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**UPDATED TECHNICAL REPORT ON THE  
COAL RESOURCES OF THE  
CHANDGANA KHAVTGAI COAL RESOURCE AREA,  
KHENTII AIMAG, MONGOLIA**

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Prepared for:

**Prophecy Resource Corporation  
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September 28, 2010

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## 2 SUMMARY

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The Chandgana Khavtgai Coal Resource Area is found in the northwest portion of the Khavtgai Uul Minerals Exploration License held by Chandgana Coal LLC, a subsidiary of Prophecy Resource Corporation (Prophecy). The resource area is located 290 kilometres east of Ulaanbaatar in Moron soum (sub-province) of Khentii aimag (province), Mongolia, and comprises approximately 1,636 hectares. The other coal exploration licenses adjacent to the resource area are held to the north by Tethys Mining LLC, a fully-owned subsidiary of Companhia Vale do Rio Doce, and to the west by Adamas Mining LLC. The resource area has a continental climate with short warm summers and longer cold winters and is generally favourable for development of the coal resource.

The resource area is located in the Nyalga Depression within the Khentii Zone of the Khangai-Khentii fold system and is part of the Shorvogo Steppe physiographic province along the northern margin of the Gobi Desert. The topography is relatively featureless with a mean surface elevation of 1,142 metres.

The coal seams belong to the Early Cretaceous age Zuunbayan Formation and are part of the southern end of the headwall portion of a faulted syncline. The coal seams subcrop at and just west of the western border of the license and dip approximately 4.5° to the southeast. The resource area is bounded to the southeast by the Nyalga Basin Fault Zone.

Subsequent to the 2008 technical report much more exploration has been completed. The goals of this exploration were to place all of the resource in the measured and indicated assurance of existence categories, obtain more information on the depth, thickness, and grade of the coal seams, and locate the geologic limits of the resource more accurately. The exploration concept was that commonly used for relatively low dipping stratiform deposits where exploration was planned and executed to obtain information on depth, thickness, continuity, and quality of the resource. This information was obtained by surface mapping, trenching, drilling and geophysical methods. Two shallow trenches were excavated in 2009 for a total length of 189 metres. Approximately 15.7 kilometres of resistivity-induced polarization and 15.7 kilometres of magnetometer lines were run across the Nyalga Basin Fault in 2008. During 2010 Prophecy completed 13 drill holes and ran 11.3 kilometres of reflection seismic lines and 27.8 kilometres of magnetometer lines. This exploration supplemented that completed in 2007 which included remote imagery interpretation, surface mapping, trenching, and seven core drill holes. The new information has placed all of the resource in the measured and indicated assurance of existence categories, enabled more accurate mapping of the geologic limits of the resource area, and made for better characterization of the geology and estimation of coal resources and quality. No development work or operations are active in the resource area.

Nine coal seams that contain coal resources are found in the resource area. The B Coal Seam contains 80% of the resource, followed by the F Coal Seam (8%) and E Coal Seam (7%) with the remaining coal seams containing smaller portions. The B Coal Seam is found throughout the resource area, has an average resource thickness of 34.2 metres and range from 6.2 to 60.5 metres thick including several, mostly thin partings. The known depth to the B Coal Seam varies from 27.7 to 266.8 metres but is probably even shallower in the northwest corner of the license. Other coal seams (formerly the Upper Coal Seams) are found above the B Coal Seam. These coal seams have a thinner resource thickness (0 to 16.0 metres) and are less extensive yet contain significant resources also. The coal seams are black, friable, readily slake and have poor competency. The partings are poorly indurated and have a moderate slake potential. The overburden is also poorly indurated with a moderate slake potential but contains few structural discontinuities. The coal seams are moderate

grade low rank thermal coals. The thickness-weighted average in-place assay (as-received basis) of the sampled coal seams (A, B and C Coal Seam) within the resource area is 36.5% moisture, 10.1% ash, 3,636 kcal/kg heating value, and 0.6% sulphur. Their agglutinating properties have not been assayed, but the coals are expected to be non-agglutinating. The apparent ASTM rank of the coal is between Subbituminous C and B based on the moist, mineral matter-free gross calorific value of core sample assays.

<b>WEIGHTED AVERAGE A, B AND C COAL SEAM QUALITY</b>				
(as-received basis)				
Parameter	Moisture (wt. %)	Ash (wt. %)	Heating Value (kcal/kg)	Total Sulphur (wt. %)
	36.54	10.10	3,636	0.59

The total coal resource within the resource area is 1,048.1 million tonnes of which 509.3 million tonnes are in the measured and 538.8 million tonnes are in the indicated assurance of existence categories. All the coal resources fall within the measured and indicated categories, there is none in the inferred category. The in-place strip ratio averages 2.2:1 over the resource area and varies from a minimum of 0.2:1 at the northwest corner of the license to a maximum of 5.3:1 to the north.

<b>COAL SEAM RESOURCES</b>			
Coal Seam	Assurance-of-Existence Category		Total
	Measured	Indicated	
I Coal Seam	0.2	0.1	0.3
H Coal Seam	3.1	4.6	7.7
G Coal Seam	3.9	5.4	9.4
F Coal Seam	41.8	41.0	82.8
E Coal Seam	35.8	39.2	75.0
D Coal Seam	3.2	2.4	5.7
C Coal Seam	15.8	13.7	29.5
B Coal Seam	403.5	430.7	834.3
A Coal Seam	1.9	1.5	3.4
Subtotal	509.3	538.8	1,048.1
Total Measured and Indicated	1,048.1		

Resources are in millions of tonnes

The Chandgana Khavtgai Coal Resource Area contains a significant coal resource. The coal seams are thick and the strip ratio is low such that surface mining methods appear best suited to recover the coal. The coal is of moderate grade and low rank and appears suitable for use as a thermal coal but the large size of the resource and moderate grade suggest the resource may also be suitable for use as a conversion feedstock.

Further exploration, analyses and tests are recommended to better understand the geology in the western portion of the license, map the coal seams above the B Coal Seam and better characterize the quality and utilization characteristics of the coal. This includes reprocessing of the acquired seismic data, rotary and core drilling, bulk sampling and more thorough and detailed analyses and tests of core samples and a bulk sample.



### **3 INTRODUCTION**

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This updated technical report describes the results of exploration performed during the period 2008 to 2010 and the use of these results with the 2007 exploration results to update the geological model, coal resource estimate and coal quality estimate of the Chandgana Khavtgai Coal Resource Area (resource area). This resource area is part the readjusted Khavtgai Uul Exploration License defined by the license boundary and the northwest fault of the Nyalga Basin Fault Zone and is not an active or inactive mining project. The exploration and resources and coal quality described here is part of an ongoing project by Prophecy Resource Corporation to evaluate the lands within the exploration license area.

The resource area is considered to have reasonable prospects for economic extraction. This is based on the following factors – (1) it is a large medium grade coal resource, (2) the geology of the resource is not so difficult as to hinder mining, (3) the local and regional demand for coal-based energy is high and is projected to increase in the future, (4) the regulatory stance of the national and local governments is favourable to mining and coal use, and (5) the resource is amenable to low cost surface mining methods.

This report was written to meet the requirements of the most recent version of Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101) and Appendix 3F Mining Standards Guidelines of the TSX Venture Exchange, of which the effective date for both is December 30, 2005. The coal ply and coal seam thickness, depth to weathered coal, and other limits are used to comply with the NI 43-101 requirements or are based on best judgement and are not intended to be limits used in any future feasibility study or practised during mining.

The titles of some report sections required by Canadian National Instrument Form 43-101F1 are not applicable to coal resource geology. This is because of the differences in the nature, exploration methods, analytical methods, etc., used in coal resource geology compared to mineral resource geology for which the Form is mostly intended. Though the section titles given in the Form have been used, the intent and requirements of some sections were interpreted by the author in terms of coal resource geology and the replies given are considered to satisfy the original intent and requirements.

For this updated technical report, each ASTM, ISO and AS sample preparation and assay designation or method referenced is not listed in Section 22 individually. Rather, all designations that are referenced for a particular system can be considered referenced from the one general system reference listed.

#### **3.1 Purpose, Information Sources, and Site Inspection**

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Mr. Ranjeet Sundher, Senior Advisor to Prophecy, requested Mr. Christopher M. Kravits, CPG, LPG, of Kravits Geological Services, LLC to update the 2008 technical report for Prophecy for filing with the TSX Venture Exchange of the Toronto Stock Exchange. Mr. Kravits was asked because he was the qualified person in preparation of the 2008 report and planned and managed the 2010 exploration activities. Mr. Kravits meets the requirements of a qualified person as described in NI 43-101.

The information used in this updated technical report came from government sources, the results of exploration performed during the period 2007 to 2010, the 2007 site visit by Mr. Kravits, and conversations with Prophecy employees and Mr. Eric Robeck, a former consultant to the former Red Hill Energy. These are cited where used in the appropriate sections of this updated technical report.

Mr. Kravits performed a site inspection of the resource area on November 17, 2007 and was accompanied by Mr. Robeck, Mr. Urtnasan Dorlig and Mr. Genden Borkhuu, engineer and geologist of the former Red Hill, and Enkhbat Batnaran, their driver. The scope of the inspection included:

1. Visitation of all drill sites which included obtaining GPS coordinates, noting the drill hole number on the casing, and obtaining photographs.
2. Visitation of the license corners adjacent to the resource area which included obtaining GPS coordinates and photographs.
3. Visitation of the trenches excavated to confirm the subcrop and from which samples were obtained which included obtaining GPS coordinates and photographs.
4. Visitation of the coal subcrop where expressed as a linear shallow depression which included obtaining GPS coordinates and photographs.
5. Visitation of the coal subcrop where suspected below a playa which included obtaining GPS coordinates and photographs.
6. Visitation of the Chandgana Coal Mine operated by Berkh-Uul LLC (Berkh-Uul), located adjacent to the former Red Hill's Chandgana Tal mining license 10126A to view the character of the coal seam and overburden.

There were no unreasonable discrepancies between the location of these features as shown on the maps and the coordinates given by Red Hill and that determined by Mr. Kravits. The details of the site inspection were reported to Mr. Robeck in a separate report dated November 27, 2007. Additionally, Mr. Kravits planned and managed the 2010 exploration activities and work performed after the field portion ended. During this time he became much more familiar with the resource area enabling him to prepare a more thorough technical report.

Red Hill Energy Inc. merged with Prophecy Resource Corporation on April 16, 2010 and changed its name to Prophecy Resource Corporation. Following this change the exploration and mining licenses issued by the Government of Mongolia to Red Hill were changed to show Prophecy as the license holder.

### **3.2 Complete Information**

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As of the date of this updated technical report, to the best of Mr. Kravits' knowledge, this updated report contains all the scientific and technical information that is required to be disclosed to make this report not misleading.

#### **4 RELIANCE ON OTHER EXPERTS**

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Other experts and individuals were relied upon where Mr. Kravits required translation of Russian or Mongolian language documents, could not identify the source of certain data, or did not have intimate knowledge of certain activities.

Information on the regional geology was obtained from a report and map published by the former Soviet government (Orehov et al., 1962). This information was translated to the English language. This translated regional geology information was accepted for use by Mr. Kravits. Information on the surface geology of the Chandgana Khatvagai Coal Resource Area used in the geologic map was obtained from Mr. Robeck through interpretation of satellite imagery accessed from Google Earth (Google Earth, 2007), surface mapping, and during the course of his exploration supervision. This information was reviewed and spot checked by Mr. Kravits using results of his site inspection but largely Mr. Kravits relied on the work of Mr. Robeck. The information on the regional and local geology obtained from these sources is used in Section 8 of this updated technical report. The certificate for Exploration License Number 11654X and the modification approved in 2009 were translated from the Mongolian language to the English language by the Translation Bureau of AGG LLC and Mr. Urtnasan Dorlig, a prophecy employee respectively. Mr. Kravits assumes AGG LLC and Mr. Dorlig are qualified translators and has relied on the accuracy of the translations. No attempt was made by Mr. Kravits to confirm the legality of these documents. The translated information is used in Section 5.

The 2007 to 2008 geological work including drill site tasks (core logging, core preparation and sampling, geophysical logging, etc.), other tasks such as geological sampling, data collection, tabulation, geophysical interpretation and modeling performed to support the 2008 technical report and portions of which are used in this updated technical report were done by Mr. Robeck or other responsible, but not necessarily qualified, individuals under Mr. Robeck's supervision. Mr. Kravits was not present during the 2007 drilling but supervised some of the other tasks and verified the methods, assumptions, and results. Where Mr. Kravits could not supervise or verify methods or assumptions he has relied on the documentation prepared by these responsible parties and conversations with these parties to determine that the tasks were performed correctly or the methods and assumptions used to perform various tasks are valid and appropriate. The trenching performed in 2009 was planned by Prophecy geologists and the work executed and documented well by Mr. Gantulga Batanov. Mr. Kravits has been to the locations and discussed the work with Prophecy staff and Mr. Batanov (Batanov, 2010) and believes the work accurate and reliable for use in this updated technical report. The 2010 drilling and seismic exploration was planned and managed on-site and later follow-up work managed by Mr. Kravits. This planning and management included drill site and other tasks to support this updated technical report and can attest to the accuracy of the drilling data. The magnetometer survey performed in 2010 was planned and managed by Prophecy geologists, executed by Geo-Oron Co., Ltd and an interpreted map prepared (Geo-Oron, 2010). Prophecy geologists and Mr. Kravits planned and managed the seismic work which was executed and the results interpreted by G E S Co Ltd (G E S Co., 2010a, G E S Co., 2010b, G E S Co., 2010c). Mr. Kravits has reviewed the results of the magnetometer and seismic work and found the interpretation of geologic features by the contractors to mostly agree with his knowledge of the resource area geology. But otherwise he has relied on the interpretations of the contractors. This information is used in Sections 10, 11, 12, and 13.

The identification of some 2007 drill holes and their assignment to the correct geophysical and lithologic logs relied on the knowledge of Mr. Robeck. Though the headers of geophysical and lithologic logs contain the drill hole number, they do not contain coordinates or sufficient locational

information to ensure they are of the drill holes indicated. Also, some drill holes do not contain identification information on the surface casing or by some other means. For most drill holes, the drill hole number on the logs was matched to the identification information on the casing. These were further confirmed by comparison of GPS coordinates obtained during the site visit to those in the drill hole database and confirmation by Mr. Robeck. But for those drill holes without identification information, Mr. Kravits relied on identification by Mr. Robeck. This was supported by comparison of the drill hole number contained in the log header to the GPS coordinates of the drill hole then to the coordinates in the drill hole database. Because Mr. Kravits planned and supervised the 2010 exploration he can attest to the identification information on drill hole logs and seismic line data matching the monumented locations on the ground and the location placed on maps.

## 5 PROPERTY DESCRIPTION AND LOCATION

The Chandgana Khavtgai Coal Resource Area is a portion of the original Khavtgai Uul Minerals Exploration License Number 11654X issued by the Government of Mongolia. The original exploration license was issued 07 April 2006 and consisted of 37,271 hectares. Since after the 2007 exploration only a small portion of the license appeared to hold coal resources, the license was readjusted 08 April 2009 to retain that portion. The form of tenure is a license issued by the government rather than any type of ownership.

### 5.1 Location and Size

The Chandgana Khavtgai Coal Resource Area is located on the northwest portion of the readjusted Khavtgai Uul Minerals Exploration License, hereinafter referred to as the Chandgana Khavtgai license (Figure 1). The readjusted license includes 9,974.96 hectares. The coal resource area encompasses approximately 1,636 hectares of the readjusted license. The central coordinates of the resource area are approximately 416271 E 5216113 N UTM Zone 49 North, WGS 1984 datum. The license corners were located and monumented by Oyu Survey LLC.

### 5.2 Exploration License Description

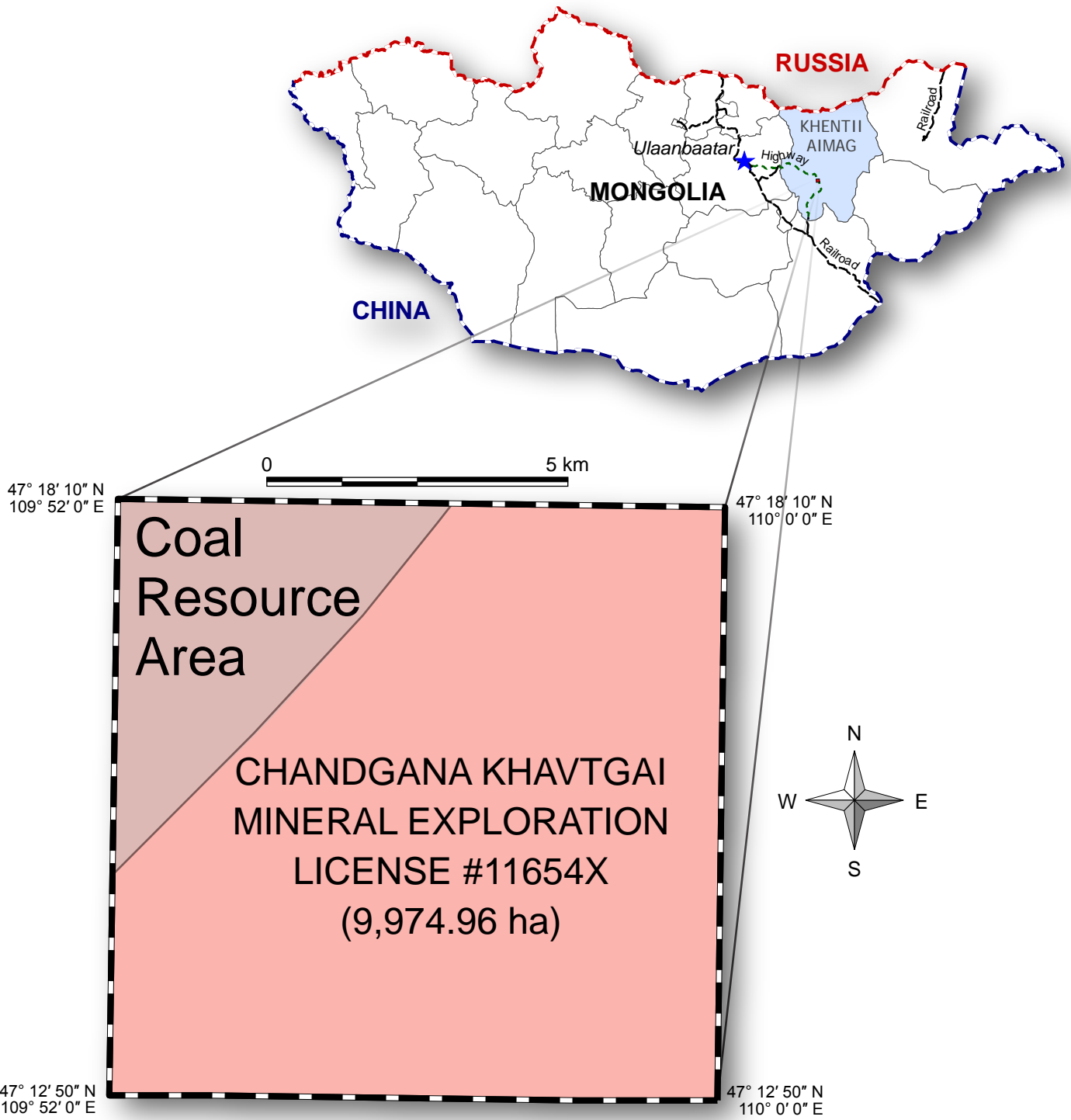
The Khavtgai Uul Minerals Exploration License Number 11654X is now held by Chandgana Coal LLC, a subsidiary of Prophecy Resource Corporation and authorizes the conduction of exploration work to 9,974.96 hectares. The coordinates of the vertices of the license boundary are shown in Table 1.

KHAVTGAI UUL MINERAL EXPLORATION LICENSE BOUNDARY					
Vertex	Longitude	Latitude	Vertex	Longitude	Latitude
1	109° 52' 0" E	47° 18' 10" N	2	110° 0' 0" E	47° 18' 10" N
3	110° 0' 0" E	47° 12' 50" N	4	109° 52' 0" E	47° 12' 50" N

Table 1

The license is held only by Prophecy through its subsidiary Chandgana Coal. No surface rights are granted other than that needed for exploration. There are no claims or encumbrances placed on the license area. The license expires April 7, 2012, and remains active so long as the annual license fee is paid. The issuer of the license is the Mineral Resources and Petroleum Authority of Mongolia which administers the mineral and petroleum resources owned by Mongolia. The term of tenure for an exploration license may be extended twice, for an additional three years on each extension. An exploration license holder has the right to (1) access the exploration area and build temporary structures for use in exploration, (2) pass through land surrounding the exploration area for the purpose of entering the exploration area, (3) exercise the rights of the license by passing through land owned or possessed by others upon their approval, and (4) the exclusive right to obtain mining licenses within the exploration license area.

A permit is not required to conduct exploration, rather permission is granted as part of the exploration license. No environmental liabilities are known to which the Khavtgai Uul Minerals Exploration License is subject. Any future exploration work would be performed under the existing Khavtgai Uul Minerals exploration license.



**Figure 1. Location of Chandgana Khavtgai Coal Resource Area**

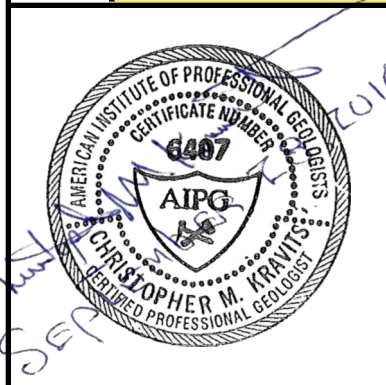
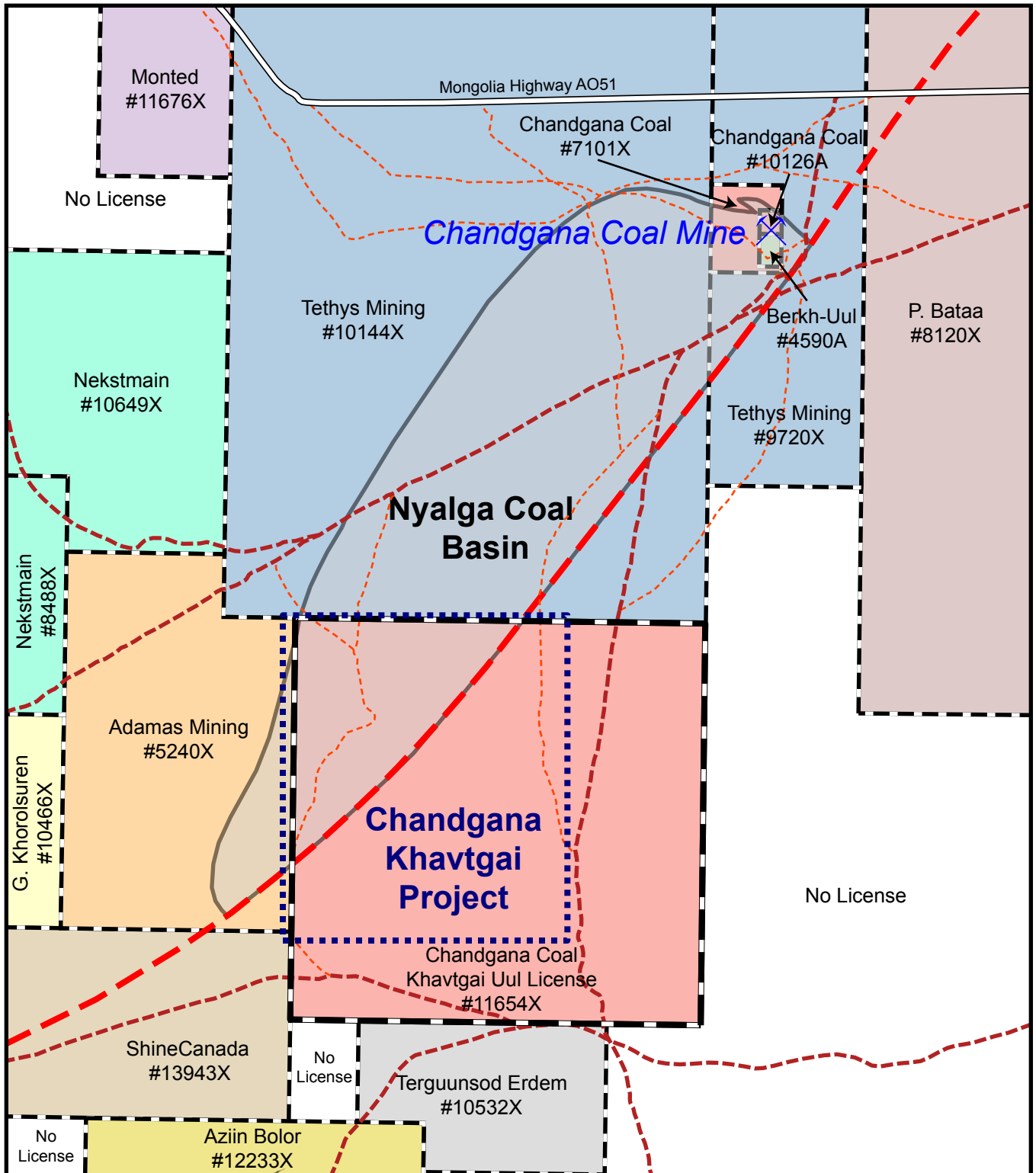
### **5.3 Resources and Mining Activity Outside the License**

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Coal resources are known to be present along the same structural trend to the northeast and southwest of the resource area. Their depth and coal seam thickness are expected to be similar to that of the resource area and the Chandgana Tal Coal Project.

The closest mine is the Chandgana Coal Mine located approximately 9 kilometres to the northeast which is part of Chandgana Coal's Chandgana Tal Coal Project (Map 1). A portion of this mine is operated by Berkh-Uul and was intermittently active during the period 2005 to 2010. The mine area includes unreclaimed spoil piles but there are no tailings ponds.

There are no important natural features outside the resource area. The only improvements outside the resource area are the Ulaanbaatar-Ondorhaan highway (AO501), a 35 kV electric distribution line to the Chandgana Coal Mine, and several unpaved but occasionally maintained roads.



0 4 km SCALE 1:140,000

**GENERAL LOCATION MAP**

Prepared By	C. M. Kravits
Approved By	
Date	09/28/22010

**Map 1. License Map**

**LEGEND**

- Project Area
- Nyalga Coal Basin
- Nyalga Basin Fault
- Chandgana Coal Mine
- Paved Highway
- Unimproved, Major
- Unimproved, Minor



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

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### **6.1 Accessibility**

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Access to the Chandgana Khavtgai Coal Resource Area is possible by ground vehicle and helicopter or possibly small airplane. Ground vehicles may enter the resource area by driving the Ulaanbaatar-Ondorhaan highway (AO501) 290 kilometres east then turning south on any of several unpaved roads and driving 16 kilometres to the resource area (Map 2). The highway is an all-weather road capable of supporting truck traffic. The unpaved roads on the resource area are generally in good condition and drivable throughout the year. However, the dirt roads can only support truck traffic when dry and only on certain sections. Helicopters may fly to the resource area and land almost anywhere. Small airplanes may also fly to the resource area but landing and take-off is only possible on several stretches of unpaved road. The elevation is not too great for helicopters or small planes although winds may be an issue at certain times of the year.

There is no access by railroad or water. The nearest railroad spurs end at Bor-Ondor, 118 kilometres south and the Baganuur Coal Mine, 124 kilometres west of the Chandgana Khavtgai Coal Resource Area and adjacent to the Ulaanbaatar-Ondorhaan highway. The Herlen River is the closest major river and is not navigable.

### **6.2 Climate and Vegetation**

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The resource area has a continental climate with warm and dry but short summers and cold and dry winters. The area is generally windy with wind direction from the northwest or northeast at speeds of 4-7 m/sec but reaching 20 m/sec in the spring. The warmest temperatures are during June to July with highs around 40° C and the coldest during December to January with lows around -30° C. Snow accumulation averages 10 cm in flat areas but may drift to 1 metre deep. The annual precipitation varies from 10 to 50 cm and most falls as rain in August (Behre Dolbear, 2007).

The surface is predominantly grass-covered although there are some low shrubs on the hills. There are no forested areas in or near the resource area.

