Resource and Reserve Estimation
For the
Zhuge Shangyu Iron and Titanium Project,
Shandong Province, People's Republic of China
For
China Zhongsheng Resources Holdings Limited

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1 EXECUTIVE SUMMARY

China Zhongsheng Resources Holdings Limited (together with its subsidiaries, "Shandong Xingsheng Mining Company Limited" or "the Client") commissioned Micromine Consulting Services ("MCS", a division of Micromine Proprietary Limited) in January of 2011 to complete a JORC standard reporting guidelines compliant resource and reserve estimation report for the Zhuge Shangyu Iron and Titanium Project ("the Project"), located in Shandong province, People's Republic of China. MCS contracted the writing of several sections of the report that had no material bearing on the resource and reserve estimate result to Jones Lang LaSalle Corporate Appraisal and Advisory Limited ("JLL"). JLL compiled the database for the project that was subsequently validated by MCS. The JORC standard reporting guidelines compliant resource and reserve estimation report would be used for a submission to the stock exchange of Hong Kong (HKEx) and would conform to the Chapter 18 requirements of the exchange.

This report updates a resource and reserve estimation completed by MCS in June 2011. The client again commissioned MCS in September of 2011 to complete an update of the reserve estimation for the project due to changes in modifying factor information. These included reduced capital expenditure and an increase in the titanium concentrate selling price. The previous resource estimate has remained unchanged while the reserve estimate has been updated. The effective date of this report is the 17th April 2012.

The Zhuge Shangyu Iron and Titanium Project is located at Zhuge in the county of Yishui, Shandong Province, Peoples Republic of China. The Zhuge Shangyu mining license No. C3700002010052210063351 is within the exploration licence area. The licence has an area of 0.356 km^2 and has a validity period from 5th May 2010 to 5th May 2015. The exploration area is covered by license No.T37120081102017091, with an area of 7.3 km^2 and a validity period from 19th July 2010 to 30th June 2012. Both licences were issued by the Department of Land and Resources of the Shandong Province and is held by Shandong Xingsheng Mining Co. Ltd.

The geology of the project area contains only the exposed Yanlingguan Formation of the Archaean Taishan Group, basalts of the Niushan Formation which is part of the Cenozoic Linqu Group and Quaternary deposits. The iron and titanium mineralisation is hosted in the gabbro of the Sanguanzhai Unit which is part of the Palaeoproterozoic Hongmen Super Unit. The mineralisation strikes north-south with an overall length of 6,500 m. The mineralisation is divided into two zones: 'Orebody 1' and 'Orebody 2'. The mineralisation is composed of ilmenite and magnetite.

Mr. David Allmark (MCS geologist) was Competent Person (as defined by the JORC guidelines) for the preparation of this report.

The Zhuge Shangyu project site was visited on the 4th of March 2011 by Mr. David Allmark and Mr. Jeff Zhang of MCS, accompanied by Ms. Annie Zhang and Mr. Jack Li of JLL. MCS checked the site layout and verified the provided data and later visited the laboratory used for the primary analytical work. MCS attempted to check the locations of drillhole collars for the project. MCS found that all of the collar locations were in farming areas and that the original collar locations had been disturbed and could not be found. The core for each interval for seven drillholes was checked with the original drillhole logs (as supplied by the client) and the assays for the intervals. MCS found that the geology, mineralisation and approximate grade of each interval inspected matched the geology and mineralisation that had been previously logged.

Exploration was carried out by the No. 8 Exploration Institute of Geology and Mineral Resources of Shandong. Drilling was on a grid measuring between 200 to 400 m by 100 to 400 m. Trenches were excavated across the strike of the mineralisation every 200 m along the strike of the orebody.

114 drillholes for 20,377.66 metres were drilled in 2008. All drilling was carried out by the No. 8 Exploration Institute of Geology and Mineral Resources using Jiang Tan XY-4 drill rigs. These drill rigs used 3 metre rods and were capable of drilling to depths of 1,000 metres. The drill rigs produced NQ size core with a drilling diameter of 91 mm at the top of the hole in the weathered rock and 75 mm to hole completion.

Drillholes from the surface were generally vertical or inclined steeply at around 80 degrees. Downhole surveys were performed every 50 metres downhole, and at orebody contacts using XJL-42 and JXY-2 electronic inclinometers.

Core recovery data was recorded for 61 drillholes. Linear core recovered length was 18,965.39 metres against 19,396.85 drilled metres. The mean drill hole core recovery was 96.34%. Core recovery was acceptable.

42 trenches were excavated for 4,139.6 linear metres. All trenches were orientated east-west and spaced on 100 m sections along the strike of the orebody and ranged in length from 21 metres to 153 metres. All were sampled as continuous channel samples taken from the base of the trench or adit on the northern face.

The primary laboratory for the project was the laboratory of the Shandong No. 8 Exploration Institute of Geology and Mineral Resources, in Rizhao city, Shandong province. The laboratory was inspected by Mr. David Allmark and Mr. Jeff Zhang of MCS accompanied by Mr. Jack Li and Ms. Annie Zhang of JLL; along with Mr. Liu Jiazhao the Manager of the No. 8 Geological Exploration Brigade on the 5th of March 2011. MCS observed during the visit that laboratory hygiene was of a high standard and the Chinese procedures for sample preparation and analysis were being followed and observed by laboratory staff.

Assay precision was calculated for total iron (TFe) and titanium dioxide (TiO_2) from the repeat analysis results. Assay precision for TFe was ±3.10%; assay precision for TiO_2 was ±5.29%. The number of samples taken for the repeat analysis is representative of the population (7.7%). Assay precision for both TFe and TiO_2 is acceptable.

Samples were routinely sent to an umpire laboratory for analysis to establish if a baseline difference in reportable grades existed between the No. 8 Exploration Institute of Geology and Mineral Resources laboratory in Rizhao city, Shandong province and an independent laboratory. The independent laboratory was the laboratory of the Shandong Province Experimental Institute of Geological Sciences, located in Jinan city, Shandong province. The umpire analytical data provided occurred at a frequency of 206 samples out of 5,336 analyses (3.9% of the total analyses). There is no assay bias apparent between the results of the two laboratories at different grade cut-offs.

Data was provided by Shandong Xingsheng Mining Company Limited (the client) on the 11th and 20th of January 2011. The final database contained records for 114 drillholes and 42 trenches.

Resource Estimation

A geological cut-off grade of 11.5% TFe and 4.6% TiO_2 was determined from the classical statistical analysis of the data. These values were used as trigger values to create grade composites for interpretation. Geological data was used to assist in the interpretation of mineralised envelopes. Interpretation and wireframing was then carried out for all mineralised envelopes over forty three cross-sections.

A balancing cut grade of 15.8% TFe was applied to all assays inside the mineralised envelopes. A balancing cut for TiO_2 was not required. All samples within the mineralised envelopes were composited to an equal sample interval length of 2 m before geostatistical analysis and interpolation.

Empty block models were created and TiO_2 and TFe grades and SG data was interpolated into the blocks. Geostatistical analysis was undertaken for TiO_2 and TFe and used as input into the ordinary kriging algorithm which was used for interpolation into the block model.

QA/QC data supplied and obtained from the site visit was moderate to high in quality and resources were classified for Measured, Indicated and Inferred categories. For Measured resources, a minimum of two samples from two holes had to be within a radius of 200 m. For Indicated resources, this radius was 400 m. All other blocks in the model were classified as Inferred resources.

The resources reported for the Zhuge Shangyu Iron and Titanium deposit are stated by category.

An economic cut-off grade was determined using the parameters presented in the mining study. A TiO_2 equivalent grade was generated using details of annual forecast yield for TiO_2 and TFe and prices of the TiO_2 and TFe concentrate from the mining study. A ratio of 1:4.6 was determined for the value of TiO_2 to TFe. A TiO_2 equivalent grade was then determined for every block in the model. The processing recovery of TiO_2 equivalent was determined to be 27.8% and the price of the combined concentrate used was CN¥2,721 per tonne.

MCS calculated an economic cut-off grade of 9.2% TiO_2 equivalent using the following formula: Economic cut-off grade = CN¥60.43 / (27.8% * CN¥2,721)

The MCS resource (**the current Resource, November 2011**) reported above a cut-off grade of 9.2% TiO_2 equivalent is shown in Table 1-1.

Table 1-1: Resource statement for the Zhuge Shangyu Iron and Titanium deposit

Resource Category	Tonnes	SG	TiO_2 equivalent	TiO_2	TFe
	(t)	*(t/m^3)*	*(%)*	*(%)*	*(%)*
Measured	372,793,000	3.19	70.30	5.86	14.00
Indicated	260,565,000	3.13	70.31	5.81	14.03
Total Measured and Indicated	633,358,000	3.17	70.31	5.84	14.01
Inferred	3,472,000	3.13	69.30	3.63	14.27
Total Resources	636,830,000	3.16	70.30	5.83	14.01

Note: Numbers have been rounded to reflect that the resources are an estimate.

Additional resource potential exists at both ends of the southern orebody and at depth along both orebodies where the orebodies remain open. Additional infill drilling could upgrade the Indicated and Inferred resource to Measured category.

Mining Study

The deposit is suitable to commence mining as an open pit mining due to the size, depth and shape of the orebodies, as well as the geology of the area. The original preliminary design report prepared by the Shandong Lianchuang Architectural Design Co. Ltd. also contained a design and reserves calculations for an underground mine which would extend the mine life beyond the life of the open pit.

The MCS reserve statement (**current Reserve, November 2011**) for the Zhuge Shangyu deposit is shown in Table 1-2.

Table 1-2: Total Reserves for the Zhuge Shangyu deposit

Reserve Classification	Ore	TiO_2 Grade	TFe Grade	Contained TiO_2	Contained TFe
	(Tonnes)	*(%)*	*(%)*	*(Tonnes)*	*(Tonnes)*
Open Pit					
Proved	200,080,000	5.76	12.78	11,525,000	25,577,000
Probable	89,910,000	5.52	12.77	4,964,000	11,481,000
Total Open Pit	289,990,000	5.69	12.78	16,489,000	37,058,000
Underground					
Proved	–	–	–	–	–
Probable	256,290,000	5.69	12.85	14,595,000	32,922,000
Total Underground	256,290,000	5.69	12.85	14,595,000	32,922,000
Combined					
Proved	200,080,000	5.76	12.78	11,525,000	25,577,000
Probable	346,210,000	5.65	12.83	19,559,000	44,402,000
Total Reserve	546,290,000	5.69	12.81	31,084,000	69,979,000

Notes:

- *The ore resources are inclusive of the ore reserve.*
- *The reserve includes diluting material with an assumed diluent grade of 0%, total dilution used was 9%.*
- *The MCS reserve is stated based on titanium with an iron credit.*

Using the reserve and the proposed production rates a life of mine schedule was developed for the open pit and underground. The schedule assumes that the production volume commences during the third year at two million tonnes per year, ramping up to eight million tonnes per year by year six.

The expected project life of the open pit is 36 years and the underground mine is approximately 40 years.

It is recommended that the following actions be undertaken to increase the amount of Proved reserves:

- Additional holes be drilled to upgrade the Resource so additional Resource falls into the Measured category.
- Perform metallurgical tests on the fresh and weathered material for compatibility.
- Metallurgical testwork be conducted to determine the levels of the penalty elements in the final concentrates.
- MCS recommends that pilot-scale mineral processing testwork be carried out to determine the true recovery rates for the particular ores, processing equipment and design parameters of this project. Based on the results of processing testwork recovery rates may need to be revised either upwards or downwards.

Respectfully submitted

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2 INTRODUCTION

China Zhongsheng Resources Holdings Limited (together with its subsidiaries, "Shandong Xingsheng Mining Company Limited" or "the Client") commissioned Micromine Consulting Services ("MCS", a division of Micromine Proprietary Limited) in January of 2011 to complete a JORC standard reporting guidelines compliant resource and reserve estimation report for the Zhuge Shangyu Iron and Titanium Project ("the Project"), located in Shandong province, People's Republic of China. MCS contracted the writing of several sections of the report that had no material bearing on the resource and reserve estimate result to Jones Lang LaSalle Corporate Appraisal and Advisory Ltd. ("JLL"). The JORC standard reporting guidelines compliant resource and reserve estimation report would be used for a submission to the stock exchange of Hong Kong and would conform to the Chapter 18 requirements of the exchange.

