

**TECHNICAL REPORT:  
SURFACE COAL GEOLOGY AND RESOURCES  
OVOOT TOLGOI – WEST FIELD  
OMNOGOVI AIMAG, MONGOLIA**

Submitted to  
**SOUTHGOBI ENERGY RESOURCES LTD.**  
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## **SECTION 1: SUMMARY**

The Americas Group, Inc. (TAG) prepared this technical report at the request of Southgobi Energy Resources Ltd. (collectively with its subsidiaries “SGQ”). It has been prepared in accordance with National Instrument 43-101, Form 43-101F1 and submitted to SGQ. The purpose of this document is to amend and restate resources published in *Technical Report: Surface Coal Geology and Resources Ovoot Tolgoi – West Field, Omnogovi Aimag, Mongolia* (hereafter “the September report”), dated September 12, 2008, which detailed results of the exploration program completed on SGQ’s Ovoot Tolgoi mine license, West Field surface resource area (hereafter “West Field”) as of December 2007, and reported surface coal resources of said property based on data acquired between project initiation (2004) and the most recent drilling (2007) as of the publication of the September report. TAG is responsible for all sections except Section 22 and non-TAG signoff/certification in Section 23.

Gary Stubblefield, P.E. a Qualified Person for engineering-related issues and Vice President Surface Mining at Norwest Corporation (Norwest) of Salt Lake City, Utah, is responsible for Section 22 and non-TAG signoff/certification in Section 23.

The same exercise will be carried out later this year reporting results of the exploration program completed through December 2007 on SGQ’s Ovoot Tolgoi mine license, Southeast Field surface resource area .

Norwest Corporation completed a Technical Report for West Field and Southeast Fields resource estimates based on drilling at Ovoot Tolgoi completed through 2006. This report was dated June 21, 2007 and filed July 20, 2006. Some details of the July 2007 report were updated in a report dated March 27, 2008 and filed March 28, 2008. The September report, which is based on drill data up through December 2007, as well as the March 28, 2008 Norwest report, which detailed exploration activities and resource estimates inclusive up through 2006 drill data, are the most recent technical reports filed for the West Field surface area and are referenced extensively in this current report. Norwest had also previously provided a Technical Report for resource estimates on this property in accordance with National Instrument 43-101 dated July 28, 2006 and filed August 8, 2006 covering exploration activities and resources estimates inclusive of 2005 drill data.

On September 20, 2007, SGQ received a Mine License for the development of an open-pit coal mine at Ovoot Tolgoi. A detailed mine license description is contained in Section 4 of this report. Pre-stripping was initiated at the beginning of 2008 and the mine started production in April 2008.

## Location

The West Field property is located in the southwest corner of the Omnogovi Aimag (South Gobi province), approximately 320 kilometers southwest of the provincial capital of Dalanzadgad and 950km south of the nation's capital, Ulaanbaatar (Figure 1). Ovoot Tolgoi is 45 kilometers north of the Mongolia-China border and the Ceke border crossing. Ceke, in the Peoples Republic of China, will be the main distribution center for Ovoot Tolgoi coal. "The resource area detailed in this document is adjacent to the existing Nariin Sukhait Mine, owned and operated by the Mongolian Alt Corporation-Qin Hua Mongolian/Chinese Joint Venture (MAK). The MAK operation currently consists of three open-pit mines on its 28.8 km<sup>2</sup> mining license" (Norwest Technical Report, March 2008).

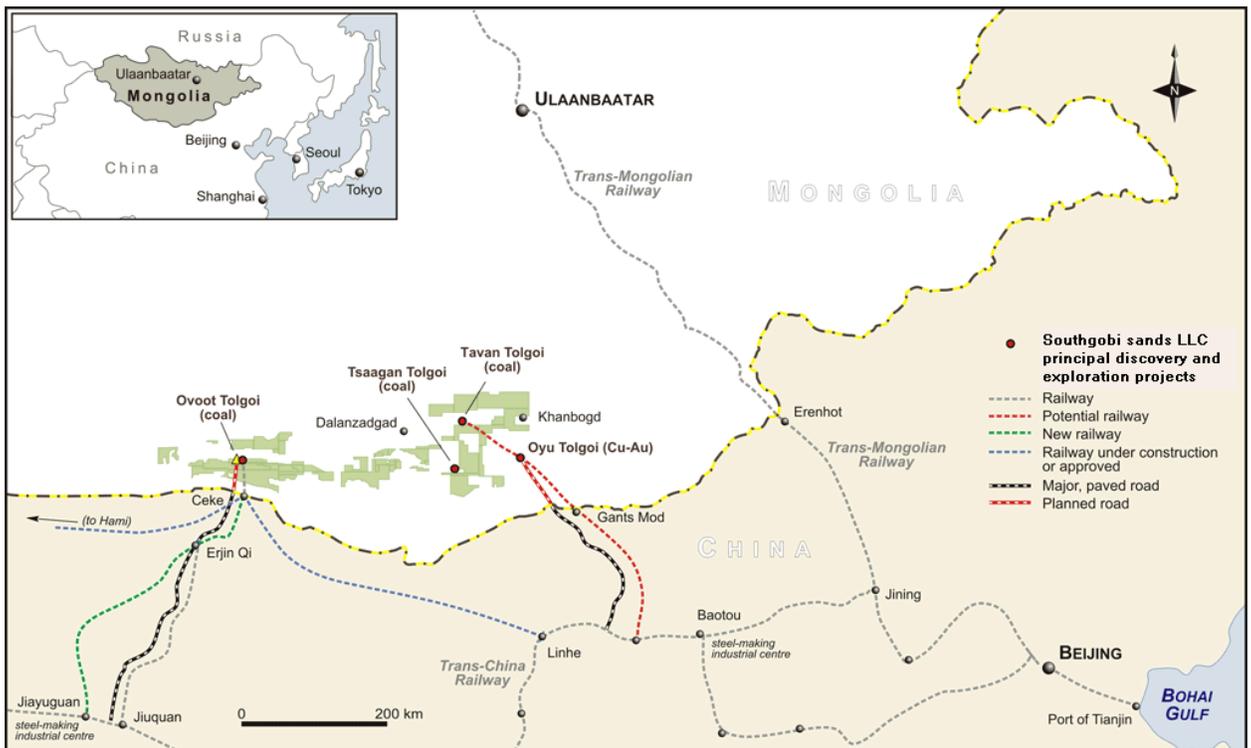


Figure 1: Ovoot Tolgoi Location Map

## Exploration

Initial exploration began in late 2004 with the completion of five drillholes in the Ovoot Tolgoi deposit area that is now within the mine license controlled by SGQ. Exploration programs continued in 2005, 2006, and 2007 with the emphasis on delineating surface resource potential. As summarized in the most recent Norwest Technical Report (March, 2008):

Exploration work has identified five different coal Zones, or packages, consisting of one or more coal seams within a distinct stratigraphic horizon. Most of the work has focused on identifying resources within the thick seams of the 5-Zone, with additional resources in the 8-, 9-, and 10-Zone above this. Structural geology at Ovoot Tolgoi shows evidence of

folding and faulting. Individual coal seams, however, are still relatively intact. The deposit is classified as “Complex” based on criteria set forth in the Geological Survey of Canada Paper 88-21.

To facilitate estimation of resources at West Field, TAG completed a digital geological model using GEMCOM Software International’s *Minex*<sup>®</sup> software. Key horizons or “surfaces” of each seam were modeled to provide the necessary limits for volume estimation. The model converted volumes to tonnages by application of density values derived from available coal quality data.

Resource estimates for West Field presented in this report are based on data acquired by SGQ exploration through December 2007. West Field resource estimates have increased from those based on the 2006 drilling program.

### **Coal Seam Structure**

Coal occurrences at West Field are found along a southwest-striking trend. Current data indicates a thrust fault system controls the distribution of coal in this area. This interpretation divides the West Field into two distinct resource blocks: south and north, with the south block riding up over the north block.

### **Coal Quality**

Annual exploration program (2005 through 2007) drilling results continue to indicate potential coking (HCC) and semi-soft (SSC) coals within the range of the surface minable coal at West Field. Composite quality analyses completed in 2005, 2006, and 2007 on the West Field license area indicate coal rank ranging from lower ranks to high volatile A bituminous, based on the ASTM D388 standard, with the main 5 Seam primarily ranging between high volatile B and A bituminous. Identified coal products include thermal coals, a metallurgical blending coal, and a semi-soft coking coal.

### **Surface Coal Resources**

TAG completed resource estimations effective June 20, 2008 for West Field. The resource estimates are based **on data acquired by SGQ exploration through December 2007**. Table 1 is a summary of coal resources based on data acquired by SGQ through December 2007.

Surface coal resources at West Field, prepared by TAG in accordance with National Instrument 43-101, have been determined to be suitable for surface mining, in depths ranging from 5 to 250m. Surface in-situ resources total approximately 103 million tonnes of combined Measured and Indicated resources, and an additional 19 million tonnes of inferred resources.

TAG surface coal resources summary for West Field as of June 20, 2008 is shown in Table 1.

Area	In-Place Resources (Tonnes)			ASTM Coal Rank
	Measured	Indicated	Inferred	
West Field	74,972,951	27,687,201	18,761,047	hvB to hvA
<b>Total</b>	102,660,152		18,761,047	

**Table 1: Surface Coal Resources Summary for West Field as of June 2008**

### Geotechnical Data

A small amount of geotechnical information currently exists within West Field. Norwest reviewed one geotechnical hole (NSW06-18C) and collected samples for a geotechnical slope stability assessment in 2006. Norwest prepared a memorandum report for IMMI presenting slope stability assessment and pit wall design guidelines in 2007 (Norwest, 2007a). The limit of the surface mine at depth is presently set at 250m.

TAG was not present during the Norwest geotechnical testing program nor modeling studies and therefore cannot verify the data acquired nor results detailed in the Norwest (May 25, 2007) slope stability memorandum, the details of which are summarized in this report.

### Ground Water Regime

In 2006, eight water test holes were drilled at West Field under the supervision of Norwest (Norwest, 2006b). Pump tests and infiltration tests were completed as well as water samples analyzed at a laboratory to determine water quality. Norwest completed modeling of the data to simulate in-pit dewatering requirements. The Norwest study determined that:

- Inflow rates to the mine pit were expected to be relatively high;
- Generally, water quality at West Field, as defined by total dissolved solids, is “fresher” to the north and within the shallow aquifer zone, due probably to active recharge, and more brackish to the south and within the deeper aquifer zone;
- Trace metals were at non-detectable levels with the exception of mercury, which tested at a significantly high level in one hole (0.05 mg/L, exceeding the Maximum Acceptable Concentration standard of 0.001 mg/L and the United States National Water Quality Standard of 0.002 mg/L); and
- Infiltration tests conducted by Norwest in drainages flowing toward the West pit indicated high infiltration rates, resulting in relatively high groundwater recharge rates, with shallow groundwater flows running parallel with the surface drainage from north to south and intercepted by the mine pits. Norwest proposed a diversion ditch be constructed north of the West pit.

TAG was not present during the Norwest water testing program nor modeling studies and therefore cannot verify the data acquired nor results detailed in the Norwest (2006) hydrology report, the details of which are summarized in this report.

### **Surface Mine Planning**

In May 2007, Mongolian government's Ministry of Environment approved Ovoot Tolgoi's Detailed Environmental Impact Assessment (DEIA).

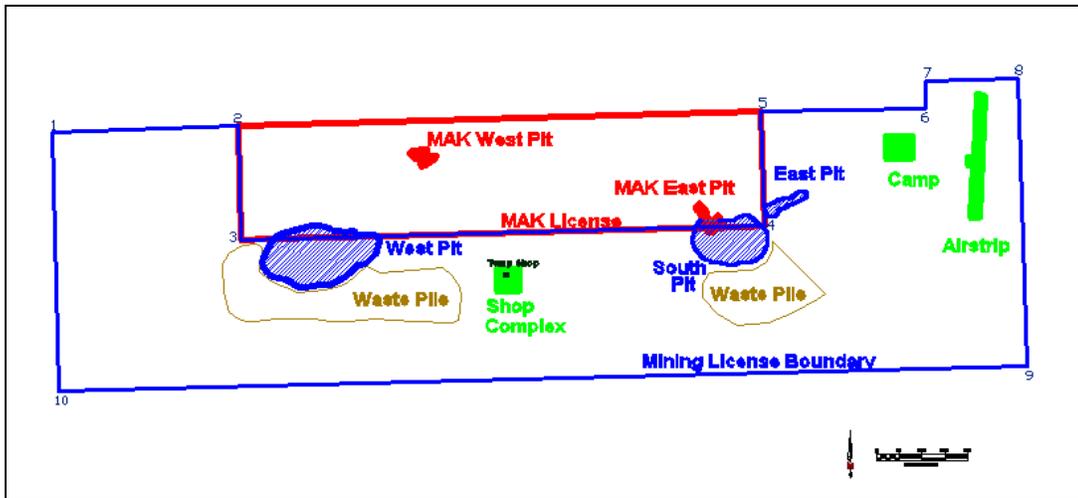
The Mongolian government's resource committee approved the geological resource report for Ovoot Tolgoi on August 6, 2007.

On September 20, 2007, SGQ received a Mine License for the development of an open-pit coal mine at Ovoot Tolgoi.

The West Field area of Ovoot Tolgoi is designated as the initial surface mine operation. Pre-development of the surface mine commenced in the first quarter of 2008, with first production beginning in April 2008. Shipping of coal to market is to start in the third quarter of 2008. The current West Field pit design is for surface operations with projected mine depths between 0 and 250m.

Once the West Field 2008 exploration, geological modeling, and resource estimation program is completed, the focus for exploration will switch to the South East Field and drilling is expected to be carried out in 2009 or 2010. These coal occurrences are immediately adjacent to the currently planned surface pit operations inside the SGQ mine license area.

Figure 2 is a plan view of the SGQ mine license. TAG, employing data provided by SGQ, has summarized the status of the geologic factors noted above.



**Figure 2: SGQ Mine License**

### Resource Revision

The September report contained an error in the resource estimate due to an arithmetic error in calculating the resources and a minor error in the resource model. The resource estimate in the September report is overstated. The arithmetic error resulted in cumulative resources being calculated rather than incremental for the Indicated and Inferred classifications. The error in the model resulted from the methodology in handling separable parting material. The resultant section of the database dealing with those values tallied incorrect information, thus creating incorrect coal thickness grids later in the process. Both errors have been corrected and the resource table has been revised.

### Acknowledgements

Sections of this report are taken from previous NI 43-101 reports for the West Field area, compiled by Norwest, and from information gathered by TAG on recent visits to the SGQ office in Ulaanbaatar, Mongolia. SGQ provided the Norwest reports to TAG.

In accordance with National Instrument 43-101, TAG has used the following referenced documents during the classification, estimation and reporting of coal resources for the West Field area:

- Canadian Institute of Mining, Metallurgy and Petroleum's (CIM) *Definition Standards on Mineral Resources and Reserves*, adopted by CIM Council on November 14, 2004; and
- Geological Survey of Canada Paper 88-21 *A Standardized Coal Resource/Reserve Reporting System for Canada* (GSC Paper 88-21)

## **SECTION 2: INTRODUCTION AND TERMS OF REFERENCE**

TAG prepared this Technical Report at the request of SGQ. It has been prepared in accordance with National Instrument 43-101, Form 43-101F1 and submitted to SGQ. The purpose of the report is to amend and restate resources published in *Technical Report: Surface Coal Geology and Resources Ovoot Tolgoi – West Field, Omnogovi Aimag, Mongolia* (hereafter “the September report”), dated September 12, 2008, which detailed results of the exploration program completed on SGQ’s Ovoot Tolgoi mine license, West Field surface resource area (hereafter “West Field”) as of December 2007, and reported surface coal resources of said property based on data acquired between project initiation (2004) and the most recent drilling (2007) as of the publication of the September report.

This Technical Report utilizes data collected at West Field through 2007 by the following entities:

- SGQ in conjunction with Sapphire Geo Ltd. (Sapphire)
- Norwest Corporation (Norwest), of Salt Lake City, Utah, USA
- Ivanhoe Mines Mongolia, Inc. (IMMI)

Additional data has been gathered from previous Mongolian government studies at Ovoot Tolgoi. Portions of this report that do not require updating have been taken from previous Norwest 43-101 reports. Norwest was present during 2005 through 2006 exploration programs and has provided QP verification of that data. TAG was not present on-site until 2008 and therefore cannot provide QP verification of the 2007 data, although after comparison with previously validated data and current 2008 data, considers the 2007 data consistent and reliable.

SGQ commissioned TAG to develop and manage an exploration program for 2008, which will also be reported under National Instrument 43-101 at a future date. Pat Riley, a principal at TAG, was previously employed at Norwest and spent periods in 2005 and 2006 working on this project for Norwest.

TAG reviewed and evaluated all geological and technical information currently available, and summarized this information within this technical report prepared in accordance with National Instrument 43-101.

SGQ provided TAG with all geological, geotechnical, and quality data information, including previous technical reports prepared by Norwest.