### **6.3 Local Resources**

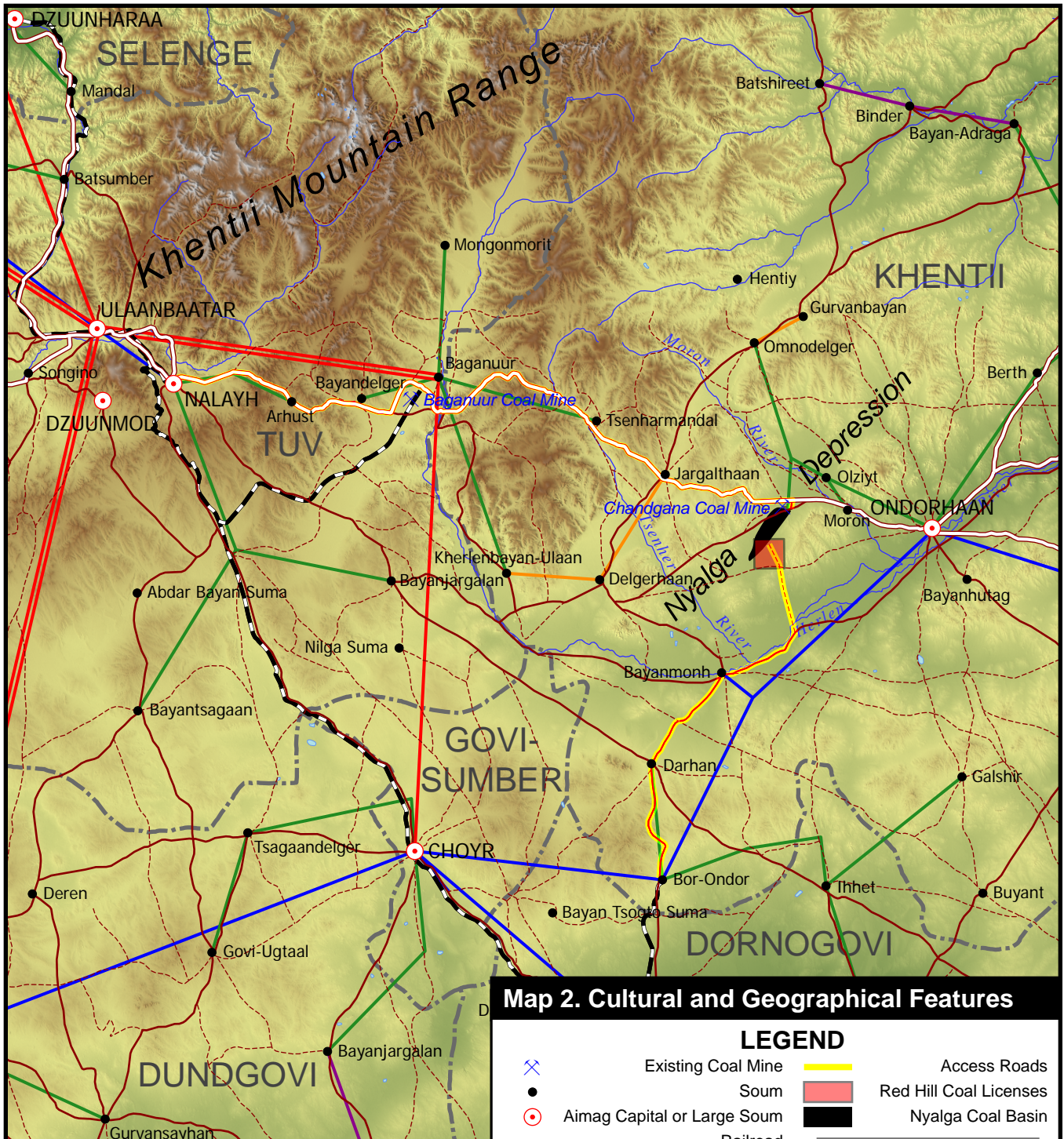
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Surface water is not readily available in the resource area. The nearest flowing water is the Herlen River 30 kilometres to the southeast (Map 2). Otherwise surface water may only be available from dry stream courses and ephemeral lakes during the summer wet season. There are no lakes or reservoirs. Groundwater appears to be available because the 2007 exploration drilling encountered an artesian aquifer in three of the seven drill holes and water was observed in other 2007 and 2010 drill holes. The size and production capacity of this aquifer has not been evaluated.

### **6.4 Infrastructure and Population Centres**

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The only infrastructure within or nearby the Chandgana Khavtgai Resource Area is the Ulaanbaatar-Ondorhaan highway (AO501), a 110 kV power transmission line to the south, a 35 kV distribution line to the Chandgana Coal Mine, and cellular phone coverage. The highway is located 16 kilometres north and is a paved all-weather highway (Map 2). There are no water or natural gas pipelines, telephone lines, canals, or water retention structures within or nearby the resource area.



**Map 2. Cultural and Geographical Features**

LEGEND	
	Existing Coal Mine
	Soum
	Aimag Capital or Large Soum
	Railroad
	Paved Highway
	Unimproved Road, Major
	Unimproved Road, Minor
	Aimag Border
	River
	Lake
	Access Roads
	Red Hill Coal Licenses
	Nyalga Coal Basin
Electric Transmission Lines	
	220 kV (x2)
	220 kV (x1)
	110 kV
	35 kV
	15 kV
	10 kV
Topographic Relief (m)	
	2500
	2350
	2200
	2050
	1900
	1750
	1600
	1450
	1300
	1150
	1000
	850
	700

0 50 km SCALE 1:2,000,000

**GENERAL LOCATION MAP**

Prepared By C. M. Kravits

Approved By

Date 09/28/2010

**Chandgana Khavtgai Project, Moron Soum, Khentii Aimag, Mongolia**

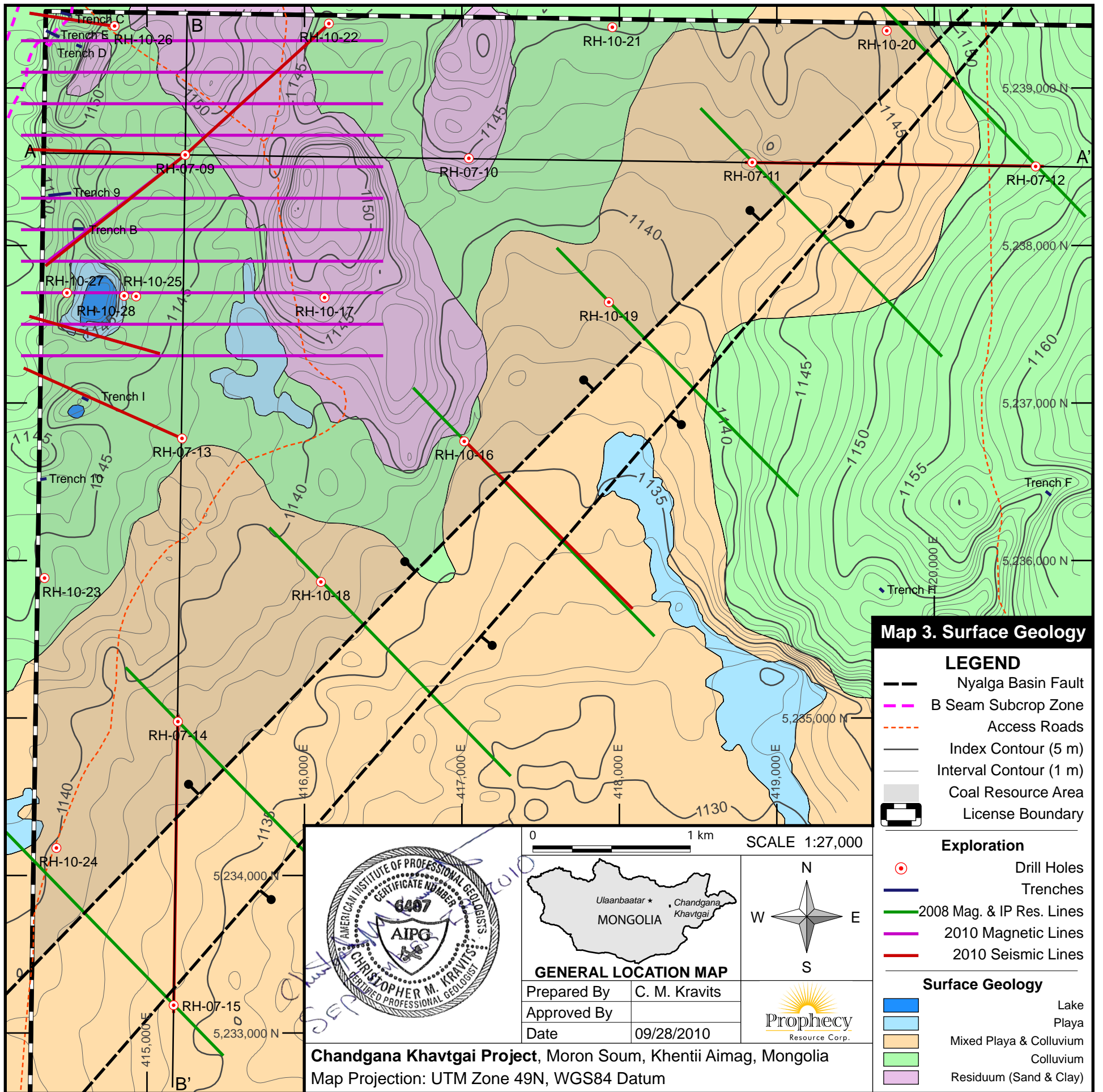
There are no population centres within the resource area. The nearest are the Chandgana farming centre 17 kilometres north and Moron and Ondorhaan soums 20 and 55 kilometres to the east, respectively.

## **6.5 Physiography**

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The resource area is located within an intermontane valley between the Nyalga Depression to the southwest and the Shorvogo Basin to the northeast. The Khentii Mountain Range is northwest and the Hongor Mountains are southeast of the resource area. The physiography of the resource area consists of a broad flat with low hills to the northwest and east otherwise there are no prominent physiographic features. The drainage bottoms are 1 to 5 metres below the adjacent surface and are usually dry. The bottoms of the ephemeral lakes are 0.5 to 4 metres below the adjacent surface.

The surface elevations of the resource area vary from 1,129 metres to 1,164 metres making for a relief of approximately 35 metres (Map 3). The low flat areas average 1,135 metres and the hills 1,152 metres in elevation.



## 7 HISTORY

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The Khavtgai Uul Minerals Exploration License was originally granted to Deej Bayalag LLC and issued on April 7, 2007 under registration number 9011039094. No previous licenses are known. The second year license fee was paid on May 22, 2007. The license was transferred to Red Hill Mongolia LLC, a subsidiary of Red Hill Energy Inc. on October 12, 2007, under registration number 90190101078 with no change in the size or boundaries. The license was readjusted to decrease its size on April 8, 2009 and it now has an expiration date of April 7, 2012. The holder (issuee) of the readjusted license is Chandgana Coal LLC, a subsidiary of Prophecy Resource Corporation.

There has been previous exploration for coal near the resource area. The former Soviet government explored for coal by drilling and trenching in 1962 and drilling in 1980 in the northern end of the Nyalga Basin (Behre Dolbear, 2007). Red Hill explored its Chandgana Tal Coal Project in the same area during the summer of 2007 under exploration license 7101X and mining license 10126A. Eight core holes were drilled the results of which are more fully described by Behre Dolbear (2007). Both Tethys Mining and Adamas Mining conducted coal exploration on their licenses contiguous to Prophecy's license during 2007 and 2008. There is previous and current mining at the Chandgana Coal Mine on the portion owned by Berkh-Uul (Map 1). There has been no petroleum or mineral exploration nor is there any current petroleum or mineral exploration in the Nyalga Basin to the best of my knowledge.

## 8 GEOLOGICAL SETTING

The resource area is located in a region of folded sedimentary rocks where igneous and metamorphic rocks are uncommon. Rock deformation consists mostly of folds with several long large-displacement normal faults and some probable small-displacement faults.

### 8.1 Regional Geology

The resource area is located in the Nyalga Basin which is a portion of the Khentii Zone of the Khangai-Khentii fold system. The Khangai-Khentii fold system is a series of folded Silurian to Cretaceous age sedimentary rocks found in eastern Mongolia (Behre Dolbear, 2007).

#### 8.1.1 Surficial Deposits and Sedimentary Rocks

Surficial materials include surface deposits and sedimentary rocks. Surface deposits appear to be Holocene in age and include alluvium, colluvium, and playa deposits (Map 3) and are up to 70 metres thick. Sedimentary rocks are found in small areas at the surface but comprise all the subsurface rocks. These rocks range in age from Silurian to Tertiary and include nonmarine sand, clay, conglomerate, sandstone, siltstone, claystone, shale, and coal (Figure 2). A minimum thickness of 3,350 metres of sedimentary rocks is known. The units are described in more detail as follows largely based on a report by Orehov (Orehov et al., 1962) with additional information by the author:

**Quaternary:** Holocene age surficial deposits include sands, silts, clays and talus found in lake, playa, alluvial, and mass wasting environments. These sediments are not lithified though some are poorly lithified by evaporite mineral cementation. The total thickness of these deposits varies from 60 to 70 metres and rest in angular unconformity on the rocks below.



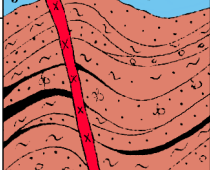
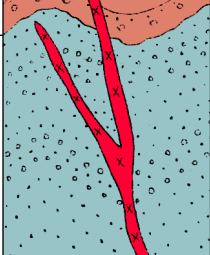
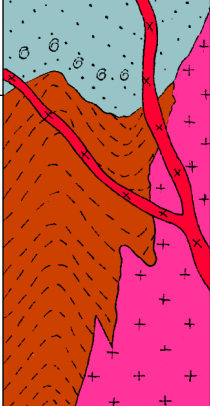
**Tertiary:** The Tertiary is represented by sediments including arkosic sands, greywacke-type red clays, and gravels, all of which are poorly to moderately lithified, and basalt at the top. Total thickness is estimated to be 50 metres.

**Lower Cretaceous:** Lower Cretaceous rocks are found in three formations including the Zuunbayan Formation, Tsagantsav Formation, and Shari Formation.

**Zuunbayan Formation:** This formation consists of two informal members based on lithology. The upper member consists of alternating shale, clay, siltstone, conglomerate, and as many as nine coal seams. This member is up to 220 metres thick. The lower member consists of shale, siltstone, and conglomerate with bituminous schist at the base. This member varies from 170 to 250 metres thick. Both members are only moderately lithified.

**Tsagantsav Formation:** The Tsagantsav Formation consists of extrusive volcanic rocks (basalt, andesite-basalt, andesite, quartz porphyry, and tuff) interbedded with black clayey schist and gray sandstones. The total thickness of this formation is approximately 500 metres.

**Shariin Formation:** This formation consists of two informal members. The upper member consists of dark brown soapy clay and is estimated to be 50 to 100 metres thick. The lower member consists of variegated clays, sandstones, and conglomerates with a total thickness of approximately 300 metres.

ERA-THEM	SYSTEM	STRATIGRAPHIC UNIT	LITHOLOGY	THICKNESS	LITHOLOGIC DESCRIPTION
CEN.	Quaternary	Alluvium		60-70 m	Sandy alluvium, colluvium, and playa
	Tertiary	Red Clay		50 m	Red clay with sand; capped with basalt
MESOZOIC	Cretaceous	Zuunbayan Fm.	Greenish-Gray Mbr.	220 m	Interbedded poorly consolidated sand, clay, silt and gravel conglomerates with one or more major coal seams
			Dark Gray Mbr.	170-250 m	Shale and siltstone with conglomerate and bitumenous schist at base
		Tsagantsav Fm.		500 m	Basalts, andesitic basalts, quartz porphyry, quartz tuffs, interbedded with black clayey schists and gray sandstones
		Shariin Fm.	Upper Mbr.	50-100 m	Dark brown soapy clay
	Lower Mbr.		300 m	Interbedded variegated color clays, sandstones, and conglomerates	
	Jurassic	Sandstone & Conglomerate		700 m	Interbedded coarse-grained sandstone with conglomerate and gravellite.
PALEOZOIC	Permian	Productive Fm.		400 m	Interbedded sandstone and sandy shales, with several thin coal seams of variable thickness; some floral remains
	Carboniferous	Graywacke		750 m	Arkosic sandstone and graywacke with conglomeratic layers; Carboniferous faunas are present in the lower horizons
	Silurian-Devonian	Phyllitic Schist		900 m	Greenish-gray, quartz-feldspar-chlorite, quartz-sericite and chlorite schists; rare porphyrites and associated tuffs

Source: Orehov et al., 1962.

Figure 2. Stratigraphic Column

**Lower Jurassic:** Jurassic age rocks are present in an unnamed unit ranging in lithology from interbedded sandstone and conglomerate to gravellite. This unit is found in angular unconformity to the Permian age rocks below. The thickness is estimated to be 700 metres.

**Permian:** The Permian age rocks are found in the Productive Formation. This unit includes alternating light gray arkosic sandstone and gray fossiliferous sandy and clayey siltstone and shale with three thin coal seams. This unit is approximately 400 metres thick.

**Carboniferous to Lower Permian undifferentiated:** This informal unit includes yellow conglomerate, bitumen-containing argillite, limestone and loam, and gray-green arkosic sandstone. The compositions of the clasts in the conglomerates include igneous, metamorphic, and sedimentary rocks along with quartz and jasper. This unit is approximately 750 metres thick.

**Silurian to Devonian undifferentiated:** This is an unnamed unit consisting of greenish-gray, quartz-feldspar-chlorite, quartz-sericite and chlorite schists as well as rare porphyrites and their associated tuffs. The thickness of this unit is estimated at 900 metres.

### *8.1.2 Igneous and Metamorphic Rocks*

---

The igneous rocks include granite and granodiorite that are part of a batholith. The granite has a pink colour and contains large biotite crystals. There is a sharp contact between these two rocks. The metamorphic rocks include schists, porphyrites and their tuffs. Rubble from these rocks is found in the Permian and Jurassic conglomerates. These rocks are considered to be Late Silurian to Early Devonian in age (Figure 2).

### *8.1.3 Structural Geology*

---

The Chandgana Khavtgai Coal Resource Area is located in the Khentii Zone of the Khangai-Khentii fold system and east of the Nyalga Depression. The Khangai-Khentii fold system is relatively simple consisting of large, low amplitude folds of sedimentary rocks above more resistant older sedimentary and igneous rocks. There are several long large-displacement normal faults.

## **8.2 Resource Area Geology**

---

Unconsolidated Holocene age sediments are found at the surface and no bedrock is exposed. The rocks found immediately below the surficial deposits belong to the nonmarine Early Cretaceous Zuunbayan Formation. The coal resource is found in the Zuunbayan Formation. Igneous dikes and sills have not been found to cut the Zuunbayan Formation.

### *8.2.1 Surficial Deposits and Sedimentary Rocks*

---

**Holocene:** Surficial deposits of this age belong to a variety of subunits including coarse-grained sandy loam with schist, granite, and quartz clasts, silt, pebble gravels, thin salt crusts, and residuum found in ephemeral stream beds and playas, mass wasted slopes and as debris remaining after weathering of bedrock (Map 3). These sediments are generally not lithified, but in some areas they are poorly lithified by evaporite minerals forming a sort of caliche. The aggregate thickness of these units varies from 0 to 7 metres.

**Lower Cretaceous:** The upper member of the Zuunbayan Formation is found below the surficial deposits has a minimum thickness of 320 metres where it was penetrated by Drill Hole RH-10-20. This member consists of alternating shale, clay, siltstone, sandstone, and



coal. There are eleven coal seams in the resource area. Where discussed in this updated technical report coal seam refers to the total thickness of all coal plies and intervening partings regardless of thickness forming a stratigraphic interval determined by the author to represent a mostly coal depositional period. Nine of these are major coal seams in that they have a large areal extent and attain minimum resource thickness. The coal seams may be fairly reliably correlated using the pattern and lithology of plies and partings and the thickness and lithology of interburden rocks. This is fortunate because there are no good stratigraphic marker beds. All the coal seams contain coal or bone coal plies and partings of varying thickness. Most individual coal or bone coal plies or coal/bone coal ply and parting combinations are greater than 0.45 metres thick meeting the minimum thickness for inclusion in resource estimation. Most partings are less than 0.3 metres thick and are included in resource estimation.

The major coal seams are named using letters starting with the lowest being the A Coal Seam to the highest being the I Coal Seam. The extent of the A Coal Seam is not fully known but where penetrated has an average thickness of 0.7 metres. The B Coal Seam is the thickest coal seam having an average thickness of 37.5 metres and has the greatest areal extent. The C Coal Seam is found in three separate locations because it has been eroded by a large paleochannel system. It is moderately thick with a range from 0 to 22.2 metres and average of 5.6 metres. The same paleochannel system has eroded the D Coal Seam at the same locations leaving three similar areas. The average coal seam thickness of these areas is 3.0 metres. The E Coal Seam is found over most of the resource area and is relatively thick (range from 0 to 14.9 and average thickness of 7.0 metres). The F Coal Seam is also extensive yet is thicker than the E Coal Seam with an average thickness of 8.4 metres and range from 0 to 23.5 metres. The G Coal Seam has a limited areal extent and is thinner with an average thickness of 1.3 metres. The H Coal Seam is similar to the G Coal Seam where it is found in the same small area and has a similar average thickness of 1.3 metres. The I Coal Seam has the most limited extent and is the thinnest of the coal seams with an average thickness of 0.1 metres.

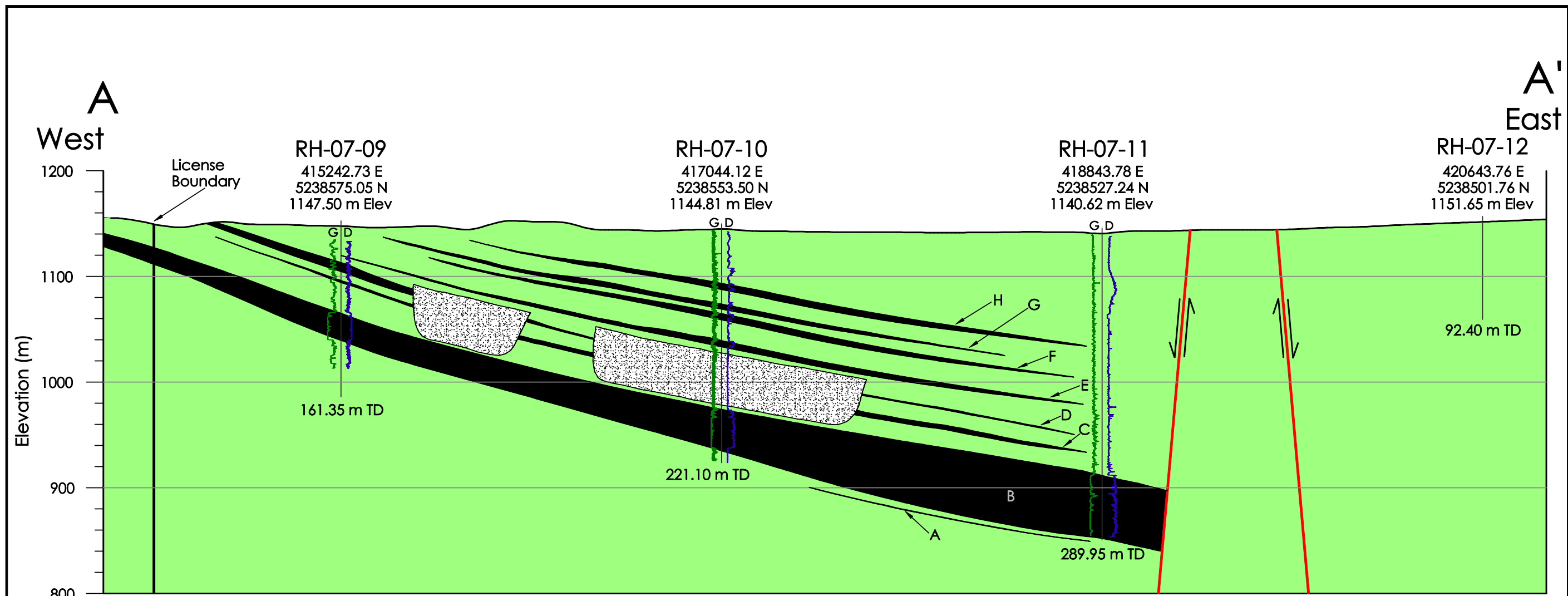
Drill Hole RH-07-09 was drilled 50 metres beyond the B Coal Seam as a stratigraphic test and found the only deeper major coal seam to be the A Coal Seam.

These rocks are poorly to moderately lithified and readily air slack. Coal burn (coal burned in-place and the associated altered rocks above) has not been found in the resource area.

### *8.2.2 Structural Geology*

---

The coal resources are found within the southern end of the Nyalga Basin. The basin appears to a faulted syncline (Figures 3 and 4) though seismic surveys suggest the coal-bearing rocks continue on the southeast side of the Nyalga Basin Fault Zone. The basin then may extend farther to the southeast than has been considered before. The coal seams subcrop along the western margin of the syncline, strike from N 20° to 65°E, and dip approximately 4.5° to the southeast (Map 4). The wide variation in strike may be a result of faulting but cannot be proven with the information available. Resistivity-IP and seismic lines across the former Nyalga Basin Fault indicate a horst exists at this location. The former Nyalga Basin Fault is the northwest normal fault bounding the horst while another normal fault about 570 metres southeast bounds the horst on the other side. These two faults and possible smaller faults indicated by the seismic survey lines justified renaming the area the Nyalga Basin Fault Zone. The location of the fault zone is also partly supported by the



5X Vertical Exaggeration

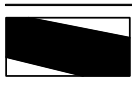





This cross section illustrates the thickness of the interval containing plies greater than or equal to 0.45 m thick for each coal seam. The total thickness of plies greater than or equal to 0.45 m thick for each coal seam is given in Table 9.

For some drill holes the vertical exaggeration has caused the interval to appear thicker than shown on the geophysical log.

Drill hole coordinates are in UTM Zone 49N, WGS84 datum.

**LEGEND**

-  Interval Containing Plies Greater Than or Equal To 0.45 m Thick
-  Paleochannel
-  Gamma ray curve
-  Density curve

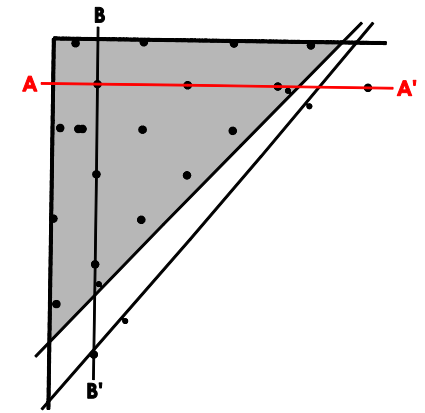
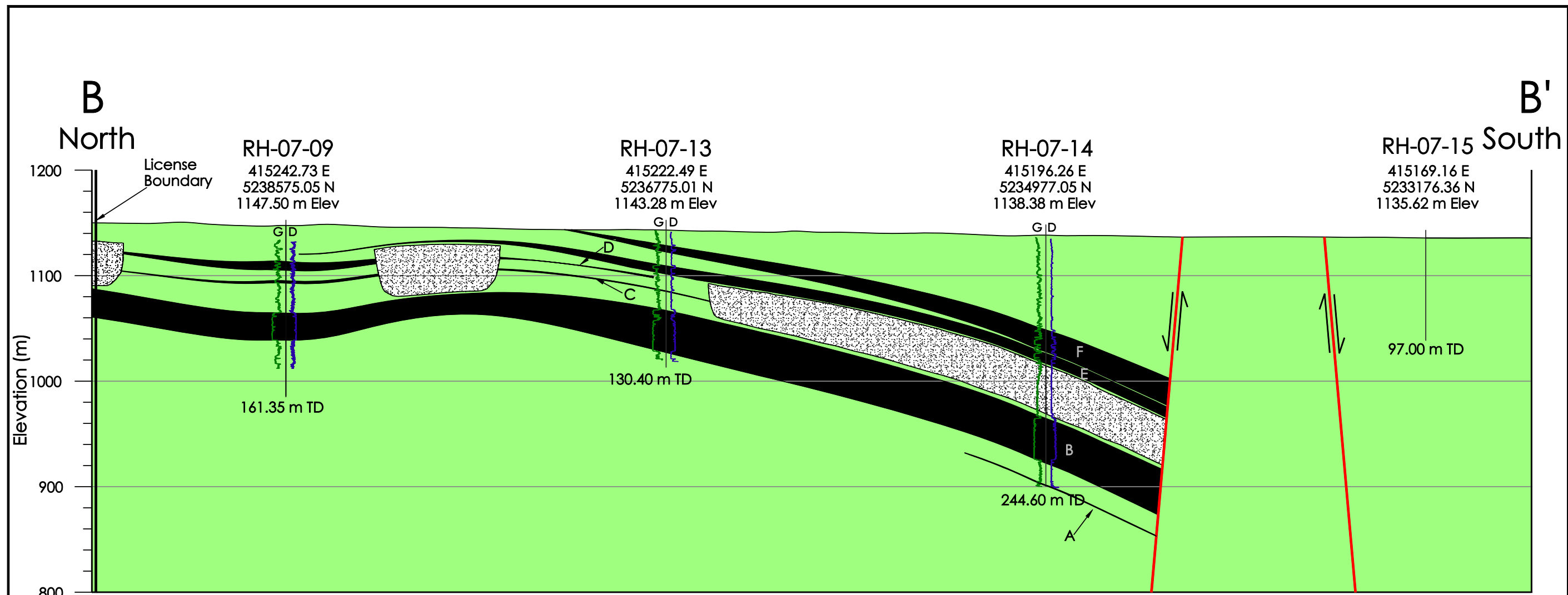


Figure 3. Cross Section A-A'



5X Vertical Exaggeration

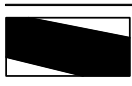





This cross section illustrates the thickness of the interval containing plies greater than or equal to 0.45 m thick for each coal seam. The total thickness of plies greater than or equal to 0.45 m thick for each coal seam is given in Table 9.

For some drill holes the vertical exaggeration has caused the interval to appear thicker than shown on the geophysical log.

Drill hole coordinates are in UTM Zone 49N, WGS84 datum.