The client again commissioned MCS in September of 2011 to complete an update of the reserve estimation for the project due to changes in modifying factor information. These included reduced capital expenditure and an increase in the titanium concentrate selling price. The previous resource estimate has remained unchanged while the reserve estimate has been updated.

The competent person for the project, Mr. David Allmark, visited the site between the 2nd and 6th of March 2011 accompanied by Mr. Jeff Zhang of MCS, Ms. Annie Zhang and Mr. Jack Li of JLL. MCS checked the site layout and verified the provided data and visited the laboratory used for the primary analytical work.

The final technical report was compiled by the competent person, Mr. David Allmark of MCS and Ms. Clare Kelly of MCS. Ms. Marta Sostre of MCS completed the data validation, classical statistical analysis, sectional interpretation and wireframing, Mr. David Allmark completed the block modelling, grade interpolation, resource categorisation and the project management. Reserve estimation was completed by mining engineer Mr. Tony Cameron. Report sections for Location and Transport, Regional Geology and Project History were provided by the JLL team led by Mr. Simon Chan and assisted by Ms. Annie Zhang. Technical translation and liaison with the client was conducted by Mr. Jeff Zhang of MCS. The project was supervised by MCS General Manager Mr. Dean O'Keefe.

A glossary of terms and abbreviations is listed in Appendix 3.

3 SCOPE OF WORK

The primary objective of this study was to produce a JORC standard reporting guidelines compliant resource and reserve estimation report for the Zhuge Shangyu Iron and Titanium Project ("the Project"), located in the Shandong Province, People's Republic of China.

The specific objectives of the work were as follows:

Resource Estimation

- Import of topographical, analytical and geological data into MICROMINE software for data validation, error detection and error elimination, modelling and resource estimation.

- Georeferencing of all available graphical information in 3D.
- Classical statistical analysis of the sampling data to determine possible domains and natural cut-offs.
- Interpretation of mineralised bodies on cross sections and/or plans.
- Wireframe modelling of the interpreted mineralised bodies, topographic surface and, where necessary, geological formations, tectonic elements and oxidation zones.
- Coding and selection of samples for further geostatistical analysis and grade interpolation.
- Classical statistical analysis of selected samples and selection of balancing cut grades.
- Compositing of samples within ore bodies (sample length adjustment).
- Geostatistical analysis of the sampling results and determination of the spatial distribution of the mineralisation.
- Creation of block models restricted by wireframe models.
- Grade interpolation into block models.
- Classification of the resources in accordance with international standards (JORC) and reporting in accordance with Hong Kong stock exchange requirements guidelines.
- Removal of mined out areas.
- Statement of the grade and tonnage at a set of different cut-off grades.

Open Pit Mining Reserve Estimation, Mine Design and Modifying Factors Assessment

- Conduct open pit mine design and scheduling, mining costs and other related parameters.
- MCS will consider all modifying factors and where possible convert resources to reserves and state the reserves. If not possible then MCS will conduct a preliminary assessment based on assumptions and produce potentially economically viable resources. It may not be possible to convert resources to reserves if the modifying factor information is inadequate or lacks detail.

Site Visit and QA/QC Audit

Conduct a site visit and a QA/QC audit: This included field observations and interviews with responsible personnel to document procedures and methodologies, supported by digital, archive and report data. These data and observations were used in assessing the following QA/QC parameters:

Methodology and quality of drilling;

Methodology and quality of sampling and assaying;

Methodology and quality of drill collar, topographical and downhole positional information;

Presence and quality of any procedural or analytical checks and controls;

Specific gravity determination methodology.

All findings, conclusions and recommendations are summarised in the Risk Assessment section of this report.

4 LOCATION, ACCESS AND GENERAL INFORMATION

The Zhuge Shangyu Iron and Titanium Project is located at Zhuge Town in the county of Yishui, Shandong Province, Peoples Republic of China. A detailed map of the project area is shown in Figure 4-1. The projects have exploration rights covering an area of 7.3 km^2, with the geographical coordinates shown in Table 4-1.

Table 4-1: Geographical Coordinates of the Zhuge Shangyu Iron and Titanium Project

	Longitude	Latitude
Minimum	118°34’53”	35°55’55”
Maximum	118°35’09”	35°56’24”

Figure 4-1: Location of the Zhuge Shangyu Iron and Titanium project

4.1 Climate and Topography

The area of China where the Zhuge Shangyu project is located experiences a semi-continental climate and has four distinct seasons. The summer is hot with high precipitation and the winter is cold and dry. The mean annual temperature is °C with long frost free periods and abundant sunshine. The prevailing wind direction is southeast in the spring and summer and northwest in autumn and winter.

The average annual precipitation is 851.8 millimetres which mainly occurs in July, August and September and accounts for about 76% of the whole year's precipitation. The overall flow is from northeast to southwest and the run-off is captured in the Bashan Reservoir.

The topography of the project area is hilly with higher topography in the north and lower topography in the south. The highest peak in the area is Su Mountain which has an elevation of 395.5 metres above sea level and the lowest point in the area is south of Xiaoyu Village and has an elevation of 175.0 metres above sea level. The relief difference in the area is approximately 220.5 metres. There are valleys, many small reservoirs and ponds in the project area.

4.2 Licence Status

The Zhuge Shangyu deposit area is covered by mining license No. C3700002010052210063351. The licence has an area of 0.356 km^2 and has a validity period from 5th May 2010 to 5th May 2015. The licence was issued by the Department of Land and Resources of the Shandong Province and is held by Shandong Xingsheng Mining Co. Ltd (Appendix 1: Tenement Licence Certificate).

The broader project area is covered by detailed exploration license No.T37120081102017091. This licence has an area of 7.3 km^2 and has a validity period from 19th July 2010 to 30th June 2012. The licence was issued by the Department of Land and Resources of the Shandong Province and is held by Shandong Xingsheng Mining Co. Ltd (Appendix 1: Tenement Licence Certificate).

4.3 Local Infrastructure and land use

The following information has been sourced from Shandong Lianchuang Architectural Design Co. Ltd (2011).

The road and rail conditions in the project vicinity are good. The project is situated 2 km from the Yishui-Boshan road which provides access to Yishui in the south and Boshan to the north. It is also situated 15 km from the Yangkou-Linyi road which provides access to the Jiaoji Railway at the Qingzhou Railway station to the north; as well as access to the Yanshi and Longhai Railways at Linyi and Xinyi Railway stations to the south. The project is also only 10 km from the Taian-Xuejiadao road which provides access to Xuejiadao in the east and access to the Beijing-Shanghai Railway to the west.

The project area has sufficient power, which is supplied by the East China Grid, and has communication facilities. There are abundant water resources and many small reservoirs, including the Bashan Reservoir, and ponds within Yishui County. Yishui County has a mining industry and so raw materials, such as explosives and equipment for mine production, as well as the materials for construction of a processing plant could be sourced locally. In addition, the population density in the area is high and is sufficient to supply labour.

The climate in the project area is suitable for agriculture; wheat, corn, sweet potato, peanuts, tobacco, vegetables, medicinal plants and small amounts of fruits are grown in the area.

5 REGIONAL GEOLOGY

Regional geology information is sourced from, Shandong Province Metallurgical Engineering Company Limited (2008), Preliminary Design of Yangzhuang Iron Deep Mining Project for Shandong Xingsheng Mining Company Limited.

The project area is located in the uplifted Gongdanshan horst part of the Luxi anticline in the Yishui fracture belt. The Eastern area is comprised of a basement of Archaean metamorphic rocks from the Yanlingguan formation of the Taishan Group and Shancaoyu Group. The main rock type in the formation is a metamorphic rock of medium to upper amphibolites facies. West of the Yishui-Tangtou fracture, the Mesozoic-Cretaceous Dasheng Group is exposed comprising dark purple sandstone and glauconite sandy shale. The area is structurally complex.

There are several ore deposits in the area such as the Yangzhuang iron ore, Beiguozhang iron, Tianbao ilmenite, Mazhan and Gaoqiao iron ore, Guanzhuang bentonite and large amounts of limestone, dolomite, building stone and river sand.

6 GEOLOGY OF THE TENEMENT AREA

All information on the geology of the tenement area comes from Shandong Lianchuang Architectural Design Co. Ltd (2011).

6.1 Stratigraphy

The geology of the project area contains only the exposed Yanlingguan Formation of the Archaean Taishan Group, basalts of the Niushan Formation which is part of the Cenozoic Linqu Group and Quaternary deposits.

6.1.1 Yanlingguan Formation

This formation is part of the Archaean Taishan Group which occurs within Palaeoproterozoic monzonitic granites. It is composed of biotite-anorthosite granulite, biotite-amphibolite granulite and magnetite-quartz amphibolites.

It outcrops to the east and north of Shangyu Donggou village and the exposed area covers approximately 0.015 km^2. The formation has a sharp contact with the monzonitic granite in which it is contained. The formation is orientated from 220° to 240° and dips between 55° and 84°.

6.1.2 Niushan Formation

This formation is part of the Neogene Linqu Group (NLN). It is composed of greyish-black basalt, amygdaloidal olivine basalt and conglomerate. The rock is hard and not easily eroded and consequently it outcrops as scarps in the local area.

This formation is exposed in the north of the area and strikes east-west. It has a strike length of approximately 300 metres, a width of approximately 150 metres and covers a total area approximately 0.52 km^2.

6.1.3 ***Quaternary System***

6.1.3.1 *Shanqian Formation*

This formation is located near Shangyu and Dayu. It is composed of sand and sandy soils with rock fragments and in some areas an aeolian loess layer 0.3 to 1.0 metre thick can also be seen. This formation covers an area of approximately 0.53 km^2.

6.1.3.2 *Linyi Formation*

The Linyi Formation is composed of clay, clayey sand and rock and is approximately 1.5 to 5.0 metres thick. The formation is distributed around the river in the Shangyu-Bashan reservoir and covers an area of approximately 0.87 km^2.

6.1.3.3 *Yihe Formation*

This formation is composed of sand, sandy gravel and pebbles. It is distributed in the flood plane in the Shangyu-Bashan reservoir and covers an area of approximately 0.37 km^2.

6.2 Magmatic Rocks

Magmatic rocks in the area are mainly contained within the Dujiacha River Unit, the Tiaohuayu Valley Unit, the Hushan Mountain Unit and the Songshan Mountain Unit which are part of the Palaeozoic Aaolaishan Formation. Magmatic rocks are also contained in the Sanguanzhai Unit of the Hongmen Super Unit as well as Niulan Unit of the Motianling Super Unit which was formed in Mesoproterozoic Era. In addition, small quantities of diorite porphyry and quartz reefs are exposed in the area.

6.2.1.1 ***Dujiacha River Unit***

This unit is present in the north of the project area and contains medium-grained hornblende monzonitic granite. It covers an area of approximately 0.33 km^2 with hilly topography.

6.2.1.2 ***Tiaohuayu Valley Unit***

The Tiaohuayu Valley Unit is mainly distributed in the central and north parts of the project area and is composed of a gneissic medium to coarse-grained biotite monzonitic granite. It covers an area of approximately 4.5 km^2 with hilly landforms.

6.2.1.3 *Hushan Mountain Unit*

This unit is located to the south of Yujia River, which is in the south of the project area. It is composed of medium to coarse-grained porphyritic monzonitic granite and covers an area of 40 km^2.

6.2.1.4 *Songshan Mountain Unit*

The Songshan Mountain Unit is located in the south and central areas of the project area and covers approximately 5.5 km^2. It is composed of porphyritic medium-grained monzonitic granite.

6.2.1.5 *Sanguanzhai Unit*

This unit is part of the Hongmen Super Unit and is present in the entire project area. It is composed of medium to coarse-grained gabbro and is the host of the iron and titanium mineralisation.