The Qualified Person responsible for this report has personally inspected the West Field property, has been involved in the processing and interpretation of data, and has been involved in preparation of this report. The author has:

- On-site exploration management experience (2008) for the Ovoot Tolgoi field
- Completed current West Field digital geological model for data inclusive through December 31, 2007
- Completed this technical report in compliance with NI43-101
- Visited the SGQ Ulaanbaatar office to discuss resource expansion goals, logistics, and acquisition of geological data for Ovoot Tolgoi in April, July, and August, 2008.

Sections of this current report are from the afore-mentioned Technical Reports compiled by Norwest. SGQ provided the Norwest reports to TAG. TAG was not present to personally verify data represented in those reports.

### **SECTION 3: RELIANCE ON OTHER EXPERTS**

TAG has prepared this report for SGQ. The findings and conclusions are based on information provided to TAG by SGQ representatives. SGQ has provided data collected by IMMI and Norwest through exploration programs conducted in 2004 through 2006 and data collected by SGQ in the 2007 exploration program. Information gathered prior to Norwest involvement has not been checked for accuracy.

Norwest was present during 2005 through 2006 exploration programs and has provided QP verification of that data. TAG was not present on-site until 2008 and therefore cannot provide QP verification of the 2007 data, although after comparison with previously validated data and current 2008 data, considers the 2007 data consistent and reliable. TAG also cannot personally verify geotechnical or hydrology data collected by Norwest in prior years, nor the subsequent reports submitted to SGQ by Norwest regarding those subjects.

Norwest, through their engineer QP, Gary Stubblefield, made a site visit April 2009, has personally verified engineering items detailed in Section 22 of this report, and has provided signoff for that section.

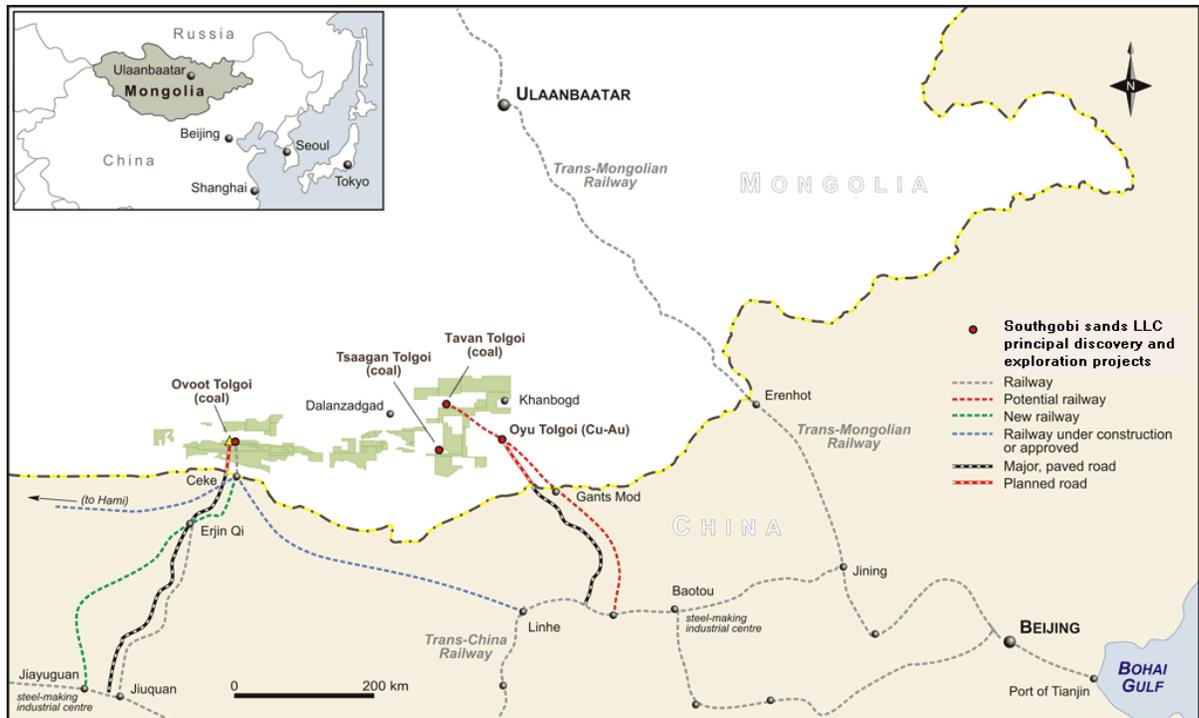
Sections of this report are taken from the previous 43-101 reports compiled by Norwest on this property. Additional geologic information was gathered by TAG on recent visits to the SGQ's office in Ulaanbaatar, Mongolia, April 4-6, 2008, April 25-26, 2008, July 24, 2008, and August 4, 2008, as well as site visits April 7 – 25, 2008, and July 25 – August 4, 2008. SGQ provided the Norwest reports to TAG.

TAG executed only geologic data validation. Mining concepts were not validated.

The author of this report has not relied on other experts in the preparation of this report.

## SECTION 4: PROPERTY DESCRIPTION AND LOCATION

As seen in Figure 3, The Ovoot Tolgoi West Field resource area is located in the southwest corner of the Omnogovi Aimag (South Gobi province), approximately 320 kilometers southwest of the provincial capital of Dalanzadgad and 950 km south of the nation's capital Ulaanbaatar. Ovoot Tolgoi is approximately 45 kilometers north of the Mongolia-China border and the Ceke border crossing. Ceke, in the Peoples Republic of China, will be the main distribution center for Ovoot Tolgoi coal.



**Figure 3: Ovoot Tolgoi Location Map**

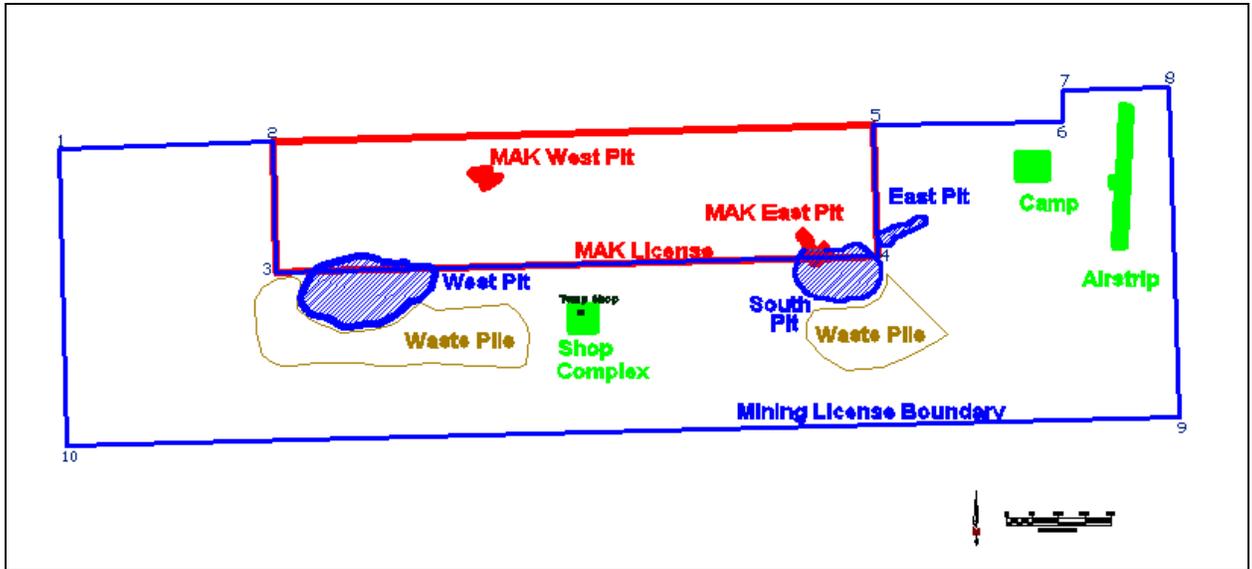
Previous work at Ovoot Tolgoi was conducted under the property control of IMMI. The coal division of IMMI and all its coal exploration licences (including the exploration licenses at Ovoot Tolgoi) were sold to SGQ (formerly Asia Gold Corporation (Asia Gold)) in 2007.

SouthGobi Sands, LLC (SGS), the operating company under SGQ, is a Mongolian-registered company. SGS holds the licenses and permits.

The Mongolian government grants Exploration licenses for a period of three years with the right to extend the period twice for two additional years each. Exploration license holders are subject to various environmental protection obligations. Following a successful exploration program, an exploration license holder can apply for a mining license to any portion of the exploration license.

A mining license is granted for a period of 30 years, with the right to extend the period twice for

20 additional years with each extension. The mining license covers both mineral and surface lease rights. SGQ’s Mine License was granted September 20, 2007 for the development of an open-pit coal mine. The West Field resource area occupies the area southwest of the MAK license boundary and encompasses the West Pit of SGQ’s Ovoot Tolgoi surface mine operation (Figure 4). The West Field resource area includes that area within the SGQ mine license between Northings\_4,762,000 and 4,763,500 and between Eastings 674,000 and 677,200. Resources occurring on exploration licences 9443X, 6359X, and 11187X outside of the Mine License are not included in this technical report.



**Figure 4: SGQ Mine License**

The Mongolian government approved the coordinates obtained from survey. Coordinates of the SQG mine license are presented in Table 2.

License Number	Licensee	Inception Date	Expiry Date	License Coordinates			Area Hectares	Mineral Interest
				Corner	Easting	Northing		
12726A	SouthGobi Sands, LLC	Sept. 11, 2007	2037	1	101°05'06"	43°01'20"	9305	100% Coal
				2	101°08'05"	43°01'20"		
				3	101°08'05"	42°59'58"		
				4	101°16'30"	42°59'58"		
				5	101°16'30"	43°01'20"		
				6	101°19'10"	43°01'20"		
				7	101°19'10"	43°01'40"		
				8	101°20'40"	42°01'40"		
				9	101°20'40"	42°58'15"		
				10	101°05'06"	42°58'15"		

**Table 2: SQG Mine License Description**

Currently no known environmental, permitting, legal, title, taxation, socioeconomic, marketing, political, or other relevant issues that may materially affect the potential mining of coal exist within the confines of the SGQ mine license area.

Any coal extracted and sold during exploration is subject to a royalty rate of 2.5% and 5% of the sales value for domestic and international sales, respectively.

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

The Ovoot Tolgoi deposit is located in south-central Mongolia, approximately 45 km north of the China border. The deposit is within the administrative unit of Gurvantes Soum, Omnogovi Aimag (South Gobi Province).

Population centers and transportation infrastructure in proximity to Ovoot Tolgoi are illustrated in Section 4: Figure 3. The Omnogovi Aimag is the most sparsely populated province in Mongolia with less than one person/km<sup>2</sup>.

Vegetation is sparse, consisting primarily of small shrubs and grasses. The area currently supports a traditional subsistence economy focused on raising sheep, goats, and camels.

The region experiences a continental desert climate. Temperatures range from 0° to -30°C in the winter and from 30° to 35°C in the summer. High winds frequently occur throughout the spring. Average rainfall is 530mm with most precipitation occurring during the summer months. The weather is acceptable for exploration activities from mid-March through October. The climate is conducive to year-round mining operations.

The Omnogovi Aimag is within the physiographic region of the Gobi Desert. The topography of the deposit varies from flat, gravel-covered desert plains to moderately hilly terrain. Surface elevation ranges from 1,515 to 1,555m above sea level. All parts of the property are accessible with four-wheel-drive vehicles.

Regular air service is available from Ulaanbaatar to Dalanzadgad and to Ovoot Tolgoi. Travel from Dalanzadgad to the property takes approximately seven hours over unpaved roads. In September 2006, SGQ acquired a permit for an on-site airport which was constructed and completed in 2007. Ovoot Tolgoi is now accessible via twice-weekly chartered aircraft from Ulaanbaatar for crew rotation and bringing in supplies.

There are two primary sources of mining labor – Ulaanbaatar and the local soum. Currently, approximately 25% of SGS employees are local. The remaining employees are flown to and from Ulaanbaatar on a two-week on, two-week off rotation.

A new rail line connecting the Ovoot Tolgoi area with the interior of China was completed in 2006. The railroad terminus is approximately 45 km south of the West Field resource area. Coal trucks travel overland from the neighbouring MAK coalmine to the railroad terminus and coal distribution areas located just south of the Chinese border. Truck shipments from the new SGQ Ovoot Tolgoi mine to customers across the border to China started on September 22, 2008.

“Although the mine has produced a greater volume than budgeted, exports have been slower due to delays associated with the Ceke border checkpoint. The border was designated a permanent border in January 2009, operating 5 days per week on a dayshift basis. SGQ has been working with appropriate Mongolian government agencies and ministries, and, as of mid-March 2009, the border is now operating on a seven-day-per-week dayshift basis. Work is in progress to operate the border on a 24-hour-per-day basis for coal exports, which is expected to occur later in 2009, significantly increasing the amount of export capacity.” (Torr, 2009)

Electrical power for the camp and shop complexes is initially being supplied by diesel generators. A powerline runs from China to Gervantes Soum, supplying electrical power to the area (Section 4: Figure 3). In the future, power will be supplied from power line.

No surface water is currently available in the immediate area of the Ovoot Tolgoi deposit. Water for the camp and shop complexes is being supplied from water supply wells drilled near each location as part of hydrological investigations. The infrastructure plans include water treatment to allow well water to be used for potable purposes. Until the treatment plant is complete, bottled water is being used for potable purposes. Water for dust suppression is available from the pit dewatering.

Waste disposal areas have been identified and approved in the mining permit. SGQ has started testing on the 8 Seams and the 10 Seams to determine the feasibility of upgrading some of the coal through screening or washing. SGQ management currently believes there is no requirement for washing of coal at Ovoot Tolgoi in the present market as the low ash and sulphur in-situ raw quality for the 5 Seam would not likely be improved sufficiently through washing to warrant the expense. Once production includes a significant tonnage in the upper seams, a beneficiation program may add value to them as they have higher ash content and more partings. Dilution from mining steeply dipping seams may also be dealt with through washing.

On September 20, 2007, SGQ received a Mine License for the development of surface coal mining at Ovoot Tolgoi. The mine began operation in April, 2008 after receiving a Permit to Mine from the Mongolian Government. Detailed mine planning is on-going, including:

- Design waste disposal areas,
- Equipment acquisition,
- On-site housing,
- Water usage,
- Mine staffing requirements, and
- Mine management.

Construction of a permanent shop, office, and housing facilities are underway and are expected to be completed in summer of 2009.

## SECTION 6: HISTORY

The first geologic investigation at Nariin Sukhait took place in 1951 and 1952 and was led by V.S. Volkhonina (1952). Results included geologic mapping at a scale of 1:500,000.

Coal was first identified in the Nariin Sukhait area in 1971 by a Mongolian exploration survey led by D. Dashtseren (1971).

A study of the Nariin Sukhait coal deposit was undertaken by Exploration Unit No.15 of Ulaanbaatar Geological Research Group in 1991. This study included field mapping, trenching, drilling of 34 boreholes, analysis of coal quality, and calculation of resources for the two most promising resource areas, now controlled by MAK. Based on standards from the former Soviet Union, inferred resources (categories A+B+C1+C2+P1) were reported to the +1,450m level, corresponding to 75 to 90m depth. Total inferred resources were reported at 125,519,900 tonnes.

The former Soviet Union generally divided a mineral deposit into 4 primary ratings depending on phases of exploration works and survey levels. The four ratings are:

- Category A = Confirmed reserves
- Category B = Indicated/Actual reserves
- Category C = Inferred/Potential reserves
- Category P = Preliminary assessed resources

These categories differ from 43-101 resources classifications. 43-101 criteria applied to coal deposits for the purposes of determination of coal resources and reserves include both “Geology Type” as well as “Deposit Type”. For coal deposits this is an important concept because the classification of a coal deposit as a particular type determines the range-limiting criteria that may be applied during the estimation of Reserves and Resources.

The author did not verify the resource estimates reported for the MAK resources area. Additionally, resource estimates correspond to coal occurrences between 75 to 90m depth and are not necessarily indicative of the mineralization on the Ovoot Tolgoi West Field resources area with coal occurrence potential to 250m depth.

The history of the deposit is included in a publicly available summary report produced by the Mongolian State Geological Centre (Dashkhoral et al, 1992). This study defined the seam nomenclature currently employed at Nariin Sukhait.

Norwest completed and updated comprehensive studies of the deposit area based upon their management of exploration programs executed from 2005 through 2006. The most recent public disclosure study is entitled *Technical Report, Ovoot Tolgoi Property, Omnogovi Aimag*,

*Mongolia, March 27, 2008*, filed March 28, 2008. This referenced technical report for Southgobi Energy Resources Ltd. is on file with the Canadian Securities Administration in the SEDAR filing system, March 28, 2008 ([www.sedar.com](http://www.sedar.com)). An additional technical report completed by TAG March 28, 2008 was prepared on the underground resources at West Field, down dip from the surface resources considered in this report. To date, with the exception of the underground report noted above, all technical reports have focused on the development of surface mining operations.