**LEGEND**

-  Interval Containing Plies Greater Than or Equal To 0.45 m Thick
-  Paleochannel
-  Gamma ray curve
-  Density curve

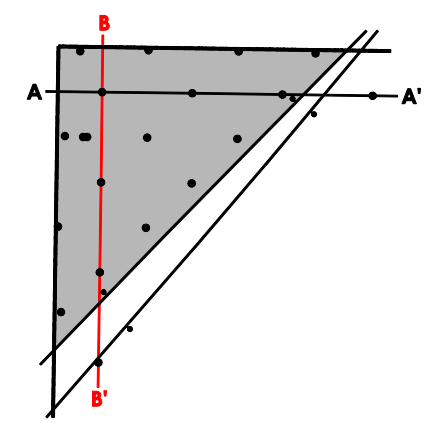
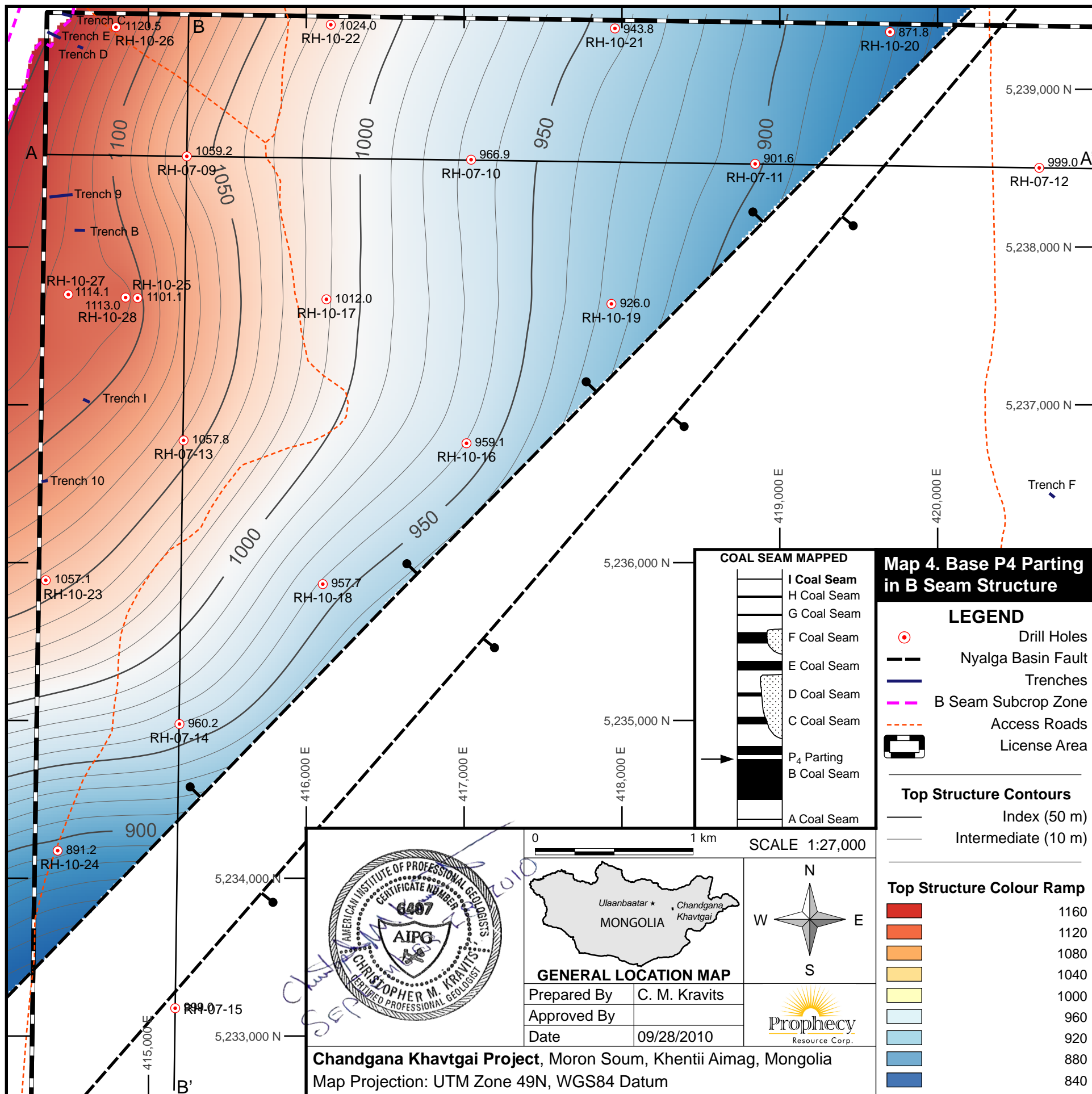


Figure 4. Cross Section B-B'



change in lithology of float material, drilling results, apparent slight topographic expression and azimuth of topographic contours, and the change in lithology of the portion of the Zuunbayan Formation penetrated in drill holes on either side of the fault. Displacement along both faults is approximately 300 metres at their north and south ends but appears to decrease at the middle. At this time the Nyalga Basin Fault Zone is considered to have a tectonic origin based on the type of deformation and observations from drill core which also agrees with the structural history of the area.

Mass wasting that may affect the reliability of the coal resource estimate or impact coal recoverability has not been found.

## 9 DEPOSIT TYPES

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The deposit consists of thick coal seams found over a large area within gently dipping sedimentary rocks. The coal is of moderate grade and low rank.

### 9.1 Determination

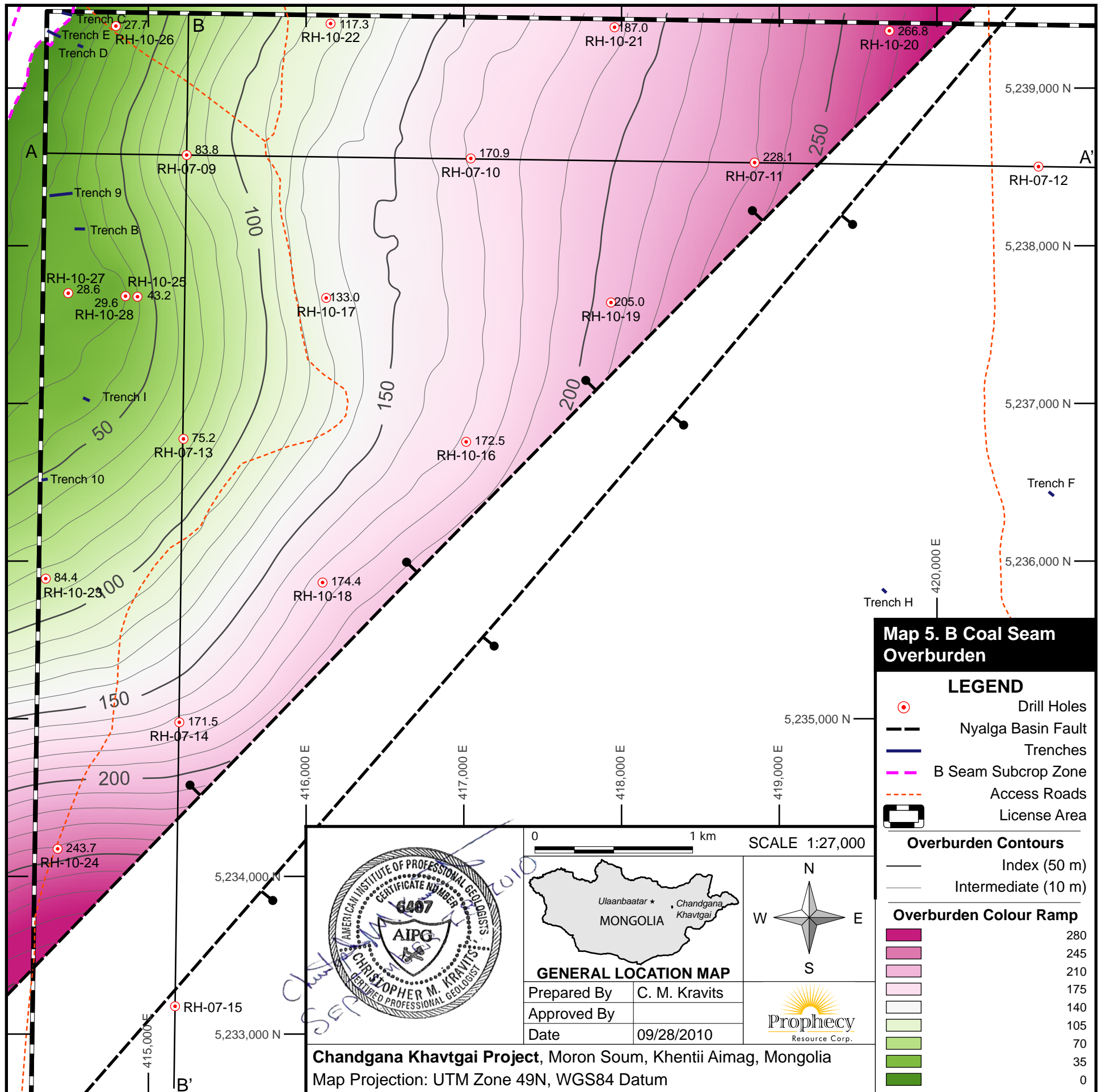
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The coal seams in the Chandgana Khavtgai Coal Resource Area are mostly amenable to surface mining methods thus the resource area is considered a surface type deposit. This is because (1) the coal seams lie under low to moderate overburden ranging from 10 to 267 metres (Map 5), (2) the coal seams are thick, (3) the in-place strip ratio averages 2.3:1, reaching a maximum of 5.4:1 (Map 6), (4) the overburden rocks and the coal seams are relatively weak, and (5) the in-place thickness-weighted average heating value of all the coal seams is relatively low at 3,636 kcal/kg on the as-received basis (Table 2). It is recognised that the thicker overburden exceeds the thickness removed at most surface mines around the world and so detracts somewhat from the surface type deposit determination. But with such a low strip ratio and thick mineable coal seams, it is thought that these depths could be reached by reducing the highwall angle. Further, though underground mining methods may be possible to as shallow as 75 metres depth, the thickness of the coal seams and the weakness of the rocks and coal make underground methods even less likely. This resource area has not been studied for unconventional energy recovery methods, especially underground coal gasification. But a review of previous and current experience and necessary geologic conditions indicates these methods would be inefficient and probably not achievable.

### 9.2 Geologic Model

---

Since there was minimal information on the resource area and Soviet era drilling records could not be obtained, the 2007 exploration plan was developed without a specific geological model. The exploration plan that was used then was that commonly used for stratiform deposits where drilling was used to obtain basic information on the stratigraphy, coal seams (depth, thickness and grade) and structure. This information was obtained and used to develop a geologic model following the 2007 exploration. The model consisted of a rapidly filling continental intermontane basin. Deposition within the basin kept pace with displacement of the Nyalga Basin Fault such that water level in the mire was optimum for plant growth and preservation of plant debris over long periods. These conditions resulted in thick coal seams with few partings having a large areal extent and moderate sulphur content. It was not known at the time whether the Nyalga Basin Fault was a growth fault (faulting is induced by sedimentary loading) or a tectonic fault as discussed in Subsection 8.2.2. After review of the 2008, 2009 and 2010 exploration data the geologic model for the resource area is somewhat better defined. As with the previous model deposition kept pace with basin subsidence, whether by sedimentary loading, growth or tectonic fault displacement or some of both so that water level in the mire was optimum for plant growth and preservation. Deposition of river-borne sediments and volcanic ash were more common than envisioned in the original model as were swamp fires. The close proximity of the thicker portions and the alignment of the main body of Coal Seams A through F suggest a genetic association with the fault zone. Following deposition faulting along the Nyalga Basin Fault Zone produced the horst (now used as the southeast limit of the resource area) and possible small displacement faults at the northwest corner of the resource area. Furthermore it now appears that the Nyalga Basin Fault Zone (former Nyalga Basin Fault) is not the limit of the basin but rather the basin continues an unknown distance to the southeast. If this is the case it may be that the fault zone is simply located in the area of thickest coal.



**Map 5. B Coal Seam Overburden**

**LEGEND**

- Drill Holes
- - - Nyalga Basin Fault
- - - Trenches
- - - B Seam Subcrop Zone
- - - Access Roads
- License Area

**Overburden Contours**

- Index (50 m)
- Intermediate (10 m)

**Overburden Colour Ramp**

Dark Purple	280
Purple	245
Light Purple	210
Pink	175
Light Pink	140
White	105
Light Green	70
Green	35
Dark Green	0

0 1 km SCALE 1:27,000

**GENERAL LOCATION MAP**

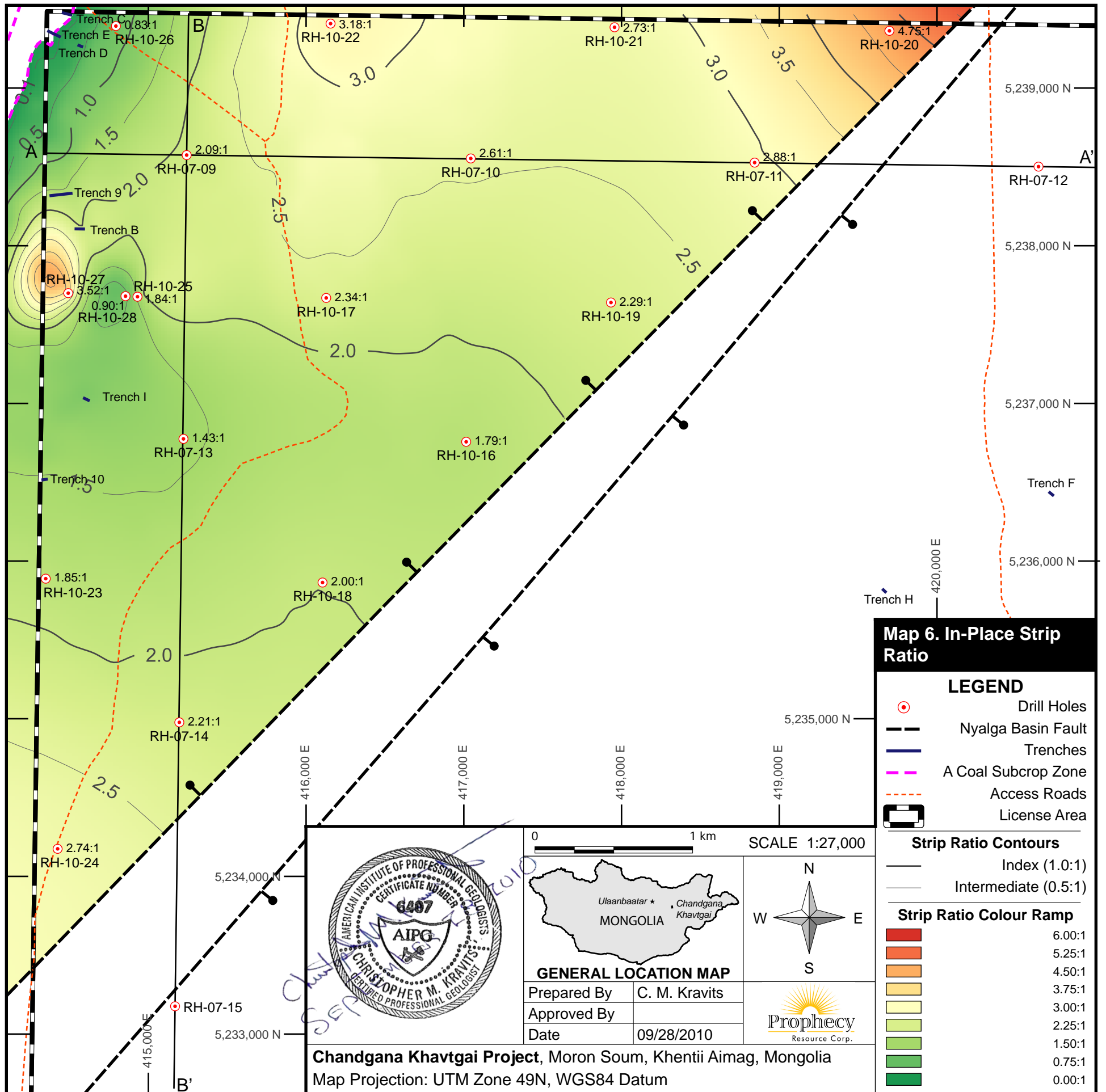
Ulaanbaatar \* Chandgana Khavtgai  
MONGOLIA

Prepared By C. M. Kravits  
Approved By  
Date 09/28/2010

**Chandgana Khavtgai Project, Moron Soum, Khentii Aimag, Mongolia**  
Map Projection: UTM Zone 49N, WGS84 Datum

Prophecy Resource Corp.







AVERAGE IN-PLACE COAL QUALITY												
Parameters/Units	A Coal Seam <sup>1</sup>			B Coal Seam <sup>2</sup>			C Coal Seam <sup>1</sup>			A, B and C Coal Seams		
	Moisture Containing Basis			Moisture Containing Basis			Moisture Containing Basis			Moisture Containing Basis		
Proximate Analysis	As-Received	Air-Dried	Dry	As-Received	Air-Dried	Dry	As-Received	Air-Dried	Dry	As-Received	Air-Dried	Dry
Moisture (wt. %)	31.28	16.44	-	36.61	23.68	-	34.02	19.14	-	36.54	23.57	-
Ash (wt. %)	20.38	24.85	29.54	9.87	11.90	15.59	20.91	25.62	31.68	10.10	12.18	15.92
Volatile Matter (wt. %)	23.38	28.41	34.09	29.12	35.08	45.96	24.10	29.54	36.53	29.01	34.95	45.75
Fixed Carbon (wt. %)	24.95	30.30	36.37	24.41	29.32	38.42	20.97	25.70	31.78	24.35	29.27	38.30
Other Analyses	As-Received	Air-Dried	Dry	As-Received	Air-Dried	Dry	As-Received	Air-Dried	Dry	As-Received	Air-Dried	Dry
Heating Value (kcal/kg)	3,354	4,072	4,890	3,648	4,392	5,754	2,991	3,666	4,534	3,636	4,379	5,730
Heating Value (Btu/lb)	6,036	7,330	8,802	6,567	7,905	10,357	6,154	7,542	9,327	6,557	7,896	10,333
Sulfur (wt. %)	0.44	0.54	0.64	0.59	0.72	0.94	0.69	0.84	1.04	0.59	0.72	0.94
Ultimate Analysis <sup>3</sup>	As-Received	Air-Dried	Dry	As-Received	Air-Dried	Dry	As-Received	Air-Dried	Dry	As-Received	Air-Dried	Dry
Carbon (wt. %)	NA	NA	NA	38.87	46.78	59.75	31.00	38.00	46.99	38.75	46.64	59.25
Hydrogen (wt. %)	NA	NA	NA	5.29	4.63	3.86	5.92	4.75	3.24	5.30	4.63	3.83
Nitrogen (wt. %)	NA	NA	NA	0.52	0.63	0.80	0.46	0.56	0.69	0.52	0.63	0.79
Oxygen (wt. %)	NA	NA	NA	44.86	35.34	19.54	41.02	30.23	16.36	44.80	35.26	19.39
Chlorine (wt. %)	NA	NA	NA	0.04	0.06	0.07	0.05	0.07	0.08	0.05	0.06	0.07
Ash Analysis	Ignited Basis			Ignited Basis			Ignited Basis			Ignited Basis		
SiO <sub>2</sub> (wt. %)	NA			45.82			55.38			46.13		
Al <sub>2</sub> O <sub>3</sub> (wt. %)	NA			16.32			22.03			16.51		
Fe <sub>2</sub> O <sub>3</sub> (wt. %)	NA			10.99			6.34			10.84		
CaO (wt. %)	NA			10.64			5.43			10.48		
MgO (wt. %)	NA			2.47			2.16			2.46		
K <sub>2</sub> O (wt. %)	NA			0.97			1.50			0.98		
Na <sub>2</sub> O (wt. %)	NA			2.26			1.37			2.23		
TiO <sub>2</sub> (wt. %)	NA			0.74			0.68			0.74		
Mn <sub>2</sub> O <sub>3</sub> (wt. %)	NA			0.35			0.05			0.34		
SO <sub>3</sub> (wt. %)	NA			6.08			3.72			6.01		
P <sub>2</sub> O <sub>5</sub> (wt. %)	NA			0.10			0.06			0.09		
SrO (wt. %)	NA			0.11			0.08			0.10		
BaO (wt. %)	NA			0.06			0.04			0.06		
ZnO (wt. %)	NA			0.02			0.02			0.02		
Undet. (wt. %)	NA			3.07			1.14			3.01		
Total	NA			100.00			100.00			100.00		
Ash Fusion Temperatures	Reducing Atm.	Oxidizing Atm.		Reducing Atm.	Oxidizing Atm.		Reducing Atm.	Oxidizing Atm.		Reducing Atm.	Oxidizing Atm.	
Initial Deformation (°C)	NA	NA		1120	1202		1218	1249		1122	1203	
Softening (°C)	NA	NA		1148	1221		1245	1277		1149	1222	
Hemispherical (°C)	NA	NA		1165	1232		1256	1291		1166	1233	
Fluid (°C)	NA	NA		1208	1260		1279	1308		1209	1261	
Hardgrove Grindability Index	NA			30			30			30		
Relative Density (g/cm <sup>3</sup> )	1.43	1.52	1.62	1.31	1.38	1.47	1.44	1.54	1.64	1.33	1.38	1.47
Basic Combustion Loadings	Value			Value			Value			Value		
Moisture (kg/million kcal)	93.3			100.4			113.7			100.5		
Ash (kg/million kcal)	60.4			27.1			69.9			27.8		
Emissions	Value			Value			Value			Value		
Sulfur Dioxide (kg/million kcal)	2.6			3.3			4.0			0.0		
Carbon Dioxide (kg/million kcal)	-			1,851.1			1,616.5			1,839.9		
Basic Combustion Parameters	Value			Value			Value			Value		
Fuel Ratio	-			0.84			0.87			0.84		
Base/Acid Ratio	-			0.43			0.22			0.43		
Slagging Index	-			0.41			0.22			0.40		
Fouling Index	-			0.98			0.29			0.95		

<sup>1</sup> Based on a thickness and density-weighted average of composite assays from two drill holes for the A Coal Seam and all drill holes for the B Coal Seam.

<sup>2</sup>Based on one drill hole composite assay.

NA - Not Assayed

<sup>3</sup> Hydrogen in the ultimate analysis includes hydrogen in the contained moisture.

**Table 2**

## 10 MINERALISATION

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Mineralisation as described in NI 43-101 is interpreted for this updated technical report as the physical character of the coal seams, their contained partings, interburden between coal seams, and the overburden as well as the type, grade and rank of the coal.

### 10.1 Definitions and Parameters

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Where discussed in this updated technical report, coal seam refers to the total thickness of all coal plies and intervening partings regardless of thickness forming a stratigraphic interval determined by the author to represent a mostly coal depositional period. A ply is a strata of coal or bone coal bounded above and below by other rocks. Partings separate plies within a coal seam and are comprised of rocks other than coal or bone coal. Resource thickness is the total thickness of plies, aggregate coal seams and partings meeting the minimum resource requirements within a coal seam and is the thickness on which resources are estimated. Plies and partings may gradually change lithology to merge into the rocks above or below a coal seam or into equivalent rocks in which case the coal seam begins to pinch-out. The rock between coal seams is termed interburden. These rocks generally represent extensive non-coal depositional environments such as fluvial systems or marine transgressions.

### 10.2 Coal Seam Character and Surrounding Rocks

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The coal seams are found in the upper member of the early Cretaceous Zuunbayan Formation. There is one major coal seam and eight smaller coal seams found in the resource area. The coal seams and surrounding rocks are described below in ascending order.

**A Coal Seam:** The A Coal Seam is apparently the stratigraphically lowest coal seam and only exceeds the minimum resource thickness in two small areas adjacent to the Nyalga Basin Fault Zone. This coal seam varies from 0 to 5.9 metres in thickness with an average thickness of 0.7 metres. There may be as many as six plies up to 2.0 metres thick. The A Coal Seam may contain up to five partings but averages 1.4 with an average parting thickness of 1.1 metres. The partings are usually comprised of claystone. The resource thickness of the A Coal Seam has a range of 0.7 to 2.0 metres and average of 0.6 metres (Map 7). The interburden between the A Coal Seam and B Coal Seam averages 14.0 metres thick and varies from claystone to sandstone with no observable areal trends. The A Coal Seam is not known well because it has only been penetrated in four drill holes.

**B Coal Seam:** The B Coal Seam is the thickest coal seam and is found throughout the resource area. This coal seam has an average thickness of 37.5 metres and varies from 6.2 to 61.1 metres. There may be as many as eight plies in this coal seam which average 15.8 metres thick. Partings average 2.1 metres thick of which there may be as many as seven but the average 2.2 in number. The partings are composed of carbonaceous claystone, mudstone, and sandstone. The B Coal Seam contains two unique partings which are tonsteins and coarse-grained sandstones. Tonsteins are brown to brown-black brittle claystones that result from volcanic ash deposited in the mire. The coarse-grained to conglomeratic sandstones may comprise partings in the lower portion of the coal seam. The partings in the B Coal Seam are easily correlated because the pattern of intervals between partings, trends in parting thickness and the lithology of the partings are fairly consistent. The B Coal Seam has an average resource thickness of 34.2 metres and varies from 6.2 to 60.5 metres (Map 8). The interburden between the B Coal Seam and the C Coal Seam varies from 9.9 to 28.5 metres

with an average of 15.5 metres. The interburden is generally composed of siltstones and claystones with thin sandstones though a thick fluvial sandstone unit comprises the interburden in much of the resource area.

**C Coal Seam:** The C Coal Seam is not present in more than half of the resource area because it has been eroded by the fluvial sandstone whose base is in the B-C Coal Seam interburden. The C Coal Seam averages 5.6 metres thick and varies from 0 to 22.2 metres. It may contain up to four plies with an average thickness of 1.5 metres. The partings in the C Coal Seam vary from claystone to siltstone, average one in number and have an average thickness of 3.9 metres. The average resource thickness of the C Coal Seam is 2.8 metres with a range of 0.5 to 9.4 metres (Map 9). The interburden between the C and D Coal Seams is commonly comprised of claystone and siltstone where it has not been eroded by the fluvial sandstone. The interburden averages 22.0 metres thick. It is not clear whether the paleochannel that deposited the fluvial sandstone was contemporaneous with C and D Coal Seam peat deposition or it post-dated D Seam deposition and eroded down to the B-C Coal Seam interburden.

**D Coal Seam:** The D Coal Seam has a similar distribution as the C Coal Seam because the fluvial sandstone is found at this stratigraphic level also. This coal seam has an average thickness of 3.0 metres and varies from 0 to 8.3 metres. It may contain one to three plies and averages 1.5 plies. The plies vary from 0.3 to 1.6 metres thick and average 0.6 metres. The number of partings in the D Coal Seam averages 0.3 with an average thickness of 5.7 metres. The parting lithology varies from claystone to siltstone with some sandstone. The range in resource thickness is 0.6 to 2.5 metres and average 0.7 metres (Map 10). The D to E Coal Seam interburden ranges from 4.0 to 32.1 metres thick with an average of 15.9 metres and is usually composed of interbedded claystone and siltstone.

**E Coal Seam:** The E Coal Seam is found over most of the resource area and has an average thickness of 7.0 metres and range of 0 to 14.9 metres. This seam may contain as many as three plies that average 1.9 metres thick. The partings vary from claystone to siltstone, range from 0.3 to 9.1 metres thick and have an average thickness of 2.2 metres. The resource thickness averages 3.5 metres and ranges from 0.8 to 8.3 metres (Map 11). The E Coal Seam is especially difficult to correlate because of its variable thickness, general lack of a coal ply-parting pattern and lack of any consistent rock types. However it appears to be best developed above the fluvial sandstone found at the level of the C and D Coal Seams. The E to F Coal Seam interburden lithology is mostly claystone though siltstone and sandstone are found in some locations. This interburden varies from 1.7 to 24.7 metres thick with an average of 12.4 metres.

**F Coal Seam:** The F Coal Seam is the thickest coal seam besides the B Coal Seam and is found over most of the resource area. This coal seam ranges from 0 to 23.5 metres thick with an average of 8.4 metres. The number of plies ranges from 1 to 6 with an average of 3.3. The average ply thickness is 2.1 metres and ranges from 0.3 to 9.9 metres. The number of partings in the F Coal Seam ranges from 1 to 5 and is usually composed of claystone. The partings vary from 0.5 to 5.2 metres thick with an average of 1.8 metres. The average resource thickness is 4.2 metres and range of 0.7 to 16.0 metres (Map 12). This coal seam is also difficult to correlate but is also best developed above the fluvial sandstone. The F to G Coal Seam interburden averages 11.5 metres and varies from 4.2 to 19.6 metres thick. The interburden is most commonly comprised of claystone with siltstone in some areas.

**G Coal Seam:** This coal seam is not very extensive or thick. The G Coal Seam has an average thickness of 1.3 metres and ranges from 0 to 4.8 metres thick. It is comprised of one or two plies that range from 0.3 to 2.0 metres thick and average 1.6 metres. The number of partings varies from 0 to 1 and the average parting thickness is 2.2 metres. The G Coal Seam is much thinner having an average resource thickness of 1.6 metres and range of 0.5 to 2.7 metres (Map 13). The G to H Coal Seam interburden thickness is fairly consistent with an average of 13.0 metres. It is most commonly comprised of claystone though interbedded claystone and siltstone is found at some locations.

**H Coal Seam:** The H Coal Seam is found in the same general area and is thin similar to the G Coal Seam. This coal seam ranges from 0 to 7.6 metres thick with an average of 1.3 metres. It is comprised of one to three plies that vary from 0.3 to 1.1 metres thick with an average of 0.7 metres. The H Coal Seam includes one to two partings that average 2.4 metres thick. The partings are usually comprised of claystone. Resource thickness is also thin with a range of 1.0 to 2.6 and average of 1.6 metres (Map 14). The H to I Coal Seam interburden thickness is fairly consistent with an average of 11.1 metres. The interburden is most commonly claystone.

**I Coal Seam:** The I Coal Seam has the smallest areal extent and is the thinnest of the coal seams. This coal seam has an average thickness of 0.1 metres and consists of one ply. The average resource thickness is 0.6 metres (Map 15).