6.2.1.6 *Niulan Unit*

This unit is part of the Motianling Super Unit and is composed of dolerite.

6.3 Structure

There is evidence of both ductile and brittle deformation in the project area.

6.3.1 *Ductile Structures*

Ductile deformation structures are mainly exhibited in the monzonitic granites and to some extent within the Yanlingguan Formation which is contained within them. The structures include folds of varying sizes, schistosity and other features and were all formed under the same southwest-northeast stress regime.

6.3.2 *Brittle Structures*

There are three principal fault structures in the project area; F1, F2 and F3.

F1 is orientated approximately north-south, dips 35° to 60° to the west, is approximately 1,300 m in length and the whole fault zone is between 6 and 15 m wide. The fault zone contains cataclastic rock and fault breccias which exhibit ferrous and siliceous alteration. The fault exhibits normal shear and is thought to have been active in the Early Cretaceous. The hanging wall is composed of granite and the footwall contains the iron and titanium mineralisation.

F2 is also orientated north-south, dips 55° to the west but is approximately 800 m in length and is 1 to 10 m wide. This fault zone also contains cataclastic rock and fault breccias with ferrous and siliceous alteration. The movement on the fault is dextral shear and the lithology on both sides of the fault is granite.

F3 is also orientated north-south, dips 80° to the west and is approximately 300 m in length and 1 to 6 m thick. This fault contains the same cataclastic rock and fault breccias with ferrous and siliceous alteration and like F2 also exhibits dextral shear.

6.4 Mineralisation

6.4.1 Mineralisation Structure

The iron and titanium mineralisation is hosted in the gabbro of the Sanguanzhai Unit which is part of the Palaeoproterozoic Hongmen Super Unit. The mineralisation strikes north-south, has an overall length of 6,500 m and is exposed at the surface as positive relief. The mineralisation is divided into two zones: 'Orebody 1 (Figure 6-1)' and 'Orebody 2 (Figure 6-2)'.

6.4.1.1 Orebody 1

Orebody 1 is in the north of the project area to the northeast of Dayu Village. The mineralisation strikes approximately north-south and dips between 24 and 88°. It is approximately 3,000 m long and between 36 to 136 m in thickness.

The minimum, average and maximum true thicknesses of the mineralisation are 5.24 m, 63.90 m and 141.42 m respectively. The maximum vertical depth of the mineralisation is 778 m but in general the mineralisation occurs and an average depth of 400 to 600 m, which corresponds to an elevation of +344 to 543 m.

The grade distribution in Orebody 1 is relatively regular. The minimum, average and maximum grades of TiO_2 are 5.00%, 6.74% and 8.74% respectively. The minimum, average and maximum grades of TFe are 11.14%, 14.65% and 17.80%. There are no major discontinuities within Orebody 1 and the mineralisation has a simple geological structure.

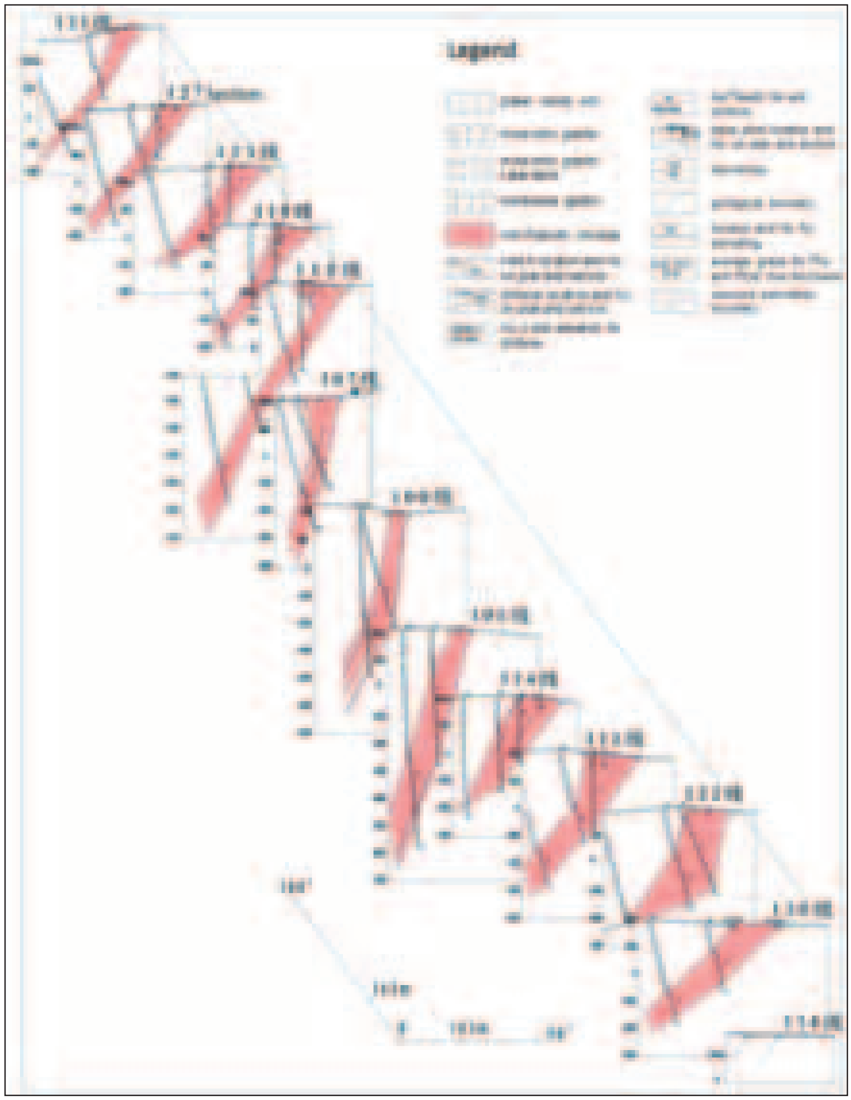

Figure 6-1: Profile of Orebody 1

Source: Shandong Lianchuang Architectural Design Co. Ltd (2011)

6.4.1.2 Orebody 2

Orebody 2 is located between Shangyu Village, Xiaoyu and a small reservoir in northern Hongshimen. It is also orientated north-south and dips between 22°and 54° towards the west. It is approximately 2,700 m long and between 9 and 100 m thick.

The minimum, average and maximum true thicknesses of the mineralisation are 4.63 m, 42.91 m and 92.36 m. The maximum vertical depth of the mineralisation is 444 m however in general the mineralisation occurs at 138 to 460 m, which corresponds to an elevation of approximately +223 to 263 m.

The grade distribution in Orebody 2 is regular and the minimum, average and maximum grades of TiO_2 are 5.45%, 6.50% and 8.05%. The minimum, average and maximum grades of TFe are 10.43%, 14.75% and 17.22%. There are some un-mineralised zones and discontinuities in mineralisation within the orebody.

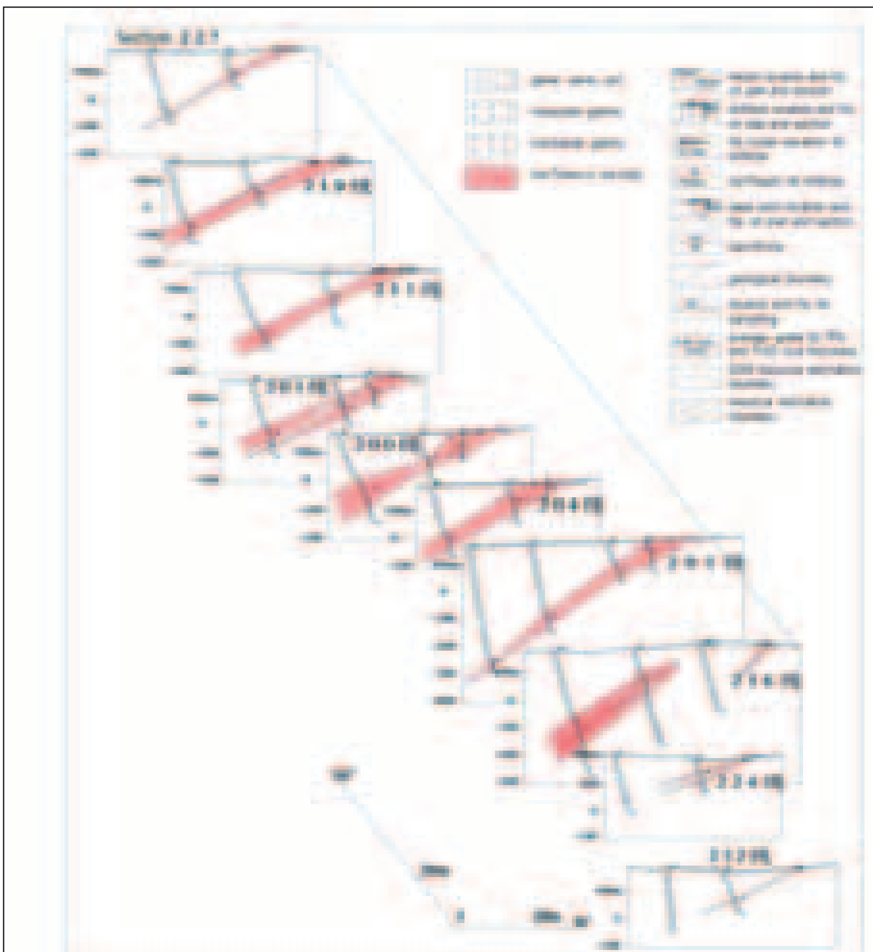

Figure 6-2: Composite Profile for Orebody 2

Source: Shandong Lianchuang Architectural Design Co. Ltd (2011)

6.4.2 *Mineralogical Composition*

The mineralisation is composed of ilmenite and magnetite. Associated minerals are pyrite and chalcopyrite. Associated non-metallic minerals are plagioclase, pyroxene, titanite, biotite, phosphate and carbonate minerals.

According to test results the principal economic mineral is TiO_2 which has an average grade of 6.63%. The principal accompanying constituent is Fe which has a total iron (TFe) grade of 14.68%. Other constituents include V2O5 at a grade of 0.05%, MnO at a grade of 0.22%, SiO2 at an average grade of 46.41%, Cu at an average grade of 0.01×10-6, Al2O3 at an average grade of 6.56%, CaO at an average grade of 6.56%, MgO2 at an average grade of 3.96%, S at an average grade of 0.18%, P at an average grade of 0.09%, As at an average grade of 3.86×10-6 and Pb at an average of 12.55×10-6.

7 PROJECT HISTORY

7.1 Ownership History

The project has been owned by Shandong Xingsheng Mining Company Limited since 18th January 2004. Details of the previous owners of the project were not provided by the client.

7.2 Exploration History

The following information has been sourced from Shandong Lianchuang Architectural Design Co. Ltd (2011).

The No. 8 Exploration Institute of Geology and Mineral Resources of Shandong were commissioned to make a detailed geological survey of the iron and titanium ore in the Zhuge Shangyu project area between April and November of 2008. A report named 'Detailed Survey Report of Ilmenite in Shangyu Mining, Yishui County, Shandong Province' was submitted in March 2009 and was approved as LKKSJZ [2009] No.10 Document by experts from Provincial Reserves Review Office on 6th March 2009. This project included a resource estimate (see Previous Resource and Reserve Estimates).

The detailed geological survey included drilling to constrain the shape, scale, internal structure and the spatial distribution of the mineralisation. It included analysis of the mineralisation characteristics, composition and grade in addition to analysis of deleterious elements. The work also included studies to assess the industrial and processing properties of the mineralisation. Hydrogeological and geotechnical work was also undertaken. Table 7-1 lists the type and quantity of work completed.