IMMI acquired the Ovoot Tolgoi property via an Exploration License granted by the Mongolian government in 2002. The coal division of IMMI and all its coal exploration licences, including the exploration licenses at Ovoot Tolgoi, were sold to SGQ (formerly Asia Gold) in 2007.

IMMI began exploration at Ovoot Tolgoi in 2004, continuing exploration through its new Mongolian operating company, SGQ in subsequent years. On September 20, 2007, SGQ received a Mine License for the development of an open-pit coal mine at Ovoot Tolgoi. Production began on SGQ holdings at Ovoot Tolgoi in April, 2008. Production since April, 2008 is summarized in Table 3.

<b>Annual Production</b>	<b>BCM Waste</b>	<b>Tonnes Coal</b>
YTD	1,154,131	456,590

**Table 3: Ovoot Tolgoi Mine Production, 2008**

**SECTION 6.1: MAK NARIIN SUKHAIT MINE**

As discussed in the July 2007 Norwest report, the SGQ property is adjacent to the southern border of MAK’s Nariin Sukhait Mine property, owned and operated by the MAK-Qin Hua Mongolian/Chinese Joint Venture. Operations began at the Nariin Sukhait Mine in 2003 at the resource areas identified by Dashkhoral et al (1992). The operation currently extracts coal from the 5 Seam from the MAK East and West pits. Annual production is estimated to be approximately 2Mtpy of both thermal and coking blend coal. A third pit is in the development stage, but is reportedly owned solely by Mongolian Alt Corporation, rather than the MAK/Chinese joint venture.

Mine operations are rudimentary, with a workforce of approximately 100 miners, including both Chinese and Mongolian nationals. Coal and overburden are removed with excavators and front-end loaders. Night shift activities focus on the removal of overburden. Daytime activities typically involve the arrival of 100 or more overland trucks from China, which are driven directly into the pits and loaded. The trucks return across the border each night, where most of the coal is offloaded at various points across the border.

## **SECTION 7: GEOLOGICAL SETTING**

“The South Gobi region of Mongolia reflects a complex geologic history of continental accretion and Basin and Range style crustal extension. The region is dominated by elongate, east-west trending mountain ranges and intervening basins. The intervening basins comprise sediments of Late Cretaceous to Permian age, overlain by a relatively thin Quaternary gravel layer or thin Aeolian deposit. The mountain ranges separating these sedimentary basins comprise mostly crystalline basement rocks dominated by intermediate to high-angle faults that show evidence for both compressional and extensional movement.” (Norwest, 2008.)

The coal-bearing rocks in West Field are late Permian in age. Coal was deposited along the margins of tectonically active continental basins and has subsequently undergone extensional tectonics followed by a period of compressional folding and faulting. (Norwest, 2008.)

### **SECTION 7.1: COAL OCCURRENCES**

“The most prominent feature relating to the Ovoot Tolgoi coal deposit is the arcuate, east-west trending Nariin Sukhait fault. The coal-bearing section, interpreted to be late Permian in age, is exposed primarily in a window adjacent to this fault. West Field is approximately 2km south of the Nariin Sukhait fault. The only place where the fault is exposed is in the MAK mine to the north of West Field, where it appears as an intermediate angle structure (40-50 degrees) in their West pit” (Norwest, 2007b).

Studies of the Ovoot Tolgoi deposit undertaken by Exploration Unit No.15 of Ulaanbaatar Geological Research Group in 1991 and a publicly available summary report produced by the Mongolian State Geological Centre (Dashkhoral et al, 1992) identified “the existence of ten coal seams and estimated the overall thickness of the coal-bearing section at 1,370 m. Cumulative thickness of the coal was given as a range of 68 to 250m, with the bulk of the resources found within the 5 Seam” (Norwest, 2008). This study resulted in adoption of seam nomenclature with the very thick coal designated the 5 Seam with the seams above and below the 5 designated in consecutive ascending or descending order respectively.

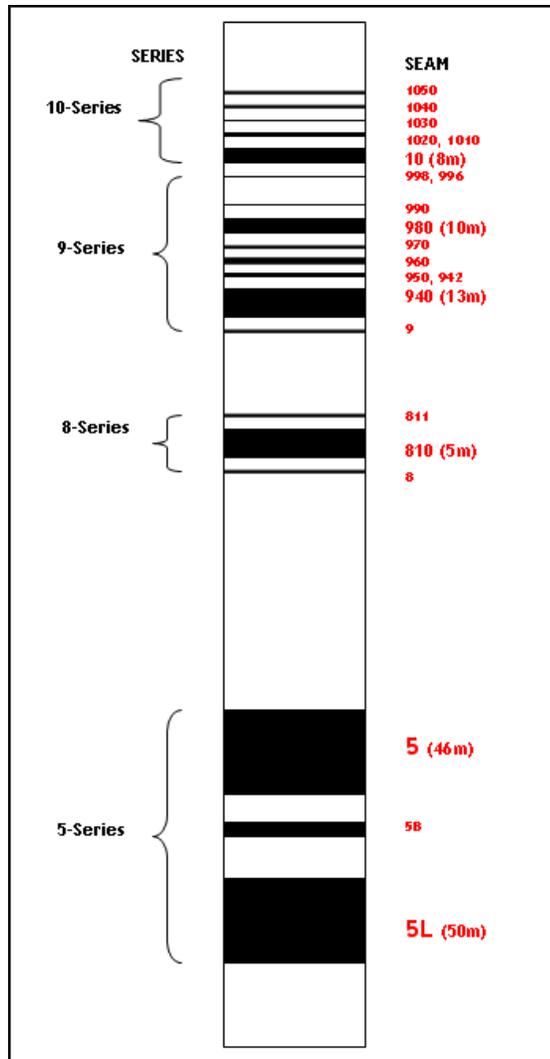
“Exploration activities undertaken by SGER [SouthGobi Sands] have also focused on the thick coal of the 5 Seam, but additionally have defined further resources in packages of “upper seams” located above this horizon. This work has shown that what was previously named as a single seam often contains a number of discrete coal seams separated by rock partings of highly variable thickness and extent. As such, modeling efforts have required the organization of these coal packages into a number of coal zones (or series)... The thick seam originally identified as the 5 Seam in outcrop has retained that designation, but the discovery of splits above and below this has required a number of additional correlatable seams” (Norwest, 2008).

“The remainder of the resource is found in the 8-, 9-, and 10-Zones, which each contain a number of discrete coal seams. The No. 4 and 7 Seams are recognized in a number of drill holes, but do not appear to represent any significant resources. Coal seams 1 through 3 described in the early work at Ovoot Tolgoi have not been identified on SGER [SouthGobi Sands] property” (Norwest, 2008).

The current interpretation of the data is that of a thrust fault through West Field (see Section 7.2 below), resulting in a repeat of the upper coal series (10 through 8). Thus, for ease in digital modeling, seam nomenclature has been modified as follows:

- the overlying packets retain the original nomenclature
- packets in the lower (underlying) block have had an “L” appended to their respective seam name

The generalized stratigraphy with current seam nomenclature for Ovoot Tolgoi West Field is illustrated in Figure 5.



**Figure 5: Generalized Stratigraphy with Seam Nomenclature**

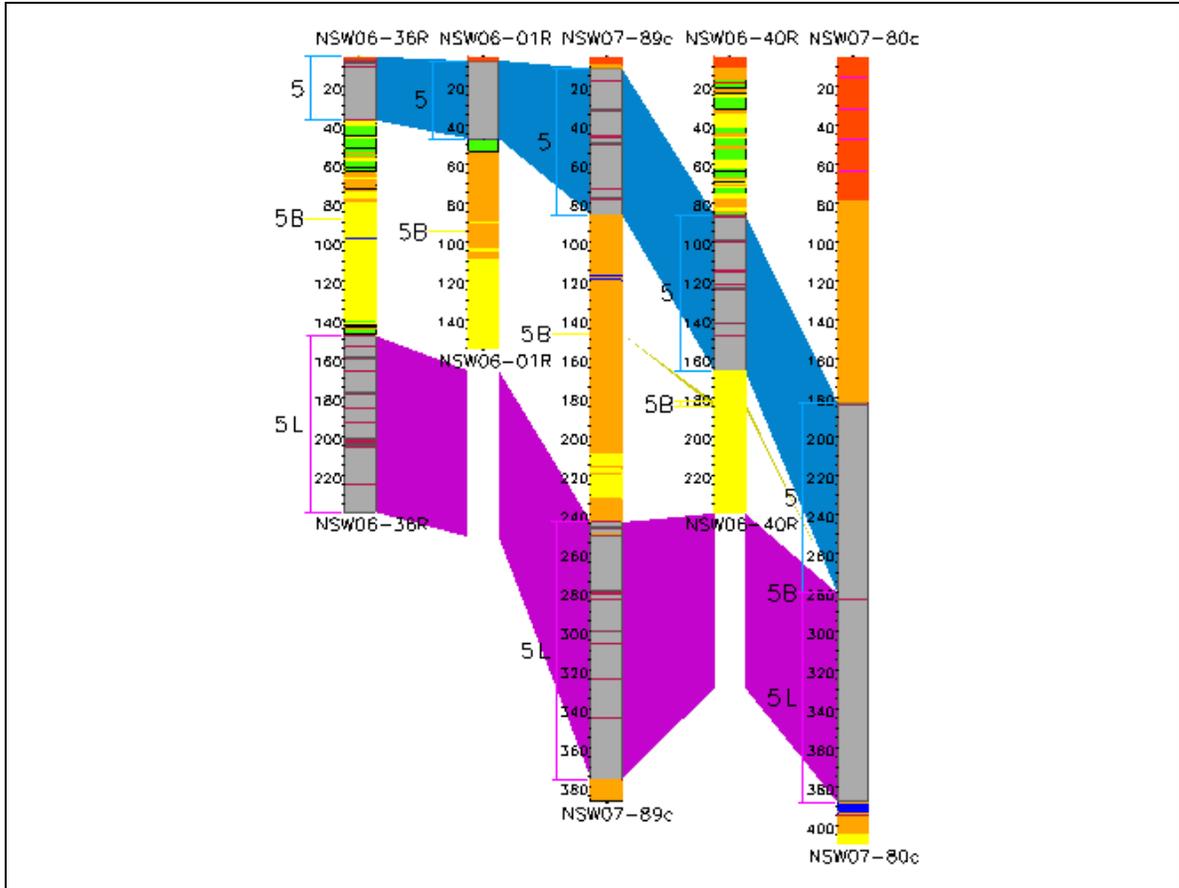
“Interburden both within and between coal series is highly variable at Ovoot Tolgoi. Interburden between the zones is generally dominated by sandstones and conglomerates, while the partings within the coals are most commonly mudstones and carbonaceous mudstones” (Norwest, 2008).

The 5 Seam in West Field surface mine area dips at 30 to 60 degrees and ranges in apparent thickness between 1.4 and 122m, averaging 46m. The immediate roof strata over the 5 Seam consist of sandstones and/or conglomerates.

Additional resource potential exists in a coal seam located below the 5 Seam. This seam has been named the 5L Seam. The 5L Seam is present within the planned surface pit area. Current data indicates the 5L Seam can occur from 0.0m (coalescing) to 157m below the No. 5 Seam, with

79m as the average interburden between the seams. The average apparent seam thickness for the 5L Seam is approximately 50m, ranging between less than a meter and 141m.

Figure 6 is a north-to-south profile section located in the central area of West Field.



**Figure 6: North to South profile section of the No. 5 and 5L Seams**

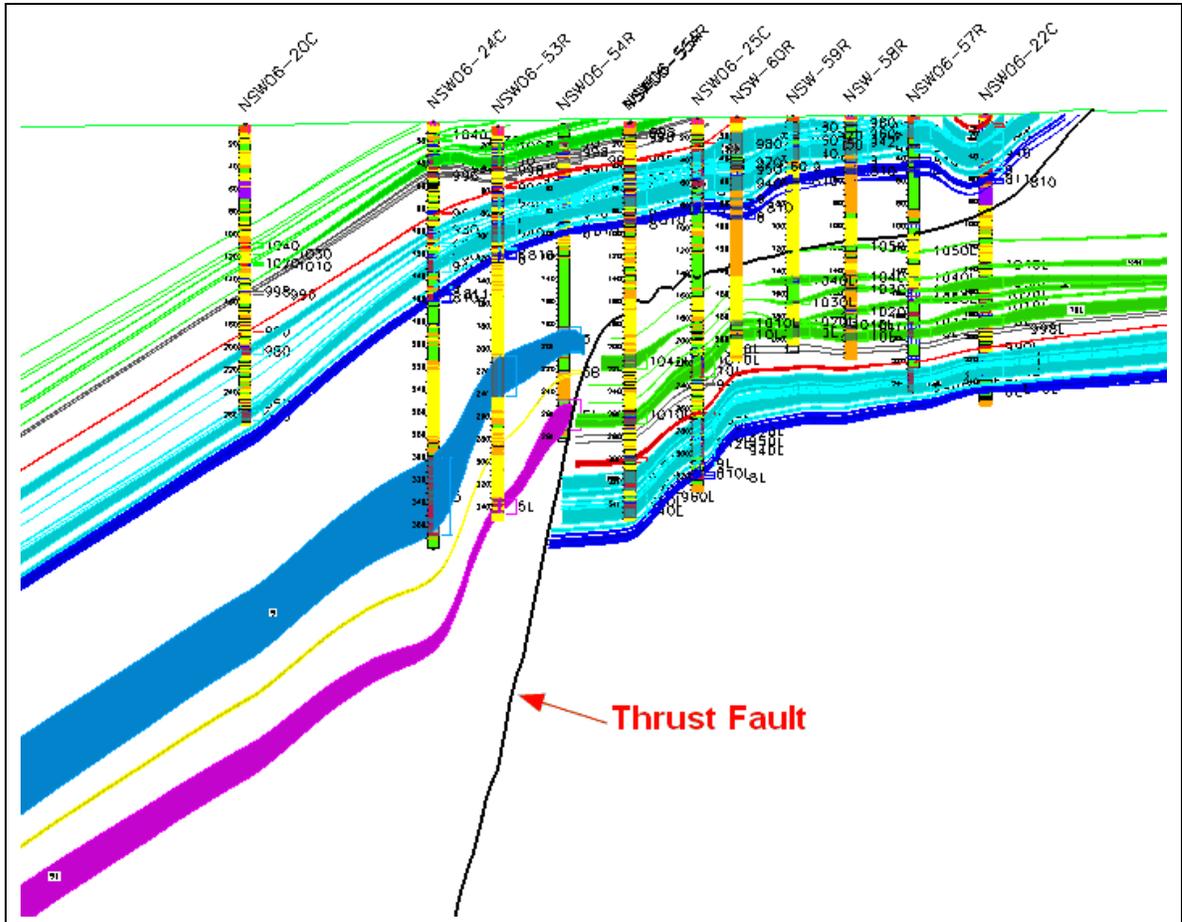
## SECTION 7.2: STRUCTURAL GEOLOGY

West Field is located on SGQ property near the southwest corner of the MAK mining license. Coal occurrences in West Field are found along a southwest-striking trend. Current data indicates a thrust fault system controls the distribution of coal in this area. This interpretation divides West Field into two distinct resource blocks: south (overlying) and north (underlying).