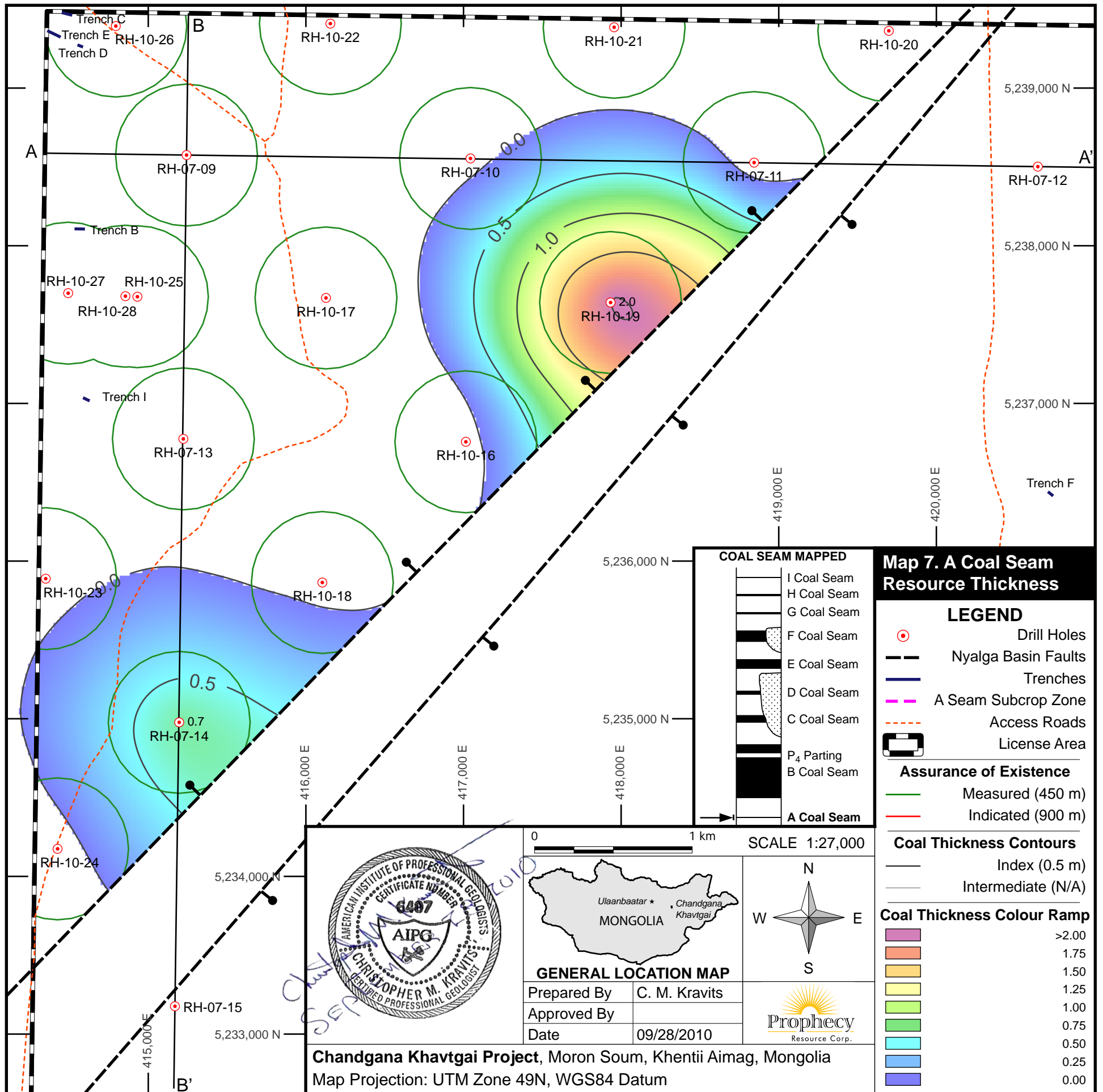
### **10.3 Coal Description, Type, Grade and Rank**

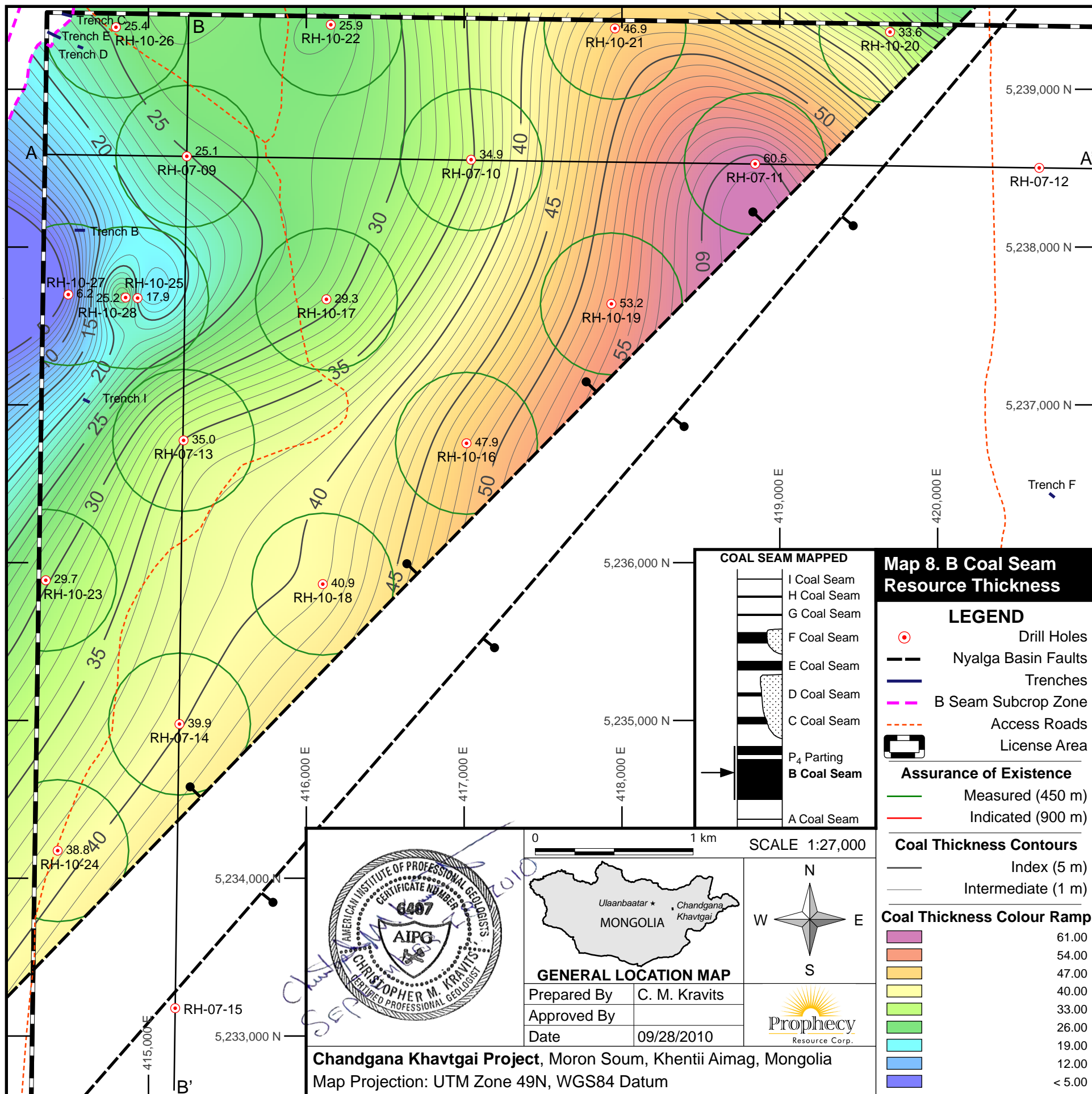
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The only coal seams observed and sampled in a fresh condition are the A, B, C, D, E and F Coal Seams. These coal seams are black with a slight shade of brown when wet, becomes browner when drying, but then becomes black when dry. They are mostly moderately dull to dull and the most common megascopic constituents are dull clarain and durain with occasional fusain. The fusain is often sufficiently thick and extensive to make for a plane of weakness. Vitrain and secondary resin are not common. The coal has a fibrous texture and occasionally discernable plant debris is found. Megascopic pyrite is not common and when found occurs as discrete grains and thin lenses. Cleat and fracture filling is rare and is usually calcite when found. No detailed lithotype descriptions or petrographic analyses have been performed on the coal seams. The G, H and I Coal Seams are considered to have a generally similar lithologic composition because they appear to have been deposited in a similar environment and undergone a similar burial and deformational history.

The coal seams are thermal type coals based on their low heating value, moderate sulfur content, low rank and probable lack of agglutinating and carbonising properties. Though the potential of the coal seams has not been evaluated for conversion to other fuels, it appears the coals may be a potential conversion feedstock because similar grade and rank coals are currently being converted or pilot scale tests indicate such.

The coal seams are a medium grade coal. The average in-place as-received quality based on all drill hole composite assays is 36.5% moisture, 10.1% ash, 3,636 kcal/kg heating value, and 0.6% sulphur (Table 2). This average as-received quality is considered representative of the resource though three conditions detract slightly from the representativeness. These are – (1) Three drill holes do not have composite assays of the full thickness of the B Coal Seam because core drilling started below the top of the coal seam, (2) Two errors were made in the composites from the 2007 drilling. These included use of a slightly thicker minimum coal seam thickness for sampling than for resource estimation and the laboratory only used thickness instead of thickness and relative density to





**Map 8. B Coal Seam Resource Thickness**

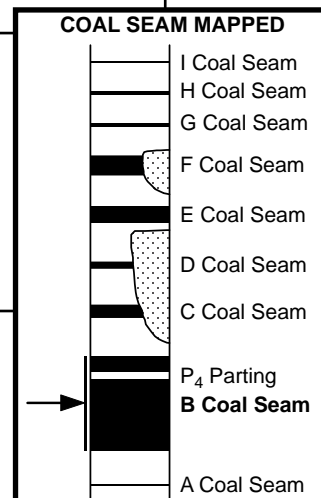
- LEGEND**
- Drill Holes
  - Nyalga Basin Faults
  - Trenches
  - B Seam Subcrop Zone
  - Access Roads
  - License Area

- Assurance of Existence**
- Measured (450 m)
  - Indicated (900 m)

- Coal Thickness Contours**
- Index (5 m)
  - Intermediate (1 m)

**Coal Thickness Colour Ramp**

	61.00
	54.00
	47.00
	40.00
	33.00
	26.00
	19.00
	12.00
	< 5.00

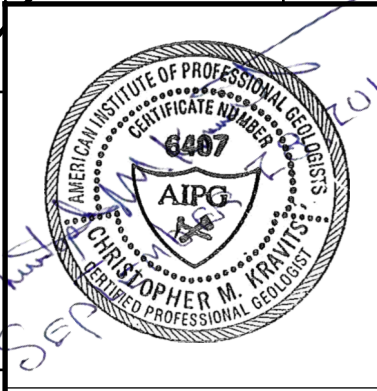
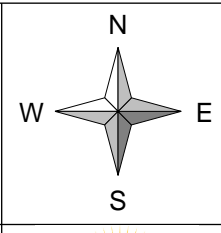


0 1 km SCALE 1:27,000

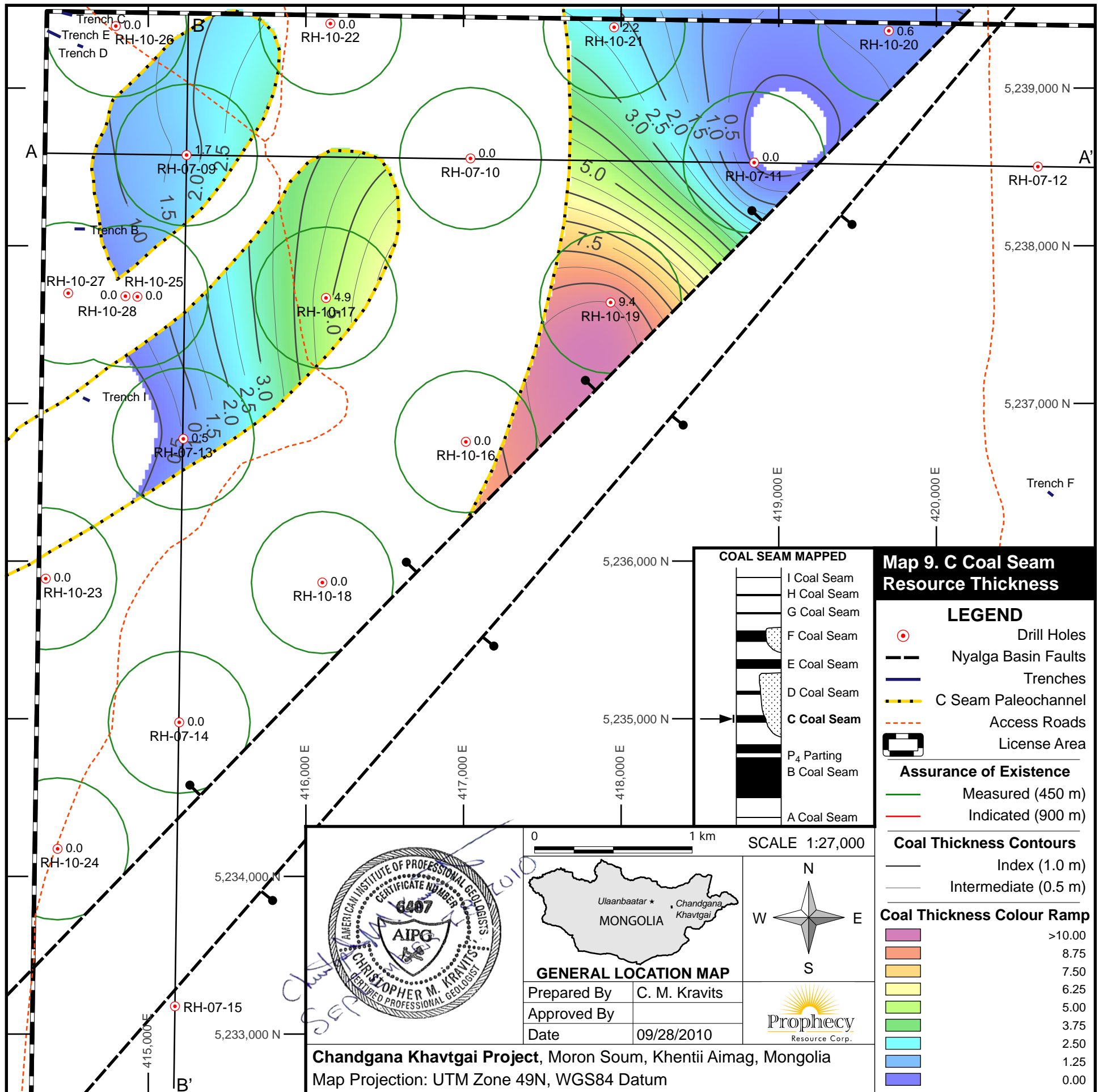


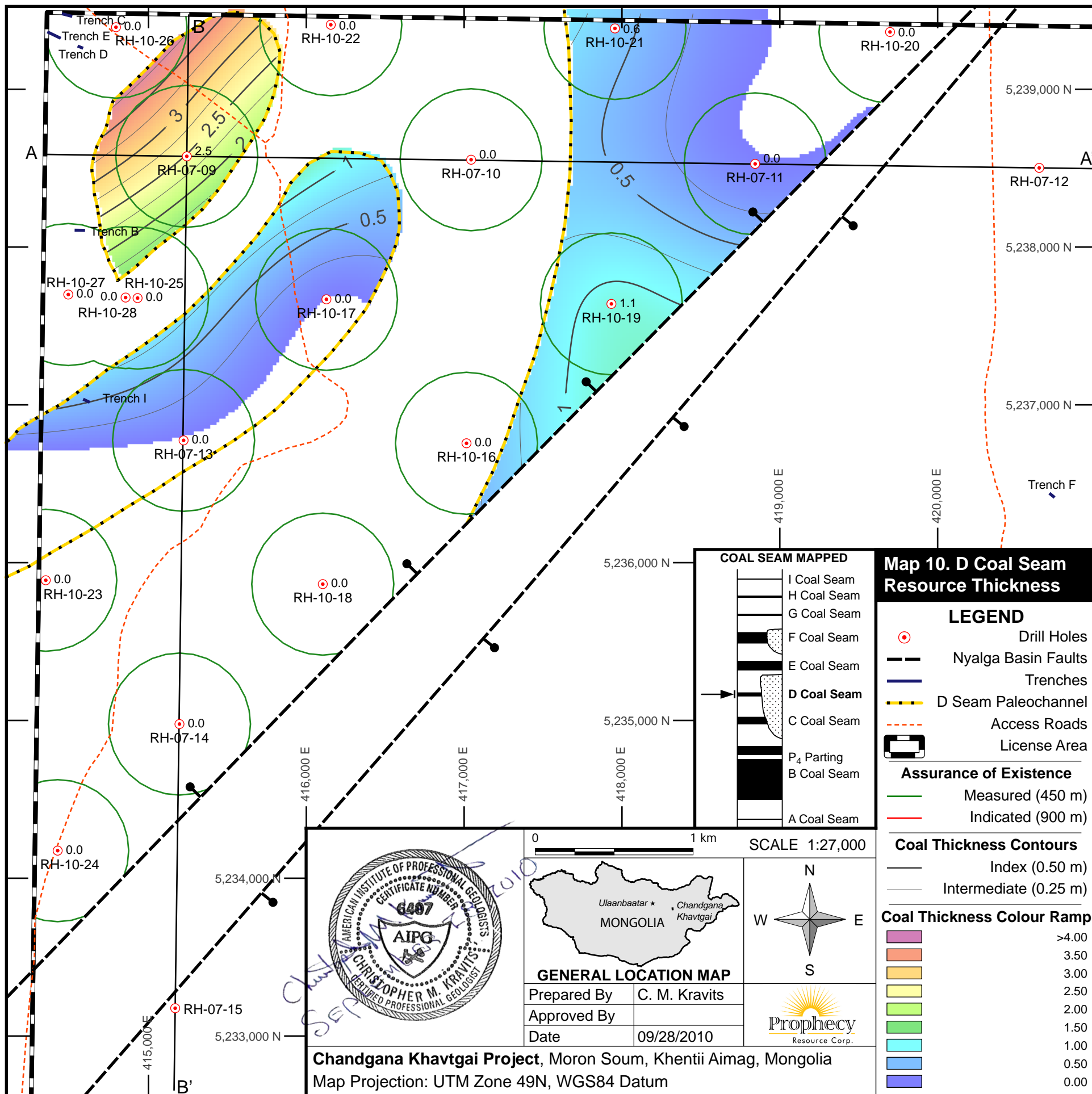
**GENERAL LOCATION MAP**

Prepared By C. M. Kravits  
Approved By  
Date 09/28/2010

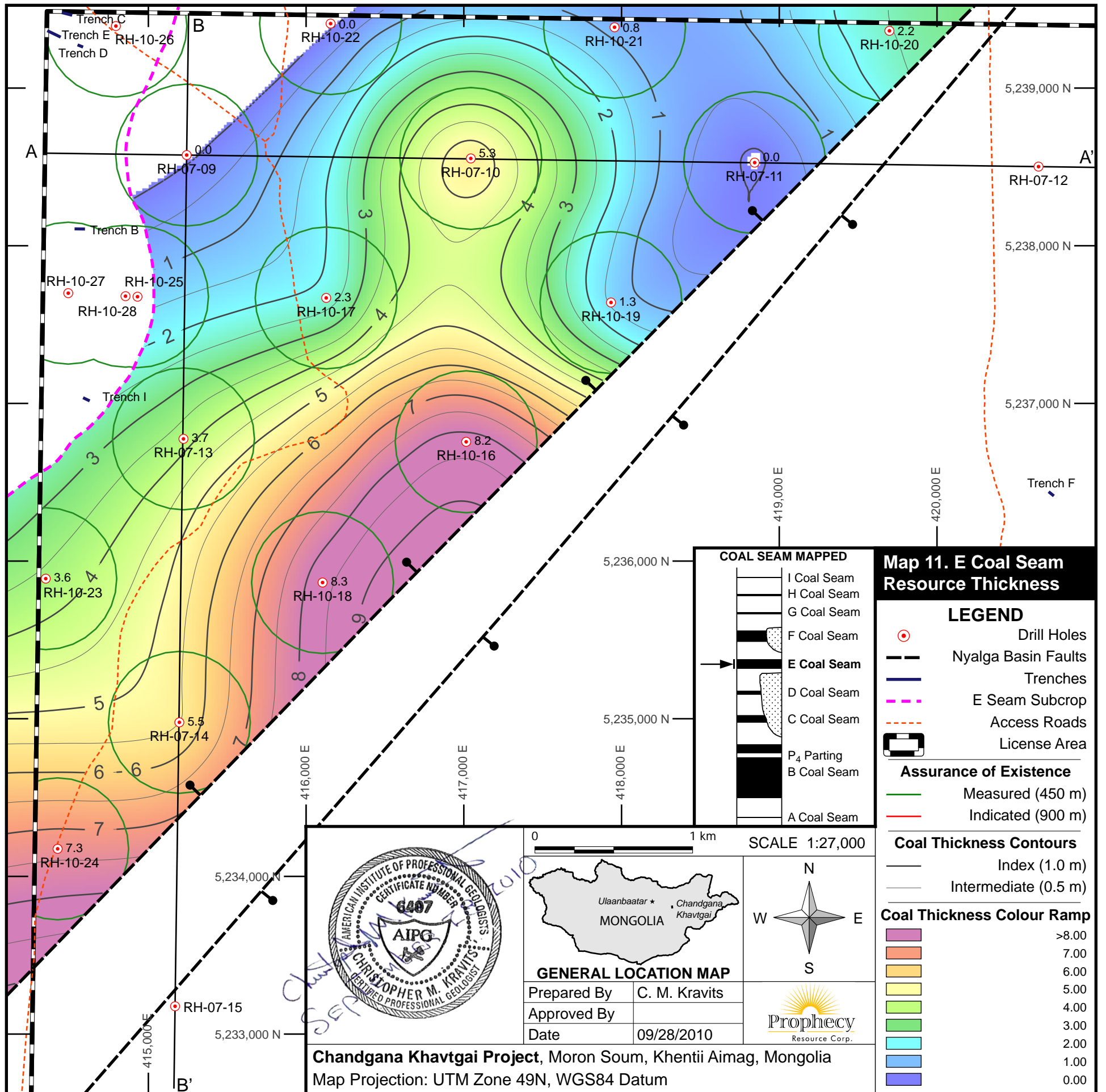


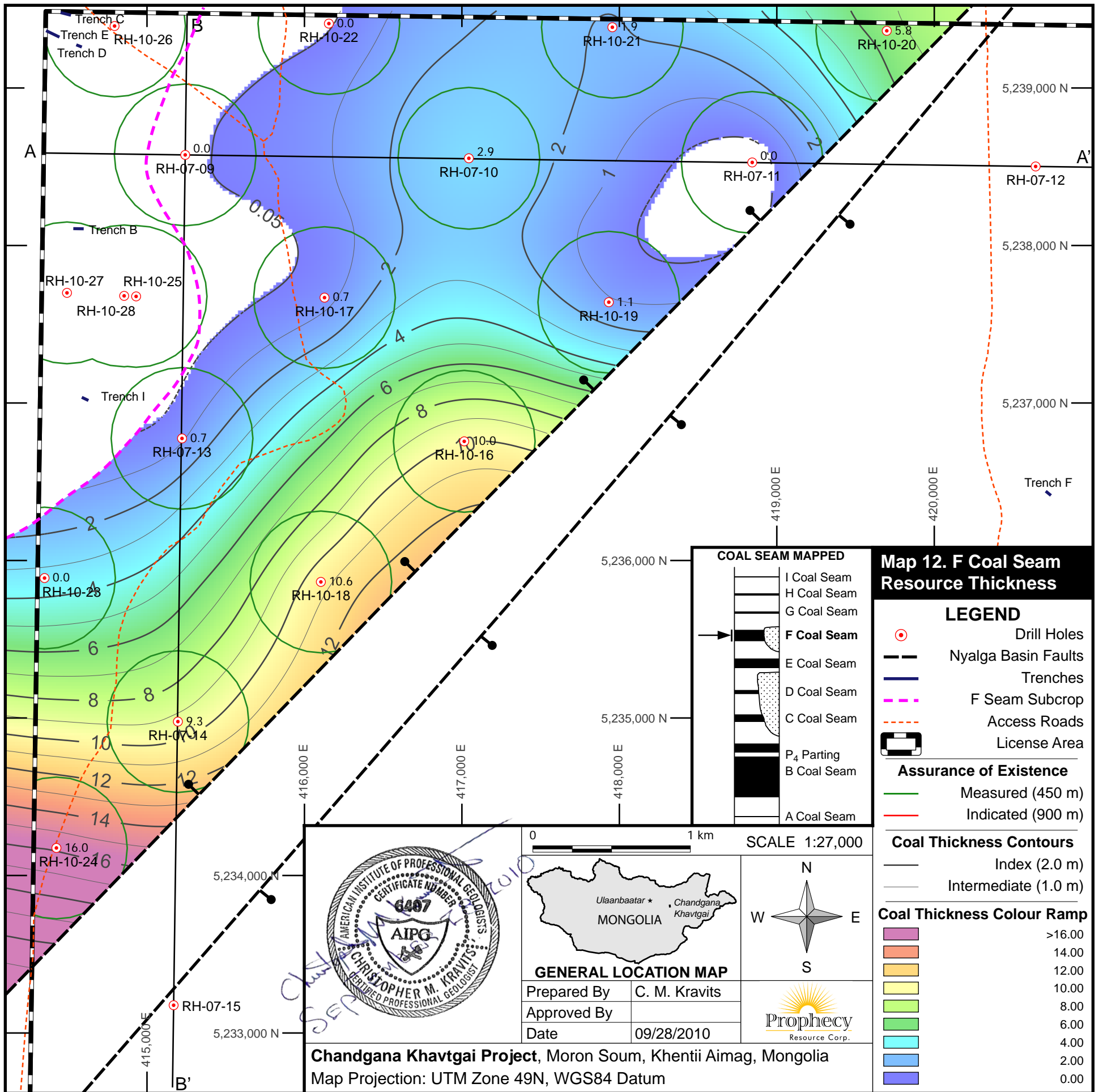
**Chandgana Khavtgai Project, Moron Soum, Khentii Aimag, Mongolia**  
Map Projection: UTM Zone 49N, WGS84 Datum

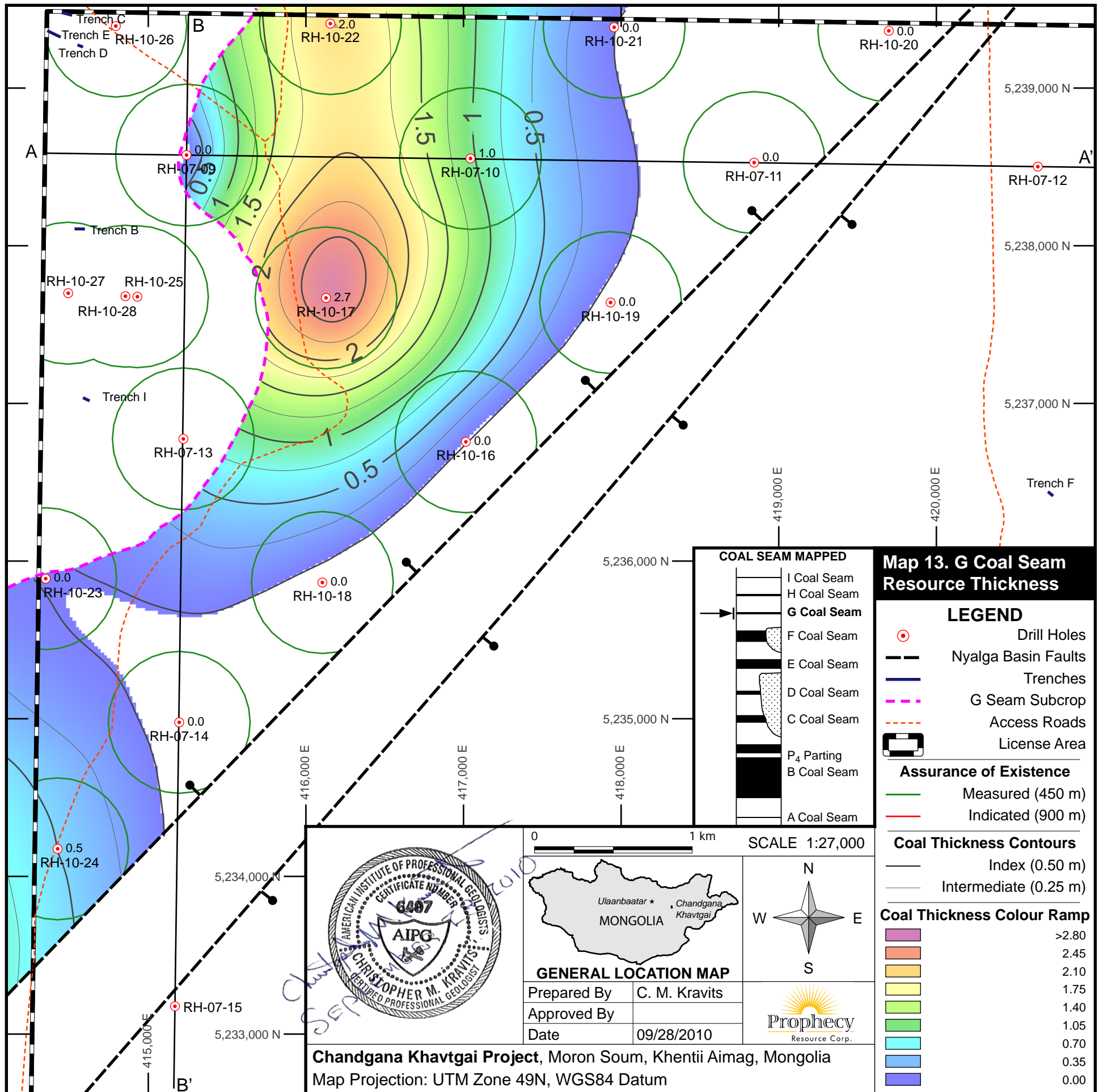












**Map 13. G Coal Seam Resource Thickness**

**LEGEND**

- Drill Holes
- Nyalga Basin Faults
- Trenches
- G Seam Subcrop
- Access Roads
- License Area