Table 7-1: Summary of Exploration Work Completed by the No. 8 Exploration Institute of Geology

Work item	Unit	Practical workload	Remarks
I. Survey			
1. Control survey	Dot	20	Fourth-class conductor
2. 1:2,000 terrain survey	km^2	7.40	
3. Prospecting line profile survey	km	7.73	
4. Baseline survey	km	6.5	
5. Layout of geophysical prospecting network	km^2	7.04	
6. Survey and repetition survey by exploratory trench	Dot	44	
7. Survey and repetition survey by borehole	Dot	116	
II. Geology survey			
1. 1:50,000 regional geology mapping	km^2	97.50	
2. 1:10,000 geology revision	km^2	12.17	
3. 1:2,000 geology survey	km^2	3.88	
III. Hydro-engineering-environmental geology			
1:10,000 hydro-geological survey in mining area	km^2	12.17	
1:10,000 engineering geology survey in mining area	km^2	12.17	
1:10,000 environmental geology survey of mining area	km^2	12.17	
IV. Geophysical prospecting			
1:10,000 high-precision magnetic survey	km^2	7.04	100×20
V. Trenching	m^3	3,668	
VI. Mechanical core drilling	m	19,982.30	106 holes (including hydrology holes)
VII. Hydrogeology drilling	m	559.30	2 holes

Work item		Unit	Practical workload	Remarks
VIII.	**Hydrogeology pumping test and hydrogeology observation**			
1.	Pumping test by borehole	Shift	48	2 holes
2.	Civil well pumping	Well	10	
3.	Simple hydrogeology observation by borehole	Hole	56	
4.	Dynamic observation of surface water and groundwater	Well	10	
IX.	**Granite mine test**			
(I)	Granite mine analysis			
1.	Sample for fundamental analysis	Piece	4,127	TFe TiO_2
2.	Complete spectrum analysis	Piece	5	
3.	Complete chemical analysis	Piece	5	
4.	Combinatorial analysis	Piece	193	SiO_2, mFe, V_2O_5、 P, S
5.	Internal test sample of iron ore	Piece	412	
6.	Outside test of iron ore sample	Piece	206	
(II)	Identification and test of granite mine			
1.	Slice producing and identification	Sheet	23	
2.	Lumislice producing and identification	Sheet	16	
(III)	Granite mine test			
1.	Corpusculum density sample	Piece	56	
2.	Humidity sample	Piece	56	
(IV)	Physical mechanics sample of rock and ore	Piece	21	3 pieces in each of 7 groups
(V)	Chemical analysis sample of underground (surface) water	Piece	11	Complete analysis
X.	**Geological Exploration**			
1.	Drilling	m	19,982.30	
2.	Trenching	m	3,668	
3.	Record of hydrology and engineering geology rock (ore) core	m	559.30	
4.	Core sampling by borehole	Piece	3,212	
5.	Channelling sampling by exploratory trench	Piece	915	

Source: Shandong Lianchuang Architectural Design Co. Ltd (2011)

More recently, in 2011 Shandong Lianchuang Architectural Design Co. Ltd completed a feasibility study on the Zhuge Shangyu Iron and Titanium Project. The scope of the project included a study of the mine, processing plant, administrative infrastructure, tailings dam, waste dumps and water supply.

8 QA/QC ANALYSIS

The quality assurance/quality control (QA/QC) analysis comes from the geological exploration reports for the project, the assay QA/QC data that was supplied by the client, and information and observations gathered by MCS during the site visit.

8.1 Drill hole sampling

All drill hole core sample boundaries were determined by lithology and mineralisation. A total of 5,336 samples were taken with an average sample length of around 2 metres. Drill core was broken into 2 halves using a manual core splitter and half of the core was sampled while the remaining half was stored.

8.2 Assay Precision

Precision is a measure of the reproducibility of a result when using the same process. Assay precision was calculated for total iron (TFe) and titanium dioxide (TiO_2) from the repeat analysis results. The provided repeat data occurred at a frequency of 412 results from a total of 5,336 analyses (7.7% of total analyses). The scatterplot for TFe results versus TFe repeat results is shown in Figure 8-1. Assay precision for TFe was ±3.10%. The scatterplot for TiO_2 results versus TiO_2 repeat results is shown in Figure 8-2. Assay precision for TiO_2 was ±5.29%.

The number of samples taken for the repeat analysis is representative of the population (7.7%). Assay precision for both TFe and TiO_2 is acceptable.

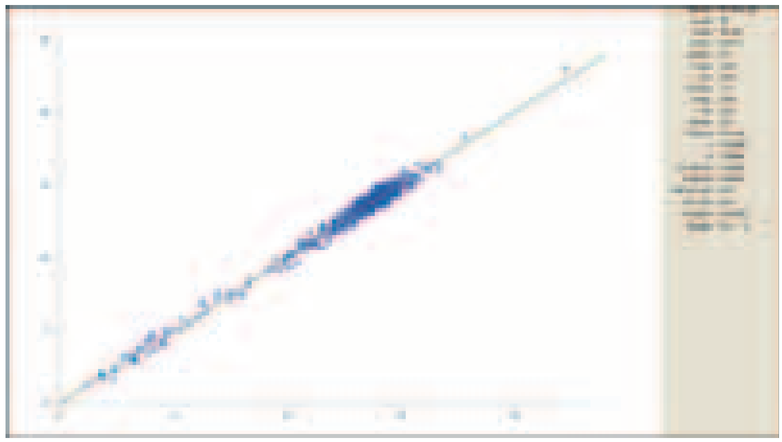

Figure 8-1: Scatterplot of TFe results versus TFe repeat results

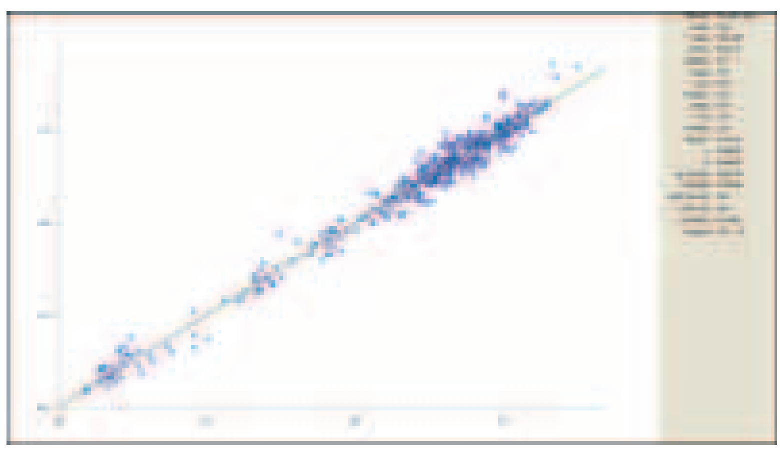

Figure 8-2: Scatterplot of TiO_2 results versus TiO_2 repeat results

8.3 Assay Bias

Samples were routinely sent to an umpire laboratory for analysis to establish if a baseline difference in reportable grades existed between the No. 8 Exploration Institute of Geology and Mineral Resources laboratory in Rizhao city, Shandong province and an independent laboratory. The independent laboratory was the laboratory of the Shandong Province Experimental Institute of Geological Sciences, located in Jinan city, Shandong province. The umpire analytical data provided occurred at a frequency of 206 samples out of 5,336 analyses (3.9% of the total analyses). A quantile-quantile plot of TFe results from the No. 8 Exploration Institute of Geology and Mineral Resources laboratory versus TFe results from the Shandong Province Experimental Institute of Geological Sciences laboratory is shown in Figure 8-3. The data points all lie very close to the straight line which indicates there is no significant assay bias present between the results of the two laboratories at different grade cut-offs.

A quantile-quantile plot of TiO_2 results from the No. 8 Exploration Institute of Geology and Mineral Resources laboratory versus TiO_2 results from the Shandong Province Experimental Institute of Geological Sciences laboratory is shown in Figure 8-4. As with the TFe results, the data points all lie very close to the straight line which also indicates there is no significant assay bias present between the two sets of results at different grade cut-offs.

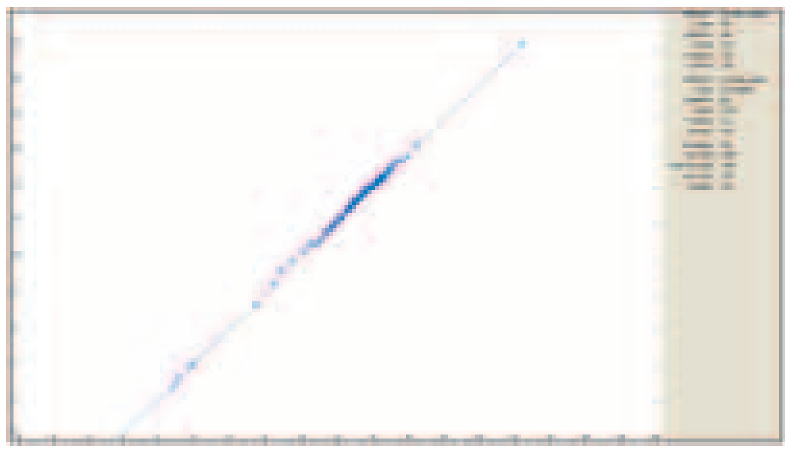

Figure 8-3: Quantile-quantile plot of TFe results from the primary laboratory versus those for the umpire laboratory

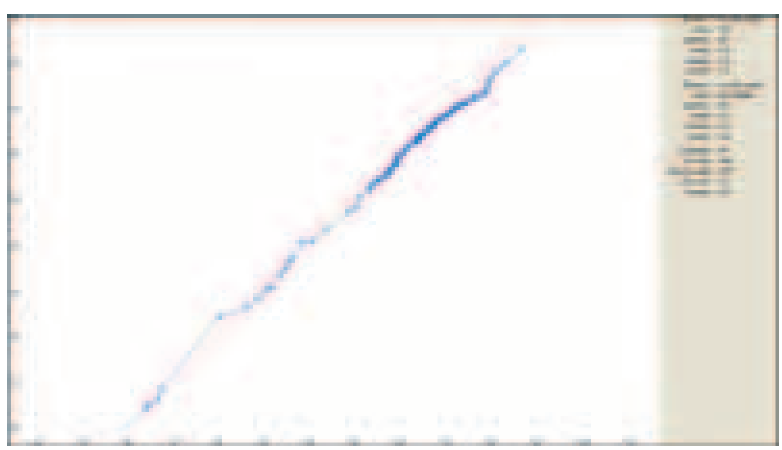

Figure 8-4: Quantile-quantile plot of TiO_2 results from the primary laboratory versus those for the umpire laboratory

8.4 Drilling Method

114 drillholes for 20,377.66 metres were drilled in 2008. All drilling was carried out by the No. 8 Exploration Institute of Geology and Mineral Resources using Jiang Tan XY-4 drill rigs. These drill rigs used 3 metre rods and were capable of drilling to depths of 1,000 metres.

The drill rigs produced NQ size core with a drilling diameter of 91 mm at the top of the hole in the weathered rock and then 75 mm to hole completion.

8.5 Drill hole survey

Drillholes from the surface were generally vertical or inclined steeply at around 80 degrees. Downhole surveys were performed every 50 metres downhole, and at orebody contacts using XJL-42 and JXY-2 electronic inclinometers.

Drillhole locations were surveyed using 4 survey markers in the planar Beijing 1954, 3 degree zone coordinate system. There are 7 mapping control points and 33 baseline points in the area.

8.6 Other surveys

A topographical survey was completed for the area using a Trimble 5700RTK type GPS receiver and using CASS5.1 topographical and cadastral mapping software.

8.7 Core Recovery

Core recovery data was recorded for 61 drillholes. Linear core recovered length was 18,965.39 metres against 19,396.85 metres of drilling, where core recovery was recorded. Recovery was weight averaged for each hole and where no data was provided for an interval, the interval was ignored.

The mean drill hole core recovery was 96.34%. This is acceptable and indicates the drillcore samples were representative of the drill interval.

8.8 Trenching and Sampling

42 trenches were excavated for 4,139.6 linear metres. All trenches were orientated east-west and spaced on 100 m sections along the strike of the orebody and ranged in length from 21 metres to 153 metres.

All were sampled as continuous channel samples taken from the base of the trench or adit on the northern face.

8.9 Standards and Blanks

The client did not provide any results of external standard analysis or details of the standards. Internal standards were used by No. 8 Geological Exploration Brigade laboratory. Some of these standards were observed during the site visit, but no data of the results for QA/QC purposes was provided by the client.