The more steeply dipping rocks of the south resource block have been faulted northward, up and over the north resource block. The thrust fault interpretation indicates the north resource block contains a repeat of the upper series (10-8) coal seams. It is unknown whether the 5-Series exists at depth in the north block, as no drillholes were drilled deeply enough to determine this. The coal seams in the north block flatten out (30 – 40 degree dip) and indicate a number of small folds

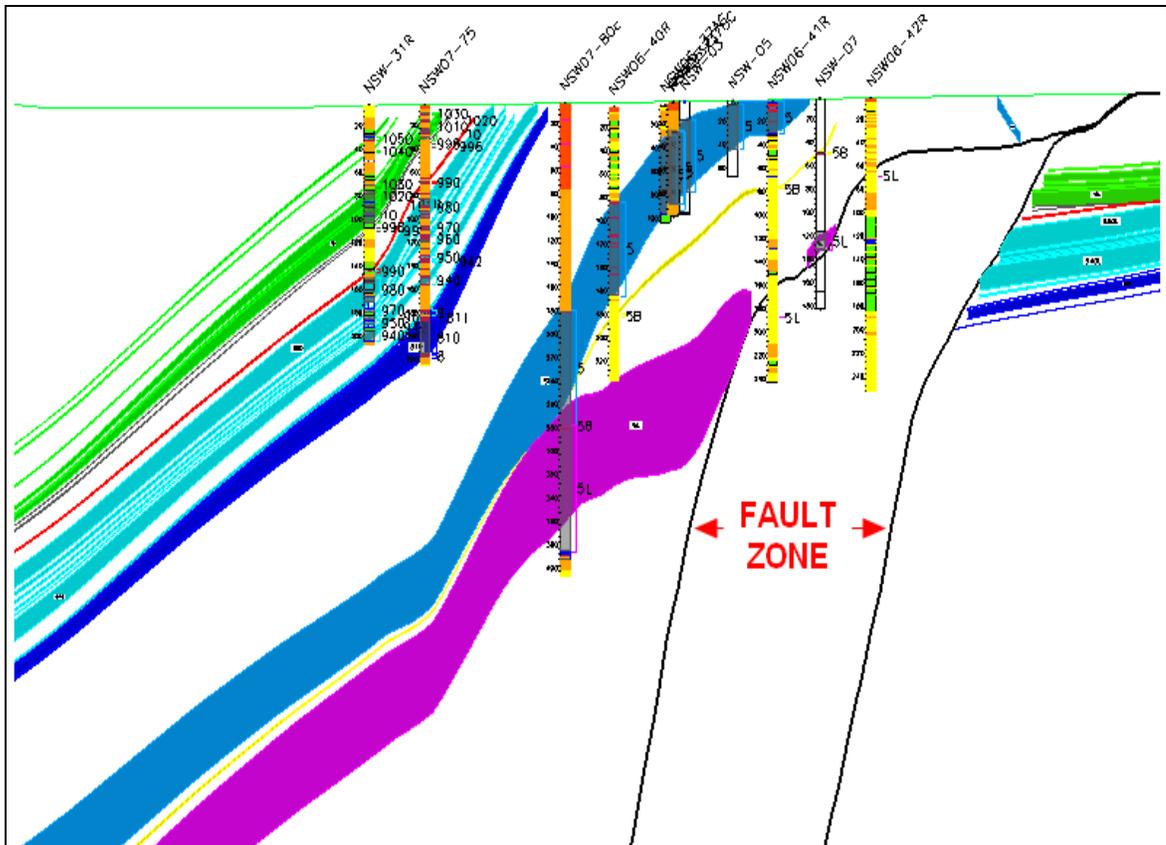
and faults. The coal seams of the south block, while more steeply dipping, also exhibit more minor rolls of the beds where they override the lower north block. These lesser structural features exhibited in both blocks are consistent with thrust fault geometry.

Figure 7 shows a representative cross-section from south to north across West Field. For ease in digital modelling, the north block seam nomenclature has had an “L” (for “lower” block) added to the seam name. Thus, the 940 Seam in the south resource block becomes the 940L in the north resource block (see also Figure 5 in Section 7.1).



**Figure 7: South to North cross-section across West Field**

West Field drillholes that intersect both upper and lower packets have, by implication, intersected the fault, and indicate that the fault is actually a fault “zone” in some areas rather than single surface, as can be seen in Figure 8.



**Figure 8: South to North cross-section across West Field showing Fault Zone**

### SECTION 7.3: GEOTECHNICAL DATA

A small amount of geotechnical information currently exists within West Field. Norwest reviewed one geotechnical hole (NSW06-18C) for their March 2007 report. This hole is located approximately 150m north of the south edge of the surface minable area and comprises 80m of rock overburden to the 5 Seam. The rock quality determination (RQD) results from this geotechnical hole are as follows:

- Sandstones and conglomerates above the No. 5 Seam are in the fair (50-75%) to excellent (90-100%) RQD ranges.
- No. 5 Seam RQD percentages vary throughout the seam thickness from very poor (<25%) to excellent (90-100%) ranges.
- Mudstones below the 5 Seam are in the very poor (<25%) to poor (25-50%) ranges. Footwall rock material (usually mudstones) below the No. 5 Seam consists of mainly very poor (<25%) to poor RQD ranges while sandstones and conglomerates are in the fair (50-75%) to good (75-90%) RQD ranges.

Norwest also completed a slope stability assessment for IMMI in May, 2007, which included data from a number of holes and samples in the Southeast and West Field areas (Norwest, 2007a). In

this study “rock mass properties were determined from geotechnical laboratory testing of representative samples taken from within the proposed pit area” to determine “unconfined compressive strength (UCS) of rock samples” (Norwest, 2007a). “In addition to the UCS testing, a large number of point load tests were completed on rock core samples taken from exploration drillholes” (Norwest, 2007a). However, due to the low strength of most of the Ovoot rock samples tested, Norwest felt that correlation of the point load values with UCS estimates were inconsistent and unreliable for use in rock mass classification, and, therefore, “only the direct UCS test results were used for determining rock strength values” (Norwest, 2007a).

The Norwest report uses the rock mass rating system, developed using data collected from geotechnical core logging, to provide a means for estimating rock mass shear strengths (Norwest, 2007a).

“Unit weights for high and low strength rock material types are based upon results of 8 specific gravity tests completed at the property (6 sandstone and 2 conglomerate). Test results ranged from 2.62 – 2.69 t/m<sup>3</sup> (25.7 – 26.4 kN/m<sup>3</sup>)” (Norwest, 2007a). According to the report, properties of other rock materials were estimated based upon experience with other projects and previous laboratory test results. Where limited or no geotechnical data was available “representative rock strength values from adjacent drill holes similar in stratigraphy and structure are extrapolated to characterize rock strengths” or, where no similar drillholes were available for extrapolation, “the rock mass has been assigned geotechnical values which are representative of the lower strength interbedded sandstone/siltstones found in both the East and West Field areas. Rock mass strengths for high and low strength West Pit rock zones were estimated in this manner.” (Norwest, 2007a.)

TAG was not present during the Norwest geotechnical testing program nor modeling studies and therefore cannot verify the data acquired nor results detailed in the Norwest (May 25, 2007) geotechnical memorandum, some of the details of which are summarized here.

#### **SECTION 7.4: GROUNDWATER REGIME**

A large presence of groundwater can cause mining difficulties. Proper water capture and management methods, however, can ensure availability of sufficient water quantities for surface mining operations.

In 2006 Norwest supervised the drilling of eight water test holes at West Field: two dewatering holes, three observation holes, and three water supply test wells. The results of this hydrology study were detailed in a report submitted to IMMI – *Groundwater and Surface Water Hydrology Report, Ivanhoe Mines Mongolia Inc. Coal Project, Nariin Sukhait 2006 Investigation, Omnogovi Aimag, Mongolia, December 2006.*

In the study, upon completion of field data collection, two-layer models were developed to simulate in-pit dewatering requirements in both confined and unconfined conditions. The upper layer represented the generally more permeable shallow aquifer zone, while the lower layer represented groundwater within the less permeable lower formations. Based on these Norwest models, Norwest concluded that inflow rates to the mine pit were expected to be relatively high and suggested options for handling anticipated groundwater inflows to include dewatering wells and in-pit pumping. Norwest recognized too that, due to uncertainty in hydraulic conductivity because of a few data points well above the average, the anticipated groundwater inflows into the West Pit may be significantly underpredicted.

The Norwest 2006 hydrology study determined that generally, water quality at West Field, as defined by total dissolved solids, is “fresher” to the north and within the shallow aquifer zone, due probably to active recharge, and more brackish to the south and within the deeper aquifer zone. All well samples indicate sodium as the primary major cation, with varying amounts of calcium and magnesium, and indicate sulfate as the primary major anion, with varying amounts of bicarbonate and chloride.

Norwest analyzed all West Field samples for trace metals (mercury, copper, cadmium, lead, zinc, chromium, and nickel) and determined that trace metals were at non-detectable levels with the exception of mercury. Mercury concentration was significantly high in WS-W3 (0.05 mg/L) and exceeds the Maximum Acceptable Concentration standard of 0.001 mg/L and the United States National Water Quality Standard of 0.002 mg/L. Norwest proposed that this well should be resampled to determine if the results were a sampling or laboratory error or from a natural source. Norwest speculated that the detected mercury at West Field was from a natural source and therefore the presence of such a high level of mercury precludes the use of this well as a drinking water supply well without proper treatment, and further warrants regular monitoring of other wells in this area proposed for drinking water. This proposed resampling has not yet taken place.

The Norwest study included infiltration tests conducted in drainages flowing toward the West pit area to provide better modeling of local rainfall-runoff in order to develop cost-effective design for diversions and mine water management systems. The infiltration tests at West Field indicate high infiltration rates, thus resulting in relatively high groundwater recharge rates. “A series of braided channels flow in parallel from north to south across the mine lease area. Flow in the channels is ephemeral and rare. When intense rainfalls occur, the peak flows are high but total runoff volumes are low. A relatively high proportion of precipitation recharges to shallow groundwater due to the high infiltration rates and the lack of vegetation. Shallow groundwater flows parallel with the surface drainage from north to south and will be intercepted by the mine pits” (Norwest, 2006b). Norwest proposed a diversion ditch be constructed north of the West Field pit.

TAG was not present during the Norwest water testing program nor modeling studies and therefore cannot verify the data acquired nor results detailed in the Norwest (2006b) hydrology report, some of the details of which are summarized here.

## SECTION 8: DEPOSIT TYPES

Geological Survey of Canada (GSC) Paper 88-21 is a reference for coal deposits as specified in NI 43-101. Per that reference, coal deposits must be classified by both “*Geology Type*”, a definition of the amount of geological complexity, and by “*Deposit Type*”, a categorization of the extraction method best-suited to the coal deposit. “For coal deposits this is an important concept because the classification of a coal deposit as a particular type determines the range limiting criteria that may be applied during the estimation of Reserves and Resources” (Norwest, 2008).

The classification of a coal deposit by *Geology Type* determines the approach to be used for resource/reserve estimation, and defines the confidence that can be placed in extrapolation of data values away from a particular point of reference such as a drillhole. It is unique among international coal reserve classification systems because it is “... designed to accommodate differences in the degree of tectonic deformation of different coal deposits in Canada. Four classes are provided for that range” (Norwest, 2008).

TAG has applied the classification scheme of GSC Paper 88-21 to the Ovoot Tolgoi coal deposits in Mongolia. The Ovoot Tolgoi deposit has been subjected to a relatively high degree of tectonic deformation including an east-west trending, regional thrust fault that has hanging wall strata modified by secondary folding, as well as normal and reverse faulting. Coal seams are typically inclined in excess of 35°. Fold segments and fault-bound blocks, however, generally retain normal stratigraphic thicknesses and continuity. The *Geology Type* for the Ovoot Tolgoi West Field area has been determined to be “Complex”.

“*Deposit Type*,” as defined in GSC Paper 88-21, refers to the extraction method most suited to the coal deposit, among them surface, underground, non-conventional, and sterilized. The Ovoot Tolgoi West Field deposit is considered to be a potential “Surface” mineable deposit at depths less than or equal to 250m.

## SECTION 9: MINERALIZATION

Mineralized zones on the SGQ Ovoot Tolgoi West Field mining license area occur primarily within a zone of upper-Permian sediments exposed in the hanging wall of the Nariin Sukhait Fault, as described in Section 7 (Norwest, 2008).

Early work adopted the seam nomenclature presented by Dashkhoral et al (1992), thereby calling the very thick coal in the middle of the sequence the 5 Seam, and naming the seams above and below the 5 in consecutive ascending or descending order respectively (Section 7.1, Figure 6).

As exploration work progressed, numerous additional seams and splits were discovered. Norwest summarized the Ovoot Tolgoi West Field coal seam characteristics in *Technical Report, Ovoot Tolgoi Property, Omnogovi Aimag, Mongolia, March 27, 2008*.

Thus, for ease in digital modeling, seam nomenclature has been modified as follows:

- the overlying packets retain the original nomenclature
- packets in the lower (underlying) block have had an “L” appended to their respective seam names

Table 4 summarizes the findings as of December 2007 inclusive of all drillholes in the West Field area. Thicknesses reported are based on drill intercepts and represent apparent thickness. Thickness range for some seams have been adjusted compared to the September report.

Series	Seam	Count	Thickness Range (m)*	Mean Thickness (m)*
10-Series	1050	14	0.70 – 13.00	2.9
	1040	17	0.36 – 6.32	2.3
	1030	26	0.60 – 6.90	2.5
	1020	32	0.20 – 10.00	3.6
	1010	27	0.30 – 6.42	2.0
	10	49	0.64 – 24.26	8.1
9-Series	998	29	0.25 – 4.00	1.6
	996	30	0.44 – 8.40	2.6
	990	59	0.52 – 5.14	1.7
	980	77	0.34 – 28.10	8.8
	970	54	0.30 – 8.40	2.9
	960	53	0.04 – 8.00	2.3
	950	51	0.36 – 11.70	1.7
	942	34	0.36 – 5.16	1.4
	940	87	0.01 – 31.00	12.4
	9	69	0.01 – 10.70	2.2
8-Series	811	19	0.04 – 6.40	2.1
	810	82	0.40 – 27.96	4.6
	8	38	0.30 – 4.70	1.8
5-Series	5	61	1.38 – 98.4	44.7
	5B	20	0.66 – 24.22	5.9
	5L	29	0.20 – 140.76	50.2
10L-Series	1050L	24	0.34 – 16.00	4.2
	1040L	34	0.40 – 16.00	4.2
	1030L	32	0.94 – 5.90	2.9
	1020L	34	0.72 – 17.98	3.3
	1010L	39	0.60 – 5.36	2.8
	10L	38	0.84 – 19.76	9.47
9L-Series	998L	14	0.26 – 1.80	0.6
	996L	9	0.24 – 2.30	0.9
	990L	29	0.46 – 4.80	1.8
	980L	33	2.40 – 22.73	9.1
	970L	30	0.96 – 9.18	3.6
	960L	28	0.54 – 4.50	2.0
	950L	26	0.46 – 3.70	1.4
	942L	15	0.40 – 3.20	1.2
	940L	34	3.40 – 25.00	11.9
	9L	28	1.00 – 7.00	2.4
8L-Series	811L	14	0.70 – 4.40	2.3
	810L	26	1.26 – 17.60	5.8
	8L	13	0.40 – 5.70	2.3

\*Based on apparent thickness from drill intercepts

**Table 4: Ovoot Tolgoi West Field Coal Seam Characteristics**

## **SECTION 10: EXPLORATION**

Exploration began in late 2004 with the completion of five boreholes in the Ovoot Tolgoi deposit area now within the mine license controlled by SGQ. Exploration continued in 2005 and in 2006 with the emphasis on delineating surface resource potential. Exploration activities included:

- Field reconnaissance mapping
- Satellite Imagery
- Surface-resistivity geophysical surveying
- Trenching
- Drilling

Exploration geology fieldwork, including reconnaissance mapping, trenching, geologist descriptions of drilling returns, geotechnical data field logs, and database development, was contracted primarily to Sapphire Geo Ltd. (Sapphire) and supervised initially by IMMI, then later by SGQ. Norwest provided assistance in the review of activities and interpretation of results in 2005 and 2006, while SGQ directly supervised and provided assistance to Sapphire in the review of activities and interpretation of results in 2007.

In addition to identifying resources at West Field, field mapping, analysis of satellite imagery, and 3-D and 2-D surface resistivity surveys were used to locate mineralization in areas of thin surficial cover. Potential targets identified with these techniques were tested with trenches cut perpendicular to the apparent strike, exposing coal seams near the surface. Trenching has been useful in identifying the near-surface expression of coal seams and placement of exploratory drill holes. Coal seam thickness and structure observed in trenches is generally greatly affected by near-surface erosion, alteration, and deformation. Therefore, trenching intercepts have been found to be unreliable sources of seam characteristics and structure, and are not used in resource estimation (Norwest, 2008).

SGQ contracted with Sapphire to provide field personnel for the 2008 exploration program. TAG provided exploration management, including field activities, processing drilling data, and reporting of results for the 2008 exploration program.

Sapphire has a three-year service record of providing competent exploration geologists for mapping, drilled lithology description records, rock quality determination (RQD), fracture frequency, field point-load testing records, field free swelling index (FSI) tests, sampling, sample preparation, and sample security in accordance with quality assurance procedures implemented in 2005. Standardized log forms for recording all geologic data and laboratory instruction forms are in English and have been employed since 2005.

## SECTION 11: DRILLING

Drilling through December, 2007 on SGQ's Ovoot Tolgoi West Field includes a total of 203 exploration holes completed and 41,188m drilled. Of these, 46 are coreholes.

Limited drilling took place under the Soviet/Mongolian government-sponsored exploration programs. Exploration expanded considerably in 2005 and 2006, with limited drilling in 2007, as summarized in Table 5. The technical report for West Field Deep (TAG, 2008) has slightly differing meterage and allocation of that meterage to the type of drilling for 2007. The numbers summarized in Table 6 below have been rechecked against the Minex database, the original data files received from SGQ, and the geophysical logs for those holes.

Field	Year	Reverse Circulation		Rotary		Core		Combination		Management Company/Field Geologist Company
		No. Holes	Meters Drilled	No. Holes	Meters Drilled	No. Holes	Meters Cored	No. Holes	Meters Drilled /Cored	
West	2005	70	12,861	17	2,223	13	2,034	-	-	Norwest/Sapphire
	2006	48	10,203	-	-	25	5,737	-	-	Norwest/Sapphire
	2007	-	-	22	4,936	5	1,958	3	1,236	SGQ/Sapphire
	2008							41	21,189	SGQ/Sapphire

**Table 5: Drilling History at Ovoot Tolgoi West Field**

Cored strata were targeted for coal quality acquisition.