**Assurance of Existence**

- Measured (450 m)
- Indicated (900 m)

**Coal Thickness Contours**

- Index (0.50 m)
- Intermediate (0.25 m)

**Coal Thickness Colour Ramp**

	>2.80
	2.45
	2.10
	1.75
	1.40
	1.05
	0.70
	0.35
	0.00

**COAL SEAM MAPPED**

- I Coal Seam
- H Coal Seam
- G Coal Seam**
- F Coal Seam
- E Coal Seam
- D Coal Seam
- C Coal Seam
- P<sub>4</sub> Parting
- B Coal Seam
- A Coal Seam

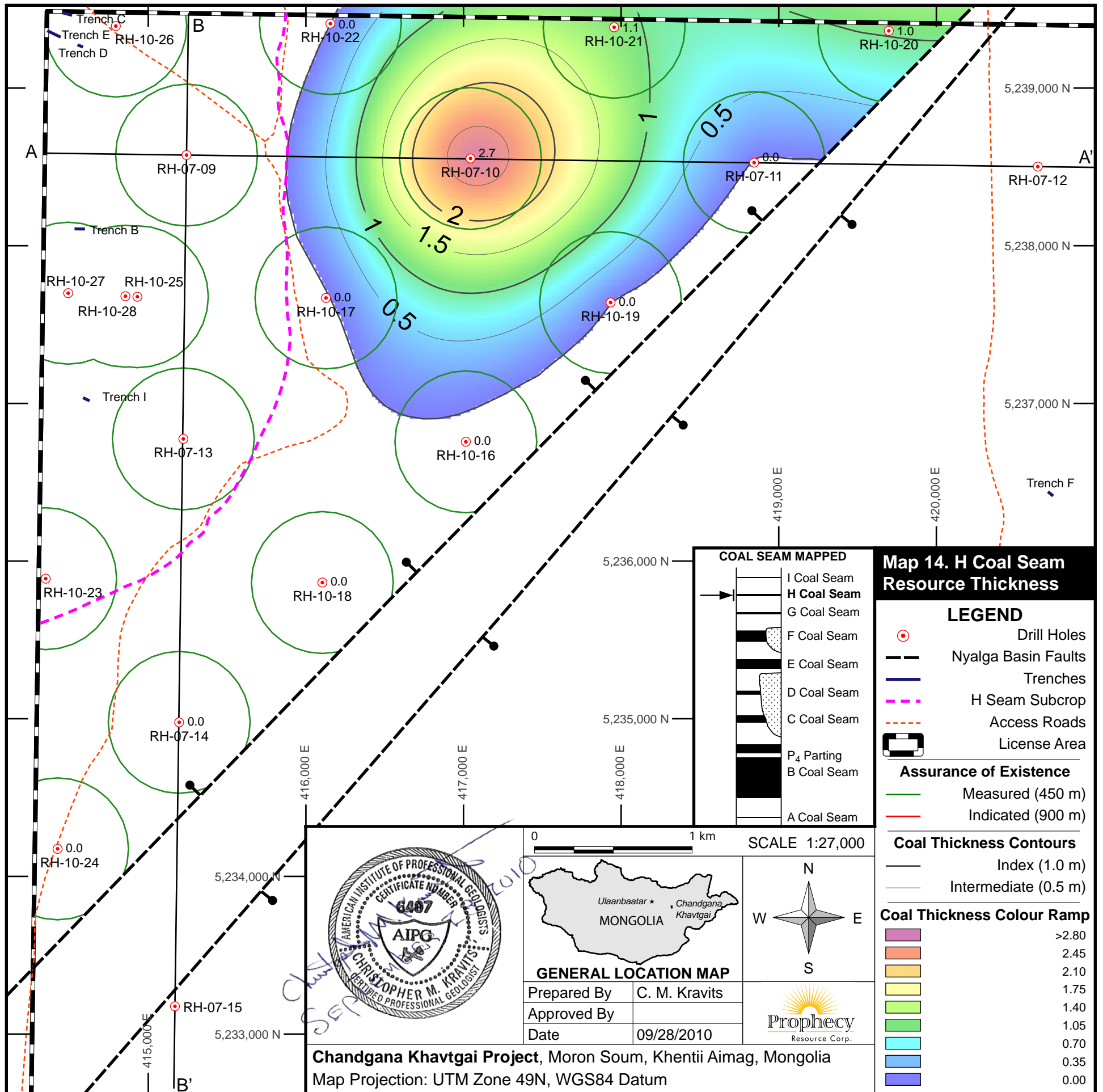
0 1 km SCALE 1:27,000

**GENERAL LOCATION MAP**

Prepared By	C. M. Kravits
Approved By	
Date	09/28/2010

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 CERTIFICATE NUMBER 6407  
 AIPG  
 CHRISTOPHER M. KRAVITS  
 REGISTERED PROFESSIONAL GEOLOGIST

**Chandgana Khavtgai Project, Moron Soum, Khentii Aimag, Mongolia**  
 Map Projection: UTM Zone 49N, WGS84 Datum



**Map 14. H Coal Seam Resource Thickness**

**LEGEND**

- Drill Holes
- - - Nyalga Basin Faults
- - - Trenches
- - - H Seam Subcrop
- - - Access Roads
- License Area

**Assurance of Existence**

- Measured (450 m)
- Indicated (900 m)

**Coal Thickness Contours**

- Index (1.0 m)
- Intermediate (0.5 m)

**Coal Thickness Colour Ramp**

	>2.80
	2.45
	2.10
	1.75
	1.40
	1.05
	0.70
	0.35
	0.00

**COAL SEAM MAPPED**

	I Coal Seam
	H Coal Seam
	G Coal Seam
	F Coal Seam
	E Coal Seam
	D Coal Seam
	C Coal Seam
	P <sub>4</sub> Parting
	B Coal Seam
	A Coal Seam

0 1 km SCALE 1:27,000

**GENERAL LOCATION MAP**

Ulaanbaatar \* Chandgana Khavtgai

MONGOLIA

W N E S

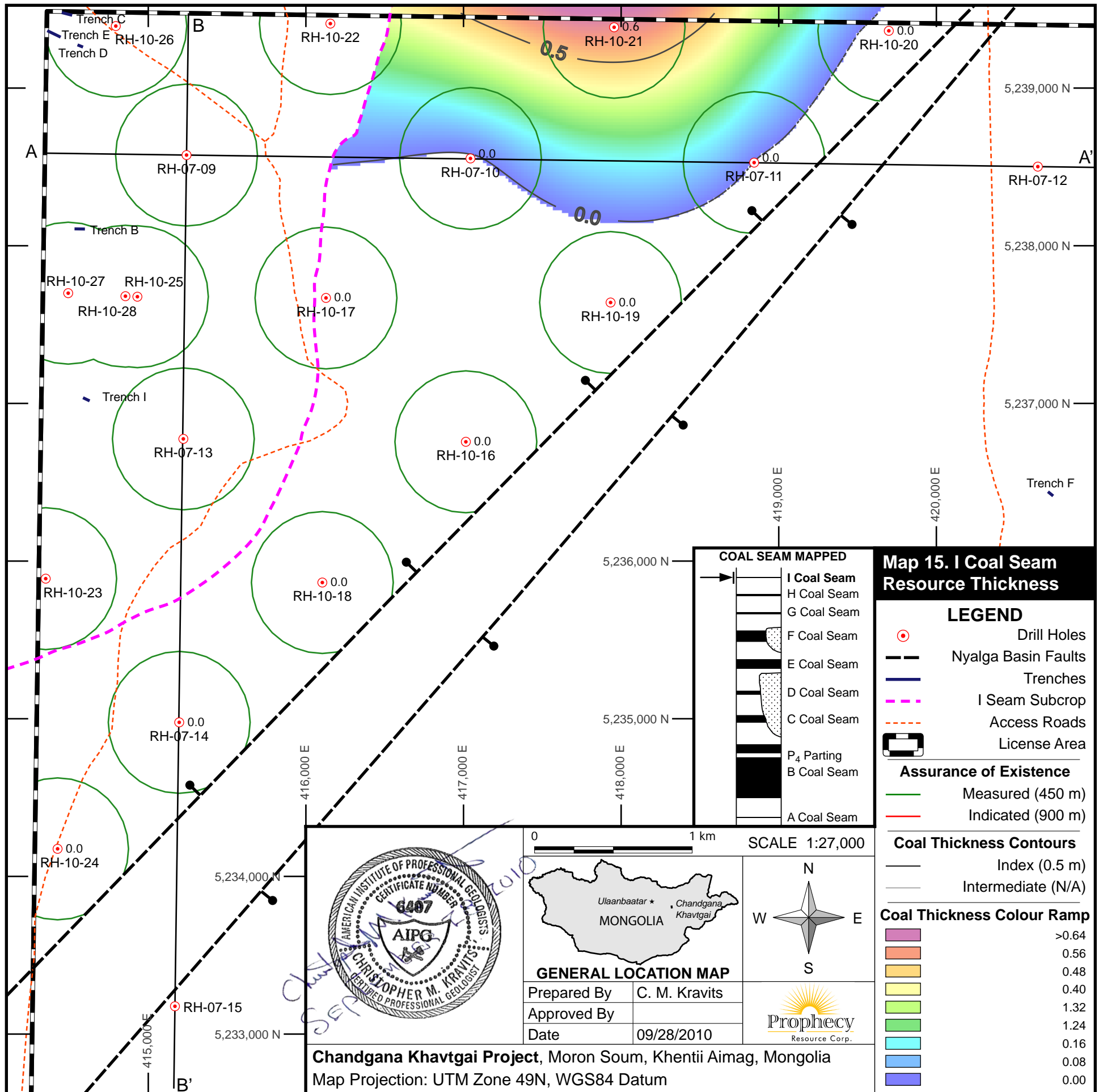
Prepared By	C. M. Kravits
Approved By	
Date	09/28/2010

**Prophecy**  
Resource Corp.

**Chandgana Khavtgai Project, Moron Soum, Khentii Aimag, Mongolia**

Map Projection: UTM Zone 49N, WGS84 Datum

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determine the increment proportions when making the composite samples (these errors were corrected before assays of the core samples from the 2010 drilling started), and (3) Only the A, B, C, E and F Coal Seams were assayed. Assays of individual samples and composite samples are available for the A and C Coal Seams but only individual sample assays are available for the E and F Coal Seams and there are no assays for the other coal seams. These conditions are considered to slightly detract from the representativeness of the quality presented in Table 2 because of the small number of drill holes affected, the fair comparability of composites based on increment thickness instead of thickness and relative density, the small amount of the resource contained in the coal seams not sampled, and the good comparability of calculated composite assays to assayed composite samples. The assays of the individual samples are given in Table 3 and the full-seam composites are given in Table 4. For comparison, calculated composite assays for the coal seams without assayed composites are given in Table 5. A more complete suite of assays were performed on the composite samples than the increment samples. But other assays (e.g. sulfur forms, soluble alkalis, trace metals, hazardous air pollutants, radionuclides, etc) were not assayed in order to keep sufficient sample available for power plant design and feasibility studies.

The assays of the trench samples obtained in 2007 are generally within the range of that of the core samples. But, the decreased dry ash-free heating value indicates that the coal from these locations has undergone varying degrees of weathering. These samples were not used in determining grade and rank because they only represent a small portion of the coal seam and vary in the degree of weathering. Other assays are needed to better determine the degree of weathering. Assays of the trench samples are given in Table 6.

The coal seams have high moisture and moderate ash loadings when considered as a thermal coal. Comparison to United States power industry rules of thumb, the moisture loading of 100.5 kg/million kcal (55.7 lbs/MMBtu) is high and the ash loading of 27.8 kg/million kcal (15.42 lbs/MMBtu) is moderate. The sulphur dioxide emissions of 3.25 kg/million kcal (1.80 lbs/MMBtu) is moderate (exceeds the limit now required by power plants in the United States) and the carbon dioxide emissions are moderate at 391.3 kg/million kcal.

The weighted average moist, mineral matter-free heating value for all the coal seams sampled is 8,927 Btu/lb which classifies the coals as an apparent subbituminous C rank (ASTM D388). The ISO rank nor a coal petrography-based rank could be determined because other assays are needed. This is a low rank for coal of this geologic age. The low rank suggests that the coal seams were either not buried deep enough, not buried long enough, or the geothermal gradient is low in this area. The poor to moderate lithification of the enclosing rocks also suggests shallow and/or short term burial.











<b>CALCULATED DRILL HOLE COMPOSITE ASSAYS</b>					
<b>Drill Hole</b>		<b>RH-10-18</b>		<b>RH-10-24</b>	
<b>Coal Seam</b>		<b>F</b>	<b>E</b>	<b>F</b>	<b>E</b>
<b>Gross Calculated Interval</b>	Drilled Depth From (m)	82.20	105.40	106.00	197.50
	Drilled Depth To (m)	103.06	114.00	185.20	205.90
Net Calculated Assay Thickness		9.15	7.72	13.23	7.30
Total Moisture (ar) (wt. %)		37.22	38.36	36.85	37.18
<b>Proximate Analysis (ad)</b>	Inherent Moisture (wt. %)	21.16	22.96	19.50	22.80
	Ash (wt. %)	26.28	18.69	21.63	15.56
	Volatile Matter (wt. %)	32.28	35.63	34.82	35.35
	Fixed Carbon (wt. %)	25.75	27.00	24.05	21.60
<b>Other Analyses (ad)</b>	Total Sulfur (wt. %)	1.29	0.97	1.14	0.67
	Heating Value (Btu/lb)	6,881	7,605	7,076	7,470
	Heating Value (MJ/kg)	16.01	17.69	16.46	17.38
	Heating Value (kcal/kg)	3,823	4,225	3,931	4,150
Relative Density (ad) (g/cm <sup>3</sup> )		1.47	1.41	1.48	1.39

Abbreviations used for moisture containing basis: ar=as-received ad=air dried (as-determined)

**Table 5**

<b>TRENCH SAMPLE ASSAYS</b>												
<b>Trench</b>	<b>Sample Number</b>	<b>Sample Depth (meters)</b>	<b>Total Moisture (ar) (wt. %)</b>	<b>Proximate Analysis</b>				<b>Other Analyses</b>				<b>Relative Density (g/cc)</b>
				<b>Inherent Moisture (ad) (wt. %)</b>	<b>Ash (ad) (wt. %)</b>	<b>Volatile Matter (ad) (wt. %)</b>	<b>Fixed Carbon (ad) (wt. %)</b>	<b>Total Sulfur (ad) (wt. %)</b>	<b>Heating Value (ad) (Btu/lb)</b>	<b>Heating Value (ad) (Mj/Kg)</b>	<b>Heating Value (ad) (Kcal/Kg)</b>	
<b>C</b>	C03	4.0	37.76	19.14	7.38	34.98	38.50	0.60	8,686	20.20	4,825	1.37
	C07	3.6	38.84	18.57	10.89	32.88	37.66	0.78	8,539	19.86	4,744	1.40
<b>D</b>	D06	4.4	45.34	24.41	10.57	31.84	33.18	0.91	7,163	16.66	3,979	1.38
	D24	4.2	46.11	21.89	13.26	42.04	22.81	1.49	6,505	15.13	3,614	1.45

Abbreviations used for moisture containing basis: ar=as-received ad=air-dried (as-determined)

**Table 6**

## 11 EXPLORATION

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The 2007 and 2010 exploration of the Chandgana Khavtgai Coal Resource Area consisted of a preparation phase, an exploration phase, and a data review and presentation phase. The preparation phase included (1) obtaining the exploration license, (2) procuring contractors and personnel, (3) establishment of the limits of the exploration license on the ground, and (4) construction of a topographic base map. For the 2008 and 2009 exploration tasks 3 and 4 were not needed. The exploration phase in 2007 included (1) a literature and records search, (2) interpretation of remotely sensed imagery, (3) surface mapping, (4) trenching, and (5) drilling. The exploration phase in 2008 only included the resistivity-IP and magnetometer lines and in 2009 trenching. For 2010, the exploration work included (1) drilling, (2) reflection seismic geophysical lines, and (3) total field magnetometer lines. The data review and preparation phase is represented by this technical report.

The 2007 and 2008 exploration was planned and carried out by or under the supervision of Mr. Eric Robeck, a former consulting geologist. He established procedures for each type of exploration that were adhered to by all personnel involved. Mr. Robeck trained several geologists to perform well site geology and monitored their work during the project. Their training included tasks and procedures commonly used in the coal industry. Mr. Kravits visited key features mapped by Mr. Robeck on the surface, the trench and drill hole locations, and the Chandgana Coal Mine; reviewed data from the exploration; and discussed the tasks and procedures followed and found all acceptable. The 2009 exploration was planned by Mr. Genden Borkhuu, Prophecy's senior geologist and reviewed and approved by him. The 2010 exploration was planned and supervised by Mr. Kravits. He ensured that established or otherwise industry standard procedures were followed for each type of exploration.

The raw and processed data and supporting data from all the exploration described in this section is filed in Prophecy's Ulaanbaatar, Mongolia office. This data includes cuttings, core and geophysical logs, raw geophysical data, surveying data and reports from this work. The results from all the exploration is summarized in this updated technical report and incorporated in the maps, figures and cross sections.

### 11.1 Preparation Phase

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Obtaining the exploration license and procuring contractors and personnel are not important to this technical report and are not discussed. For the 2007 exploration, the preparation included establishing the license corners, creating a topographic base map, establishing the drill holes and assessing access and ground conditions. The corners of the exploration license were located and staked by Oyu Survey Company LLC (Oyu Survey) of Ulaanbaatar, Mongolia who is a licensed surveying contractor. Topographic data were gathered by two Oyu Survey crews who traversed the resource area September 12-20, 2007, using a theodolite. The traverses were done in a regular grid pattern with elevation points every 100-150 metres where practical to ensure acceptable detail. The surveyed area consists of 5,400 hectares containing approximately 8,000 elevation points. The elevation points were reconciled to the national Mongolian coordinate system which uses the Krassovsky 1940 datum. Following this, all survey coordinates were converted by Oyu Survey into UTM Zone 49 North WGS 1984 coordinates for use by Red Hill. The topographic map was constructed by Oyu Survey. A hard copy map was provided with contours at 1 metre intervals and the elevation data provided in electronic form. Coordinates are in the Universal Transverse Mercator (UTM) system Zone 49 WGS 1984 datum and the elevations in metres. The coordinates of

the topographic file do not match those used by the Government of Mongolia so a conversion was calculated to change the topographic file coordinates to that of the government.

The preparation for the 2010 exploration included establishing the drill hole locations with a GPS receiver. Also, the accessibility to the drill hole location and ground conditions of the location were assessed.

## **11.2 Exploration Phase**

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### *11.2.1 Literature and Records Search*

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A search of the literature for the 2007 exploration found no directly useful information. A records search was conducted by Mr. Genden Borkhuu and Mr. Eric Robeck at the Mongolian Government Geological Centre in Ulaanbaatar. This search uncovered a cross section, stratigraphic column and several geologic maps at various scales. The literature and records search did not find any detailed information on the Chandgana Khavtgai Coal Resource Area. This information did provide some background on the geology of the area to assist in planning the exploration. Following the 2007 exploration several literature and records searches were conducted but no additional useful information was found to aid in preparing for the 2010 exploration.

### *11.2.2 Interpretation of Imagery*

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Remotely sensed imagery was obtained and interpreted in the summer of 2007 by Mr. Robeck, a former consultant to the former Red Hill Energy. The imagery included low altitude black and white aerial photos and satellite imagery with a nominal resolution of 14.2 m/pixel (Google Earth, 2007). These were useful in generally locating coal seam subcrops since they were considered to be expressed as linear shallow depressions. The imagery also helped in mapping the extent of the Holocene surficial deposits. The imagery interpretation was largely inconclusive in locating lineaments suggestive of the Nyalga Basin Fault. This is understandable because of the lack of bedrock exposures, featureless topography and homogeneous vegetation. This work was not performed during the 2010 exploration.

### *11.2.3 Surface Mapping*

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Surface mapping based on geomorphology and observation was performed by Mr. Robeck during the summer of 2007 with fair success. Generally the surface mapping was considered only fairly successful despite the surficial deposits covering the bedrock making interpretation of subsurface geology difficult. The approximate location of the Nyalga Basin Fault was inferred by a change in composition of the float material and subtle changes in topography. The location of the B Coal Seam subcrop that was previously determined by interpretation of remote imagery was better located by mapping the curvilinear alignment of small circular to elongate depressions and shallow hand trenching of these depressions. This was further supported by hand trenching which found coal in some of these depressions. Limited surface mapping was performed during the 2010 exploration but gave no useful results.

### *11.2.4 Trenching*

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Eight deep trenches were excavated in the summer of 2007 and two in the summer of 2009 using an excavator. The 2007 trench excavation was managed by Mr. Robeck and the 2009 trenches by Mr. Gantulga Batanov, a geological consultant. Some trenches encountered coal and provided access to

obtain samples to assess the depth of weathering of the coal and coal quality. Trenches B, C, D, E, I, 09 and 10 were excavated in the suspected B Coal Seam subcrop zone (Map 3) of which Trenches C, D and 09 exposed either the B or C Coal Seam. Samples were obtained from Trenches C and D. Trench A was excavated at Red Hill's Chandgana Tal Coal Project with results reported by Behre Dolbear (2007). Trenches F, G, and H were excavated on the suspicion that a coal seam subcrop was near the surface at these locations and to assist in determining the location and displacement of the Nyalga Basin Fault but no coal was found. Geologic information was not recorded from the 2007 trench exposures because reliable bedrock exposures could not be made that justified recording of the results. But for the 2009 trenches the attitude of the bedrock was obtained from Trench 09 which generally supported the suspected attitude of the bedrock. The trenching results were generally inconclusive but provided some usable information in that it provided more information supporting that the shallow linear depressions are likely coal seam subcrops along with coal samples and strike and dip data. Information on the trenches is given in Table 7.

TRENCH INFORMATION											
Trench	B	C	D	E	F	G	H	I	09	10	
Date Started	24/08/07	25/08/07	25/8/07	28/08/07	09/07/07	09/07/07	09/07/07	10/09/07	13/08/09	14/08/09	
Date Ended	24/08/07	25/08/07	25/8/07	28/08/07	09/07/07	09/07/07	09/07/07	10/09/07	13/08/09	14/08/09	
Elevation (m)	1145	1147	1147	1149	1156	1142	1148	1143	1160	1154	
Coordinates of Start	Easting	414532	414451	414551	414359	420708	419653	419985	414586	414373	414322
	Northing	5238107	5239498	5239274	5239364	5236440	5235824	5235406	5237036	5238317	5236514
Coordinates of End	Easting	414598	414517	414586	414444	420741	419679	420006	414628	414519	414362
	Northing	5238106	5239481	5239260	5239323	5236413	5235799	5235389	5237016	5238333	5236520
Coal Seams Uncovered	C	No coal	?	?	?	No coal	No coal	No coal	?	?	No coal
	B	No coal	?	?	?	No coal	No coal	No coal	?	?	No coal
Depth to Coal (m)	N/A	2.2	3.0	2.5	No coal	No coal	No coal	5.0	2.5	No coal	
Coal Thickness (m)	N/A	3.6	4.3	N/A	No coal	No coal	No coal	N/A	0.5+	No coal	
Sample Obtained	No	Yes	Yes	No	No	No	No	No	No	No	
Sample Assayed	No	Yes	Yes	No	No	No	No	No	No	No	

Coordinates are in meters UTM Zone 49 WGS84 Datum.

**Table 7**

No trenching was performed in 2010.

### 11.2.5 Drilling

Seven drill holes were drilled in the summer of 2007 and thirteen in the summer of 2010. Mr. Eric Robeck managed the 2007 drilling which was executed by Landdrill International Inc. of Ulaanbaatar, Mongolia using a truck-mounted Longyear Model 44 rig. Mr. Christopher M. Kravits (the author) managed the 2010 drilling which was executed by Best Drilling Inc. of Ulaanbaatar, Mongolia using a trailer-mounted Longyear Model 44 rig. Eighteen drill holes are located in the resource area northwest of the Nyalga Basin Fault Zone and two east of the fault zone. For those northwest of the fault zone, a spot coring approach was used where the hole was rotary drilled with a PDC bit to core point then cored to total depth. All core was HQ size. The core point was missed when plug drilling three of these drill holes such that no core could be obtained for varying amounts of the upper portion of some coal seams. This is understandable because coal seam depth information was unavailable in 2007 and the irregularities in structure found during the 2010 drilling were not known. All the drill holes northwest of the Nyalga Basin Fault Zone penetrated through the base of the B Coal Seam and some through the A Coal Seam. Drilling mud was used as a medium through the surficial deposits then changed to polymer or a mud/polymer mix when drilling through the bedrock. Overall core recovery averaged greater than 90% and was better than 95% in the coal-bearing intervals. Drill cuttings and core were lithologically logged on site and the core was sampled

for assay. After drilling, the drill holes were geophysically logged. The holes were then plugged with cement and a marker placed at the surface.

The two drill holes southeast of the Nyalga Basin Fault did not encounter coal. These holes were plug drilled with a full face PDC bit to total depth with limited coring in zones of poor circulation. The cuttings and core samples were logged but the holes were not geophysically logged. The holes were plugged with cement upon completion of drilling.

Drilling provided the most reliable information including depth and thickness of coal seams and core samples. This allowed better mapping of the extent, elevation and thickness of the coal seams and better estimation of coal quality. The B Coal Seam is found throughout the resource area and is thick but locally thins in the west central and northeast portions of the area. Otherwise the B Coal Seam was found to be slightly thicker than expected. The other coal seams are thicker and have a greater extent than previously shown though they are found in the same general area. The elevation of the coal seams varies more than previously described suggesting local folds or faults are present. Assays of the coal core samples shows coal quality to be similar to that described previously. The greatest changes are a slight increase in moisture and ash and slight decrease in heaving value.

The drill hole locations are shown on Map 3 and a summary of the drill hole information is given in Table 8.

### *11.2.6 Seismic Geophysical Methods*

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Reflection seismic geophysical methods were used during 2010. GE&S Company and Geo-Oron Company were joint contractors providing the seismic geophysical services. Eight lines were surveyed totalling 11.3 kilometres. This included three lines to locate the Nyalga Basin Fault, four lines to locate the suspected B Coal Seam subcrop and one line to map a suspected fault in the northern portion of the resource area. A drop weight energy source was used with a ten geophone array placed on either five or three metre spacing. The lines included drill holes for control where possible. Care was taken to not survey during windy periods or when vehicle movement was nearby. Though only three lines were surveyed to locate the Nyalga Basin Fault, this work appears to have been successful in locating the fault and suggests it to be a fault zone that includes a horst. This is based on (a) each line containing a pair of anomalies where stratified unbroken rock is found to the southeast and northwest of the anomalies with fractured or otherwise non-reflecting material between, (b) the south-eastern anomaly of each pair generally coincides with a north-eastern alignment of resistivity-IP anomalies (described in the next section) suggesting similar location and continuity, and (c) alignment of topographic contours at some locations. The five seismic lines in the north-western portion of the resource area indicated the B Coal Seam continues farther to the west than previously thought. These lines also suggest small displacement faults are present but exact location and displacement could not be determined. Information on the seismic lines is given in Table 9 and their locations are shown on Map 3.

### *11.2.7 Resistivity-IP Methods*

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Seven resistivity-induced polarization (resistivity-IP) lines were run during 2008 to locate the Nyalga Basin Fault. The contractor was Geosan LLC of Ulaanbaatar, Mongolia who used a dipole-dipole configuration with 50 metre long dipoles. The transmitters were operated in time domain mode to input an 8,000 msec square current pulse with 2,000 msec intervals. The receiver collected the real primary voltage and its decay, chargeability and apparent resistivity on eight channels. The depth

DRILL HOLE INFORMATION						
Drill Hole	Date Drilled		Collar Elevation	Coordinates		Total Depth
	Start	End		Easting	Northing	
RH-07-09	24/8/07	27/8/07	1147.50	415242.734	5238575.049	161.35
RH-07-10	29/8/07	31/8/07	1144.80	417044.119	5238553.502	221.10
RH-07-11	01/09/07	05/09/07	1140.60	418843.779	5238527.244	289.95
RH-07-12	07/09/07	08/09/07	1151.60	420643.762	5238501.758	92.40
RH-07-13	09/09/07	10/09/07	1143.30	415222.487	5236775.007	130.90
RH-07-14	11/09/07	13/9/07	1138.40	415196.264	5234977.048	244.60
RH-07-15	14/9/07	18/9/07	1135.60	415169.163	5233176.358	97.00
RH-10-16	06/06/10	08/06/10	1137.30	417014.887	5236756.486	232.00
RH-10-17	07/05/10	08/05/10	1149.20	416127.394	5237668.849	171.00
RH-10-18	30/05/10	06/06/10	1138.20	416104.303	5235863.935	226.00
RH-10-19	08/06/10	12/06/10	1138.30	417932.981	5237639.849	279.70
RH-10-20	12/06/10	16/06/10	1147.60	419698.369	5239362.993	328.00
RH-10-21	09/05/10	11/05/10	1145.40	417955.534	5239385.600	255.00
RH-10-22	11/05/10	20/05/10	1145.00	416155.116	5239408.919	152.00
RH-10-23	22/05/10	24/05/10	1145.70	414349.207	5235888.430	124.00
RH-10-24	24/05/10	30/05/10	1141.30	414424.614	5234174.770	301.00
RH-10-25	20/05/10	21/05/10	1147.40	414930.984	5237676.676	70.00
RH-10-26	15/05/10	17/05/10	1150.70	414794.069	5239393.372	70.00
RH-10-27	19/06/10	21/06/10	1145.60	414491.954	5237699.210	119.10
RH-10-28	22/06/10	22/06/10	1146.00	414855.000	5237680.000	64.10
Drill Hole	Cuttings Log	Core Log	Geophysical Log	Analyses of Core	Coal Seams Penetrated	
RH-07-09	Yes	Yes	Yes	Yes	B, C, D	
RH-07-10	Yes	Yes	Yes	Yes	B, E, F, G, H	
RH-07-11	Yes	Yes	Yes	Yes	B	
RH-07-12	Yes	Yes	No	No	B	
RH-07-13	Yes	Yes	Yes	Yes	B, C, E, F	
RH-07-14	Yes	Yes	Yes	Yes	A, B, E, F	
RH-07-15	Yes	Yes	No	No	B	
RH-10-16	Yes	Yes	Yes	Yes	B, E, F	
RH-10-17	Yes	Yes	Yes	Yes	B, C, E, F, G	
RH-10-18	Yes	Yes	Yes	Yes	B, E, F	
RH-10-19	Yes	Yes	Yes	Yes	A, B, C, D, E, F	
RH-10-20	Yes	Yes	Yes	Yes	A, B, C, E, F, H	
RH-10-21	Yes	Yes	Yes	Yes	B, C, D, E, F, H, I	
RH-10-22	Yes	Yes	Yes	Yes	B, E, G	
RH-10-23	Yes	Yes	Yes	Yes	B, E	
RH-10-24	Yes	Yes	Yes	Yes	B, E, F, G	
RH-10-25	Yes	Yes	Yes	Yes	B	
RH-10-26	Yes	Yes	Yes	Yes	B	
RH-10-27	Yes	Yes	Yes	Yes	B	
RH-10-28	Yes	Yes	Yes	Yes	B	

Coordinates are in meters UTM Zone 49 WGS84 Datum.