8.10 Laboratory inspection

The primary laboratory for the project was the laboratory of the Shandong No. 8 Exploration Institute of Geology and Mineral Resources, in Rizhao city, Shandong province. The laboratory was inspected by Mr. David Allmark and Mr. Jeff Zhang of MCS accompanied by Mr. Jack Li and Ms. Annie Zhang of JLL, with Mr. Liu Jiazhao the Manager of the No. 8 Geological Exploration Brigade, on the 5th of March 2011. Sample receival, sample preparation and sample analysis facilities were viewed and procedures were documented. The laboratory is certified by the Shandong Provincial Quality and Technology Supervision Bureau and the State Recognising Supervision Administration Committee. Certificates for both authorities are shown in Figure 8-5.

Figure 8-5: Laboratory accreditation certificates

Upon sample receival, all details of the samples were logged and entered into a spreadsheet. Sample batch numbers and internal QA/QC sample numbers were then allocated. Details of all required element analyses were then recorded and staff members were allocated their own particular responsibility for the sample batch.

Sample preparation involved two stages of crushing and one of pulverisation. For the first stage, the sample was crushed in the primary jaw crusher to 10 millimetres. During the second stage, the sample is crushed further by 'cold crushers' to 1 millimetre. For the pulverisation stage, the sample was crushed by roll crushers to 0.074 millimetres. The machines for the first and second stages of crushing are shown in Figure 8-6 while the roll crusher machine for pulverisation is shown in Figure 8-7. The storage area for the pulverised sample is shown in Figure 8-8.

Figure 8-6: First stage jaw crusher (left) and second stage cold crusher (right)

Figure 8-7: Roll crushers for pulverisation stage

Figure 8-8: Storage of pulverised samples

8.10.1 *Analytical Method*

After sample preparation, the weight of each sample was checked by weighing on a set of scales and the weight was recorded. To the dry sample was added a mixture of sulphuric and phosphoric acid. The mixture was then heated on a hot plate if the sample did not dissolve. The final solution was analysed for total Fe and TiO_2 using a Thermo Scientific iCAP 6000 series inductively coupled plasma optical emission spectrometer (ICP-OES) machine housed in a temperature and humidity controlled room Figure 8-9.

Figure 8-9: Technician operating ICP-OES machine at the primary Rizhao laboratory

8.10.2 *Laboratory Inspection Summary*

MCS observed during the visit that laboratory hygiene was of a high standard and the Chinese procedures for sample preparation and analysis were being followed and observed by laboratory staff.

8.11 Site visit

The Zhuge Shangyu project site was visited on the 4th of March 2011 by Mr. David Allmark and Mr. Jeff Zhang of MCS, accompanied by Ms. Annie Zhang and Mr. Jack Li of JLL. MCS checked the site layout and verified the provided data and later visited the laboratory used for the primary analytical work in Rizhao. The No. 8 Geological Exploration Brigade that conducted the exploration was also visited at their base in Rizhao city.

8.11.1 *Drillhole collar location verification*

The purpose of the site visit was to independently verify a selection of drillhole collar positions and to inspect and verify core intersections to confirm the geology and mineralisation.

Within the allowable time MCS attempted to check the locations of drillhole collars for the project. MCS found that all of the collar locations were in farming areas and that the original collar locations had been disturbed. Parts of the concrete caps were found but were not in their original location. For the Zhuge Shangyu project, no original collars could be found. Local villagers assisted with trying to find some of the collars, but the locations were found to be disturbed and only some scattered, small pieces of concrete, possibly from the concrete caps, were found. Collar locations could not be verified.

8.11.2 *Drill core verification*

MCS viewed the drillcore for the project at the project site. The core was stored in a core storage shed and was covered in a film of dust but was in good condition. The core appeared a little disorganised but core from complete holes was kept together and was able to be inspected (Figure 8-10).

Figure 8-10: Core storage facility for the drill core from the Zhuge Shangyu project

MCS was able to check a random selection of drillcore intervals from 7 drillholes. The details of the core inspected are listed in Table 8-1. The core for each interval was checked with the original drillhole logs (supplied by the client for the site visit) and the assays for the intervals. MCS was able to verify the geology, mineralisation and approximate grade of each interval inspected. All core appeared to have been correctly split and sampled. Marker tags for the depths of each interval in the boxes were available and also inspected. All were found to be correct, and were generally in the correct position. Photographs of the core that was inspected are shown in Figure 8-11 to Figure 8-17.

Table 8-1: Details of drillcore intervals inspected

HoleID	Depth from *(m)*	Depth to *(m)*	Comments
ZK130-1	197.60	199.60	Ilmenite ore, magnetic.
ZK100-1	548.60	550.50	Ilmenite ore, slightly magnetic.
ZK204-1	87.20	89.50	Ilmenite ore, slightly magnetic. Assay 14% TFe, 6.5% TiO_2
ZK114-2	140.20	142.40	Ilmenite ore, slightly magnetic. Assay 14% TFe, 6.5% TiO_2
ZK115-4	666.60	667.50	Ilmenite ore, moderately magnetic. Assay 14% TFe, 6.5% TiO_2
ZK118-1	173.00	175.90	Ilmenite ore, moderately magnetic. Assay 14% TFe, 5.7% TiO_2
ZK114-1	69.60	71.10	Ilmenite ore, moderately magnetic. Assay 14% TFe, 8% TiO_2

Figure 8-11: Drill core from ZK130-1 (197.60-199.60 m)

Figure 8-12: Drill core from ZK100-1 (548.60-550.50 m)

Figure 8-13: Drill core from ZK204-1 (87.20-89.50 m)

Figure 8-14: Drill core from ZK114-2 (140.20-142.40 m)

Figure 8-15: Drill core from ZK115-4 (666.60-667.50 m)

Figure 8-16: Drill core from ZK118-1 (173.00-175.90 m)

Figure 8-17: Drill core from ZK114-1 (69.60-71.10 m)

8.12 Specific Gravity and Moisture

Specific gravity was determined by the quick immersion method according to the Chinese geological exploration code. The sample was first coated in wax to prevent absorption of water. The weight of the sample in air was obtained then the sample was immersed in water and a second weight in water was obtained. The amount of water displaced by the immersion of the sample was recorded. The specific gravity was then determined according to the following formula:

W2 = wax plus sample weight

W1 = dry weight

Wax density 0.9 t/m^3

Wax volume, VP = (W2 – W1)/0.9

VC = displaced water volume

Sample volume, V = VC – VP

Density = W1/V

9 EXPLORATION GRID DENSITY

According to the Shandong Lianchuang Architectural Design Co. Ltd (2011), the exploration carried out by the No. 8 Exploration Institute of Geology and Mineral Resources of Shandong was based on the nature of the mineralisation, which is large in scale with a simple internal structure. As a result trenches were excavated across the strike of the mineralisation at 100 m intervals with trenches excavated every 200 m along the strike of the orebody. Drilling was carried out on a grid measuring between 200 to 400 m by 100 to 400 m.

10 PREVIOUS RESOURCE AND RESERVE ESTIMATES

According to Shandong Lianchuang Architectural Design Co. Ltd (2011), the work carried out by the No.8 Exploration Institute of Geology and Mineral Resources of Shandong in 2008 included an approved resource estimate (LKKSJZ [2009] No.10 Document) approved by the Provincial Reserves Review Office on 6th March 2009.

The total resource amounted to 462.894 Mt of ore containing 30.692 Mt of TiO_2 at a grade of 6.63% TiO_2. This included resources in ore body '122b' of 14.096 Mt of ore containing 995 thousand tonnes of TiO_2 at a grade of 7.06% and Total Iron (TFe) at a grade of 14.56%, resources in ore body '332' of 89.642 Mt of ore containing 5.916 Mt of TiO_2 at a TiO_2 grade of 6.60% and TFe at a grade of 14.63% and resources in ore body '333' of 359.156 Mt of ore containing 23.781 Mt of TiO_2 at a grade of 6.62% and TFe at a grade of 14.72%. **This resource estimate is a 'historic' resource. This resource has not been reviewed or audited by Micromine Consulting Services and is not considered to be JORC compliant and therefore should not be relied upon.** MCS has not been provided with details of the parameters or the methods used to obtain this resource estimate.

In 2011 Shandong Lianchuang Architectural Design Co. Ltd carried out a feasibility study which included a reserve estimate. This estimate was carried out using 'Datamine' software and the resulting reserves in the three separate ore bodies are summarised in Table 10-1. MCS has not been provided with details of the parameters or the methods used to obtain this resource estimate.

Table 10-1: Summary of historic reserves estimate

Ore Body	Tonnage *(Mt)*	TFe Grade *(%)*	TiO_2 Grade *(%)*
122b	14.096	14.56	7.06
332	89.642	14.63	6.60
333	156.000	14.72	6.62
Total	462.894	14.68	6.63

Source: Table taken from information in Shandong Lianchuang Architectural Design Co. Ltd (2011).

This reserve estimate is a 'historic' reserve. This reserve has not been reviewed or audited by Micromine Consulting Services and is not considered to be JORC compliant and therefore should not be relied upon.

11 RESOURCE ESTIMATION METHODOLOGY

11.1 Methodology

The modelling methodology involved the following steps:

- Database compilation;
- Data validation;
- Exploratory data analysis;
- Interpretation of mineralisation based on the geological cut-off grade;
- Wireframing of interpreted mineralised polygons;
- Modelling of experimental semivariograms;

- Determination of modelling search neighbourhood parameters;
- Block modelling and grade interpolation;
- Removal of mined out areas;
- Resource classification;
- Resource reporting at a cut-off that Indicated the resources was potentially economically viable.

11.2 Software

The Zhuge Shangyu iron and titanium deposit resources were estimated using MICROMINE (Version 12.0.4) software.

11.3 Database Compilation

Data was provided by Shandong Xingsheng Mining Company Limited (the client) on 11th and 20th of January 2011. The provided data consisted of one Excel spreadsheet, containing collar, survey, assay, core recovery, specific gravity data and lithological descriptions and other information in 8 worksheets.

The Excel spreadsheet provided was as follows:

1. Xingsheng drilling data – Shangyu.xls

The contents of each worksheet in the Xingsheng drilling data – Shangyu.xls spreadsheet is shown in Table 11-1.

Table 11-1: Contents of spreadsheet Xingsheng drilling data – Shangyu.xls

Worksheet	No. of Holes and Trenches	No. of Records
Survey	156	156
Collar	156	156
Assay	104	5,336
Geology	100	450
Recovery	61	8,781
SG	67	120
Lookup Codes	NA	NA
Notes	NA	NA

11.4 Data Validation

The files of both spreadsheets were then prepared so that they could be imported into MICROMINE software. Minor changes were made to the files after import into MICROMINE to enable creation of a drillhole database in MICROMINE.

The original drawings from the exploration report were then supplied by the client on the 20th of January 2011 and MCS performed the following:

- Displayed geology plans and cross-sections in MapGIS then imported into MICROMINE. The plans and sections were then geo-referenced in MICROMINE and the collar positions and traces were checked;

- Checked collar coordinates, survey and assay data with the original data on the drawings;

- Entered additional downhole survey data for each drillhole that had not been included in the supplied data previously.

Obvious errors in the supplied database were then corrected. The database was then checked using special processes designed to detect the following errors:

- Duplicate drillhole or trench names;

- One or more collar coordinates missing in the collar file;

- FROM or TO missing or absent in the assay file;

- FROM ⩾ TO in the assay file;

- Sample intervals are not contiguous in the assay file (gaps exist between the assays);

- Sample intervals overlap in the assay file;

- First sample is not equal to 0 m in the assay file;

- First depth is not equal to 0 m in the survey file;

- Several downhole survey records exist for the same depth;

- Azimuth is not between 0 and 360 degrees in the survey file;

- Dip is not between 0 and 90 degrees in the survey file;

- Azimuth or dip is missing in survey file;
- Total depth of the holes is less than the depth of the last sample; and
- Total downhole survey depth is greater than the total drillhole depth.