Major Drilling Mongolia and Tanan – Impex LLC provided drilling services for SGQ that included RC, rotary, and core methods during 2005 and 2006. Holes drilled in West Field in 2007 used either rotary, core drilling, or a combination of the two, and were approximately 96 to 495m in total depth. Exploration continued in the deeper underground area of West Field in 2008 with hole lengths between 100m and 800m. The summary of exploration drilling at Ovoot Tolgoi is shown in Table 5. Drilling in 2008 in the underground area is included in the West Field meters. Data from the 2008 drilling has not yet been evaluated.

Section line spacing of approximately 150m to 200m was generally employed. Borehole spacing on the section lines approximates 50m.

Sapphire provided geologic data acquisition services.

No QP was present during the 2007 program to personally verify the data. However, this author witnessed field protocols currently used by Sapphire field geologists in April, July, and August

2008. When compared with Norwest-established protocols (used by Sapphire geologists) and data verified by Norwest in 2005 and 2006, the 2007 data is consistent with both prior-years and present-year data acquisition. This author cannot verify, but believes the core recovery and geologic services were adequate and reliable.

Drillhole core and cuttings descriptions, geophysical logs, and coal analyses data from the surface resources exploration programs have been used to characterize, interpret, and project the stratigraphy and structure of the Ovoot Tolgoi West Field area.

Intercept depths and seam thickness are reported on apparent thickness.

## **SECTION 12: SAMPLING METHOD AND APPROACH**

Core drilling was utilized to collect complete representative samples of West Field coal seams, observe structural details, and to measure more accurately the depths of lithologic contacts. All quality analyses used for modeling were restricted to core samples. Forty-six coreholes have been drilled at Ovoot Tolgoi West Field representing approximately 23% of the total number of boreholes drilled.

Core drilling at Ovoot Tolgoi West Field has primarily been done with wireline drilling systems and modern, triple-tube core barrels. All of the triple-tube coring completed during the 2005 and 2006 drill programs was performed under Norwest supervision, while triple-tube coring completed during 2007 was performed under SGQ supervision. Core logging and sampling were performed by Sapphire, again under Norwest supervision in 2005-2006, and under SGQ supervision in 2007.

Core was retrieved, logged, and sealed according to Norwest conventions established in 2005. Each core run was measured for total core cut versus core recovered. Photographs were taken at 0.5m intervals. Coal showing distinct lithologic variation was sampled separately, as were partings over 0.05m. Otherwise, coal intervals with a uniform appearance were bagged in 0.6m sample increments as per the core box length. When zones of core loss greater than 0.1m were encountered, separate samples were collected both above and below the zone.

In 2005 and 2006 reverse circulation drilling provided cuttings samples of good integrity. Samples were collected at 1m intervals, and cuttings were laid out in rows on the ground for examination and logging by the Sapphire on-site geologist. A number of holes were drilled with a conventional air-rotary system. Cuttings were laid out and logged in a similar fashion as for reverse circulation drilling. In 2007, all holes were drilled with conventional air-rotary or were cored.

A section line spacing of approximately 150m to 200m was generally employed for the 2005 through 2007 drilling. Borehole spacing on the section lines approximated 50m.

A detailed summation of drilling methods is listed in Section 11, Table 5.

Sapphire continues the sampling method and approach according to the procedures and conventions established in 2005 in order to ensure continuity of quality control.

Although some coreholes experienced core loss, TAG is unaware of any drilling, sampling or recovery factors that could materially impact the accuracy and reliability of the results.

## **SECTION 13: SAMPLE PREPARATION, ANALYSES, AND SECURITY**

Core logging and sample handling was performed by Sapphire under Norwest supervision during the 2005 and 2006 drilling programs and under SGQ supervision for the 2007 drilling program. Laboratory instructions and security measures were likewise provided by Norwest or SGQ. Laboratories employed were SGS Mineral Labs in Denver, Colorado in 2005 (ISO-9000 certified, accredited by NQA in the United States of America), and SGS Laboratories in Tianjin, China in 2006-(currently holds ISO-17025 certification, accredited by the CNAS, China National Accreditation Service for Conformity Assessment).

Geologists employed by Sapphire, and under the direction of Norwest or SGQ, collected and recorded drilled core and reverse circulation cuttings as per protocol established by Norwest in 2005. The collected samples were then submitted for analysis using methods that are standard for the coal industry. In 2005 and 2006, reverse circulation samples were collected at 1.0m intervals for laboratory analyses (Norwest, 2008). SGQ elected to eliminate these samplings for the 2007 drilling program, and TAG has elected to use only cored sample analyses as the most reliable data.

### **SECTION 13.1: CORE DRILLING SAMPLES**

Field protocol for handling core samples was established prior to the 2005 drilling program and is as follows.

Core recovery (reported in percent) is recorded after comparing the recovered core length with the core run length recorded by the driller. “Recovered core is [then also] measured and compared to the coal interval thickness determined from the geophysical log suite” (Norwest, 2008).

Recovered coal intervals are sampled using the following criteria and quality control measures:

- Coal samples are broken out based on lithologic changes
- In zones of uniform coal appearance, samples are bagged about every 0.60m as per the capacity of the core boxes
- In-seam partings up to a maximum thickness of 0.60m are included in a coal sample, where the thickness of the adjacent coal beds above and below the parting are both a minimum of twice the parting thickness
- A parting is sampled separately if it is determined by the geologist to be a non-coal lithology type >0.60m thickness
- Samples are cleaned of any contaminants
- Core is placed in individual, core-sleeve style, plastic bags
- The bags are labeled on the outside with both the corehole and sample number and sealed with plastic tape to prevent excessive moisture loss

- Samples are then placed in sequence into waxed-cardboard core boxes or plastic corrugated core boxes, as available
- Core boxes are sealed with tape and are labeled with meters contained within and Box No.
- Core boxes are transported to SGQ in Ulaanbaatar
- Core is shipped for coal quality or rock strength analyses to a certified and accredited laboratory
- At the time of shipment, scanned geologic and geophysical logs, laboratory instructions and a shipment manifest are sent to Norwest's office in Salt Lake City, Utah (2005-2006).
- Laboratory instructions and the shipment manifest are forwarded to SGQ office in Ulaanbaatar (2005-2007).
- All records are compared with contents upon arrival at the accredited laboratory. To date, there has been no loss or compromise of samples during shipment.
- Core samples undergo a full-suite of coal quality testing, including short proximate, full proximate, thermal tests, ash analysis, washability testing, and metallurgical testing.

In the author's opinion, sample security, preparation, and analyses were performed adequately and securely so as to provide unbiased and accurate results.

## **SECTION 14: DATA VERIFICATION**

Between 2005 and 2006, Norwest directly managed the exploration program from conceptual planning of exploration targets, through data collection, to interpretation and analysis. Norwest provided on-site management throughout the majority of the exploration project during those two years. All data collection was done under a defined set of protocols established in 2005 by the Qualified Persons (QP) from Norwest. Norwest site geologists were responsible for the training and administration of data collection procedures and were responsible for reviewing all data. Norwest maintained oversight of all data collection throughout the exploration program, and the QPs visited these operations and reviewed these procedures.

Upon completion of a drillhole, the geologic and geophysical logs were reviewed by a Norwest geologist. All geologic, geophysical, and sampling data was entered and maintained in an electronic database. All mapping was entered and maintained in electronic format on a CAD-based system. Data entry of all geologic data was managed by Norwest at the project site. All electronic data was forwarded on a routine basis to Norwest's office in Salt Lake City. Results from coal quality testing were added into the database in the Salt Lake office.

During 2007, although Norwest was no longer involved at Ovoot Tolgoi, those field protocols established by Norwest and implemented by Sapphire field geologists were continued, supervised by SGQ geological personnel. However, no QP was on-site for the 2007 drilling program.

TAG, an independent geological consulting company based in Lakewood, Colorado, is owned and operated by Patrick P. Riley. Mr. Riley was a contractor/QP for Norwest at Ovoot Tolgoi during 2005 and 2006. He was instrumental in defining field protocols established at Ovoot Tolgoi and in training the Sapphire geologists in their implementation.

The author of this technical report, A.L. Livingston, is currently associated with TAG. Both Riley and Livingston are independent consultants/QPs at Ovoot Tolgoi for the 2008 drilling program. Both compared the data from 2007 with the data from prior years and with data from the 2008 drilling program and found it consistent. They confirmed that Sapphire field geologists continue to follow protocols established in 2005, and are confident that the 2007 data was collected in like manner. While the 2007 data cannot be directly verified by a QP, Riley and Livingston consider it reliable. Due to ill health Riley is not currently available to provide sign-off as co-author. Livingston has verified 2008 protocols through April, July, and August 2008 on-site visits, compared data acquired under the 2008 protocols with previous data and found them consistent, but was not present during collection of data during the 2005 – 2007 drilling programs.

Information collected prior to TAG's involvement in the Ovoot Tolgoi project area in 2008 has been supplied to TAG by SGQ and, other than that specified above, has not been directly verified.

## **SECTION 15: ADJACENT PROPERTIES**

The following Adjacent Properties discussion is quoted from Norwest's *Technical Report, Ovoot Tolgoi Property, Omnogovi Aimag, Mongolia, March 27, 2008*, filed March 28, 2008 and from Norwest's *Technical Report, Coal Geology and Resources, Ovoot Tolgoi Property, Omnogovi Aimag, Mongolia, June 21, 2007*, filed July 20, 2007.

“SouthGobi’s Ovoot Tolgoi property surrounds and is adjacent to the MAK Nariin Sukhait Mine, owned and operated by the MAK-Qin Hua Mongolian/Chinese Joint Venture. The operation currently mines coal from the No. 5 Seam from two open-pit mines, referred to as the West Pit and the East Pit. SGER [SGQ] has reported to Norwest that annual production to be approximately 2 million tonnes per year (Mtpy) of both thermal and coking blend coal, transported to customers in China.” (Norwest, 2008).

“The MAK East Pit operations have trespassed and recovered a minor amount of coal from adjacent SGER [SGQ] holdings. SGER management has discussed this issue with MAK. No legal action is pending regarding this issue, and SGER management anticipates cooperation with MAK in the development of SGER mining at Ovoot Tolgoi.” (Norwest, 2007b.)

TAG was unable to verify the information provided on the MAK mine, and it is not necessarily indicative of the mineralization on the Ovoot Tolgoi Property.

## **SECTION 16: MINERAL PROCESSING AND METALLURGICAL TESTING**

### **SECTION 16.1: REGIONAL QUALITY CHARACTERISTICS**

Composite quality analyses performed in 2005 and 2006 on SGQ's Ovoot Tolgoi mining license area indicate the coal rank to be high volatile B to A bituminous, based on the ASTM D388 standard. Previous Soviet-Mongolian government studies (Dashkhoral et al, 1992) utilized Soviet standards and determined the rank to be of the GJO and IGJO groups, equivalent to high-volatile bituminous coals. High volatile B and A bituminous coals are hard black coals. High volatile B produces between 7212 to 7785 kcal/kg and high volatile A produces greater than 7785 kcal/kg heat output. The 2007 annual exploration drilling results continue to indicate potential coking (HCC) and semi-soft (SSC) coals at West Field, as well as lower ranked thinner coals.

Detailed sample analyses have identified the coal at Ovoot Tolgoi to be mixture of thermal and metallurgical grade coal. Regionally, the coal is generally low ash (less than 20 percent, air-dried basis) and sulphur approximately one percent. Inherent (or residual moisture) in the coal is less than 2 percent of the coal. Free Swelling Index ranges in values from non-coking (less than 2) to coking (greater than 4).

### **SECTION 16.2: COAL QUALITY**

Drilling activities at West Field are summarized in Section 11. A total of 203 RC, rotary, core, and combination exploration holes have been completed in West Field through December 2007. Of this total, 46 coreholes contain samples suitable for quality analyses, as shown in Table 6.

<b>Core/Quality Holes</b>			
<b>Resource Area</b>	<b>Total Number of Exploration Holes</b>	<b>Number of Coreholes used for Quality Analysis</b>	<b>Percentage of Quality Holes</b>
West Field	203	46	22.7

**Table 6: Percentage of Coreholes at West Field**

Additional quality information was collected from the 2008 exploration program of 41 coreholes although this information is still being compiled.

Core samples were selectively subjected to the analyses described below.

Proximate Analysis (Long): The values for moisture, ash, volatile matter, and fixed carbon collectively total 100%, with fixed carbon being a value calculated as the difference of 100% minus the sum of the other three values. Thermal Value is a measure of the heat-producing capability of coal measured in Kcal/kg or BTU/lb. Sulphur is reported as a percentage of the total sample

- Moisture
- Ash
- Volatile matter
- Fixed carbon
- Sulphur
- Thermal Value

Relative Density (specific gravity) was performed on many of the samples to determine accurate tonnage calculations.

In some cases, metallurgical testing (a series of tests to evaluate the coking characteristics of coal) was also performed on the samples, in particular FSI:

- Gieseler plastometer
- Audibert – Arnu dilatometer
- Reactive maceral analysis (petrographics)
- Phosphorous content (P%)
- Free swelling index (FSI) or Crucible Swelling Number (CSN)
- Trace element analyses ( in parts per million, determines the potential for release of deleterious elements following combustion of the coal)
- Hardgrove Grindability Index (HGI) (a test to determine the relative ease or difficulty in crushing coal)
- Vitrinite content
- Vitrinite reflectance

TAG has employed dry ash percentage, sulfur percentage, and Free Swelling Index (FSI) as indicators for coal product type.

Table 7 shows the three coal product categories that TAG has identified, using incremental core samples of the 5 Seam. These product categories are detailed below:

<b>Coal Product</b>	<b>%Ash</b>	<b>%Sulfur</b>	<b>FSI</b>
Hard coking coal (HCC)	Ash <10%	Sulfur <1%	FSI > 4
Semi-soft coking coal (SSC)	Ash <12%	Sulfur <1.2%	FSI = 1 to 4
Thermal coal (THC)	Ash < 45%		FSI < 1

**Table 7: Coal Product Categories based on Critical Coal Analyses**

High ash (>45%) coal is designated as WASTE.

Geologic reviews conducted by TAG indicate the distribution of the three product types is not uniform throughout individual or between separate coal seams at West Field.

In 2007, SGQ drilled eight coreholes at West Field. Seven are summarized in Table 8 below. Per SGQ information, NSW07-88c lab analyses were not included in the dataset as they were determined to be unreliable. A summary of average coal quality values by seam is shown in Table 8. For seam analyses to be considered reliable and reportable, at least 90% of the seam needed to be sampled.

Borehole	Seam	Apparent Thickness (m)	Average Quality (air-dried basis)							
			% Ash	% Sulfur	% Fixed Carbon	Kcal/kg	BTU/lb	ASG	FSI	ASTM Rank
NSW07-80c	5	98.08	5.79	0.45	60.47	7621	13715	1.30	5.5	High-Vol A Bituminous
	5L	107.34	6.69	0.42	59.57	7600	13677	1.30	6.0	High-Vol A Bituminous
NSW07-81c	5	71.64	6.43	0.48	59.38	7511	13517	1.29	5.0	High-Vol A Bituminous
	5L	52.22	6.93	0.39	58.65	7570	13623	1.30	5	High-Vol A Bituminous
NSW07-82R/c	940	13.38	9.99	0.83	53.77	7217	12987	1.83	6.5	High-Vol A Bituminous
	810	10.76	18.10	1.00	49.44	6537	11764	1.39	6.0	High-Vol A Bituminous
	5	98.44	7.62	0.37	59.84	7609	13693	1.44	4.5	High-Vol A Bituminous
NSW07-86c	960	2.46	26.77	1.44	41.15	5542	9973	1.27	2.5	High-Vol A Bituminous
	940	19.90	13.07	1.48	50.34	6851	12329	1.35	3.5	High-Vol A Bituminous
	810	6.00	21.49	1.54	47.36	6221	11195	1.47	4.5	High-Vol A Bituminous
	5	52.08	5.94	0.46	60.68	7658	13781	1.29	4.0	High-Vol A Bituminous
NSW07-87R/c	5	43.86	5.80	0.46	60.70	7691	13840	1.29	6.0	High-Vol A Bituminous
NSW07-89c	5	75.10	7.28	0.94	58.03	7396	13310	1.32	4.0	High-Vol A Bituminous
	5L	131.94	6.86	0.38	59.38	7581	13643	1.32	5.0	High-Vol A Bituminous
NSW07-92R/c	5	50.84	5.46	0.48	61.78	7772	13986	1.31	4.5	High-Vol A Bituminous

**Table 8: 2007 Coal Quality Results by Corehole and Seam**

## **SECTION 17: MINERAL RESOURCE ESTIMATES**

### **SECTION 17.1: APPROACH**

The classification, estimation, and reporting of coal resources for the Ovoot Tolgoi West Field area is in accordance with National Instrument 43-101. TAG has used the referenced documents, the Canadian Institute of Mining, Metallurgy and Petroleum's CIM "Definition Standards on Mineral Resources and Reserves" adopted by CIM Council on November 14, 2004, and the Geological Survey of Canada Paper 88-21 "A Standardized Coal Resource/Reserve Reporting System for Canada" (GSC Paper 88-21) for the resource estimates summarized in this technical report.