Table 8



2010 SEISMIC LINE INFORMATION									
Seismic Line	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	
Date Started	07/05/10	08/05/10	09/05/10	05/06/10	05/06/10	16/08/10	17/08/10	19/08/10	
Date Ended	08/05/10	09/05/10	10/05/10	05/06/10	05/06/10	16/08/10	18/08/10	19/08/10	
Coordinates of Start	Easting	418797	416993	415196	415243	415222	414798	414355	414253
	Northing	5238527	5236785	5235020	5238575	5236775	5239391	5237870	5237550
Coordinates of End	Easting	420696	418084	415169	414244	414217	414254	416161	415082
	Northing	5238503	5235693	5233127	5238610	5237222	5239475	5239412	5237313
Length (m)	1,915	1,500	1,915	1,000	1,100	600	2,380	860	

Coordinates are in meters UTM Zone 49 WGS84 Datum.

Table 9

sections of modeled resistivity were made by contouring the data. This work located anomalies along a northeast-southwest alignment that fairly well coincided with the southeast fault bounding the graben or associated faults. Information on the resistivity-IP lines is given in Table 10 and their locations are shown on Map 3.

2008 RESISTIVITY-IP AND MAGNETOMETER LINE INFORMATION								
Resistivity-IP Line	RIPL-08-1	RIPL-08-2	RIPL-08-3	RIPL-08-4	RIPL-08-5	RIPL-08-6	RIPL-08-7	
Date Started	03/09/08							
Date Ended	10/09/08							
Coordinates of Start	Easting	419428	418515	417602	416690	415777	414864	413951
	Northing	5239760	5238872	5237985	5237097	5236209	5235321	5234433
Coordinates of End	Easting	420961	420049	419136	418223	417310	416398	415845
	Northing	5238183	5237295	5236407	5235519	5234631	5233744	5232856
Length (m)	2,200	2,200	2,200	2,200	2,200	2,200	2,465	
Magnetometer Line	ML-08-1	ML-08-2	ML-08-3	ML-08-4	ML-08-5	ML-08-6	ML-08-7	
Date Started	03/09/08							
Date Ended	10/09/08							
Coordinates of Start	Easting	419431	420052	417607	418244	415779	416399	415484
	Northing	5239762	5237295	5237985	5235522	5236209	5233744	5232863
Coordinates of End	Easting	420938	418520	419138	416691	417311	414866	413956
	Northing	5238213	5238872	5236408	5237100	5234634	5235325	5234433
Length (m)	2,200	2,200	2,200	2,200	2,200	2,200	2,465	

Coordinates are in meters UTM Zone 49 WGS84 Datum.

Table 10

### 11.2.8 Magnetometer Methods

Magnetometer surveys were performed in 2008 and 2010. The 2008 work was conducted by Geosan LLC of Ulaanbaatar, Mongolia under the direction of Mr. Robeck. This work included seven lines run in the same area as the resistivity-IP lines also to locate the Nyalga Basin Fault. This work included a proton magnetometer base station that recorded the diurnal variation of total magnetic intensity and a portable magnetometer to record the magnetic intensity along the survey lines and calculate the diurnal correction. The total magnetic intensity was contoured to produce a map for presentation. This work did not find an obvious indication of the fault though there is a slight increase in overall magnetic intensity northwest of the fault.

Fifteen magnetometer lines were run in 2010 in the northwest corner of the license to locate suspected faulting. This work was conducted by GE&S Company and Geo-Oron Company of Ulaanbaatar, Mongolia under the direction of Mr. Genden Borkhuu. These used a similar method and equipment as the 2008 lines. Both total magnetic intensity profiles and a total magnetic intensity map were produced for presentation. Two possible faults were located one of which is supported by a change in elevation of the B Coal Seam and subtle topographic features. Some of the recommended exploration is intended to prove this possible fault. The information on the magnetometer lines is given in Table 11. The magnetometer line locations are shown on Map 3.

2010 MAGNETOMETER LINE INFORMATION									
Magnetometer Line		ML-08-1	ML-08-2	ML-08-3	ML-08-4	ML-08-5	ML-08-6	ML-08-7	ML-08-8
Date Started	07/08/10								
Date Ended	12/08/10								
Coordinates of Start	Easting	414200	414200	414200	414200	414200	414200	414200	414200
	Northing	5239500	5239300	5239100	5238900	5238700	5238500	5238300	5238100
Coordinates of End	Easting	416200	416200	416200	416200	416200	416200	416200	416200
	Northing	5239500	5239300	5239100	5238900	5238700	5238500	5238300	5238100
Length (m)		2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Magnetometer Line		ML-08-9	ML-08-10	ML-08-11	ML-08-12	ML-08-13	ML-08-14	ML-08-15	
Date Started	07/08/10								
Date Ended	12/08/10								
Coordinates of Start	Easting	414200	414200	414200	414200	414798	414355	414253	
	Northing	5237900	5237700	5237500	5237300	5239391	5237870	5237550	
Coordinates of End	Easting	416200	416200	416200	416200	414254	416161	415082	
	Northing	5237900	5237700	5237500	5237300	5239475	5239412	5237313	
Length (m)		2,000	2,000	2,000	2,000	550	2,375	860	

Coordinates are in meters UTM Zone 49 WGS84 Datum.

**Table 11**

### 11.3 Data Review and Presentation Phase

The geologic data from the trenching were reviewed by Mr. Robeck, Prophecy staff geologists, and Mr. Kravits to ensure correct location and validity of the results. The data are archived in hard copy and electronic form at Prophecy’s Ulaanbaatar office. A summary of the data are presented as part of this updated technical report and the data is otherwise incorporated in the conclusions, maps and cross sections contained in this report.

The lithologic and sampling data from the drilling were regularly reviewed by Mr. Robeck and Mr. Kravits during the drilling to ensure consistent descriptions, avoid depth errors, etc. Each geophysical logging run and resulting logs were critically reviewed to ensure consistency of presentation, correct depths, and correct sonde response. The data are archived in hard copy and electronic form at Prophecy’s Ulaanbaatar office. Summaries of the data are presented as part of this updated technical report.

The geologic data from the seismic geophysical lines were reviewed by Prophecy staff geologists and Mr. Kravits to ensure they are correctly located. Mr. Kravits relied on the seismic contractor to ensure the validity of the data. The data are archived in hard copy and electronic form at Prophecy’s Ulaanbaatar office. A summary of the data is presented as part of this updated technical

report and the data is otherwise incorporated in the conclusions, maps and cross sections contained in this report.

The geologic data from the resistivity-IP lines were reviewed by Prophecy staff geologists and Mr. Robeck to ensure they are correctly located and appear meaningful. Mr. Robeck used his experience with this type of exploration to assess the validity and interpret the data but also relied on the resistivity-IP contractor. The data are archived in hard copy and electronic form at Prophecy's Ulaanbaatar office. A summary of the data is presented as part of this updated technical report and the data is otherwise incorporated in the conclusions, maps and cross sections contained in this report.

The geologic data from the magnetometer lines were reviewed by Mr. Robeck and Prophecy staff geologists to ensure they are correctly located and appear meaningful. Otherwise Mr. Kravits relied on the magnetometer contractors to ensure the validity of the data. The data are archived in hard copy and electronic form at Prophecy's Ulaanbaatar office. A summary of the data is presented as part of this updated technical report and the data is otherwise incorporated in the conclusions, maps and cross sections contained in this report.

#### **11.4 Summary**

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The exploration confirmed the presence of a significant coal resource to the northwest of the Nyalga Basin Fault Zone. The geologic limits of the coal resource are much better known. The former Nyalga Basin Fault is now known to be a fault zone that limits the resource at generally the same location as previously reported. The B Coal Seam does not subcrop at the western portion of the resource area but rather continues at shallow depth to subcrop just west of the license boundary. Analyses of core samples from the 2010 drilling confirm that the coal seams are a low rank, moderate grade thermal type coal.

## 12 DRILLING

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This section specifically discusses the drilling methods in more detail. Seven drill holes were drilled in the summer and fall of 2007 and thirteen in the summer of 2010. The cuttings and core were described from each hole and the core analyzed. All the drill holes in the resource area (northwest of the Nyalga Basin Fault) were geophysically logged while the two to the southeast were not.

### 12.1 Type and Extent

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For the 2007 drilling, Landdrill International Inc. of Ulaanbaatar, Mongolia, was contracted to drill the holes and used a truck-mounted Longyear Model 44 rig. The procedure was to (1) drill with a 132 mm (HWT) full face PDC bit and set conductor casing, (2) drill the overburden to core point with a 96 mm (HQ) full face PDC bit using polymer as a medium, and (3) core from core point to total depth with an HQ-3 core drilling string. Coring was done using HQ rods behind a 96 mm OD diamond core bit with inert polymer as a medium. Wireline coring methods were used with a sleeved 3 metre core barrel assembly. All drilling was done on a 24-hour schedule. The drilling method, drilling procedures, and size of core obtained is considered appropriate for the logistics of the area, goals of the drilling, and type of analyses desired.

Five of the drill holes were drilled northwest of the Nyalga Basin Fault Zone and two southeast of the fault zone. Those in the resource area west of the fault zone were located to maximize characterisation of the resource and the reliability of the resource estimate. These five drill holes penetrated nearly the full thickness of the upper member of the Zuunbayan Formation. The two drill holes southeast of the Nyalga Basin Fault Zone were drilled to confirm the lack of coal and to help locate and characterize the fault zone. The drill hole locations and elevations were obtained by ground survey methods using a theodolite.

Drill cuttings were collected at one metre intervals, described and the lithologic information logged onto forms. The drill core was described in white light and ultraviolet light, the information logged on forms at a scale of 3 cm=0.5 m, and the core photographed with a digital camera. The core information logged includes lithology, rock mechanics, and sampled intervals. Other information was noted during drilling and logging including water and gas encountered and unusual drilling conditions. After completion of the core logging, the core was sampled, placed in plastic sleeves, and the samples noted on the core log. The sampling method and sample treatment are described in more detail in Section 13. The lithology and rock mechanics information are considered to be logged in acceptable detail.

After reaching total depth, the drill holes in the resource area were geophysically logged. Some of these were logged through the core rods if the hole was not stable. The logging suite included gamma, spontaneous potential, gamma-gamma density, single point resistivity, and caliper. Printed field copies at a scale of 1 cm=2 metres and Log ASCII Standard (LAS) electronic files of the logs were provided to Red Hill.

Upon completion of logging the drill holes in the resource area or reaching total depth for the drill holes outside the resource area, the holes were plugged with bentonite chips and capped with 2 to 5 metres of cement. The conductor casing was pulled from some of the drill holes. A marker with drill hole identification information was placed in the top of the cement.

The 2010 drilling was performed by Best Drilling Inc. of Ulaanbaatar, Mongolia using a skid-mounted Longyear Model 44 rig. The drilling procedure was the same as that used in 2007. The drilling method, drilling procedures, and size of core obtained is considered appropriate for the logistics of

the area, goals of the drilling, and type of analyses desired. Geologic data and samples were obtained using the same methods practised during the 2007 drilling. The lithology and rock mechanics information are considered to be logged in acceptable detail. Geophysical logging was performed similar to that performed in 2007 with one exception. The exception is that spontaneous potential was not logged, otherwise natural gamma, gamma-gamma density, single point resistivity, and caliper were logged.

## **12.2 Summary and Interpretation of Results**

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The drilling provided the most reliable data to characterise the geology of the resource area, estimate resources and estimate coal quality. The drilling – (1) provided more information on the areal extent and thickness of the coal seams, (2) further defined the structural geology, (3) confirmed the presence of a significant coal resource, (4) placed all of the resource in the measured and indicated assurance-of-existence categories, (5) better defined the geologic boundaries of the resource, (6) better characterized the type, grade and rank of the coal seams, and (7) gave indications of groundwater and mining conditions.

Accurate measurements of the depth and thickness of all the coal seams are now available and the closer spacing between drill holes allows all the coal seams to be correlated more reliably. Nine major coal seams are now known. The A Coal Seam is the stratigraphically lowest coal seam followed, in ascending order by the very thick B Coal Seam then seven (C through I) thinner coal seams. The B Coal Seam is the thickest ranging from 6.2 to 61.1 metres thick, is found at a maximum depth of 311.7 metres, and has the greatest areal extent. The E and F Coal Seams are thinner (0 to 23.5 m) but are found over most of the resource area. The other coal seams are thinner and are less extensive. All the coal seams contain partings that range in thickness from 0.1 to 9.1 metres thick.

The attitude of the rocks and faulting is much better known. The resource area has a more complex geology than previously thought in that there is either folding or faulting though overall dip is still to the southeast. The extent of the basin is slightly larger because the coal seams subcrop farther northwest and the coal-bearing rocks are probably present on the southeast side of the Nyalga Basin Fault Zone. The former Nyalga Basin Fault is now considered to be a fault zone with a central horst.

The drill hole spacing placed all of coal resources in the measured and indicated assurance-of-existence categories. Analyses confirmed the coal to be a moderate grade, low rank thermal coal. Cores allowed visual characterisation of rock properties and provided samples for assay. The overburden and interburden rocks and the coal are weak being poorly to moderately lithified but with few fractures. Finally, the drilling mapped a 33.0 to 42.5 metres thick moderately artesian sandstone aquifer between the B and E Coal Seams.

## **13 SAMPLING METHOD AND APPROACH**

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The approach and methods used to sample the coal seam were those commonly used for thick stratiform deposits and specifically for thick low rank coal seams. Samples of the coal and surrounding rocks were obtained from drill holes and trenches.

### **13.1 Sampling Approach**

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In planning the 2007 exploration, exposures in the nearby Chandgana Coal Mine were considered. These exposures suggested that at least one of the coal seams should be very thick, low rank and dip at a low angle to the southeast. Thus, having a thick stratiform deposit and considering that the exploration is the first in the resource area, the approach used was to obtain samples that gave a reliable gross estimate of coal quality. To meet this goal, sampling was planned to (1) obtain samples at widely spaced locations, (2) sample the full thickness of the coal seam, (3) determine the limit of weathered coal, and (4) ensure the samples are representative of the grade and rank of the coal. The desire to obtain samples at widely spaced locations complimented the desire to place as much of the resource in the higher assurance-of-existence categories as possible.

Drilling and trenching were then considered most appropriate for obtaining samples. Large diameter HQ drill cores were obtained using a three metre core barrel. Only the B Coal Seam was cored because the existence of the upper coal seams was not known. The full thickness of the B Coal Seam was cored where possible. Unfortunately, in some cases a portion of the top of the coal seam was rotary drilled before changing to the core drilling string because the structure of the coal seam was not known.

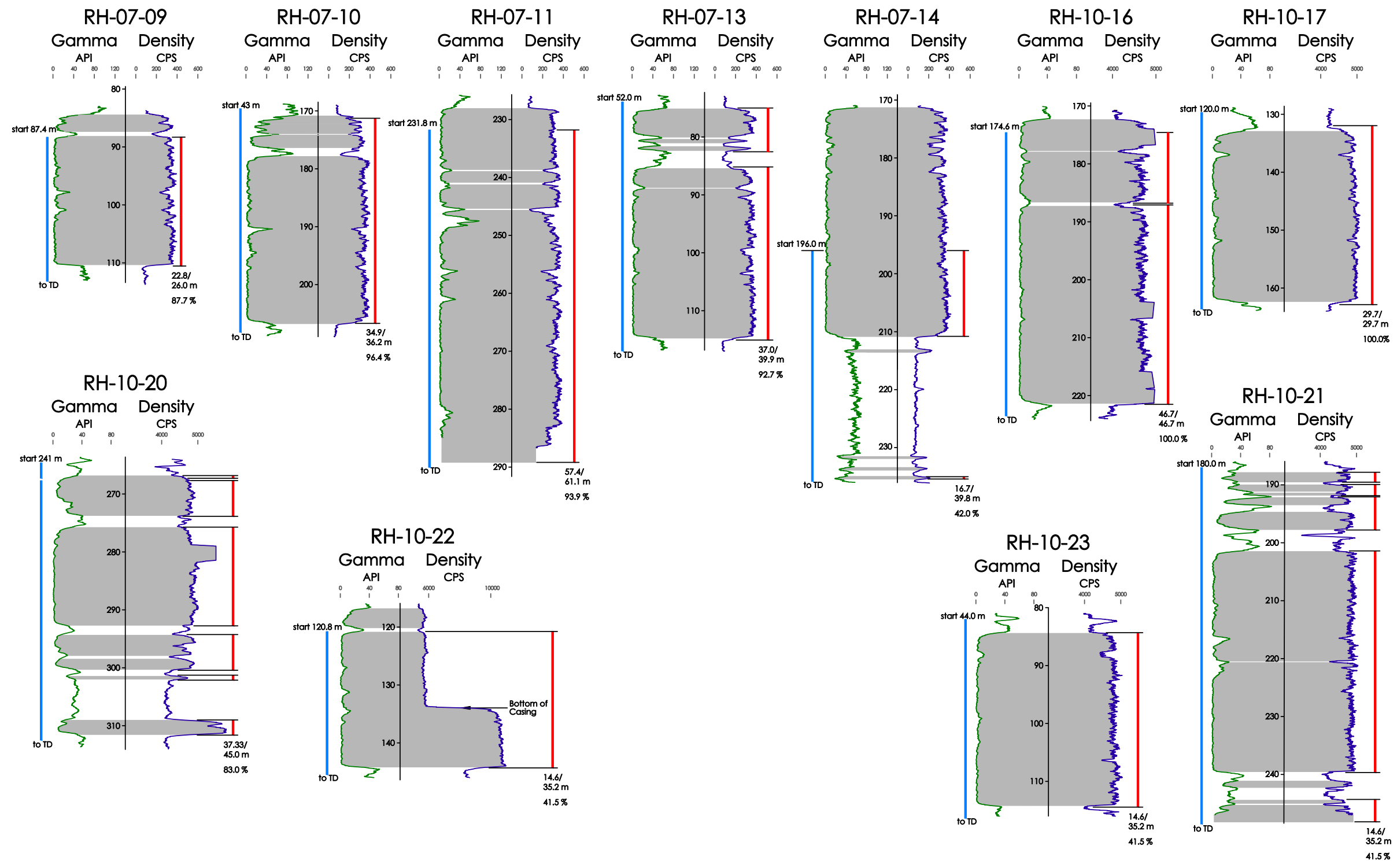
A similar sampling approach was used for the 2010 drilling. But the stratigraphically higher coal seams were core drilled in two drill holes besides the B Coal Seam. Since the structure of the coal seam was known fairly well core was obtained from all of the targeted coal seams but one where the upper few metres were rotary drilled. The representativeness of the core samples obtained during the 2007 and 2010 drilling was enhanced in several ways. These included (1) selecting large diameter core to increase core recovery, (2) core drilling on a 24 hour schedule to increase core recovery, and (3) using inert drilling fluids when possible to reduce core contamination. The core sampled (including core loss) intervals and analysed intervals are indicated relative to the entire coal seam thickness in Figures 5 and 6.

Trenching with an excavator was primarily done to locate the B Coal Seam subcrop, but secondarily to obtain samples to be assayed. The portion of the coal seam exposed in Trenches C and D were sampled. The representativeness of the trench samples was enhanced by obtaining large samples and placing the sample in plastic bags as soon as possible to preserve in-situ moisture. Information on the trenches is given in Table 7.

### **13.2 Sampling Method**

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The sampling of cores during the 2007 and 2010 drilling followed the same methods. Sampling was started and completed as soon as possible after lithologic descriptions and photographs were done. The sampling method followed that of ASTM D 5192 where practical. Sample treatment methods included rinsing the core of contaminants and allowing sufficient time for the free water to drain from the core to enhance sample representativeness. Sample preservation included placing the core in 6 mil plastic sleeves to minimize moisture loss then placement on wooden core boxes for protection. The samples were removed from the core tray in lengths up to 1 metre depending on the thickness of partings and the beginning and end of core runs.



The legend is included in Figure 6.

Figure 5. Sampled and Analysed Intervals

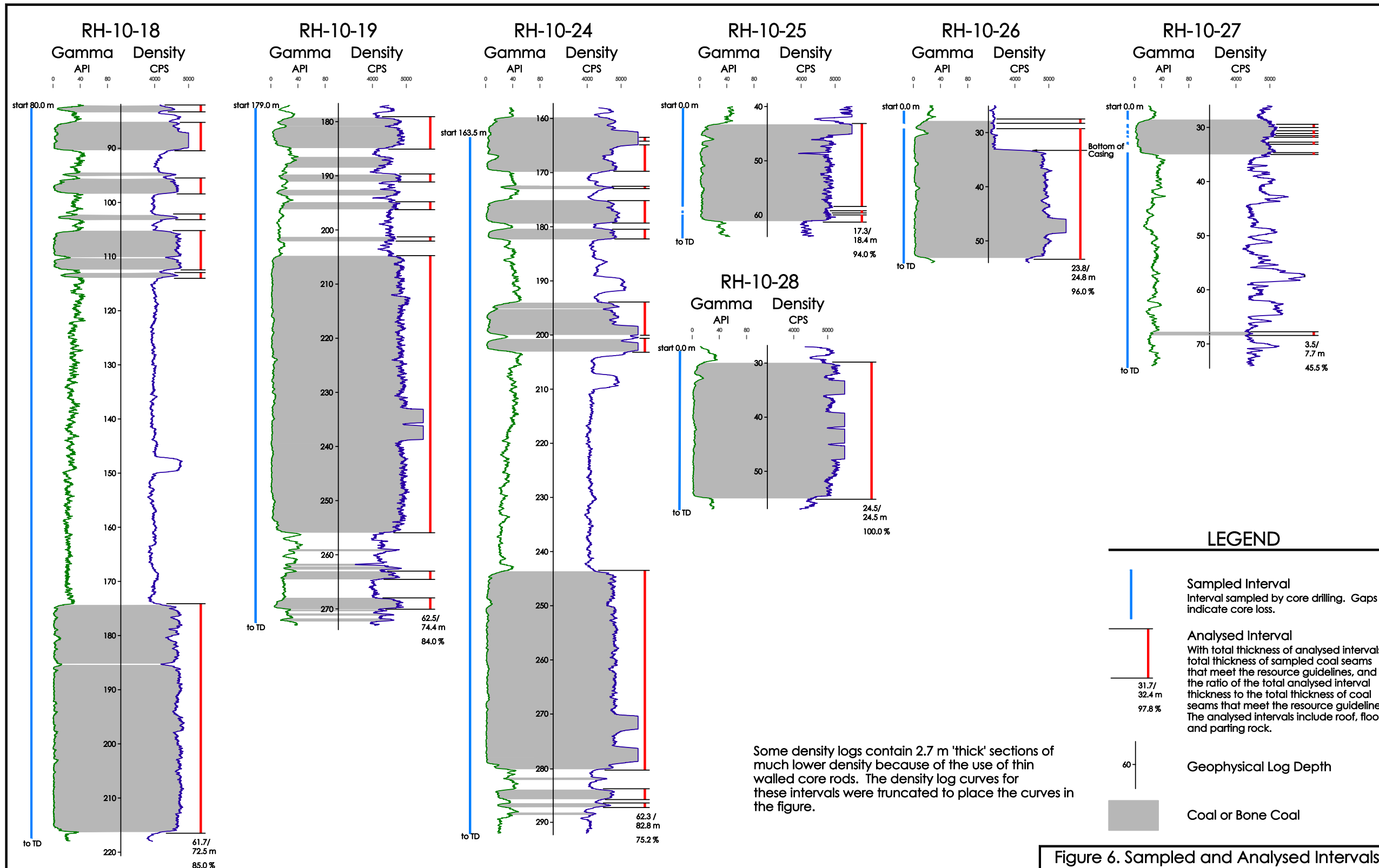


Figure 6. Sampled and Analysed Intervals



The guidelines used in selecting sample intervals include:

1. Bone coal was sampled similar to coal.
2. Rock partings equal to or less than 0.3 metres thick was included with coal.
3. For rock partings between 0.3 and 0.5 metres thick, the entire parting was sampled separately.
4. For rock partings greater than 0.5 metres thick, the lower and upper 0.2 metres were sampled separately from the middle portion of the parting. The middle portion was archived.
5. The first 0.2 metres of rock other than coal or bone coal above and below the coal seam was sampled separately.
6. The minimum coal seam or ply thickness sampled is 0.45 metres.
7. The minimum aggregate coal plus parting thickness is 0.50 metres.
8. Stray coal seams greater than or equal to 0.45 metres were sampled.

The samples were then placed in 6 mil plastic sleeves, the sleeves sealed and labelled, and the sample placed into partitioned wooden core boxes for shipping. The plastic sleeves preserved the samples from loss of moisture and introduction of foreign materials and kept the samples separate from other core samples. A total of 82 core samples were obtained from the 2007 drill holes and 274 from the 2010 drill holes.

The trench samples were obtained after exposing the coal seam with an excavator. Then a hand pick was used to clean the surface of the coal seam of extraneous material. The sample was obtained by removing a square metre area to a depth of 15 cm deep with a pick. Care was practiced to avoid contamination from sloughage of the trench sides. The sampled coal was then gathered as soon as possible to minimise potential moisture loss, placed in a sturdy plastic bag, and prepared for shipment. The sampling procedures followed ASTM D 4596 but some aspects were modified because of the location and logistics of the exploration area. Two trench samples were obtained for assay from each of Trenches C and D. Though these samples are representative of the intervals sampled, they are not, and are not intended to be, representative of the full seam thickness nor of unweathered coal.

### 13.3 Sample Quality

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The sampling approach and the sampling methods used to fulfill the approach during the 2007 and 2010 drilling and trenching resulted in high quality representative samples. The sampling procedures outlined in ASTM D 5192 and D 4596 were adhered to though some modifications, which are acknowledged in those designations, were needed because of factors beyond Mr. Robeck's and Mr. Kravits's control. Core loss has the greatest potential to decrease sample quality, but the amount of core loss is so small that the decrease in sample quality is insignificant.

Coal seam composite assays were not performed on all the upper coal seams that were core sampled despite that the ply, parting, and roof and floor rock samples were assayed. This is because the coal seam correlations which are needed in order to select samples for the composite were not known until late in preparing this report. The ply and parting assays though were used to calculate composites for comparison to the assayed composites. The lack of assayed composites from these upper coal seams detracts somewhat from the average in-place coal quality for all coal seams given in Table 2 because these coal seams are not included in the average.

## **14 SAMPLE PREPARATION, ASSAYS AND SECURITY**

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All the drill core and trench samples were prepared and assayed in accordance to ASTM International (ASTM), International Organization for Standardization (ISO), or Australian Standards (AS) procedures in the coal laboratories of SGS-CSTC Standard Technical Services Co., Ltd. These laboratories are located in Ulaanbaatar, Mongolia (SGS Mongolia), the test centre in Tianjin, China (SGS Mineral Fuels), and the geochemical and ores laboratory in Tianjin, China (SGS Geochemical and Ores). Sample preservation, security and tracking was established and well maintained from the drill site to reporting of the results.

### **14.1 Laboratories**

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During processing and assay of the 2007 trench and core samples the SGS laboratories in Tianjin were accredited by the China National Accreditation Service for Conformity Assessment (CNAS) under Certificate No. CNAS L2774. This accreditation specified that these laboratories were certified to perform the assays reported in this updated technical report according to ASTM and ISO procedures. The SGS Mongolia laboratory was accredited under ISO 9001 and only prepared the samples and sent representative splits to the SGS Tianjin laboratories. The SGS Mineral Fuels laboratory performed all the types of coal assays reported for the 2007 samples in this updated technical report while the SGS Geochemical and Ores laboratory performed the ash assays and nitrogen assays. The accreditation, quality control, and other documents were obtained and reviewed by Mr. Kravits. The accreditation was granted August 3, 2006 and expires August 2, 2011. The Tianjin laboratories participated in a corporate quality control round robin program on a monthly basis. They had ranked a minimum of 'capable' for the period October 2006-September 2007 (Murray, 2007).