Numerous errors were identified and corrected in the database. Details of all errors identified are in the Appendix 2: Zhuge Shangyu Iron and Titanium Project Database Validation and Acceptance Report. The final database contained records for 114 drillholes and 42 trenches. The number of records for each holeID in the final database is shown in Table 11-2.

Table 11-2: Number of records for each HoleID in the final database

HoleID	Northing (mN)	Easting (mE)	RL (m)	Depth (m)	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
QZ130-1	3978788.000	40372138.000	189.00	9.50	1	0	0	0	0
QZ130-2	3978788.000	40372155.000	189.00	9.50	1	0	0	0	0
QZ130-3	3978788.000	40372146.000	189.00	10.00	1	0	0	0	0
QZ130-4	3978788.000	40372138.000	189.00	18.00	1	0	0	0	0
QZ130-5	3978788.000	40372255.000	183.65	16.25	1	0	0	0	0
QZ130-6	3978788.000	40372138.000	183.65	6.50	1	0	0	0	0
QZ130-7	3978788.000	40372265.000	183.65	4.80	1	0	0	0	0
QZ130-8	3978788.000	40372270.000	183.65	11.00	1	0	0	0	0
QZ134-1	3978588.000	40372150.000	186.25	13.00	1	0	0	0	0
QZ134-2	3978588.000	40372170.000	185.80	13.00	1	0	0	0	0
QZ134-3	3978588.000	40372160.000	185.95	16.00	1	0	0	0	0
QZ134-4	3978588.000	40372155.000	186.00	16.00	1	0	0	0	0
QZ134-5	3978588.000	40372230.000	184.40	17.00	1	0	0	0	0
QZ134-6	3978588.000	40372250.000	184.00	11.00	1	0	0	0	0
QZ134-7	3978588.000	40372240.000	184.20	11.00	1	0	0	0	0
QZ134-8	3978588.000	40372235.000	184.35	15.00	1	0	0	0	0
QZ138-1	3978388.000	40372048.000	184.80	5.70	1	0	0	0	0
QZ138-2	3978388.000	40372067.000	185.35	9.00	1	0	0	0	0
QZ138-3	3978388.000	40372097.000	184.96	12.00	1	0	0	0	0
QZ138-4	3978388.000	40372117.000	184.78	11.00	1	0	0	0	0
QZ138-5	3978388.000	40372138.000	183.23	14.00	1	0	0	0	0
QZ138-6	3978388.000	40372157.000	183.00	13.00	1	0	0	0	0
QZ138-7	3978388.000	40372203.000	182.20	17.50	1	0	0	0	0
QZ138-8	3978388.000	40372183.000	182.20	11.00	1	0	0	0	0
QZ138-9	3978388.000	40372213.000	182.13	16.50	1	0	0	0	0
QZ138-10	3978388.000	40372233.000	182.00	16.20	1	0	0	0	0

HoleID	Northing *(mN)*	Easting *(mE)*	RL *(m)*	Depth *(m)*	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
QZ138-11	3978388.000	40372253.000	181.84	17.40	1	0	0	0	0
QZ138-12	3978388.000	40372280.000	181.48	16.40	1	0	0	0	0
QZ138-13	3978388.000	40372300.000	181.16	13.50	1	0	0	0	0
QZ211-1	3977700.000	40372485.000	179.70	12.50	1	0	0	0	0
QZ211-2	3977700.000	40372465.000	179.00	8.00	1	0	0	0	0
QZ211-3	3977700.000	40372445.000	178.42	7.00	1	0	0	0	0
QZ211-4	3977700.000	40372425.000	176.45	7.50	1	0	0	0	0
QZ211-5	3977700.000	40372435.000	178.15	10.00	1	0	0	0	0
QZ211-6	3977700.000	40372440.000	178.28	9.00	1	0	0	0	0
QZ211-7	3977700.000	40372505.000	180.20	15.00	1	0	0	0	0
QZ211-8	3977700.000	40372515.000	180.55	11.00	1	0	0	0	0
QZ215-1	3977900.000	40372446.000	178.00	10.00	1	0	0	0	0
QZ215-2	3977900.000	40372466.000	178.16	13.00	1	0	0	0	0
QZ215-3	3977900.000	40372456.000	178.16	17.00	1	0	0	0	0
QZ215-4	3977900.000	40372500.000	178.40	15.00	1	0	0	0	0
QZ215-5	3977900.000	40372510.000	178.40	6.50	1	0	0	0	0
QZ215-6	3977900.000	40372520.000	179.00	15.50	1	0	0	0	0
QZ215-7	3977900.000	40372530.000	179.46	22.00	1	0	0	0	0
QZ215-8	3977900.000	40372540.000	179.88	18.00	1	0	0	0	0
QZ215-9	3977900.000	40372550.000	180.50	10.00	1	0	0	0	0
QZ219-1	3978100.000	40372521.000	179.38	14.00	1	0	0	0	0
QZ219-2	3978100.000	40372526.000	179.34	14.00	1	0	0	0	0
QZ219-3	3978100.000	40372541.000	179.23	6.00	1	0	0	0	0
QZ219-4	3978100.000	40372533.000	179.30	10.00	1	0	0	0	0
STC0	3981030.050	40372300.000	243.00	138.40	1	67	3	2	0
STC1	3981130.310	40372328.220	244.06	124.00	1	58	3	1	0
STC1A	3979191.000	40372123.000	216.00	115.00	1	50	0	3	0
STC2	3979389.000	40372170.000	215.00	151.50	1	71	3	4	0
STC3	3979588.000	40372178.000	219.51	114.00	1	57	3	6	0
STC3-1	3981230.010	40372357.020	251.91	122.00	1	59	3	0	0
STC4	3980830.050	40372204.120	224.00	123.00	1	60	3	3	0
STC4A	3979489.000	40372169.000	220.11	130.30	1	61	0	2	0
STC7	3981430.060	40372348.500	264.14	104.00	1	50	3	2	0
STC8	3980630.120	40372180.050	221.30	94.00	1	0	3	2	0
STC11	3981630.050	40372322.000	287.15	89.00	1	44	3	2	0
STC15	3981870.000	40372294.000	326.94	84.00	1	42	3	1	0
STC20	3977300.820	40372456.750	196.35	104.80	1	47	3	2	0
STC24	3977108.030	40372393.820	189.21	135.40	1	68	5	2	0
STC26	3977004.020	40372366.570	189.82	146.00	1	70	3	2	0
STC28	3976906.050	40372350.220	197.48	141.00	1	69	6	2	0

HoleID	Northing (mN)	Easting (mE)	RL (m)	Depth (m)	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
STC32	3976600.000	40372364.120	195.74	127.60	1	61	3	2	0
STC36	3976505.750	40372364.250	193.80	133.00	1	61	3	2	0
SZK0	3981030.230	40372333.120	240.25	81.69	1	24	0	2	0
SZK1	3979386.120	40372212.400	207.79	50.00	1	25	1	8	50
SZK2	3979583.000	40372227.000	211.03	50.00	1	25	3	8	42
SZK3	3981230.050	40372373.210	250.87	65.43	1	28	0	2	0
SZK24	3977106.080	40372416.000	186.20	100.00	1	43	0	2	0
SZK28	3977297.000	40372177.220	175.58	57.74	1	23	0	2	0
TC100	3980230.000	40372190.000	210.33	53.00	1	22	3	0	0
TC103	3980430.000	40372200.000	208.35	56.00	1	27	4	0	0
TC104	3980030.000	40372150.000	227.90	55.00	1	23	7	0	0
TC108	3979830.000	40372170.000	227.20	54.00	1	23	4	0	0
TC109	3980730.000	40372169.000	216.80	153.00	1	75	7	0	0
TC112	3979688.000	40372147.000	221.80	112.00	1	49	4	0	0
TC113	3980930.000	40372246.000	232.58	140.00	1	64	4	0	0
TC120	3979288.000	40372146.000	214.87	103.00	1	51	5	0	0
TC121	3981330.000	40372354.000	265.40	109.00	1	51	4	0	0
TC124	3979088.000	40372115.000	203.00	122.00	1	60	4	0	0
TC125	3981530.000	40372334.000	279.73	116.00	1	59	3	0	0
TC201	3977200.000	40372450.002	199.24	108.00	1	51	9	0	0
TC205	3977421.020	40372415.050	183.85	104.00	1	50	4	0	0
TC206	3976800.000	40372340.000	191.20	138.00	1	69	4	0	0
TC210	3977103.430	40372416.000	189.47	93.00	1	46	3	0	0
TC216	3976300.000	40372513.000	218.10	42.00	1	8	4	0	0
TC216-1	3976300.000	40372657.000	219.55	38.00	1	19	4	0	0
TC219	3978100.000	40372444.000	185.27	21.60	1	10	3	0	0
TC220	3976100.000	40372561.000	210.70	103.00	1	51	3	0	0
TC223	3978300.000	40372462.000	190.90	95.00	1	35	4	0	0
TC224	3975900.000	40372638.280	200.60	35.00	1	17	5	0	0
TC227	3978500.000	40372502.000	193.15	56.00	1	28	3	0	0
TC228	3975700.000	40372633.000	197.86	32.50	1	15	3	0	0
TC232	3975500.000	40372696.180	196.83	23.50	1	12	4	0	0
ZK100-1	3980229.020	40372123.360	224.35	608.40	6	112	4	2	306
ZK100-2	3980229.980	40372121.360	224.70	445.50	10	89	3	2	219
ZK107-1	3980630.020	40372112.040	214.93	480.60	5	70	4	1	234
ZK107-2	3980630.000	40372154.880	217.30	329.20	4	88	8	1	173
ZK108	3979831.010	40372118.000	225.31	500.10	5	191	9	2	303
ZK108-1	3979828.150	40372044.630	226.14	808.00	5	124	6	2	466
ZK114-1	3979588.030	40372175.890	218.90	245.80	3	115	3	0	110
ZK114-2	3979588.040	40372121.730	221.54	351.75	4	117	10	1	165

HoleID	Northing (mN)	Easting (mE)	RL (m)	Depth (m)	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
ZK114-3	3979587.980	40372031.720	239.50	446.00	5	11	4	0	215
ZK115-1	3981030.010	40372311.510	241.92	324.80	3	88	6	2	109
ZK115-2	3981029.000	40372226.300	241.20	369.80	4	59	4	1	124
ZK115-3	3981035.010	40372100.451	234.98	546.80	5	51	4	1	187
ZK115-4	3981030.000	40372012.000	222.05	785.80	5	72	4	1	407
ZK118-1	3979388.000	40372186.320	211.65	284.60	3	138	8	1	109
ZK118-2	3979388.000	40372102.140	223.80	348.20	4	62	4	1	139
ZK118-3	3979388.000	40371980.770	211.16	495.90	5	62	4	1	190
ZK119-1	3981229.020	40372362.450	251.57	198.90	2	88	2	1	84
ZK119-2	3981229.000	40372302.890	253.80	310.00	3	53	3	1	114
ZK119-3	3981234.000	40372152.170	239.56	436.50	4	35	3	2	153
ZK122-1	3979207.000	40372102.520	214.90	336.00	4	142	4	2	193
ZK122-2	3979188.000	40372060.210	209.15	380.30	4	97	4	1	204
ZK122-3	3979188.000	40371893.040	194.82	428.00	5	23	6	1	211
ZK122-4	3979188.000	40371780.340	207.77	501.00	5	0	2	0	249
ZK123-1	3981430.000	40372349.130	264.25	216.30	3	80	4	0	83
ZK123-2	3981430.020	40372302.050	263.80	306.90	3	81	4	2	113
ZK123-3	3981430.000	40372143.120	256.84	364.40	4	28	4	1	133
ZK123-4	3981419.000	40371984.660	251.85	541.70	5	0	2	0	286
ZK127-1	3981631.980	40372313.080	288.00	195.50	2	68	6	1	66
ZK127-2	3981629.000	40372240.220	279.72	262.40	5	40	4	2	90
ZK127-3	3981630.000	40372125.630	270.64	425.10	4	60	4	1	143
ZK130-1	3978788.000	40372081.940	191.80	258.60	3	63	4	1	87
ZK130-2	3978788.000	40371933.200	201.88	386.10	4	51	4	1	134
ZK131-1	3981869.000	40372230.410	304.10	234.90	3	52	4	0	82
ZK131-2	3981872.000	40372070.630	283.03	419.10	5	40	3	1	148
ZK200-1	3977100.000	40372318.720	182.86	179.00	2	26	6	0	101
ZK200-2	3977095.060	40372123.700	183.07	334.40	4	63	7	1	187
ZK203-1	3977301.000	40372448.740	196.61	118.40	1	29	3	1	68
ZK203-2	3977304.000	40372371.700	185.87	176.10	2	44	10	0	99
ZK203-3	3977300.000	40372177.160	175.38	284.70	3	39	8	1	160
ZK204-1	3976900.020	40372317.250	199.75	143.60	2	46	4	1	79
ZK204-2	3976899.070	40372141.600	191.65	259.60	3	34	5	1	129
ZK208-1	3976700.000	40372335.050	199.52	117.80	2	40	4	1	39
ZK208-2	3976700.000	40372249.060	194.10	148.80	2	31	4	1	51
ZK208-3	3976700.000	40372067.930	188.30	330.80	4	29	4	0	111
ZK208-4	3976744.000	40371920.000	174.30	482.20	5	14	4	1	162
ZK211-1	3977700.000	40372322.620	175.60	201.80	2	23	4	1	74
ZK211-2	3977700.000	40372096.000	177.68	300.60	3	34	4	1	112
ZK216-1	3976292.250	40372522.180	219.75	258.00	3	7	6	1	92

