32′	6.9	0.17	0.15	0.26
1041302	GT109-110	1028.06-1028.79	Mog coal seam direct floor45					0.30	3.8	38.0	38.4	36.0	39.6	1.3	1.2	1.3	1.5	35°43′	6.7	0.21	0.22	0.23
1041303	GT111-112	1035.16-1041.32	Mog coal seam floor46					0.70	4.5	44.5	42.0	44.8	46.8	2.1	2.0	2.2	2.1	33°27′	6.0	0.15	0.14	0.30

Technical supervisor :

Verify :

Table prepared by : Lanxin Li

Date:

Hebei Coalfield Geological Research Institute

Rock Mechanical testing report

To: Canadian Dehua International　　　　Murray River Project P1-C48

Number	Sample Number	Depth	GT sample	Ratio	Capacity	Water Ratio	Water Absorption	dilatancy	Protodyakonov coefficient	Compression(Mpa)				Tensile(Mpa)				Shear		tangent modulus	deformation parameter	Poisson ratio
		M	Name			%	%	%		Average	Variation range			Average	Variation range			angle of internal friction	Cohesion Coefficient	10^5MPa	10^5MPa	
1041304	GT1-10	324.23-462.17	coal seam roof 1					0.10	5.9	58.8	55.6	58.8	62.0	5.0	5.0	5.3	4.8	40°27′	10.1	0.33	0.34	0.16
1041305	GT11-12	468.46-468.94	coal seam direct roof 2					0.10	5.0	49.9	49.6	52.0	48.0	2.1	1.5	2.5	2.4	39°27′	9.2	0.41	0.37	0.20
1041306	GT13-16	470.54-493.25	coal seam direct floor3					0.20	5.9	58.7	62.4	58.8	54.8	4.1	3.6	4.1	4.6	40°12′	10.2	0.36	0.31	0.24
1041307	GT17-18	652.35-652.74	coal seam direct roof 4					0.10	8.2	81.7	83.2	84.4	77.6	4.7	5.1	4.9	4.1	41°29′	13.8	0.29	0.26	0.18
1041308	GT21-41	655.05-830.40	coal seam direct floor4					0.20	4.9	48.8	48.0	46.8	51.6	3.5	3.7	3.5	3.4	40°39′	9.4	0.35	0.32	0.20
1041309	GT21-42	835.97-836.22	B1 coal seam roof 6					0.10	4.6	46.3	45.6	49.6	43.6	2.9	2.7	3.0	3.1	37°24′	6.7	0.33	0.25	0.26
1041310	GT43-44	839.13-839.60	B1 coal seam direct roof 7					0.30	5.4	54.4	58.8	54.8	49.6	3.8	4.9	3.5	3.4	38°42′	8.2	0.29	0.29	0.20
1041311	GT45-46	840.15-840.58	B1 coal seam direct floor8					0.10	4.3	42.7	43.2	44.8	40.0	2.3	2.1	2.2	2.5	37°42′	7.2	0.24	0.20	0.19
1041312	GT47-48	846.15-846.81	B2 coal seam direct roof 9					0.20	4.3	42.9	40.4	44.8	43.6	2.6	2.2	2.5	3.1	34°29′	5.7	0.29	0.25	0.33
1041313	GT49-50	849.70-850.10	B2 coal seam direct floor 10					0.20	5.8	58.3	57.2	54.8	62.8	4.0	3.5	4.1	4.4	40°12′	10.1	0.30	0.27	0.24
1041314	GT51	857.61-857.91	B2 coal seam floor 11					0.10	6.1	60.8	58.0	60.0	64.4	4.6	3.8	4.9	5.0	41°41′	11.8	0.26	0.21	0.13
1041315	GT52	863.57-863.77	C coal seam roof 12					0.10	4.5	44.7	44.4	42.8	46.8	1.5	1.6	1.5	1.4	33°49′	4.9	0.28	0.28	0.23
1041316	GT53	871.75-871.95	C coal seam direct roof 13					0.50	2.4	23.9	22.8	24.0	24.8	1.0	1.1	1.0	0.9	34°27′	4.1	0.15	0.14	0.31
1041317	GT54-55	874.35-874.80	C coal seam direct roof 14					0.30	3.4	33.9	36.8	35.2	29.6	1.4	1.5	1.4	1.2	34°20′	4.2	0.17	0.20	0.22
1041318	GT56-57	876.85-877.42	C coal seam direct floor 15					0.50	4.2	41.9	41.6	44.2	40.0	1.9	1.6	2.0	2.1	35°37′	6.2	0.24	0.20	0.23
1041319	GT58-61	879.45-907.37	C coal seam floor 16					0.10	6.3	62.7	63.6	64.4	60.0	5.0	5.0	5.0	4.9	41°39′	12.8	0.29	0.28	0.21
1041320	GT62	917.28-917.48	E1 coal seam roof 17					0.20	5.3	53.3	50.0	52.8	51.2	2.3	2.5	2.1	2.4	40°39′	9.4	0.30	0.31	0.15
1041321	GT63	926.60-926.83	E1 coal seam roof 18					0.20	7.9	79.2	73.6	67.6	96.4	6.5	6.0	6.5	7.0	43°40′	15.2	0.45	0.45	0.20
1041322	GT64-65	938.10-938.65	E1 coal seam direct roof 19					0.20	6.4	63.9	68.0	64.8	58.8	3.9	3.3	4.0	4.4	39°34′	9.4	0.32	0.30	0.18
1041323	GT66-67	940.65-941.05	E1 coal seam direct floor 20					0.10	5.6	56.0	59.2	56.0	52.8	2.5	2.3	2.6	2.6	38°27′	9.7	0.29	0.25	0.18
1041324	GT68-69	944.25-944.65	E2 coal seam direct roof 21					0.70	2.6	25.9	23.6	26.8	27.2	0.7	0.7	0.7	0.8	34°21′	6.1	0.16	0.18	0.27
1041325	GT70-71	947.20-947.71	E2 coal seam direct roof 22					0.40	2.8	28.5	24.8	29.6	31.2	0.9	0.8	0.9	0.9	35°42′	4.7	0.16	0.15	0.23
1041326	GT72-73	952.07-955.75	E2 coal seam floor 23					0.30	3.4	34.4	38.4	32.0	32.8	1.2	1.0	1.2	1.4	35°42′	4.7	0.20	0.22	0.28
1041327	GT74	961.12-961.22	F coal seam roof 24					0.40	5.2	52.5	52.0	50.8	54.8	2.8	2.3	2.9	3.1	40°17′	7.9	0.31	0.29	0.18
1041328	GT75	968.94-969.16	F coal seam roof 25					0.20	4.1	40.7	39.2	40.0	42.8	1.3	1.3	1.2	1.3	36°27′	3.2	0.16	0.20	0.14
1041329	GT76	976.01-976.23	F coal seam direct roof 26					0.10	4.2	42.1	42.4	44.0	40.0	1.6	1.7	1.4	1.8	36°20′	4.9	0.23	0.19	0.19
1041330	GT77-78	978.46-978.94	F coal seam direct roof 27					0.20	4.8	47.6	46.4	46.8	49.6	2.2	2.5	2.1	1.9	34°39′	4.4	0.24	0.23	0.20

Technical supervisor :　　　Verify :　　　Table prepared by :　Lanxin Li　　　Date:

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