During processing and assay of the 2010 core samples the SGS Mongolia laboratory was accredited to ISO/IEC 17025 and ISO 9001 (Rao, 2010). This accreditation was granted in 2005 and specifies that this laboratory is certified to prepare the samples and perform the assays reported in this updated technical report according to ASTM and ISO procedures. The SGS Geochemical and Ores Laboratory in Tianjin, China performed the ash assays, ultimate assays and ash fusion temperature assays. This laboratory is also certified under ISO 9001 for performing these assays. The SGS Mongolia laboratory participates in proficiency testing managed by Laboratory Quality Systems Inc. for all the assays it performs, the most recent series completed July 1, 2009, October 27, 2009, May 25, 2010 and has passed all tests. Mr. Kravits has reviewed the laboratory proficiency testing results for the testing done just prior to receiving the core samples from the 2010 Khavtgai drilling.

Based on this information, it is the opinion of Mr. Kravits that the sample preparation and analytical procedures practiced by the SGS Tianjin laboratories is adequate for the analyses required of this updated technical report.

### **14.2 Sample Preparation**

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The conditions under which the 2007 trench and core samples were prepared followed ASTM D2013. Further, routine equipment maintenance was practiced including cleaning of equipment before preparation of each sample, use of clean containers, etc., and an enclosed dust extraction system is used in the sample preparation rooms (Murray, 2007). The SGS Tianjin laboratories externally and internally audit sample preparation methods as part of their CNAS certifications.

For the 2007 samples, the samples were received from the field by SGS Mongolia who verified that they were complete, crushed and split them and retained a reserve sample (Robeck, 2007).

Preparation of the gross sample followed ASTM procedure then followed the specific preparation required for the type of assay. It is important to note that the SGS Tianjin Mineral Fuels laboratory used a staged crushing process to determine air dry loss and correctly calculate total moisture. Sample splitting was planned so as to have sufficient sample for preparing composite samples. The reserves of each sample were delivered to Prophecy and are kept in a storage facility in Ulaanbaatar.

The 2010 core samples were also prepared by SGS Mongolia following ASTM D2013 using enclosed jaw crushers (Rao, 2010). SGS Mongolia regularly maintains their equipment and controls dust in the laboratory environment. The 2010 core samples were received from the field by SGS Mongolia who verified that they were complete, crushed and split them and retained a reserve sample. Preparation of the gross sample followed ASTM procedure then followed the specific preparation required for the type of assay. The SGS Mongolia laboratory again used a staged crushing process to determine air dry loss and correctly calculate total moisture. Sample splitting was planned so as to have sufficient sample for preparing composite samples. The reserves of each sample were delivered to Prophecy and are kept in a storage facility in Ulaanbaatar.

### 14.3 Sample Assays

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All samples were assayed using the appropriate ASTM International, ISO or AS test method. While sample aliquots are in process they are stored in an environmentally controlled, covered and secured storage area (Rao, 2010).

The trench samples were analyzed only for comparative purposes and to gauge depth of weathering. They are not included in the data used to estimate in-place coal quality. Hard copy and electronic copies of all assays are filed at Prophecy's Ulaanbaatar, Mongolia office. The sample preparation, practice and test methods used by SGS and the number of samples assayed for use in this updated technical report is given in Table 12.

### 14.4 Sample Security

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Sample security was ensured from the drill site to the assay report. A chain of custody form was completed by Mr. Robeck for the 2007 samples and by Mr. Kravits for the 2010 samples that gives sufficient information to identify the samples and describes the analyses required. The chain of custody accompanied the samples during shipment from the drill site to the laboratory and was signed by all parties involved in the transport of the samples and SGS Mongolia upon receipt. All the samples were shipped under Red Hill or Prophecy control directly to SGS Mongolia. Upon delivery the samples were jointly inventoried by a Prophecy representative and SGS staff before SGS signed for receipt of the samples. The signed sample chains of custody are on file at Prophecy's Ulaanbaatar office. SGS Mongolia then entered the sample information into their laboratory information management system (LIMS) which generated unique laboratory identification numbers. Sample preparation and laboratory worksheets are then prepared by the LIMS to track each sample to the final report. The laboratory managers review the sample tracking while the samples are in process and review the final assay reports to ensure the correct sample identifying information accompanies the correct assays (Murray, 2007 and Rao, 2010). This responsibility is part of the laboratory accreditation which for the 2007 samples was validated by ISO (Murray, 2007). No assay results were found to have been misidentified.

Once in the custody of SGS, the samples were sealed and stored in a secure lockable location to prevent tampering. The storage conditions are controlled to protect the samples from heat, light and humidity (Rao, 2010). No samples were lost, stolen or tampered.

None of the samples were handled by Mr. Robeck, Mr. Kravits, or any contractors, employees, officers or directors of Red Hill or Prophecy after receipt by SGS and none of these parties were involved in preparation or assay of the samples.

<b>SAMPLE PREPARATION AND ASSAY METHODS</b>			
Analysis	Gross Sample Preparation Method	Practice and Test Method	Number of Samples
Total Moisture	ASTM D2013-4	ISO 11722	362
Ash	ASTM D2013-4	ISO 1171	362
Heating Value	ASTM D2013-4	ISO 1928	362
Total Sulfur	ASTM D2013-4	ISO19579	362
Volatile Matter	ASTM D2013-4	ISO 562	362
Fixed Carbon	ASTM D2013-4	ISO 1213-2	18
Ash Analysis	ASTM D2013-4	ASTM D2795 ASTM D3682-01	18
Ash Fusibility	ASTM D2013-4	ISO 540	18
Carbon	ASTM D2013-4	ASTM D3176-02 ASTM D3178-02	18
Hydrogen	ASTM D2013-4 ASTM D3176-89	ASTM D3176-02 ASTM D3178-02	18
Nitrogen	ASTM D2013-4 ASTM D3176-89	ASTM D3176-02 ASTM D3179-02	18
Oxygen	ASTM D2013-4 ASTM D3176-89	Calculated by difference	18
Chlorine	ASTM D2013-4	ASTM D2361-02	18
Hardgrove Grindability Index	ASTM D2013-4	ASTM D409-02	18
Relative Density	ASTM D2013-4	AS 1038.21.1.2	362

AS - Australian Standard

ASTM - American Society for testing and Materials

ISO - International Organisation for Standardisation

**Table 12**

## 15 DATA VERIFICATION

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There are five types of data used in this updated technical report: topographic data, stratigraphic data, trench data, geophysical data and assay data. Each type of data was reviewed to verify that it represents the location, depth and/or other descriptive information of its source. The quality of the data was then assessed by a review for accuracy and errors. The methods used vary according to the type of data and were performed using practices common in the coal industry or the industry that produces such data.

### 15.1 Data Verification

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The topographic data and the map produced from this data were verified by Mr. Kravits during the site inspection and with information obtained during the inspection (Kravits Geological Services, 2007). This was done by comparing the coordinates and elevation of the drill holes, trenches, and license corners determined with a handheld GPS receiver to the coordinates and elevations on the geologic map (Map 3).

The stratigraphic data obtained from the drill holes were verified by Mr. Kravits in two ways. These included comparison of the identification, location, and other information of the 2007 drill holes in the stratigraphic database to the information on the geophysical and lithologic log headers and the information obtained during the site inspection and comparison of the interpreted and correlated geophysical logs by Mr. Kravits to those of Mr. Robeck. For the 2010 drill holes this was not necessary because Prophecy geologists and Mr. Kravits located the drill holes with a GPS receiver prior to drilling and the completed drill hole was surveyed by Oyu Survey LLC (Oyu Survey, 2010). The GPS coordinates and surface elevation were placed on the geophysical log headers to better tie the log to the drill hole.

The trench data were verified against observations made and coordinates obtained by Mr. Kravits during the site visit and notes made and pictures obtained by Mr. Robeck during the trenching.

The geophysical data were verified by comparison of the contractor supplied coordinates of their activities to evidences of their activity and coordinates obtained by Oyu Survey or Mr. Kravits.

The assay data were verified by comparison of the descriptive information (drill hole number, depth interval, sample number, and lithology) and assay results accompanying the quality data to that of the same information on the core log and chain of custody and the recorded lithology. Transcribed data were reviewed twice for errors.

### 15.2 Quality Control

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The quality of the topographic data was assessed by Mr. Kravits by reviewing the topographic map made by computer gridding and contouring the elevation data. The map was reviewed for anomalous features and contour values. Further, the general location, shape, and size of topographic features observed on the ground were compared to those on the topographic map.

Before the quality of the stratigraphic data was assessed, the quality of the geophysical logs was reviewed. This included (1) a review of log presentation (legibility, depth scale continuity, depth corrections, etc.), (2) a review of sonde calibration data, and (3) comparison of core lithologies to the log curves for depth and log response. The geophysical logging contractor is Monkarotaj LLC (Monkarotaj) based in Ulaanbaatar, Mongolia who uses equipment manufactured by Auslog Pty Ltd (Auslog) based in Australia. The sonde information and recent calibration data for the 2007 drilling was obtained by Mr. Kravits from Monkarotaj (Izmaylov, 2007). The winch, software, and sondes

were calibrated August 2, 2007 by Auslog. The calibration information for the geophysical logs from the 2010 drilling is given on the logs. The quality of the stratigraphic data provided by Mr. Robeck was then assessed by comparison of the depth interval, elevation, thickness and lithologies of coal seams, partings and interburden rocks obtained from interpretation and correlation of the geophysical logs by Mr. Kravits to that in the data base and comparison of the lithologies, coal seam depths, and parting depths noted in the core logs to that determined from the geophysical logs. The stratigraphic data from the 2010 drilling were not assessed for quality because the data was compiled by the author though the data were reviewed several times during the course of preparing this updated report.

The trenches produced data on the coal seam subcrop location and coal quality. It was only possible to assess the quality of the trench data in a general sense by comparison to the geology of the resource area and to the quality of the core samples.

The Prophecy geologists nor Mr. Kravits are qualified to review the quality of the geophysical data. These data were reviewed in a general sense by comparison the known geology of the resource area. Otherwise Mr. Kravits relied on the contractors that the quality of the data is acceptable.

The analytical data from the 2007 trenching and drilling and 2010 drilling were reviewed using a variety of methods to find analyses that may be in error. These included:

1. Simple logical tests including (a) a check that air-dried moisture is less than as-received moisture, (b) a check that values for air-dried basis parameters are greater than those for the as-received basis and similarly that values for dried basis parameters are greater than that for as-received and air-dried basis, and (c) a check that the ash fusion temperatures increase from initial deformation through softening then hemispherical and finally to fluid.
2. A scan for anomalous values. This was done by sorting the data by lithology and calculating descriptive statistics for each lithology. Values greater than two standard deviations from the mean were considered anomalous and thus suspect and then assessed to verify their validity.
3. A check that the proximate parameters (moisture, ash, volatile matter, and fixed carbon) of the same moisture basis total to 100%. Those analyses that did not total to 100% would be further evaluated to determine which parameter(s) were in error.
4. A check that the ultimate parameters (carbon, hydrogen, nitrogen, and oxygen) plus ash and sulfur of the same moisture basis total to 100%. Those analyses that did not total to 100% would be further evaluated to determine which parameter(s) were in error.
5. Calculation of a multiple linear regression equation relating heating value to moisture and ash of the same moisture basis. The regression equation has a high coefficient of correlation and so can be used to find heating values that may be in error.
6. Calculation of a regression equation relating dry ash to specific gravity or density. The regression has a high coefficient of correlation and so is used to find suspect dry ash, specific gravity, or density values.
7. Comparison of these analyses to analyses of drill cores or run-of-mine coal or published analyses from nearby areas. This is a more general method of assessing the quality of the data but yet may point to questionable data that can be verified using other methods.

### **15.3 Removal of Unusable Data**

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The coal quality data were also reviewed for analyses that, though meeting the verification and quality tests, should be rejected for other reasons. The most common reason to reject an assay is

that the assay is of weathered coal. Weathered coal is not representative of the coal expected to be mined and marketed and so the assay is not included with those of unweathered coal. Less heating value and greater oxygen content will be found in weathered coal. The assays should be retained though because it can be useful in mapping the margin of weathered coal.

## 15.4 Results

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The topographic map was successfully verified and found to be an accurate and faithful representation of actual surface topography.

All the stratigraphic data were successfully verified and found to accurately represent the depth of the correlated coal seams and the derived thicknesses, elevations, and strip ratios were correct. The presentation and quality of the geophysical logs from both the 2007 and 2010 drilling are acceptable with one caveat. That is the 2010 geophysical logs show random 2.7 metre sections where the density is abruptly less and the caliper is slightly greater. The drill holes were logged through the 3 metre core drill rods so it is believed these sections are a result of thinner drill rod wall thickness. These do not detract from the geophysical log quality but are a hindrance in log interpretation.

The trench data were successfully verified. Their locations were correctly mapped and the geologic data complemented the drilling and mapping data.

All the geophysical data were considered to be acceptable for use. This is because the contractor interpretations complemented the other data and the author assumed the data acceptable since the contractors based their interpretations on their data.

Of the assay data, only the assay data from Trench C are considered acceptable; those from Trench D are not. The analyses of the Trench D samples appear to be correct but are not representative of fresh coal within the resource area. The assay data from the 2007 drill hole samples were successfully verified and review of the data found them to be acceptable with two exceptions. The Hardgrove grindability indices are questionable. They appear low for a coal of this rank and compared to that of the Chandgana Tal Project. However, reruns produced similar results and some lignite A-subbituminous B United States coals have similar Hardgrove grindability indices. The other exception is that conversion of the laboratory-determined air-dried basis ultimate assay to as-received and dried basis values give questionable results. The conversions were made using the appropriate ASTM equations yet the results are questionable and are considered possibly a result of the low rank of the coal. There were no unacceptable assays from the 2010 drilling. A small number of typographical and conversion errors were found during data review of these data but these were corrected.

In summary Mr. Kravits found all the data acceptable for use with only a few data considered unusable. All the types of data used in compiling this updated technical report was generated with proper software or manual procedures and has been accurately transcribed from the original source where needed.

## 16 ADJACENT PROPERTIES

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Licensing and mining activity and geologic and coal quality characteristics of adjacent properties are briefly described here. There are five exploration licenses and no mining licenses adjacent to or near the Chandgana Khavtgai Coal Resource Area (Map 1). These include Tethys Mining (a subsidiary of CVRD) to the north, Nekstmain to the northwest, Adamas Mining to the west, ShineCanada to the southwest, and Terguunsod Erdem to the south. The area to the east and portions of the area to the south are not licensed. Chandgana Coal LLC holds an exploration license and a mining license covering their Chandgana Tal Coal Project nine kilometres northeast of the resource area. A National Instrument 43-101 technical report on the Chandgana Tal Coal Project was prepared for the former Red Hill Energy by Mr. Gardar Dahl (Behre Dolbear, 2007). This report was reviewed by Mr. Kravits but the raw data were not reviewed. Berkh-Uul holds a mining license adjacent to those of Chandgana Coal LLC and mines coal on a sporadic basis.

The Chandgana Coal Mine, shared by Chandgana Coal LLC and Berkh-Uul, was visited by Mr. Kravits during the November 17, 2007 site inspection to gain a sense of geologic and mining conditions. The goals of the visit were to (1) examine the character of the coal seam (colour, partings, lithology, cleating, and competency), (2) examine the character of the overburden rocks (lithology, fractures, degradation from exposure, and competency), and (3) examine the character of faults, joints, and cleats.

The information gained from the site inspection to this nearby mine was useful in preparing this updated technical report because it provided insight into geologic and potential mining conditions at the Chandgana Khavtgai Coal Resource Area (Kravits Geological Services, 2007). These insights included:

1. The coal is mostly black with a slight brown shade. This suggests a higher rank than expected and is supported by the chemical analyses.
2. The overburden is poorly to moderately lithified and readily air slakes. This would decrease core recovery and decrease stability of a surface mine highwall or underground mine roof and floor rock.
3. The coal is low rank, crumbly (friable) upon drying, and has many fusain bands. This would decrease core recovery and decrease pillar stability in underground mines.
4. The coal readily desiccates indicating that care must be exercised to minimize moisture loss during sample handling and preparation for assay.

The quality of the coal from the Chandgana Tal Project reported in Behre Dolbear's technical report (Behre Dolbear, 2007) were compared to that in this report. Generally, the quality of the B Coal Seam from the resource area compared well to Chandgana Tal. But, differences were found with moisture, Hardgrove grindability and relative density where Chandgana Tal has greater values. The B Coal Seam appears to be a higher grade (less moisture, ash, and sulphur and greater heating value) at Chandgana Khavtgai than at Chandgana Tal but is a slightly lower rank. Mr. Kravits has not verified the Chandgana Tal information and does not suggest that this coal quality is indicative of that of the resource area.



## **17 MINERAL PROCESSING AND METALLURGICAL TESTING**

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The title used here is considered to have the same intent as the coal preparation and utilisation testing section title in NI 43-101F1. No coal preparation tests have been performed on the samples to assess moisture, ash, or sulphur reduction. Further no coal utilisation tests have been performed to assess combustion methods, ash behaviour, etc. although some assays performed on the samples and derivative calculations of coal combustion loadings, emissions, and basic combustion parameters given in Table 2 provide some general information useful for assessing coal when combusted or converted. Also, no tests have been performed to assess the applicability of the coal to coal conversion methods. Some additional assays are recommended for the samples obtained in the drilling and trenching recommended for 2011 and are described in Section 21.

## **18 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES**

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The Canadian Institute of Mining, Metallurgy and Petroleum (CIM) requires resources to have reasonable prospects of economic extraction. The main reason supporting the likelihood of economic extraction is the geology of the resource. The coal seams are thick (especially the B Coal Seam), are found under relatively thin overburden, the dip of the coals seams is low, and the coal is a low rank moderate grade thermal coal. Further, preliminary information has been developed by Prophecy to evaluate external factors that affect economic extraction including markets, transportation and environmental issues. A market analysis found regional markets but it was also found that local use, especially conversion to other fuels, appeared feasible. A coal transportation study evaluated transportation to other parts of Mongolia and the former Soviet Union that addressed routes, costs, and available capacity and found favourable results. Also, based on a favourable environmental analysis of Prophecy's Ulaan Ovoo project, no major environmental obstacles to extraction are expected for Chandgana Khavtgai.

Only coal resources are estimated for the Chandgana Khavtgai Coal Resource Area because the project has not reached the mining feasibility stage. The coal resource was estimated in five steps: (1) the making of determinations and assumptions and selection of parameters, (2) correlation of coal seams between drill holes, (3) construction of computer data files, (4) computer modeling of the coal resource, and (5) computer calculation of the coal resource.

### **18.1 Resource Estimation Requirements**

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This section of the updated technical report is prepared to comply with the requirements of NI 43-101. The coal resource estimate is made following the guidelines described in Geological Survey of Canada Paper 88-21 and reported using the mineral resource categories described in CIM Definition Standards for Mineral Resources and Mineral Reserves. The mineral resource categories used herein are considered to be equivalent to those same resource categories described in Geological Survey of Canada Paper 88-21.

The author recognizes that the Canadian Securities Administration does not consider it reasonable to use the guidelines and resource categories of Geological Survey of Canada Paper 88-21 for estimating and reporting the coal resources of foreign properties such as the Chandgana Khavtgai Coal Resource Area. It is understood that technical, regulatory, economic, and other constraints on possible development are likely quite different than that of Canada and so may make the guidelines and categories inapplicable. However, the guidelines and categories of Paper 88-21 are used because since Mongolia has no such standards, the use of this widely accepted standard provides a familiar format from which interested parties can evaluate the resource and that regulators in the jurisdiction this updated technical report will be filed are familiar.

### **18.2 Determinations, Parameters and Methods**

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#### *18.2.1 Determinations*

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The drilling performed in 2010 provided sufficient data points to make for a more acceptable estimate of resources and grade. There are now 18 drill holes in the resource area providing sufficient data to demonstrate the continuity of the coal seams and sufficient assays of core samples to estimate coal quality. The drill hole spacing is now sufficient to place all of the resource in the measured and indicated assurance-of-existence categories.

The complexity of the geology of the resource area is determined to be in the moderate category because of the slight difficulty in correlating some coal seams and moderate deformation of the rocks. Overall the coal seams and partings are easily correlated using physical stratigraphy methods but the E and F Coal Seams are correlated with more difficulty. The structural geology is not simple for several reasons. The Nyalga Basin Fault Zone is fairly complex with possible sympathetic faults. The geophysical work also suggests small displacement faults along the western portion of the resource area. Furthermore the strike of the strata ranges from N 20° E to N 65° E and the dip from 2.0° to 6.0° with an average of 4.5°.

The resource area is determined to be a surface type deposit though a portion of the resource may be more suitable to underground mining or the energy value recoverable by non-conventional methods. The surface type of deposit was assigned because (1) surface mining is the most likely initial mining, (2) the in-situ strip ratio is very low across the resource area, (3) the great thickness of the B Coal Seam and to an extent the E and F Coal Seams, and (4) the lower competency of the coal seams, interburden and overburden rocks probably make for low resource recovery and difficult mining by underground methods. Further, this is a future interest type resource (as discussed following) and improvements in surface mining technology and methods or a novel mine design may allow more of the resource to be recovered to greater depth.

The feasibility of exploitation category of the resource area is considered to be future interest. The resource area contains a significant moderate grade coal resource with generally favourable mining conditions but it currently lacks infrastructure as described in Section 6, and is a moderate distance from existing markets. The need to upgrade or extend major infrastructure needs (power and railroad) from a distance of over 100 kilometres underscores this determination. Further, the closest markets are a moderate to significant distance away and are presently supplied by existing closer mines (though one will exhaust its resources in the near future).

### *18.2.2 Parameters*

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The parameters used in estimating the coal resource follow those given in Geological Survey of Canada Paper 88-21 but also include others commonly used for surface mineable coal resources. These parameters include:

1. Coal resources were estimated to the license boundary.
2. Coal resources were estimated to the northwest fault of the Nyalga Basin Fault Zone.
3. Coal at a depth less than 10 metres was not included in the estimate.
4. Bone coal is included with coal.
5. Single coal seams or plies greater than or equal to 0.45 metres thick were included in the estimate.
6. Aggregate coal seams (coal/bone coal + parting) greater than or equal to 0.50 metres were included in the estimate.
7. Rock partings equal to or less than 0.3 metres thick were included in the estimate.
8. No limit was placed on the coal/rock thickness ratio when considering the deepest coal seam included in the estimate.
9. No limit was placed on coal seam interburden thickness.
10. An average in-place relative density of 1.31 g/cc (arb) was used for the B and D through I Coal Seams, 1.43 for the A Coal Seam, and 1.44 for the C Coal Seam to convert coal volume to mass.

These parameters do not need explanation except 3 and 10. Coal shallower than 10 metres is excluded in order to remove weathered, oxidised coal. A conservative 10 metre depth was used because the trench samples showed a marked decrease in dry ash-free heating value when depth was less than 4 metres compared to analyses of fresh coal from the core samples. The average depth of the surficial deposits is considered to be 5 metres and the depth of coal seam weathering may be as deep as an additional 5 metres, making for a total of 10 metres. The relative densities used are the weighted average densities or composite sample densities for a specific coal seam or for the D through I Coal Seams where relative density was not assayed, that of the A Coal Seam was used. The coal seam composite relative densities were determined in the laboratory from samples and checked against the calculated weighted average density of the individual coal plies and partings. Since the full seam composites include rock partings less than or equal to 0.3 metres (but not roof and floor rock) the relative density is representative of the intervals for which resources are estimated and not the pure coal itself. Also, the stated coal quality is for the same coal-bone coal-parting interval that resources were estimated.

### *18.2.3 Methods*

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The coal seams were correlated using physical stratigraphy methods. This was possible because of the dominance of coal seams in the section, the character of the coal seams, and the relatively simple structural geology. This method involved matching geophysical log sequences, coal seam thickness, and coal seam ply and parting patterns. Where correlations were not as reliable as desired and to further support the correlations attention was paid to unique parting lithology (especially where tonsteins were found), coal lithotypes (especially fusain), and unique roof and floor lithologies. The correlations were later tested by mapping coal seam thickness and structure.

Several computer data files were compiled for use in estimating the coal resource and describing its general mineability. The first file represents the topography of the resource area and was compiled as described in Subsection 11.1. The second file contains stratigraphic information including drill hole coordinates, drill hole elevations, depths of the top and bottom of the coal seams, and coal seam and resource thicknesses (summarized in Table 13). The third computer file contains vertices of polygons to limit the coal volume calculation to the license boundary and geological limits. The fourth computer file contains vertices of polygons to limit the coal volume calculation to the measured assurance-of-existence category limit. The fifth computer file contains vertices describing polygons that limit the coal volume calculation to the indicated assurance-of-existence category limit. These files are not included with this hard copy of the updated technical report because of their size and so are archived at Prophecy's Ulaanbaatar office.

The coal resource was then modeled with computer software using the stratigraphic data file. The maps produced include (1) isopach maps of the coal seams, (2) a structure map of the P<sub>4</sub> parting in the B Coal Seam, (3) an in-place strip ratio map, and (5) an overburden isopach map. The models were also used to create cross sections. The models are based on gridded surfaces (grids) which are two-dimensional arrays of regularly spaced values representing the spatial change in the value of a parameter. The topographic and stratigraphic data were used to create the following maps:

1. Coal seam resource isopachs were made by creating a grid of total thickness of coal/bone coal plies + aggregate coal-bone coal-parting intervals + partings that meet the minimum resource thickness criteria (resource thickness) described in Section 18.2.2. These grids were then contoured. These maps do not represent the total thickness of all coal/bone coal plies and aggregate coal-bone coal-parting intervals.

SUMMARY OF STRATIGRAPHIC DATA									
Drill Hole	Elevation Top of Resource-Containing Interval (m)								
	A	B	C	D	E	F	G	H	I
RH-07-09	1009.80	1063.70	1094.30	1112.70	1120.00	1131.80	1142.00	SBO	SBO
RH-07-10	NDE	973.90	985.60	1005.20	1038.90	1058.60	1073.50	1093.20	1105.20
RH-07-11	NDE	912.50	922.60	944.60	977.10	1001.80	1020.80	1032.60	1048.00
RH-07-13	NDE	1068.10	1086.60	1097.80	1109.90	1123.50	SBO	SBO	SBO
RH-07-14	903.90	966.90	982.50	1000.70	1028.40	1030.10	1061.70	1070.70	1079.60
RH-10-16	NDE	964.80	977.30	993.90	1010.60	1014.80	1036.30	1051.70	1063.30
RH-10-17	NDE	1016.20	1035.40	1060.40	1085.80	1102.90	1117.20	1130.20	1140.60
RH-10-18	NDE	963.80	985.90	1000.50	1032.90	1035.14	1072.60	1088.80	1104.00
RH-10-19	870.30	933.30	964.20	980.10	1002.10	1007.50	1025.10	1043.20	1055.80
RH-10-20	NDE	880.80	896.80	917.10	951.70	964.30	977.60	991.80	1002.60
RH-10-21	NDE	958.40	982.40	998.40	1008.20	1030.50	1045.90	1066.40	1078.00
RH-10-22	NDE	1027.70	1048.00	1065.00	1092.80	1107.00	1120.00	1130.30	SBO
RH-10-23	NDE	1061.30	1070.70	1090.70	1108.70	1123.70	1142.70	SBO	SBO
RH-10-24	NDE	897.60	911.60	924.80	946.90	959.00	1001.60	1017.00	1029.60
RH-10-25	NDE	1104.20	1126.90	1134.50	SBO	SBO	SBO	SBO	SBO
RH-10-26	NDE	1123.00	1141.10	SBO	SBO	SBO	SBO	SBO	SBO
RH-10-27	NDE	1117.00	1138.60	SBO	SBO	SBO	SBO	SBO	SBO
RH-10-28	NDE	1116.40	1136.00	SBO	SBO	SBO	SBO	SBO	SBO

Drill Hole	Coal Seam Resource Thickness (m)								
	A	B	C	D	E	F	G	H	I
RH-07-09	0.00	25.10	1.70	2.50	0.00	0.00	0.00	SBO	SBO
RH-07-10	NDE	34.90	0.00	0.00	5.30	2.90	1.00	2.70	0.00
RH-07-11	NDE	60.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RH-07-13	NDE	34.95	0.50	0.00	3.70	0.70	SBO	SBO	SBO
RH-07-14	0.66	39.90	0.00	0.00	5.50	9.30	0.00	0.00	0.00
RH-10-16	NDE	47.90	0.00	0.00	8.20	10.00	0.00	0.00	0.00
RH-10-17	NDE	29.30	4.90	0.00	2.30	0.70	2.70	0.00	0.00
RH-10-18	NDE	40.90	0.00	0.00	8.30	10.55	0.00	0.00	0.00
RH-10-19	2.00	53.20	9.40	1.10	1.30	1.10	0.00	0.00	0.00
RH-10-20	NDE	33.56	0.60	0.00	2.20	5.80	0.00	1.00	0.00
RH-10-21	NDE	46.92	2.20	0.60	0.80	1.90	0.00	1.10	0.60
RH-10-22	NDE	25.90	0.00	0.00	0.00	0.00	2.00	0.00	SBO
RH-10-23	NDE	29.70	0.00	0.00	3.60	0.00	0.00	SBO	SBO
RH-10-24	NDE	38.80	0.00	0.00	7.30	16.00	0.50	0.00	0.00
RH-10-25	NDE	17.90	0.00	12.90	SBO	SBO	SBO	SBO	SBO
RH-10-26	NDE	25.40	0.00	SBO	SBO	SBO	SBO	SBO	SBO
RH-10-27	NDE	6.20	0.00	SBO	SBO	SBO	SBO	SBO	SBO
RH-10-28	NDE	25.20	0.00	SBO	SBO	SBO	SBO	SBO	SBO

NDE - drill hole not deep enough

SBO - drill hole started below outcrop

**Table 13**

2. The structure map was created by gridding the base of the P<sub>4</sub> parting in the B Coal Seam. The P<sub>4</sub> parting was selected because the B Coal Seam correlation is the most reliable and the P<sub>4</sub> parting is the least variable horizon within the coal seam. This grid was then contoured. This map is only intended to show the change in attitude of the rocks and does not represent the attitude of a particular coal seam and should not be used to estimate depth to a coal seam.
3. The in-place strip ratio map represents the ratio of cubic metres of burden (overburden + interburden + partings greater than 0.3 metres thick) to tonnes of coal at each drill hole and is reported as cubic metres/tonne. This was done in three steps – (a) Calculating the total overburden + interburden + parting volume by subtracting the total resource thickness of the coal seams above the B Coal Seam from the B Coal Seam overburden thickness and converting

the result to cubic metres, (b) Calculating the total resource thickness for the B through I Coal Seams and converting to tonnes, and (c) dividing the overburden volume by the tonnes. A bulking factor is not applied to the volume of burden and a recovery factor is not applied to the tonnes. The strip ratio is estimated down to and including the B Coal Seam because the A Coal Seam resource is not reliably known and probably very small.