HoleID	Northing *(mN)*	Easting *(mE)*	RL *(m)*	Depth *(m)*	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
ZK216-2	3976294.000	40372364.630	199.85	362.50	4	74	8	1	125
ZK216-3	3976288.000	40372175.000	192.92	470.00	5	63	6	1	180
ZK219-1	3978100.000	40372290.210	177.80	167.00	2	27	4	1	65
ZK219-2	3978117.000	4037216.200	178.30	301.00	3	33	4	1	116
ZK224-1	3975900.000	40372520.810	196.64	122.20	2	20	6	1	88
ZK224-2	3975900.000	40372328.280	212.17	222.10	3	6	6	0	129
ZK227-1	3978501.350	40372384.280	179.65	128.40	2	15	4	2	69
ZK227-2	3978500.030	40372201.620	184.30	266.30	3	32	8	0	156
ZK232-1	3975497.500	40372529.220	185.65	167.40	2	11	8	1	125
ZK232-2	3975503.000	40372399.170	196.74	235.40	3	22	12	0	137

The client provided to MCS a file containing elevations of the topographic surface with 4,116 points in the project area. A DTM of the topographic surface was constructed from this data.

11.5 Exploratory Data Analysis

Classical statistical analysis was conducted twice for the Zhuge Shangyu Iron and Titanium deposit. The first study was undertaken with the entire dataset to meet the following objectives:

- To estimate the geological cut-off grade for total iron (TFe) mineralisation and titanium dioxide (TiO_2) mineralisation; and
- To determine the distribution parameters of iron and titanium dioxide grades.

The descriptive statistics for total iron (TFe) and titanium dioxide (TiO_2) for the exhaustive population are shown in Figure 11-1 and Figure 11-2. The histograms of the exhaustive population for TFe and TiO_2 are shown in Figure 11-3 and Figure 11-4 respectively. The exhaustive TFe grade population shows a mixture of three approximately normally-distributed populations. The exhaustive TiO_2 population shows a mixture of four approximately normally-distributed populations. These normally-distributed populations likely represent the weathered and unweathered domains. The probability plot for the exhaustive population for TFe and TiO_2 are shown in Figure 11-5 and Figure 11-6. The cumulative frequency plots for the same data are shown in Figure 11-7 and Figure 11-8. The line on the probability plot for TFe changes curvature in the middle section at around 11.5% TFe (inflection point) representing a boundary between unmineralised and mineralised total iron grade populations. The value of 11.5% TFe was chosen as the geological cut-off grade. The line on the probability plot for TiO_2 changes curvature in the middle section at around 4.6% TiO_2 (inflection point) representing a boundary between unmineralised and mineralised titanium dioxide grade populations. The value of 4.6% TiO_2 was chosen as the geological cut-off grade.

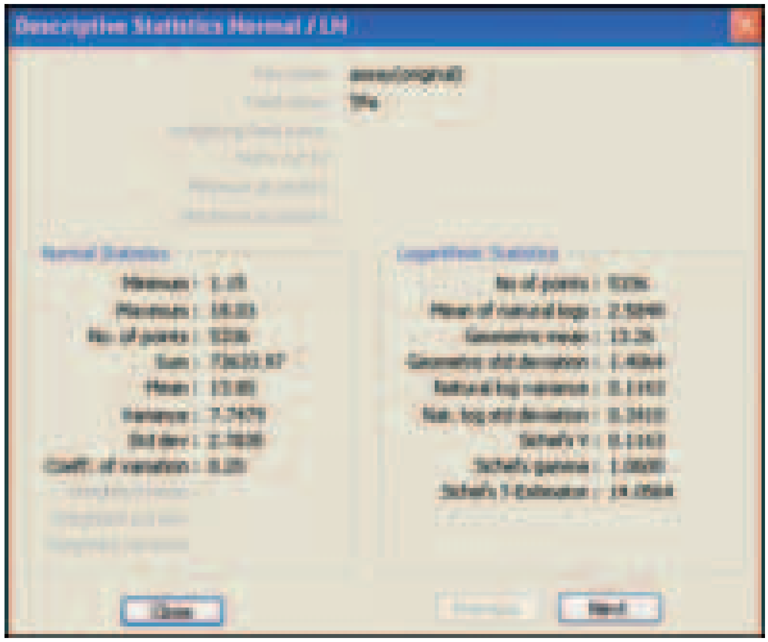

Figure 11-1: Descriptive statistics for total iron (TFe) for the exhaustive population

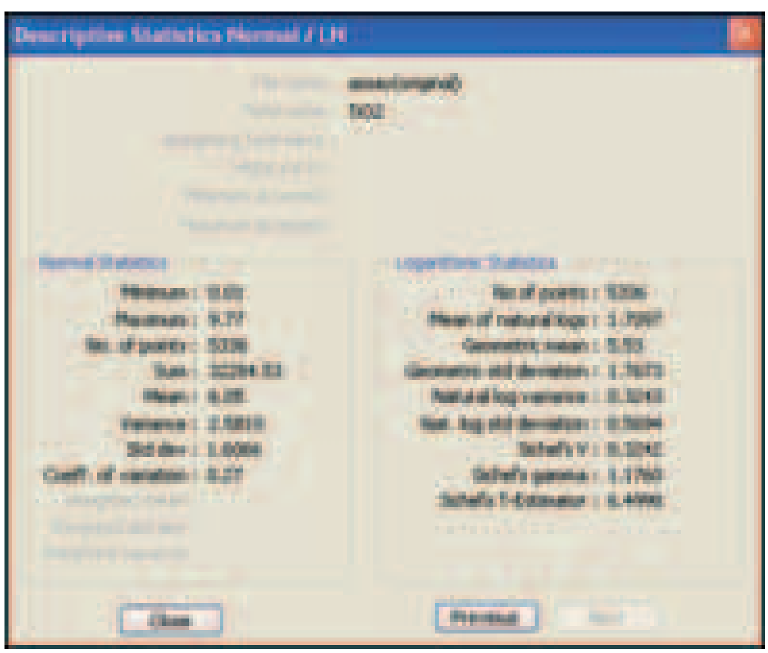

Figure 11-2: Descriptive statistics for titanium dioxide (TiO_2) for the exhaustive population