### **SECTION 17.2: COAL RESOURCE ESTIMATION**

As discussed in the 2007 Norwest report, "the term 'resource' is utilized to quantify coal contained in seams occurring within specified limits of thickness and depth from surface."

"The resource estimations contained within are on a clean basis, i.e., as an in-situ tonnage and not adjusted for mining losses or recovery. However, minimum mineable seam thickness and maximum removable parting thickness are considered; coal intervals not meeting these criteria are not included in the resources."

"Resources are classified as to the assurance of their existence into one of three categories, Measured, Indicated or Inferred. The category to which a resource is assigned depends on the level of confidence in the geological information available. GSC Paper 88-21 provides guidance for categorizing various types of coal deposits by levels of assurance. These were considered by the Qualified Person during the classification of the resources."

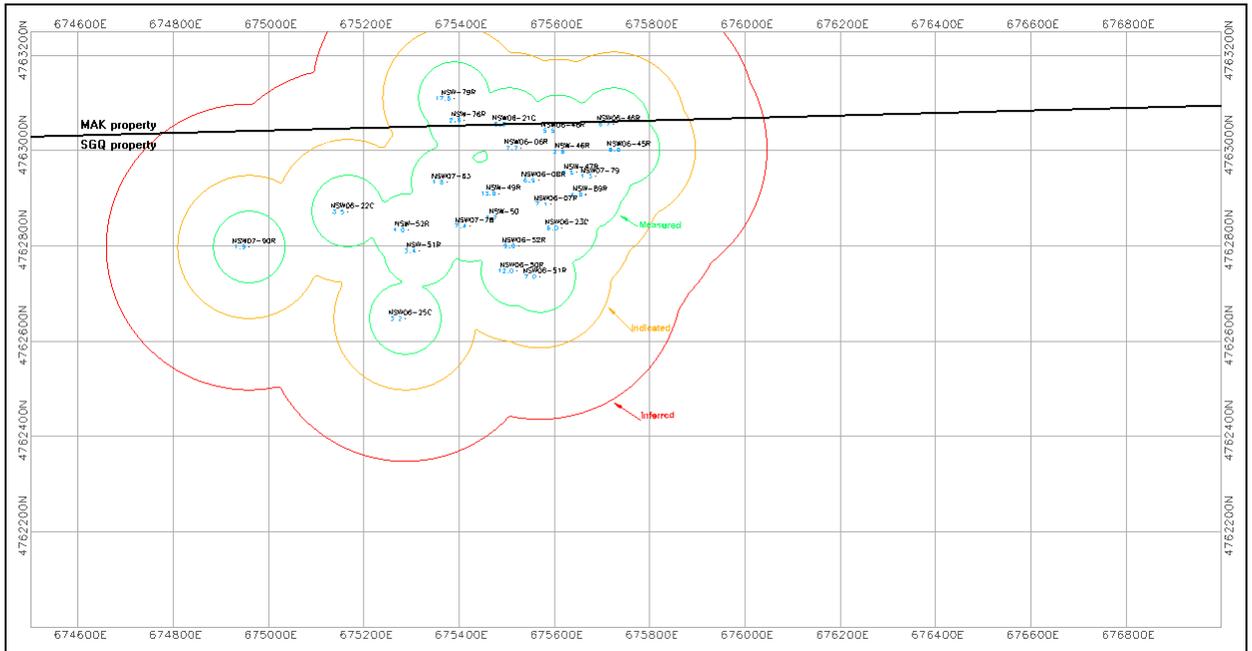
Additionally, resources are classified in GSC Paper 88-21 as to the assurance of their existence into one of four categories, using the criteria for coals found in Geology Type "Complex" conditions, as shown in Table 9.

<b>Criteria</b>	<b>Assurance of Existence Category</b>		
	<b>Measured</b>	<b>Indicated</b>	<b>Inferred</b>
Cross-section spacing (m)	150	300	600
Minimum # data points per section	3	3	3
Mean data point spacing (m)	100	200	400
Maximum data point spacing (m)	200	400	800

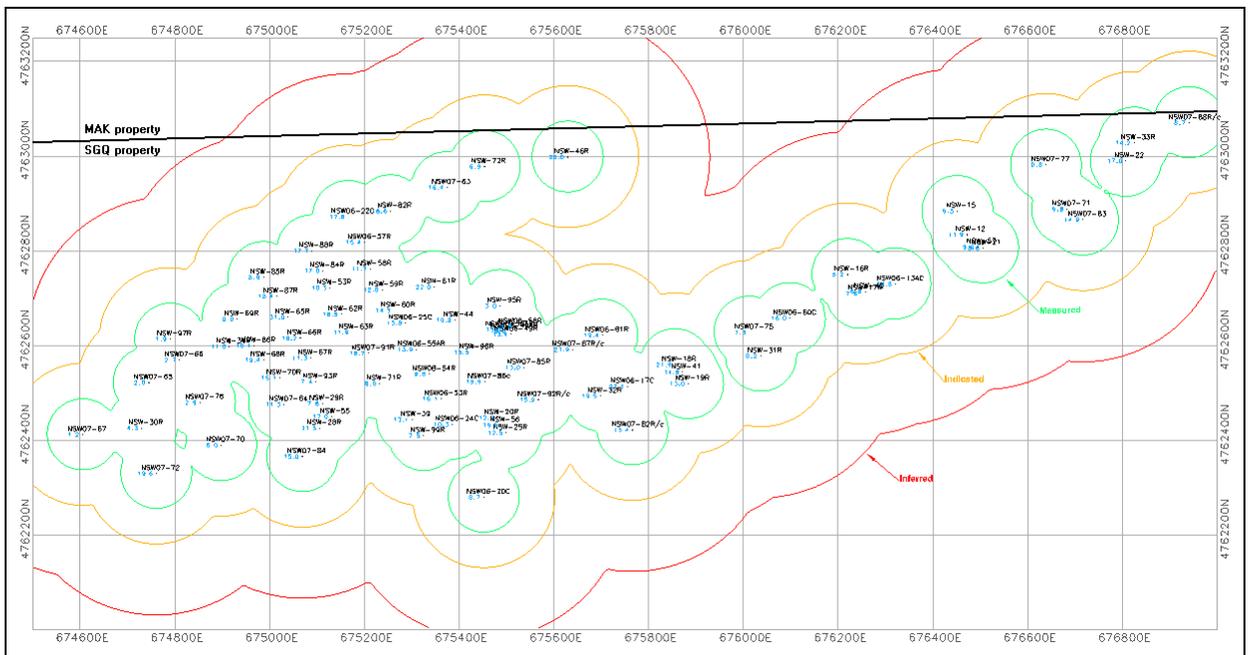
**Table 9: Criteria Used to Define Assurance of Existence for Coals in Complex Geology Type**





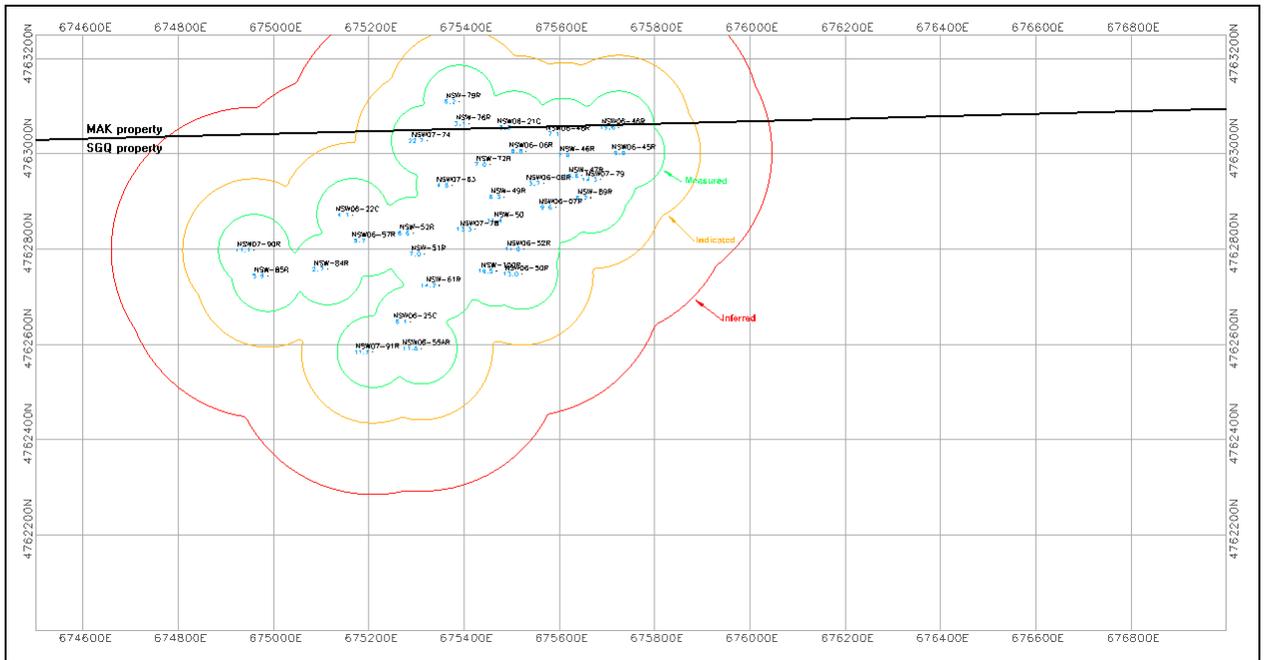


**Figure 9d: Plan View of West Field 810L Seam Resource Areas by Category**

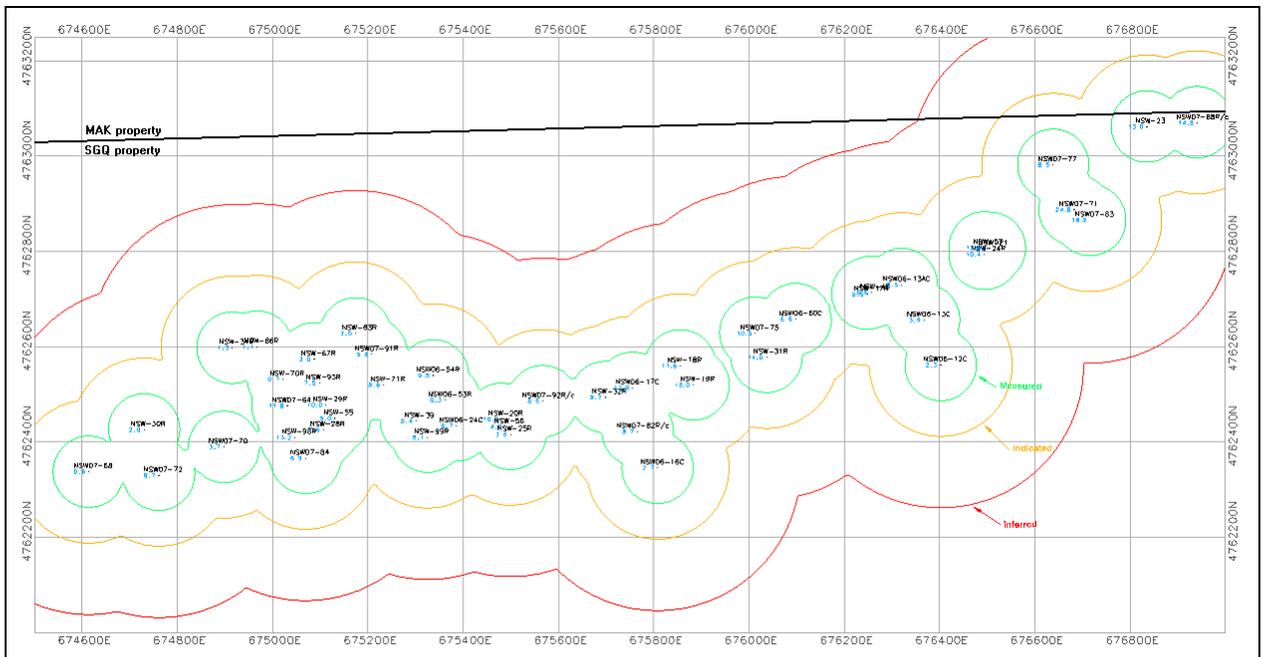


**Figure 9e: Plan View of West Field 940 Seam Resource Areas by Category**

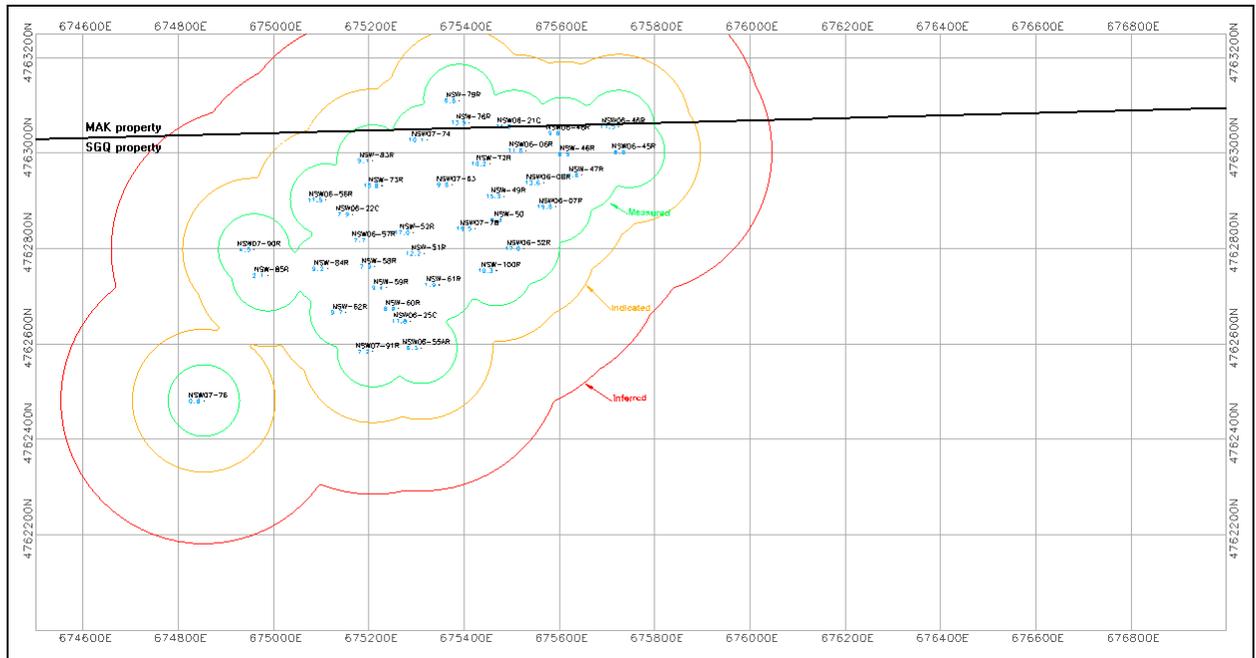




**Figure 9h: Plan View of West Field 980L Seam Resource Areas by Category**



**Figure 9i: Plan View of West Field 10 Seam Resource Areas by Category**



**Figure 9j: Plan View of West Field 10L Seam Resource Areas by Category**

Coal resources for the West Field area are defined for the categories of Measured, Indicated, and Inferred, as summarized in Table 10. Resources were calculated as insitu (no recovery factor), 1.33 specific gravity, 250m maximum depth, and a 5m weathering depth. ASTM coal rank for West Field coals calculates at high-vol bituminous B and A, with the acceptable-recovery sampling from 2007 data falling solely into the high-vol Bituminous A category.