4. The B Coal Seam overburden map was created by subtracting the grid of the elevation of the top of the B Coal Seam from the surface topography grid then contouring the resulting grid.

The Surfer® gridding software was used to create the grids using the minimum curvature algorithm. This algorithm generates the smoothest possible surface while attempting to honour the data as close as possible but it is not an exact interpreter (Golden Software, 2002). When modeling, parameters were used that ensured the data were honoured yet produced maps that were geologically acceptable. The modeling was performed by Mr. Kravits who has eleven years of experience modeling coal resource areas with the software.

Coal seam resources were estimated in six steps. These are: (1) A copy of each coal seam resource isopach grid was clipped where grid node values less than the minimum thickness described in Section 18.2.2 were converted to a null value, (2) The resulting grid was then blanked using a polygon file to make a new grid that is limited to the license boundary, Nyalga Basin Fault and 10 metre overburden line if the coal seam subcrops in the license, (3) The grid resulting from step 2 was blanked using a polygon file to make another grid representing coal seam thickness within the measured assurance-of-existence category limit, (4) The grid resulting from step 2 was blanked using a polygon file to make another grid representing coal seam thickness within the indicated assurance-of-existence category limit, (5) The volume of the grids in cubic metres resulting from steps 2, 3 and 4 were then determined, and (6) The volumes were converted to a mass in tonnes using the weighted average as-received relative density. Because of the distribution of relative density assays, three weighted average relative densities were used because this data is available for three coal seams. The greatest number and largest areal distribution of relative densities are from the B Coal Seam so the weighted average value is used for this coal seam. There are values for the A Coal Seam from two drill holes and the C Coal Seam from one drill hole which were used for these coal seams. For the D through I Coal Seams the weighted average value for the B Coal Seam was used because it is considered more representative than a weighted average value for the A, B and C Coal Seams. The result of the conversion is the amount of tonnes in the resource area for each coal seam and the amount in each assurance-of-existence category. These numbers were entered in a table and totalled by coal seam and assurance-of-existence category. Several checks were made to ensure accuracy of the results. These checks included comparison of the volume and tonnes resulting from step 2 to the total of the volume and tonnes from steps 3 and 4 and random manual estimates.

The apparent coal seam thicknesses determined from geophysical and lithologic logs were not adjusted to true thicknesses for the resource estimate. This is because the average dip of 4. 5° renders the decrease in thickness insignificant.

### **18.3 Coal Seam Resources**

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Resources are found in nine coal seams. The greatest portion of the total resource is found in the B Coal Seam (79.6 %) followed by the F Coal Seam (7.9 %), the E Coal Seam (7.2 %) and the remaining coal seams in smaller portions (Table 14). The total estimated resources are 1,048.1 million tonnes.

The total resources in the measured assurance-of-existence category are 509.3 million tonnes (48.6 % of the total) and the resources in the indicated assurance-of-existence category are 538.8 million tonnes (51.4 % of the total).

<b>COAL SEAM RESOURCES</b>				
Coal Seam	Assurance-of-Existence Category		Total	Portion of Resources
	Measured	Indicated		
I Coal Seam	0.2	0.1	0.3	0.03%
H Coal Seam	3.1	4.6	7.7	0.74%
G Coal Seam	3.9	5.4	9.4	0.89%
F Coal Seam	41.8	41.0	82.8	7.90%
E Coal Seam	35.8	39.2	75.0	7.16%
D Coal Seam	3.2	2.4	5.7	0.54%
C Coal Seam	15.8	13.7	29.5	2.82%
B Coal Seam	403.5	430.7	834.3	79.60%
A Coal Seam	1.9	1.5	3.4	0.32%
Subtotal	509.3	538.8	1,048.1	100.00%
Portion by Category	48.59%	51.41%		
Total Measured and Indicated	1,048.1			

Resources are in millions of tonnes

**Table 14**

The accuracy of the resource estimate is considered to be good. This is because the parameters and methods used are reasonable, the coal seam correlations are reliable, the computer data files are accurate, the computer modeling is reasonable, the correct math is used to convert the coal volume to tonnes, and random manual checks were performed. An increase in the number or a better distribution of drill holes probably would not significantly increase the accuracy of the estimate of B Coal Seam resources because of its good correlatability but would increase the accuracy of the estimated resources of the other coal seams.

The average coal quality was estimated for the B Coal Seam for each assurance-of-existence category (Table 15). This was done by modeling each parameter from the drill hole composite analyses across the resource area and averaging the grid values for each assurance-of-existence category. Coal quality was not modeled for the other coal seams because of the lack or scarcity of data.

<b>AVERAGE IN-PLACE COAL QUALITY BY ASSURANCE OF EXISTENCE CATEGORY B COAL SEAM</b>				
Assurance of Existence Category	Moisture (ar) (wt. %)	Ash (ar) (wt. %)	Heating Value (ar) (kcal/kg)	Sulfur (ar) (wt. %)
Measured	37.0	9.6	3,641	0.6
Indicated	36.8	9.6	3,667	0.6

Abbreviation used for moisture containing basis: ar=as-received basis

**Table 15**

## 18.4 Effect from Technical and Infrastructure Influences

This coal resource estimate is partly based on the determination that the resource is best recovered by surface mining methods and assumed common truck-shovel, dragline or bucket wheel excavator overburden removal and loader or shovel coal removal. Consideration of pavement breaker-type surface miners as a coal removal method (Lovejoy, 2010) would not change the resource estimate

because this is still basically a surface mining method. But should surface mining methods be limited by overburden depth or competency, for example, other resource recovery technologies may be considered for the remaining resource. Consideration of these other technologies when estimating resources could affect the estimated resources. When considering mining to recover the remaining resources, longwall mining with top coal caving, thin seam (highwall) mining and more common auger mining are options. Thick coal seams are now being recovered successfully by longwall mining with top coal caving in China and Australia (Duncan, Sobey, and Clarke, 2007) and Turkey (Unver and Yasitli, 2006). Highwall mining (Anonymous, 2009 and Buschbaum, 2007) is another technology that may recover some of the coal resource but is limited in the thickness of coal that may be mined and the depth of penetration. More common augering is another option. Should a portion of the resource area be considered amenable to these methods, that portion of the resource would probably be considered as an underground type deposit. The estimated resources of that portion of the resource would then decrease because a greater minimum coal seam thickness is required for estimating underground mineable resources. Should the resource be considered recoverable by an in-situ technology such as underground coal gasification the resource estimate would also be affected. Though this technology is not included in GSC Paper 88-21 the deposit type determination would most likely be underground resulting in a decrease in resources because of the greater minimum thickness required. This technology appears most applicable to the B Coal Seam because of its greater areal extent but the great thickness of the coal seam, low strength of the overburden rocks, high groundwater volume and other factors would make this technology inefficient at best.

Should infrastructure become available to the resource area, especially sufficient electrical power and rail transportation, the feasibility of exploitation determination would be changed to an immediate interest type. The coal resource estimate then would decrease slightly because the required minimum coal seam thickness is greater.

## **18.5 Effect from Outside Influences**

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No environmental, permitting, legal, title, taxation, or political issues are known to exist or appear likely in the future that would affect this resource estimate. The Government of Mongolia has demonstrated itself to be in favour of resource development as evidenced by their promotional efforts and the large amount of foreign and domestic activity in natural resource investment.

A change in local and regional markets, by either increased demand from existing markets or new markets for the coal or coal-derived fuels may increase the attractiveness of the Chandgana Khavtgai Coal Resource Area. This is particularly true in light of the current and projected future demand for energy in Asia and the west Pacific Rim. This increased demand may generate interest in putting the needed infrastructure in place.

## **18.6 Qualified Person**

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Mr. Kravits is the qualified person for this updated technical report. He holds Bachelor of Arts and Master of Science degrees in geology. He has 34 years of experience in the coal industry performing coal property evaluations, due diligence, exploration, mining geology, coal marketing support, environmental support, and other duties. He is a Certified Professional Geologist with the American Institute of Professional Geologists, a licensed or registered geologist in four states, and a certified coal geologist by the American Association of Petroleum Geologists. Mr. Kravits is an independent consulting geologist who has no financial or other interest in Prophecy Resource Corporation or its subsidiaries.



## **19 OTHER RELEVANT DATA AND INFORMATION**

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No additional information or explanation is needed to make this updated technical report understandable and avoid misleading statements.

## 20 INTERPRETATION AND CONCLUSIONS

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The 2008, 2009 and 2010 exploration in the Chandgana Khavtgai Resource Area largely achieved the goals set out in the 2008 technical report. The exploration placed all of the resource in the measured and indicated assurance-of-existence categories, significantly increased the geologic knowledge of the resource area, more accurately located the geologic limits of the resource and increased the reliability of the resource and coal quality estimates. The coal resource is found in a moderately complex geologic setting. The coal resource is large and of moderate grade and low rank such that it is best suited as a thermal coal. The large size and moderate quality of the resource justify utilisation and mining feasibility studies.

This recent exploration has allowed much better delineation the areal extent, depth, and thickness of the coal seams and partings, made for more accurate characterisation the general geology, greatly increased the reliability of the coal resource and coal quality estimates, and provided much more information to assess potential utilisation, conversion, and extraction methods. There are nine coal seams that attain the minimum resource thickness. The B Coal Seam is the most laterally extensive and thickest such that it holds most of the coal resource. The other coal seams are not as extensive or thick though two of them also hold significant resources. New composite assays are now available such that the full extent of the B Coal Seam is sampled along with two new composite assays of the A Coal Seam and one new composite assay of the C Coal Seam and individual samples of the E and F Coal Seams making for a much more reliable estimate of grade and rank for the resource. The weighted average assay of all coal seams shows the coal contains moderate amounts of ash, heating value, and sulphur and the coals classify as an apparent subbituminous C (ASTM D388) rank coal. From a coal combustion perspective, the coal seams have high moisture and moderate ash loadings and will produce a moderate amount of sulphur dioxide and carbon dioxide when combusted. The trench samples helped in determining the depth of weathering and thus the limit of the resource at the subcrop. Analyses of more complete samples from the C through I Coal Seams will probably not substantially change the coal quality estimate or rank determination for the resource because of their lesser resource amounts.

Some uncertainty remains concerning the coal seam correlations and structural geology of the western portion of the resource area. The much thinner B Coal Seam thickness at Drill Hole RH-10-27 is unusual though the coal seam stratigraphy is generally similar to nearby drill holes and the coal seam is close to projected structure. The structural geology in this area appears more complicated than expected because the seismic and magnetometer results suggest that small displacement (less than coal seam thickness) faults are present yet indicates the B Coal Seam continues beyond the west boundary of the license. Together these do not have the potential to significantly affect the coal resource estimate but may hinder initial mining. The seismic data reprocessing and drilling recommended in Section 21 are intended to resolve these uncertainties.

The conclusion of Mr. Kravits is that the amount, density, quality, and type of data are adequate to provide a reliable estimate of coal resources and coal type, grade, and rank. More exploration will not significantly change the total coal resource estimate and coal quality estimate but rather is recommended to increase the knowledge of the geology of the resource area. Further the resource area is at the stage where additional exploration is needed to support evaluation of extraction, utilisation and possible beneficiation methods.

## **21 RECOMMENDATIONS**

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More geologic work is recommended including exploration, sampling, chemical and physical assays and a hydrologic study. Marketing and transportation studies have been completed following the 2008 technical report which lead to coal utilisation and mining feasibility studies that will start later this year. The recommended work will increase the geologic knowledge of the resource area to support these upcoming studies by (1) more accurately mapping the geology at the western boundary of the license, (2) more accurately mapping the C through I Coal Seams, (3) obtaining more coal quality information on the C through I Coal Seams, (4) obtaining information on the character of the rock mass, (5) obtaining information on the hydrology of the resource area, (6) obtaining information on the processing, handling, storage and utilisation characteristics of the coal, and (7) obtaining information on the potential to improve the quality of the coal. Upon completion of the recommended work, more reliable estimates of coal resources and coal quality, coal utilization characteristics, mining feasibility and coal quality improvement can be made. Resolution of the reason for the change in structure at the northeast and southwest corners of the resource area and better mapping of the Nyalga Basin Fault Zone is not recommended at this time. The near term need for this information is not as important as the recommended work so it will be recommended in the future.

These recommendations will support coal utilisation and mining feasibility studies from which decisions will be made as to the best coal utilisation method and the type and feasibility of mining. Depending on the type of coal utilisation selected and a favourable mining feasibility determination, a subsequent phase of work is likely. This work may include more detailed drilling to determine coal seam subcrop and possible fault location in the northwest area, more detailed sampling and assays and additional hydrologic work.

### **21.1 Geologic Work**

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The recommended geologic work involves exploration, sampling, chemical and physical assays and beneficiation tests, and hydrologic studies.

#### *21.1.1 Exploration*

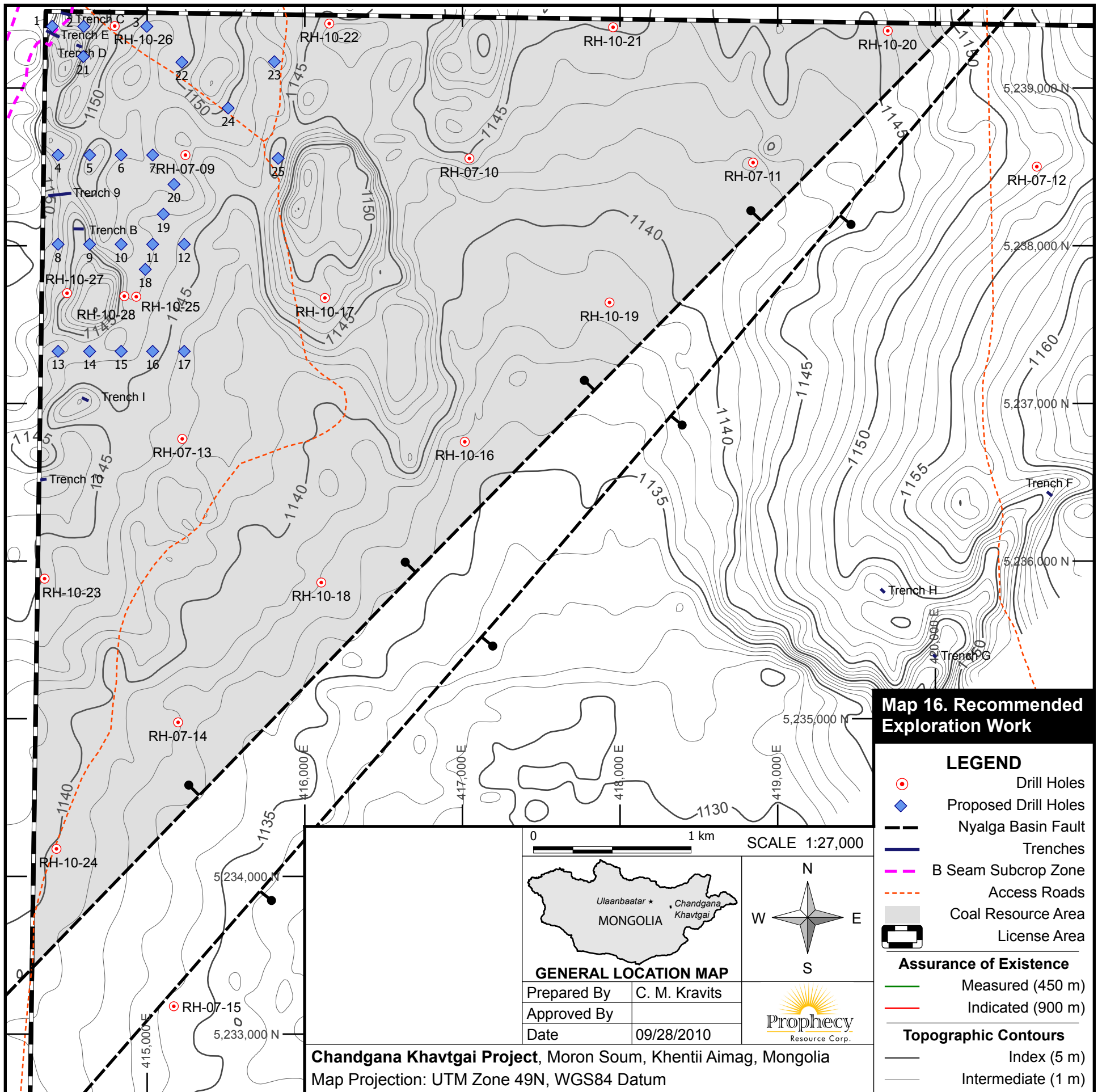
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Exploration using drilling methods is the major portion of the cost of the recommended work. Some drill holes will be completed to provide hydrologic information besides geologic information. Other exploration work includes reprocessing of the 2010 seismic geophysical data. These methods are described in the following sections and drill hole locations are shown on Map 16.

##### *21.1.1.1 Drilling*

Twenty-five new drill holes are recommended to obtain stratigraphic, coal seam, structural, and hydrologic information. These new drill holes are located in the northwest portion of the resource area. These are shallow and would be drilled through the base of the B Coal Seam as early in the season as possible.

For all the drill holes, cuttings and core samples will be obtained and the drill holes geophysically logged. Drill holes 1 to 20 are primarily intended to obtain stratigraphic and structural information to determine depth to the B Coal Seam and resolve potential faulting or folding. They are secondarily intended to obtain core samples for coal quality information, especially depth of weathered coal. As such, core drilling is only recommended for half of the drill holes while the other



half may be rotary drilled. Drill holes 1 to 17 are especially important to the mining feasibility study because they will determine the depth to the B Coal Seam and the presence of weathered coal, both of which are very important in planning the initial cut and assessing near-term mineability. It is not intended to drill all these drill holes. The plan for each line of drill holes is to drill the eastern drill hole to confirm structure, and then drill the western drill hole. The middle drill hole is then drilled after which the next drill hole location is determined by the portion of the line that shows the greatest difference in coal seam elevation.

Drill holes 21 to 25 are intended to obtain hydrologic information and will be completed and developed as water monitoring and sampling wells. Drill holes 22 to 25 will be specifically used for draw down tests initially. These drill holes should be completed before the other drill holes so the information is obtained as soon as possible allowing the hydrology study to be completed and the report made available for the mining feasibility study.

During drilling attention should be made to a likely bulk sampling location. Should a likely location be found that has not been drilled, that location should be drilled and core sampled. This information will ensure the location is acceptable and aid in planning the bulk sample.

#### *21.1.1.2 Reprocessing of Seismic Data*

The 2010 reflection seismic data should be reprocessed. Though the initial processing was sufficient to meet the needs at the time, more accurate information can be obtained from the data if the processing artifacts were removed, the signal better migrated and the effects of the surface materials filtered. This work should precede the drilling because will likely decrease the drilling needed.

#### *21.1.2 Sampling*

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Sampling of the coal seams and surrounding rocks will be done by core drilling or augering and possibly by excavation.

##### *21.1.2.1 Core Sampling*

Core drilling will obtain core samples for standard chemical assays of the coal and surrounding rocks. These are especially important in drill holes 1 through 17 because the depth of coal weathering must be assessed. Core samples are also needed for physical property assays of the coal seams, partings and surrounding rocks and, overburden rocks and surface deposits that will be used in the mining feasibility study. Good core recovery is important in these drill holes. The sampling practices used previously are needed here.

##### *21.1.2.2 Bulk Sampling*

Bulk sampling would be done through large diameter core drilling or augering or excavation depending on the depth to unweathered coal and the amount of sample needed for the chemical and physical properties assays desired. The bulk sample will be obtained after the assays of the core samples have been received and reviewed to ensure there is no weathered coal at the bulk sample location. Should the favoured location be considered too deep for an excavated bulk sample and a smaller (several hundred kilogram sample) be acceptable, then large diameter coring or hollow-stem augering methods would be used. A number of drill holes/auger holes would be needed, the number determined by the core diameter, coal seam thickness and mass of sample desired.

Should a suitable shallow location be found though, an excavated bulk sample is preferred. This is because a larger more representative sample is obtained allowing for a greater variety of assays with more accurate and reliable results. In fact, many physical property and beneficiation tests cannot be performed reliably or the results be considered valid without a large sample that has the likely run-of-mine size consist. An excavated bulk sample requires planning, coordination of tasks, and manpower which must be considered but whose description is beyond the scope of this report.

### *21.1.3 Chemical and Physical Property Assays and Beneficiation Tests*

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Chemical and physical property assays are recommended for the core samples and the bulk sample. These are intended to provide a more reliable estimate of the quality of the resource and depth of weathering in the area of initial production, information to assess utilisation characteristics, and information to assess the potential for coal quality improvement.

#### *21.1.3.1 Chemical Assays*

For the core samples, the suite of assays performed on the core samples from the 2007 and 2010 drilling should be performed with the addition of soluble alkalis, hazardous trace elements, and sulfur forms. The sampling and preservation protocol used previously should be followed as should the sample security procedures. The assays should be completed as soon as possible to allow early selection of the bulk sampling location and planning to begin.

The chemical assays of the bulk sample should include the same suite of assays performed in 2007 and 2010 and soluble alkalis, trace elements, sulfur forms which are useful when assessing coal utilisation. Tests of slagging, fouling, corrosion and erosion potential would not be performed at this time but sufficient sample would be retained should these be desired at a later time. Another assay is spontaneous combustion potential which is useful when considering the stability of the coal exposed in the pit, in stockpiles or during transport. Sampling, preservation, transport and storage protocols would be developed for these samples. As with obtaining the bulk sample, planning of the processing and assays is needed to realise full use of the sample and produce all the assays desired.

#### *21.1.3.2 Physical Property Assays*

Physical property assays of the core samples are desired to assist the mining feasibility study. Because the rocks are poorly lithified (compacted) soils (soft rock) assays may be more appropriate than rock mechanics assays. The most appropriate suite of assays will need to be determined by a civil engineer. Should rock mechanics assays be considered appropriate, the suite should include unconfined and triaxial compressive strength and slake durability. But should soils (soft rock) assays be considered appropriate the suite should include Atterburg limits, compaction, load bearing ratio, unconfined pressure, simple shear, triaxial shear, bulk density, saturation and swell. The sampling, preservation, transport and storage protocols would depend on the suite of analyses.

The bulk sample should be assayed for a variety of physical properties that would assist in assessing crushing needs, storage and transport losses and handling characteristics (natural size degradation, dust generation, abrasiveness). These assays include Hardgrove grindability index, sieve (screen) assay, drop shatter assay, slake durability, tumbler assay, abrasiveness and spontaneous combustion susceptibility. Like with the chemical assays of the bulk sample, the physical property assays must be planned.

### 21.1.3.3 Beneficiation Testing

There is potential for beneficiating the coal by reducing moisture, ash and sulfur and possibly sodium and chlorine. Reducing moisture and ash would increase the heating value and as a result the marketing range of the coal. Reducing sulfur would decrease the sulfur dioxide emissions of the coal when burned, decrease slagging potential of the coal ash, and probably decrease emissions of trace elements when the coal is burned. Reducing chlorine could decrease the corrosivity of the condensed combustion gases. Reducing sodium will reduce the fouling, agglomerating and corrosion potential of the solid and liquid coal ash. Beneficiation testing may be performed on core samples or a bulk sample. Assays of core samples may provide a good indication of beneficiation potential but an excavated bulk sample is preferred for several reasons including (a) a large sample mass provides more reliable testing results, (b) some tests require a sample with a size consist similar to the mined product, (c) some tests require a large sample mass, (d) sufficient sample is available for retests if needed, and (e) the results are more reliably scalable to a process design. Beneficiation testing requires planning to select and schedule assays, arrange logistics, etc.

The moisture reduction potential of the coal may be tested through crude tests designed in-house, commercial scale testing facilities, bench scale apparatuses at universities and research institutions or firms that provide technologies for moisture reduction or pelletizing/briquetting. There are no formalised tests to assess moisture reduction potential in coal. In-house tests could be designed and performed that simply use ambient evaporative drying but would be difficult to scale to a commercial operation. Belt presses used in preparation plants have some potential to reduce moisture in the coal and could be tested at a commercial scale testing facility. Thermal and fluidised-bed moisture reduction testing may be available at universities and research institutions but are available at testing facilities of firms that provide these technologies, some of which provide pelletizing/briquetting technology. There are no coal producers known that only reduce the moisture of their coal then send it to market. It appears that all briquette or pelletize the reduced moisture product in order to decrease the size degradation and spontaneous combustion propensity of the reduced moisture coal. In-house tests would require several hundred kilograms from a bulk sample but the other tests require a much larger mass of coal (several tonnes) for initial testing.

The potential for reducing the ash, sulfur and possibly sodium may be tested using combined sizing and crushing tests, air classification tests, and conventional washability tests. Combined sizing and crushing testing is commonly done in-house by coal miners but is not a formalised test. Rather tests are planned by the coal producer and laboratory and the results evaluated in-house. This testing may be performed on core samples to obtain an initial indication of the potential of this method but a realistic assessment requires a larger bulk sample. Air classification involves use of an air column or fluidised bed to separate coal from greater density materials. This technology is not too common but is gaining acceptance with several facilities installed around the world. Testing is performed at some universities but mostly at firms that provide this technology. Again there are no formalised tests so tests would be planned by the coal producer and laboratory and the results evaluated in-house. Conventional washability testing is a formalised test and the results can be designed and scaled to a preparation plant. The testing may be performed using core samples and several hundred kilogram samples at commercial coal laboratories but multi-tonne sample tests performed at commercial coal testing facilities are the most reliable. This method also has the potential to reduce chlorine. As with combined sizing and crushing, testing performed on core samples provides an initial indication of the beneficiation potential but a realistic assessment requires a bulk sample.

The potential for reducing chlorine may be tested by designing tests in-house because there is no standardised test. The test would consist of soaking or washing the coal in water for various

periods, assaying the resulting coal and evaluating the results in-house. This testing was done for some Australian and US coals but it is not known whether the process is practised commercially.

**21.1.4 Hydrologic Studies**

Hydrologic studies are recommended because hydrologic information is needed for the mining feasibility study and to assess whether ground water can provide the mine’s water needs. Drilling and completion of drill holes for hydrologic studies were described in Section 21.1.1.1. This section deals with the monitoring, sampling, testing and modeling work. A minimum amount of groundwater monitoring, sampling and testing is needed in order to develop a groundwater model. The groundwater model should address (1) groundwater amount and quality, (2) groundwater recharge and flow, (3) groundwater aquifers, (4) effects of surface mining on groundwater amount and quality, and (5) surface water. This work should start as soon after the wells are completed and developed in order to be available for the mining feasibility study.

**21.1.5 Schedule and Costs**

Preparation work for the exploration should start in the fourth quarter of 2010. This included reprocessing the seismic data to determine the number of drill holes needed and planning the bulk sample assays. The exploration activity should start in late first quarter of 2011 and be completed by the fourth quarter of 2011. The recommended schedule and projected costs are shown in Table 16.

<b>RECOMMENDED EXPLORATION SCHEDULE AND COSTS</b>							
<u>Activity</u>		<u>Schedule</u>					<u>Cost (US\$)</u>
		2010	2011				
		4 Qtr	1 Qtr	2 Qtr	3 Qtr	4 Qtr	
Drilling	Drill Holes 1 - 3						\$36,000
	Drill Holes 4 - 7						\$71,000
	Drill Holes 8 - 12						\$85,000
	Drill Holes 13 - 17						\$90,000
	Drill Holes 18 - 20						\$66,000
	Drill Holes 21-25						\$159,000
Seismic	Reprocess 2010 Data						\$5,000
Sampling	Core Samples						see note 1
	Bulk Sample						\$20,000
Assays	Chemical						\$130,000
	Physical Properties						\$20,000
	Beneficiation						\$75,000
Hydrologic Studies							\$25,000
					<b>Total Cost</b>		<b>\$782,000</b>

<sup>1</sup> Core sampling cost is included with drilling

**Table 16**

The cost for each activity includes indirect and direct costs. The estimated beneficiation assay cost assumes that small scale testing of portions of the bulk sample are performed in Asia.



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## 23 SIGNATURE, SEAL AND DATE

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I, Christopher M. Kravits, CPG LPG prepared this updated technical report, titled "Updated Technical Report on the Coal Resources of the Chandgana Khavtgai Coal Resource Area, Khentii Province, Mongolia" the effective date of which is September 28, 2010.



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Christopher M. Kravits, CPG, LPG

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September 28, 2010  
(effective date)