West Field Area Seams	In-Place Resources (Tonnes)		
	Measured	Indicated	Inferred
1050	351,167	397,093	415,640
1040	426,416	527,626	901,817
1030	647,454	635,415	816,866
1020	1,157,896	699,087	431,590
1010	628,683	449,656	401,195
10	4,196,676	2,851,737	3,268,970
998	436,537	283,562	371,413
996	626,950	301,876	240,198
990	1,018,486	590,318	456,001

980	6,842,759	3,308,757	2,827,003
970	1,469,447	767,715	536,058
960	1,124,495	433,851	103,271
950	786,390	293,249	55,699
942	354,138	132,739	39,453
940	10,301,254	3,278,371	1,785,958
9	1,606,413	527,487	179,881
811	386,370	414,989	445,701
810	4,154,895	2,128,694	794,130
8	649,383	451,469	188,851
5	13,976,859	3,431,833	1,295,472
5B	752,825	258,625	70,890
5L	6,905,083	1,747,960	89,783
1050L	399,845	46,031	104,113
1040L	860,903	34,786	46,964
1030L	744,028	129,567	287,487
1020L	1,001,106	176,490	140,330
1010L	946,247	177,876	91,650
10L	3,039,238	472,139	277,011
998L	40,154	13,722	17,874
996L	58,473	33,422	19,935
990L	433,018	155,959	133,927
980L	2,527,498	992,615	885,459
970L	753,594	211,807	101,971
960L	414,921	143,342	131,236
950L	264,729	107,756	118,414
942L	111,545	65,848	22,640
940L	2,764,994	627,016	430,213
9L	467,066	87,504	37,885
811L	198,537	56,449	76,548
810L	960,205	184,210	97,073
8L	186,274	58,553	24,477
TOTAL	74,972,951	27,687,201	18,761,047

**Table 10: 2007 Coal Resources Summary for Ovoot Tolgoi West Field**

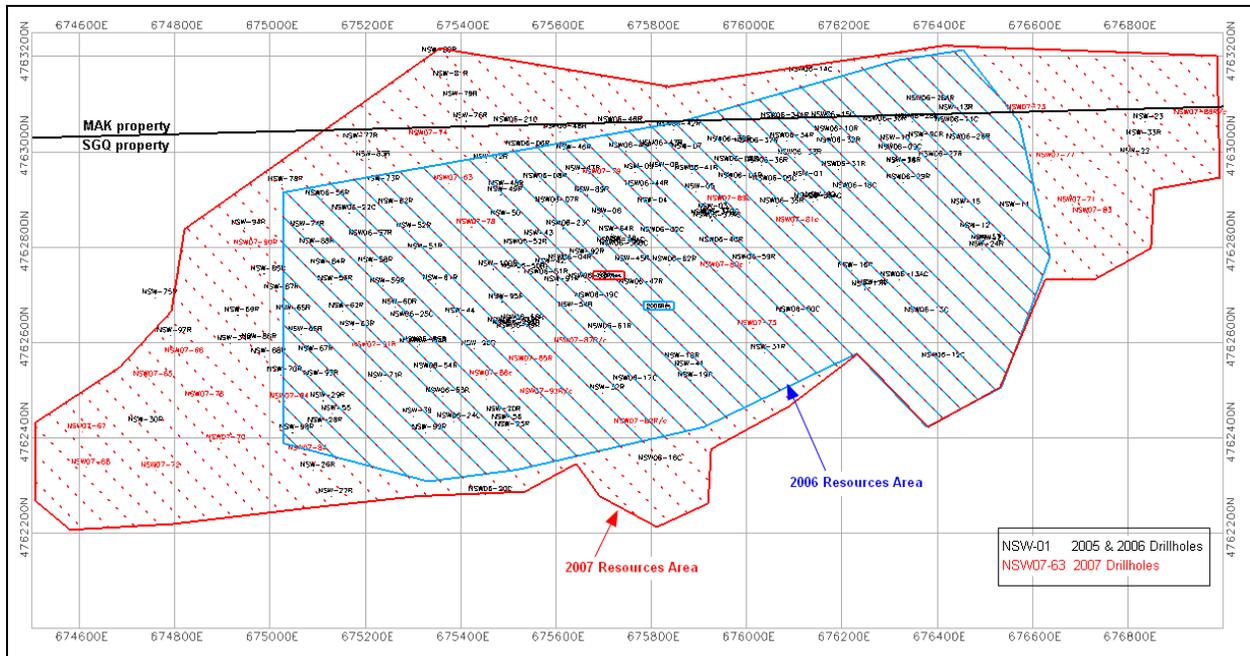
To facilitate the estimation of resources at West Field, TAG generated a digital geological model for West Field using Gemcom Software International's *Minex*<sup>®</sup> geological modeling software. Key horizons or "surfaces" of each seam were modeled to provide the necessary limits for volume estimation. Cross-sections were displayed on-screen in order to map digitally the 3-dimensional location of the fault trace. The fault trace was mapped as a top and bottom surface defining the fault zone, inside of which no coal existed. In many areas these two surfaces are nearly coincident, but noticeably diverge in other areas. Section 7.2: Figures 7 and 8 illustrate these two scenarios in cross-section.

Seams in the north (underlying) resource block were cut by the bottom surface of the fault, while seams of the south (overriding) resource block were cut by the top surface of the fault. Volumes were converted to tonnages by application of density values representative of coal seams derived from available coal quality data. The resources estimates above are based on data acquired by SGQ exploration through December 2007.

Resource estimates have increased from those based on data inclusive of the 2006 drilling program. There are several reasons for this increase:

- Additional holes provide more seam intercepts in some areas compared to the previous model;
- Additional holes place more resources into the Measured and Indicated classes; and
- Resources were expanded in all directions, but primarily to the west and east as new holes allowed previously unknown seam correlations in earlier holes to be tied into the main stratigraphy.

Figure 10 shows the 2006 resource areal extent compared to that of 2007. Small outliers were not included. Resources calculated for 2007 are limited to a greater extent by the MAK/SGQ lease boundaries than those calculated in 2006.



**Figure 10: Comparison of 2007 to 2006 resource areas**

Currently, per information supplied by SGQ, there are no known mining, metallurgical, infrastructure, environmental, permitting, legal, title, taxation, socioeconomic, marketing, political, or other relevant factors that would materially affect the resource estimate.

Sections of this report are from the previous 43-101 reports compiled by Norwest Corporation, and information gathered by TAG on recent visits to the SouthGobi Sands LLC office in Ulaanbaatar, Mongolia. SGQ provided the Norwest reports to TAG.

### Resource Revision

The September report contained an error in the resource estimate due to an arithmetic error in calculating the resources and a minor error in the resource model. The resource estimate in the September report is overstated. The arithmetic error resulted in cumulative resources being calculated rather than incremental for the Indicated and Inferred classifications. The error in the model resulted from the methodology in handling separable parting material. The resultant section of the database dealing with those values tallied incorrect information, thus creating incorrect coal thickness grids later in the process. Both errors have been corrected and the resource table has been revised.

## **SECTION 18: OTHER RELEVANT DATA AND INFORMATION**

No other relevant data and information are applicable to this report.

## SECTION 19: INTERPRETATION AND CONCLUSIONS

Exploration to date at SGQ's Ovoot Tolgoi West Field area indicates approximately 103 million tonnes of coal classified as Measured and Indicated surface resources.

“Coal is [generally] of high volatile bituminous B to A in rank and is suitable for various thermal purposes. Seam intervals have been identified that may be suitable for a metallurgical blend or as a semi-soft coking coal” (Norwest, 2008).

The West Field study area is “*Complex*” *Geology Type* and “*Surface*” *Deposit Type* based on criteria set forth in the Geological Survey of Canada Paper 88-21.

Current in-situ surface coal resources at Ovoot Tolgoi West Field, independently prepared by TAG, in accordance with National Instrument 43-101, total approximately 103 million tonnes of Measured and Indicated resources, with an additional 19 million tonnes of Inferred resources.

The surface resources reported have been constrained by:

- a 0.6m minimum seam thickness
- 0.6m minimum separable parting
- 5m depth of weathering
- 250m base depth limit for surface mine development.
- SGQ mine license boundary

Between 2005 and 2006, Norwest, with Norwest Qualified Persons, managed and provided direct supervision of the 2005 and 2006 exploration programs, and reviewed data from previous programs. During that time, Norwest maintained complete control of the data collection, construction of the geologic model and resource calculation. In 2007, SGQ managed and provided direct supervision of the exploration program. No Qualified Person was on-site during the time of data collection. Geological exploration data was collected during 2005, 2006, and 2007 by Sapphire, using field protocols established by Norwest in 2005. TAG was contracted in 2008 to provide a digital geologic model using all data between 2005 and 2007, and to provide a Technical Report under the strictures of NI43-101. TAG cannot directly verify the data collected in 2007, but has compared the data collected by Sapphire in 2008 with data collected in 2007 and data verified by Norwest in 2005 and 2006. Tag finds all data consistent and has therefore concluded that the data acquired in 2007 is reliable.

Resource calculations and classification have been done in accordance with National Instrument 43-101. Furthermore, TAG has determined the data collected at Ovoot Tolgoi West Field to be adequate for the completion of the pre-feasibility level of mine planning as defined by National Instrument 43-101.

## **SECTION 20: RECOMMENDATIONS**

A drilling and coring program targeting West Field deep resource potential was completed during 2008. That data is currently being evaluated. Although some of the 2008 data will be valuable in clarifying additional surface resources, drilling is generally located downdip from surface resources discussed in this report. SGQ has indicated the desire to evaluate the Ovoot Tolgoi West Field resources to a depth of 300m. In order for engineering to continue to advance the development of detailed surface mine planning as well as greater delineation of the deep resources, TAG recommends SGQ execute additional exploration drilling downdip and along strike from the existing drillholes to obtain geologic structural, groundwater, coal quality data, and updated seam resource estimates for the surface resource area discussed in this report.

In addition to coring and other geologic data acquisition that has been contracted to Sapphire under direct or indirect supervision of Qualified Persons, it is necessary for other competent personnel to provide services that will lead to qualified evaluations of hydrologic and geotechnical data.

### **Ground Water**

A detailed hydrology study has been recommended by AquaTerra, after review of current hydrology information, especially to determine how effective and how much dewatering effort may be required. Estimated phase I costs range from approximately \$1.0 to \$1.4 million and include several test dewatering holes and several water disposal holes.

### **Geotechnical**

A detailed geotechnical study is currently in progress for Ovoot Tolgoi West Field at a cost of approximately \$85,000 US. This study, being completed by Seegmiller International, an independent geotechnical company, will provide updated slope stability analysis and pit slope recommendations for the pits in West Field. A similar study will be required for Southeast Field, projected for 2011 or later.

### **Additional Drilling for Resource and Estimation**

TAG recommends additional in-fill drilling at West Field to refine the resource estimates for use in short-term mine planning. TAG also recommends additional exploration drilling at West Field in order to shift more resources from inferred to measured and indicated categories. Many of the upper seams require additional coring for coal quality determinations. A total of approximately 14,000 meters is recommended, at an approximate cost of \$3.7 million.

## **Geophysical**

TAG, in reviewing and evaluating the technical data summarized in this report, believes the deliverables from down-hole geophysical (GP) logging services require improvement in the following areas.

- Log ASCII Standard (LAS) files should comply with the Canadian Well Logging Society's LAS 2.0 standard
- Development of constant calibration ranges
- Development of consistent GP interpretations methodologies
- Utilization of more reliable logging tools

TAG recommends improvement in drilling mud systems that will result in improved hole stability and logging conditions. TAG recommends investigating other types of geophysical logs to further assist geologic interpretations of coal seam structure, and rock strength attributes. These can include, but are not limited to dipmeter or inclinometry, acoustic, and UCS Televiewer. At this point in time, insufficient information is available to provide any cost estimate of these tests.

## **Coal Quality**

Per the recommendations above for additional exploration and development drilling, TAG recommends approximately 3000 core samples be submitted to an independent laboratory for proximate coal analysis at an approximate cost of \$105,000. Marketing issues may require additional types of analyses. At present, coal quality laboratory results are contained in multiple Excel spreadsheet files. TAG recommends consolidation of all coal quality per test type (proximate analyses, trace elements, ultimate analyses, etc.) into one master file at an approximate cost of \$35,000 US. TAG also recommends that all coal quality data from the master spreadsheet be imported into a software system capable of storing, sorting, reporting, modeling, and mapping at an approximate cost of \$60,000 US. TAG also recommends future analyses be reported not just on the current Air-Dried basis, but also on As-Received and Dry Basis as well, as this is more easily compared to other data via international standards.

TAG also recommends washability and screening studies be considered. Although the main 5 Seam is an exceptionally low ash and sulphur resource, other seams, with their higher ash, thinner seams, and more frequent parting and roof/floor dilution, would likely benefit from cleaning. SGQ management currently believes there is no need to wash the 5 Seam in the present market. Once production includes a significant tonnage in the upper seams, a beneficiation program may add value to them. As a result, further beneficiation studies may be warranted.

### **In-House Database**

A significant amount of drillhole and laboratory data has been accumulated through the exploration programs between 2004 and 2008. To date, this data has been supervised, maintained, and utilized by third-party consultants, but is apparently not kept together in an in-house SGQ database. TAG recommends the creation of a relational database to track and cross-reference all documents and data produced by SGS exploration and development programs. Original hardcopies or digital softcopies where no originals existed should also be kept in one place and managed in-house by SGS.

## SECTION 21: REFERENCES

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The Americas Group, Inc. (2008, September 12). *Technical Report: Surface Coal Geology and Resources, Ovoot Tolgoi- West Field, Omnogovi Aimag, Mongolia.* (Dated September 12, 2008, filed on September 12, 2008.)

The Americas Group, Inc. (2008, March 28). *Technical Report: Underground Resources at Ovoot Tolgoi West Field, Omnogovi Aimag, Mongolia.* (Dated March 28, 2008, filed on March 28, 2008.)

Torr, Stephen D. and Wusaty, Gene (March 29, 2009). *Technical Report: Coal Geology and Resources, Ovoot Tolgoi Project, Omnogovi Aimag, Mongolia.* (Dated March 29, 2009, filed on April 1, 2009.)

Volkonina, V.S. and associates (1951-1952), *Report on geological and hydrogeological mapping at a scale of 1:500000 in South Gobi, People's Republic of Mongolia, Ulaanbaatar.*

## **SECTION 22: ADDITIONAL REQUIREMENTS FOR A TECHNICAL REPORT ON DEVELOPMENT PROPERTIES AND PRODUCTION PROPERTIES**

### **SECTION 22.1: INTRODUCTION**

Ovoot Tolgoi is an operating coal mine in an early stage of development, and is currently uncovering, mining and selling coal to a variety of different clients in the export market. For this reason, a description of the mining operations is presented in this Technical Report.

A significant amount of work on a pre-feasibility study on the Ovoot Tolgoi project was performed in 2007, however, as a final estimate of reserves was not made at that time the study is considered to be incomplete, and requires updating. The current operations have been implemented consistent with what was proposed in the pre-feasibility study, with only minor differences. However, to-date there has been no further effort to identify reserves. For this reason, the results of economic analysis, and corresponding estimate of the reserve base, is not included in this Technical Report. It is Norwest's understanding that the previous pre-feasibility study will be updated, and a statement of reserves included in a new Technical Report, to follow.

### **SECTION 22.2: MINING OPERATIONS**

The Pre-Feasibility Study of 2007 (the 'PFS') proposed a mine plan to achieve the following points:

- A total production level of 5Mtpy.
- A mine life of approximately 20 years.
- Three coal products are to be sold into the Chinese market; metallurgical, premium thermal and thermal coal.
- Mine plan must be 'optimized' with respect to project value.
- Strip Ratio is to climb gradually over life-of-mine in order to maximize project value.

The issues outlined in the PFS continue to be driving factors in SGS's long term mine plan, and current mining operations.

Because many of the seams in the Ovoot Tolgoi deposit are in-cropped / outcropped by surface topography, there are significant near-surface resources which are amenable to extraction through surface mining methods. Taking into account the physical properties of the deposit, the mining strategy, and the abilities of the mining equipment, various surface mining methods were considered, including dragline stripping and 'dozer pushing' of waste material. Ultimately, it was found that stripping and mining with the primary use of a hydraulic mining shovel matched with mining trucks, was likely to be most cost effective practical method of mining. Truck / shovel

operations are currently being conducted at Ovoot Tolgoi, with equipment as specified in the PFS.

Figure 11 illustrates the coal loading of transportation trucks.



**Figure 11: Coal Loading at Ovoot Tolgoi**

#### **Equipment Selection**

For the purposes of the PFS study it was recommended that mid-sized hydraulic shovels ( $13.5\text{m}^3$  –  $24\text{m}^3$  bucket size) be used, matched with the appropriate sized mining trucks (90-180 tonne capacity). The smaller ( $13.5\text{m}^3$ ) shovels were to be replaced / augmented with the use of the larger ( $24\text{m}^3$ ) shovels as production increased. A small front-end loader was for coal mining and stripping as required ( $17\text{m}^3$  and  $10\text{m}^3$  bucket, respectively). In addition, Norwest recommended various pieces of support equipment appropriate to the primary equipment, and to the proposed

mine plan. The suite of primary equipment currently in operation at Ovoot Tolgoi is similar to that proposed in the PFS.

Table 11 summarizes the primary equipment currently on-site and operating at Ovoot Tolgoi.

<b>Equipment Description</b>	<b>Make/Model</b>	<b>Size</b>	<b>No. of Units</b>
Hydraulic Shovel	Liebherr 994	13.5 m <sup>3</sup>	1
End-Dump Trucks	Terex TR100C	91 tonne	6
Front-End Loader	LeTourneau L-950	10/17 m <sup>3</sup>	1
Track Dozer	Liebherr PR764	300 kw	1
Drill	Atlas Copco DM45	175 mm	1
Rubber Tired Dozer	Kawasaki 95ZV	250 kw	1
Grader	Tiger PY280	5m	1

**Table 11: Equipment Fleet at Ovoot Tolgoi (Development Phase)**

Table 12 summarizes the expansion phase equipment that is either on-site or currently on order, and assumed to be operating at Ovoot Tolgoi by the 4th quarter of 2009.

<b>Equipment Description</b>	<b>Make/Model</b>	<b>Size</b>	<b>No. of Units</b>
Hydraulic Shovel	Liebherr 996	34 m <sup>3</sup>	1
End-Dump Trucks	Terex MT4400	236 tonne	4
End-Dump Trucks	Terex TR100C	91 tonne	1
Track Dozer	Caterpillar D10R	433 kw	2
Drill	Atlas Copco DM45L		1
Grader	Caterpillar 16M	5m	1
Excavator	Liebherr 974C	7 m <sup>3</sup>	1
Crane	Liebherr MTC1055	55 tonne	1

**Table 12: Equipment Fleet at Ovoot Tolgoi (Expansion Phase)**

The current suite of mining equipment is similar to what was suggested in the PFS. Some of the proposed mining equipment is slightly larger than originally proposed (e.g., shovels, trucks, tractor dozers). This allows South Gobi Sands (SGS) to realize additional economies of scale while maintaining an appropriate stripping capacity.

### **Historic Production**

A mining license and permit were granted for the Ovoot Tolgoi coal mining operations on September 20, 2007 and April 2, 2008, respectively. Prior to issuance of the permit, SGS had commenced some development work including topsoil removal and road construction, in accordance with Mongolian law.

The historic production for 2008 is summarized in Table 13.

	<b>Units</b>	<b>Forecast Year</b>	<b>Budget Year</b>	<b>Actual *</b>
<b>Total Waste Mined</b>	BCM	2,300,423	1,500,000	2,535,520
<b>Total Coal Mined</b>	tonnes	1,299,258	1,000,000	1,158,212
<b>Thermal</b>	tonnes			218,310
<b>Premium</b>	tonnes			939,902
<b>Coking</b>	tonnes	NA	NA	NA
<b>Stripping Ratio</b>	bcm/tonne	1.77	1.5	2.19

\* Note: Actual production is for calendar year 2008.

**Table 13: Actual Production (2008)**

The mining license is contained within a portion of the total property controlled by SGS. The remaining property is controlled as part of the SGS exploration licenses.

#### **Projected Schedule Overview**

The proposed ramp-up schedule is shown in Table 14.

<b>Period</b>	<b>Tonnes (000)</b>
Year 1	1,000
Year 2	1,500
Year 3	3,000
Year 4	4,000
Year 5 and beyond	5,000

**Table 14: Proposed Production Schedule**

As shown above, the 2008 total production of 1,158,212 tonnes for Year 1 has exceeded the target. The Chinese border currently operates seven days per week, on a day-shift basis. It is expected that later in 2009 the border crossing will be operating on a 24 hours per day basis for coal exports, significantly increasing the potential export capacity.

#### **Workforce Summary**

Table 15 summarizes current staffing schedules as of March, 2009:

<b>Staffing Location</b>	<b>No. of Staff</b>
<b><i>Headquarters Office Staffing</i></b>	
Administration Department	13
Accounting Department	7
Corporate and Social Affairs Department	3
Dalanzadgad Representative	2
Gurvan Tes Representative	1
Ceke Representative	1
Environmental Department	2
Exploration Department	1
IT Department	2
Human Resources	3
Procurement Department	3
<b>Total</b>	<b>38</b>
<b><i>Ovoot Tolgoi Staffing</i></b>	
Administration Department	13
Accounting Department	2
Human Resources Department	3
Engineering Department	10
IT Department	2
Maintenance Department	4
Safety Department	13
Procurement Department	4
Environmental Department	2
Mining Department - Supervisory	11
Mine Helpers	7
Operators	66
Camp Manager	1
Repairman	2
Construction	3
Cooks	19
Drivers	8
Cleaners	14
Fireman	7
<b>Total Mine Site Staffing</b>	<b>191</b>
<b>Total Staff</b>	<b>229</b>

**Table 15: Proposed Workforce**

### **Coal Transportation**

The Ovoot Tolgoi project site is located approximately 45km from the Chinese border crossing. The crossing is known as Shivee Khuren on the Mongolian side, and as Ceke on the Chinese side. Currently, all coal sales are transported by truck to China with the point-of-sale of coal considered to be at the ‘minegate’. Transportation trucks may be loaded either directly from the

pit, or from the coal stockpile. Customers are obliged to provide coal trucks for transportation along a 45km public road, connecting Ovoot Tolgoi with the border crossing. Figure 12 shows coal transport trucks en route to the border crossing.



**Figure 12: Coal Transportation**

#### **Mine Infrastructure**

Major facilities identified in the PFS have either been constructed or are currently in the process of being constructed at Ovoot Tolgoi.

Facilities provided by SGS currently include:

- Maintenance shop and warehouse (construction on-going)
- Temporary maintenance shop
- All-weather fire engine bay

- Man camp / administrative offices / recreational facilities complex (construction on-going)
- Air strip and terminal
- Improvements to public road for coal transportation.

In addition, an explosives magazine and fuel depot have been constructed on-site by the appropriate contractors to SGS.

Figure 13 illustrates on-going maintenance of the permanent maintenance facility.



**Figure 13: Permanent Maintenance Facility**

### **SECTION 22.3: RECOVERABILITY**

Due to the early stage of the mine operations, little data exists to confirm detailed mine design assumptions used in the PFS. Based on a current personal inspection of the operation, the original assumptions used in the PFS do not appear to require adjustment until more definitive information can be gathered. Detailed mine design assumptions used in the PFS include the following:

- Waste density of 2.5 tonnes/bcm (note that this has been revised to 2.4 t/bcm).
- Coal density, as modeled from drilling results.

- Primary swell of 30% in waste and coal.
- Final swell of 25% in waste.
- Coal loss of 10 cm and 5 cm from roof and floor, respectively.
- Dilution of 20 cm and 10 cm from roof and floor, respectively.
- In addition to the coal losses and dilutions, overall mining recoveries for coal seams in the Ovoot Tolgoi deposit were assumed as follows:
  - Seam Thickness <3 m, 85%
  - Seam Thickness 3 m - 10 m, 90%
  - Seam Thickness 10 m - 20 m, 95%
  - Seam Thickness >20 m, 98%
- Average moisture loss of 2% from total moisture to yield as-shipped moisture. This approximates loss of water through handling and stockpiling in normally dry weather.

#### **SECTION 22.4: CONTRACTS**

SGS currently receives various goods and services under contract. These include:

- Explosives supply, storage and blasting operations by Mera, LLC
- Fuel supply and storage by Gurvan Zam, LLC
- Maintenance contract on all mining equipment by Monnis International, Inc.
- Security services at mine site (including airport) by Alpha Security.
- Chartered flights from Ulaanbaatar to Ovoot Tolgoi with EZNis Airways, a domestic Mongolian carrier.
- Laboratory services by SGS Mongolia (SGS Mongolia are not affiliated with Southgobi Sands, LLC in any way. They are simply a service provider).

In addition, there are several current coal sales agreements between SGS and their customers in China. As of March 23, 2009, approximately 201 tonnes of coal have been exported across the Chinese border. There are currently four contracts in place, securing 1.2 Mt of coal sales for 2009, with additional coal sales currently being negotiated. Transportation and border crossing facilities (including an SGS-operated truck scale) are currently in-place and in regular use.

#### **SECTION 22.5: MARKETS**

Three run-of-mine (ROM) product streams will eventually be produced at Ovoot Tolgoi; a metallurgical coal (7,200 kcal/kg, 9% ash, FSI>4), a premium thermal coal (+/- 6,000 kcal/kg, 15% ash), and a thermal coal (~5,000 kcal/kg, 25%-30% ash). Transportation trucks, provided by the customers, are loaded directly from the pit or from stockpile for delivery. Blending of coal from both the pit and from stockpile is practised in order to ensure that the appropriate quality of coal is delivered to the customer.

Markets have been developed to provide premium thermal coal for several Chinese customers. It is expected that additional customers will be secured to match the increase in coal production

over the upcoming years. Currently, all coal is sold directly by SGS and no agency or brokerage relationships apply.

All coal sold is run-of-mine ROM and is not subject to any washing or upgrading, in accordance with the PFS. Washability testing is currently being performed; however, results are not yet available.

#### **SECTION 22.6: ENVIRONMENTAL CONSIDERATIONS**

The Ovoot Tolgoi Coal Project has received prior approval of its detailed EIA and Environmental Protection plan (EPP) from the Ministry of Nature and Environment, and an addendum has been prepared and approved to reflect the project as currently planned.

The EPP is an annual environmental plan that must be approved by the Ministry of Nature and Environment. Ovoot Tolgoi is obligated to post environmental performance bond amounting to 50% of the annual budget estimate for environmental works. During 2008, it was estimated the environmental work would be \$60,000, with \$30,000 in bonding required and posted.

The PFS summary of environmental considerations was based on original Norwest work on hydrological and water management studies. In addition, it relied partly on a report titled *Detailed Environmental Impact Assessment for the Nariin Sukhait Coal Deposit Mining Project*, prepared by Environmental Consulting Company (ENCO), Ltc, 2006. Potential environmental issues identified in the PFS are summarized as follows:

- Mine Dewatering
- Post-Mining Pit Reclamation
- Acid Generation/Acid Rock Drainage
- Rare Plants
- Environmental Protection Measures

Since beginning of production, a containment pond has been constructed to store all pit water which has been pumped from the mine. This pond was constructed to typical international standards. As part of on-going operations, topsoil is removed and stockpiled for later use in final reclamation. There are no endangered plant species in the mining license area.

While an analysis of the waste to determine the propensity for acid drainage has not yet been completed, acid drainage is not anticipated. If acid-generating material is found to be present it is planned to be managed separately in order to prevent acid mine drainage.

Waste oil haul is hauled back to Ulaanbaatar for recycling by the contractor / supplier. Other non-toxic waste recyclables are given to a local village where they are welcomed as a source of additional income.

## SECTION 22.7: TAXES

The various taxes, royalties, and government levies that are applicable to Ovoot Tolgoi are as follows:

- Royalties – 5% for export coal sales at Mine Gate.
- Property Tax – 0.6% on acquisition value.
- Mining License - \$5/ha x 9,308 ha = \$46,540/year.
- VAT – 10% refundable.
- Income Tax – 10% of the first 3 billion MNT (Mongolian Tugrug), 25% thereafter.
- Depreciation – 7 years on equipment (PFS assumed 10 years), 40 years on fixed assets
- Social Insurance Tax of 13% (PFS assumed 20%).

In some cases, there are slight variances between what was assumed in the PFS and what is actually being levied against the project. The assumptions in the PFS may be considered to be conservative.

## SECTION 22.8: CAPITAL AND OPERATING COST ESTIMATES

### Capital Cost

Ovoot Tolgoi is in a ‘Mine Development’ phase of operation. Capital expenditures for mine equipment, infrastructure and development are summarized below:

Initial mining equipment purchases*	15.7
Site facilities & maintenance complex*	12.0
Support & training	3.0

\*Proposed cost upon completion of development phase

**Table 16: Mine Development Capital (US\$-millions)**

In addition to the development capital summarized above, SGS has purchased, or has committed to, an additional \$33 million USD of expansion phase capital.

### Operating Costs

The PFS made various assumptions in evaluating operating costs. Several elements of the operating cost estimate have been found to differ from the original study. The following differences should be noted:

- A increase in labor rates of approximately 20%.
- A current fuel price rate (as of March 31, 2009) of \$0.90/liter.

Other variances between estimated and actual operating costs are considered by Norwest to be insignificant.

## SECTION 22.9: ECONOMIC ANALYSIS

Despite the fact that Ovoot Tolgoi is an operating mine, with established customers, there does not currently exist a complete and current pre-feasibility study or economic analysis that forms

the basis of a reserve statement, as required by NI 43-101. It is SGS' intention to complete such a study, including an appropriate economic analysis, which will be based on proven and probable reserves only and will take into account sensitivity analyses of such factors as coal quality, coal prices and estimated operating and capital costs.

**SECTION 22.10: PAYBACK**

As noted above, there does not currently exist a complete and current pre-feasibility study or economic analysis that forms the basis of a reserve statement, as required by NI 43-101. It is SGS' intention to complete such a study, including an appropriate economic analysis which will estimate a payback period of capital.

**SECTION 22.11: MINE LIFE**

As noted above, there does not currently exist a complete and current pre-feasibility study or economic analysis that forms the basis of a reserve statement, as required by NI 43-101. It is SGS' intention to complete such a study. Once economic reserves have been determined a life-of-mine will be estimated.

**SECTION 23: SIGNATURE AND DATE**

The effective date of publication of this technical report is April 30, 2009.

Dated this 30<sup>th</sup> day of April, 2009.

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

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A. Lorraine Livingston, CPG  
Associate Senior Geologist  
The Americas Group

Dated this 30<sup>th</sup> day of April, 2009

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

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Gary M. Stubblefield, P.E.  
VP Surface Mining  
Norwest Corporation

Following are signed and dated Certificates of Qualifications of the persons involved in preparing this report.

## CERTIFICATE OF QUALIFICATIONS

I, A. Lorraine Livingston, of Lakewood, Colorado, do hereby certify that:

1. I am an Associate Senior Geologist with *The Americas Group, Inc.* 12081 W. Alameda Parkway, #410, Lakewood, Colorado 80228 USA
2. This Certificate applies to all sections of the “Technical Report: Coal Geology and Resources Ovoot Tolgoi – West Field, Omnogovi Aimag, Mongolia”, dated April 30, 2009 (the “Technical Report”) *with the exception of Section 22 and certification/signoff by Norwest in Section 23.*
3. I am a Certified Professional Geologist and a member of the American Institute of Professional Geologists – Registration Number CPG-11069.
4. I am a licensed Professional Geologist in the state of Wyoming – License Number PG-2402.
5. I am a graduate of Cornell University (Bachelor of Arts, Geology and Environmental Science, 1976).
6. I have practiced my profession as a geologist for 30 years. I have worked on coal properties in the United States of America, Australia, Canada, Colombia, Venezuela, and Mongolia. I have completed investigations on coal properties on behalf of private and public entities. I am a “qualified person” for the purposes of future National Instrument 43-101 public disclosure requirements.
7. I have reviewed the data collected and provided by SouthGobi Sands, LLC for the Ovoot Tolgoi coal deposit contained within the SGQ mine license area. I participated in the preparation of this technical report concerning the coal geology and coal resource tonnage for the West Field surface coal occurrences within SGQ’s mine license, although neither I, nor any other TAG representative, was present as a QP during the collection of that data. I have visited the Ovoot Tolgoi project site twice – April 7 – 25, 2008, and July 25 – August 4, 2008, and the SGQ Ulaanbaatar office on April 4-6, 2008, April 25-26, 2008, July 24, 2008, and August 4, 2008.
8. I am responsible for all sections in the Technical Report except Section 22.

9. I have no direct or indirect interest in SGQ or any affiliates of it, nor do I expect to acquire any such interest. I am independent of the Company in accordance with section 1.4 of National Instrument 43-101.
10. I have had no involvement with the Ovoot Tolgoi Project prior to 2008.
11. I have read NI 43-101 and the Technical Report has been prepared in compliance with such instrument.
12. I have not been restricted in any way in my access to information, data or documents that I consider relevant to this report.
13. As at the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated in Lakewood, Colorado, this 30<sup>th</sup> day of April, 2009

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

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A. Lorraine Livingston, CPG  
Associate Senior Geologist  
The Americas Group, Inc.

## CERTIFICATE OF QUALIFICATIONS

I, Gary M. Stubblefield, of Salt Lake City, Utah, USA, do hereby certify that:

1. I am currently employed as a Vice President by Norwest Corporation, 136 East South Temple, Salt lake City, Utah, 84111.
2. I graduated from the University of Utah in 1970 with a B.Sc. degree in Mining Engineering.
3. I am a Registered Professional Engineer in the states of Colorado (20374), Montana (18269) and Utah (270119-2202) and am a Founding Registered Member of the Society of Mining Engineers (3132840). I am also a member of the Mining & Metallurgical Society of America (MMSA).
4. From my graduation in 1970, I have been involved in the coal mining industry in engineering, supervision, management, and executive roles at mine sites and in corporate offices. I have been employed as a mining consultant since 1999 where I serve as Vice President of Surface Mining.
5. I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. I am responsible for the preparation of Section 22 (Additional Requirements for a Technical Report on Development Properties and Production Properties) of the report titled “Technical Report: Surface Coal Geology and Resources, Ovoot Tolgoi – West Field Omnogovi Aimag, Mongolia” and dated April 30<sup>th</sup>, 2009 (the “Technical Report”)
7. I am familiar with the property and made a personal inspection of the site between April 17 and April 20, 2009.
8. I am not aware of any material fact or material change with respect to the subject matter in Section 22 of the Technical Report that is not reflected in the report, non-disclosure of which would make the report misleading.
9. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.

10. I have read NI 43-101 and Form 43-101(F1), and the Technical Report has been prepared in compliance with that instrument and form.

Dated at Salt Lake City, Utah this 30<sup>th</sup> day of April, 2009.

Respectively submitted,

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

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Gary M. Stubblefield, P.E.  
VP Surface Mining, Norwest Corporation