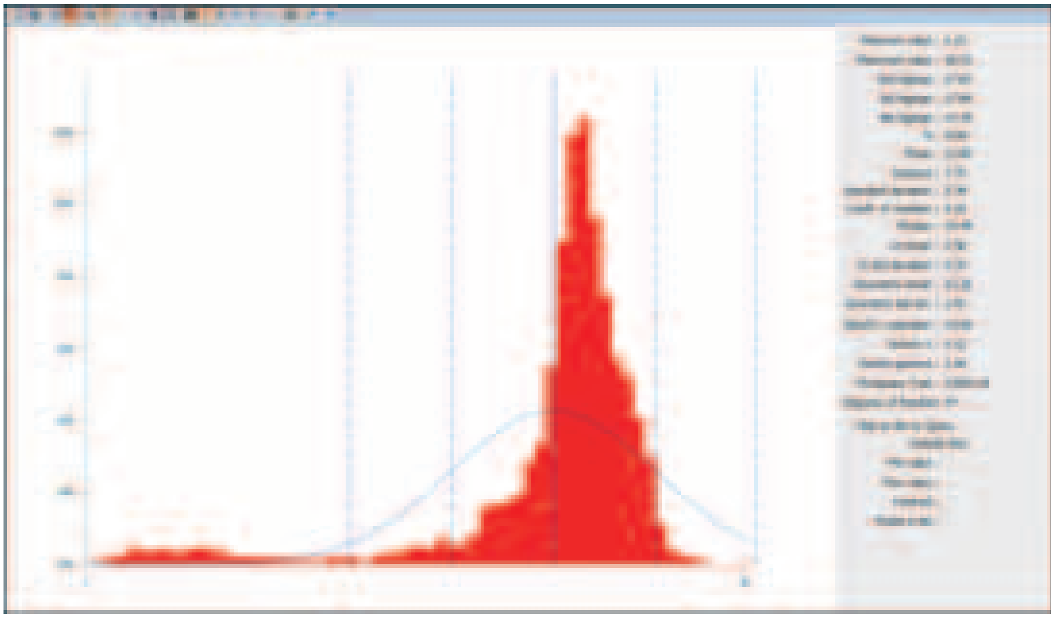

Figure 11-3: Histogram for TFe for the exhaustive population

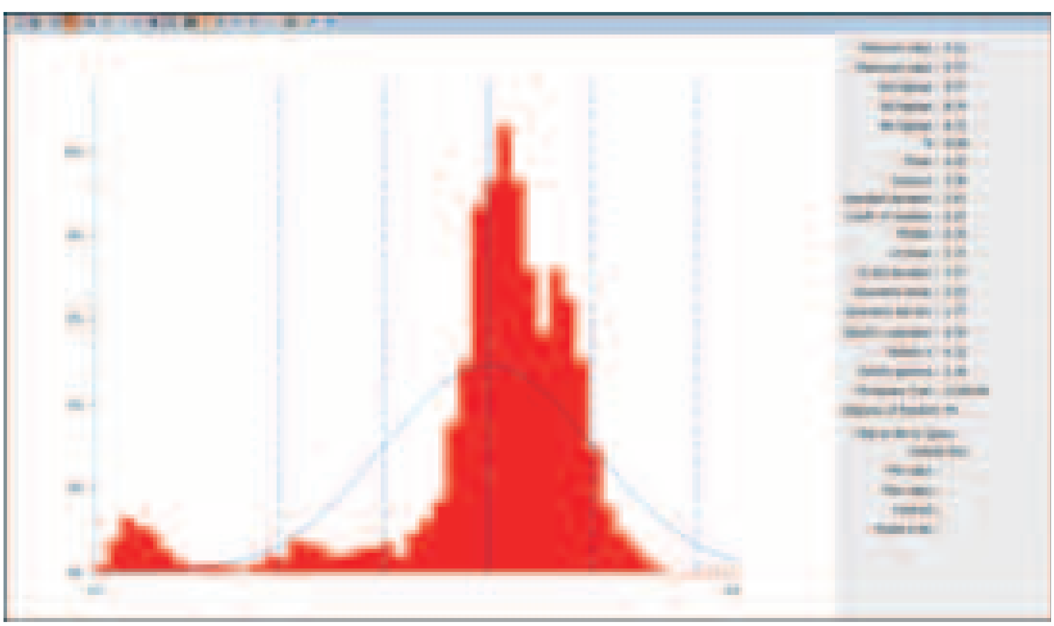

Figure 11-4: Histogram for TiO_2 for the exhaustive population

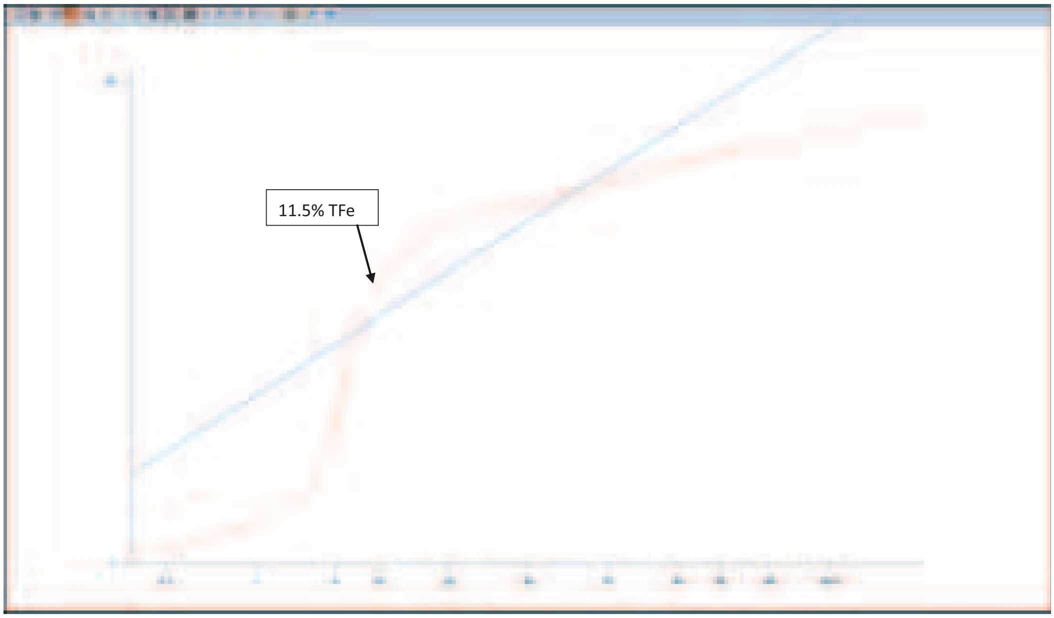

Figure 11-5: Probability plot for TFe for the exhaustive population

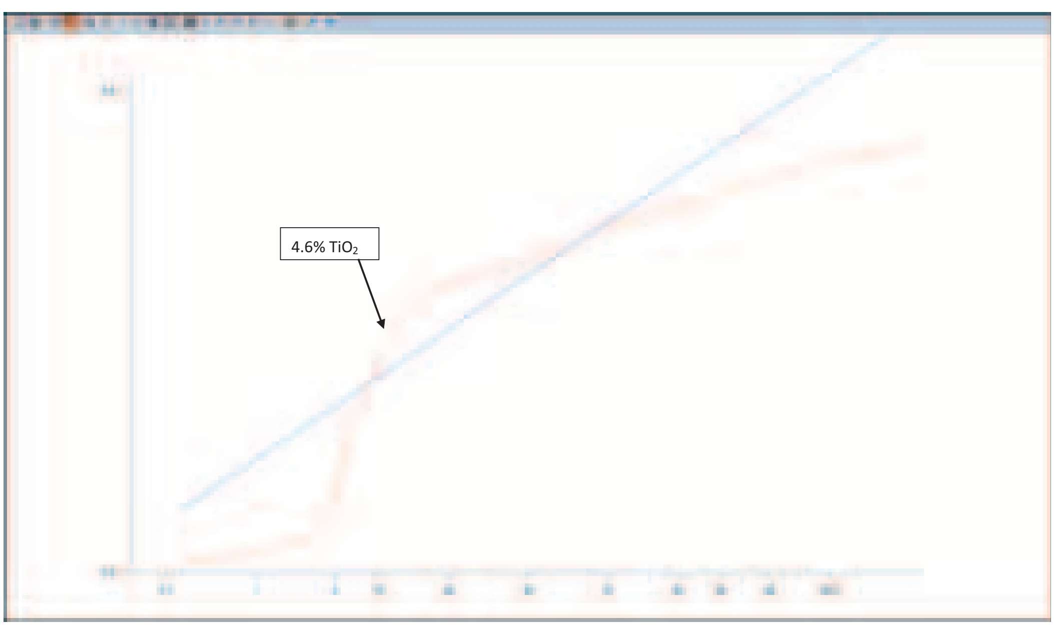

Figure 11-6: Probability plot for TiO_2 for the exhaustive population

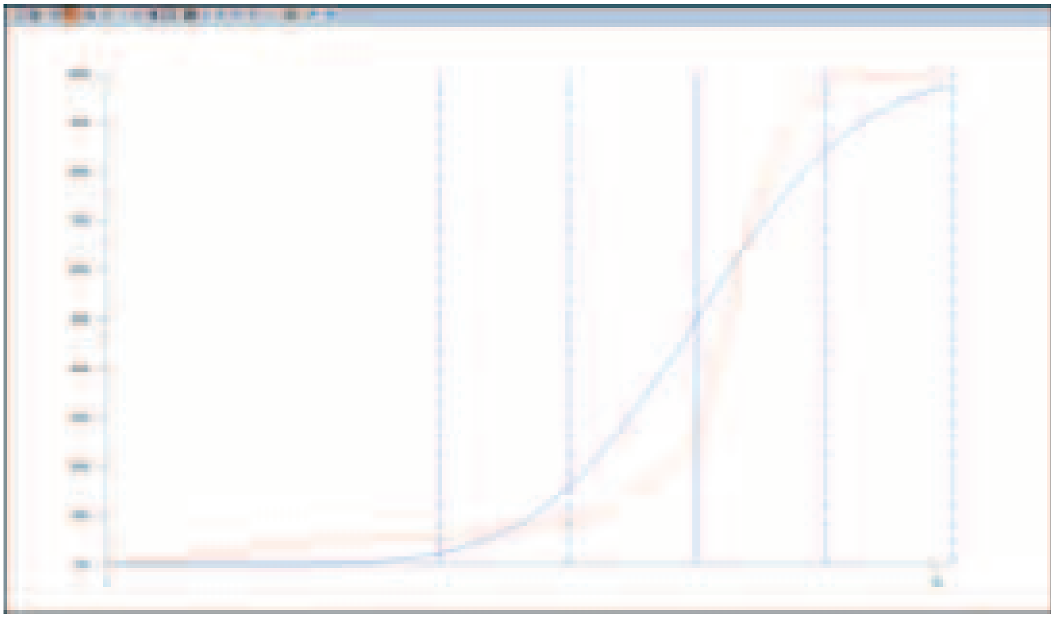

Figure 11-7: Cumulative frequency plot for TFe for the exhaustive population

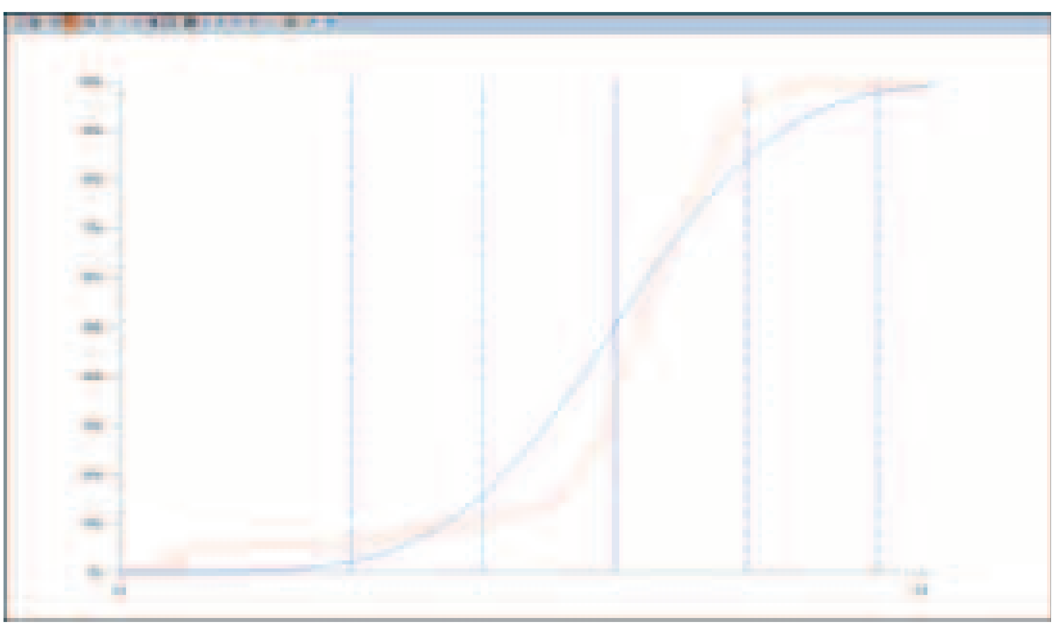

Figure 11-8: Cumulative frequency plot for TiO_2 for the exhaustive population

The second classical statistical analysis was performed using only the grades from samples within the interpreted mineralised envelopes to meet the following objectives:

- To estimate the mixing effect of grade populations for TFe and TiO_2;
- To estimate the necessity of the separation of grade populations if more than one population exists inside the wireframes;
- To determine the balancing cut grade for TFe and TiO_2 to be used for grade interpolation.

The mineralised envelopes were divided into weathered domains and unweathered domains for TFe and TiO_2.

The histograms of the TFe and TiO_2 grade populations within the unweathered mineralised wireframes are shown in Figure 11-9 and Figure 11-10. The probability plots of the TFe and TiO_2 grade populations within the unweathered mineralised wireframes are shown in Figure 11-11 and Figure 11-12, while the cumulative frequency plots for the same data are shown in Figure 11-13 and Figure 11-14. The histograms indicate there is only one normally-distributed population in the unweathered mineralised wireframes. To reduce the very few but high grade sample assays that form a tail on the histogram for TFe, a balancing cut was determined at the 97.7 percentile on the cumulative frequency plots to be 15.8% TFe. A new field for TFe cut of 15.77% was created in the assay file and the new assays cut to 15.77% were generated. For TiO_2 the population on the histogram appears regular with no tail of upper values, therefore a balancing cut was not required.

For the weathered wireframes, the histograms indicate there is one normally-distributed population for TFe and two normally-distributed populations for TiO_2. The two populations for TiO_2 were spatially separated by wireframing and flagging them separately. None of the weathered populations displayed long tails of upper values so it was decided no balancing cut was required to be applied.

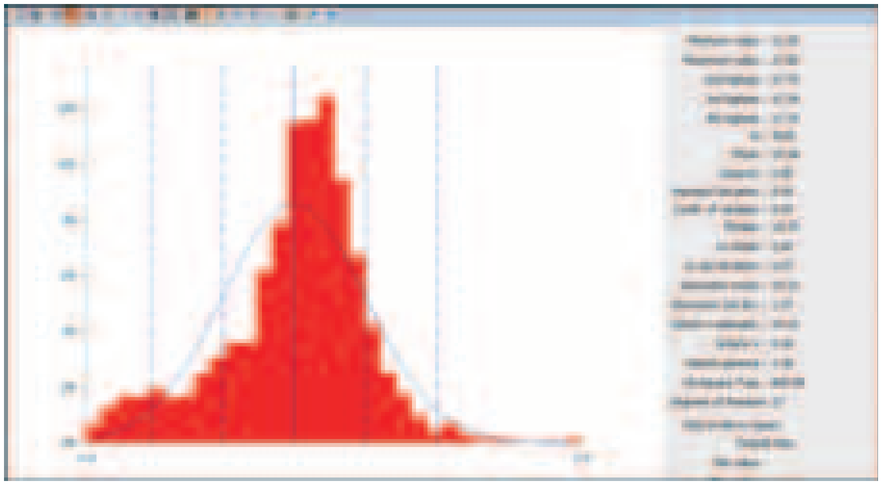

Figure 11-9: Histogram of TFe grades inside the unweathered mineralised wireframe

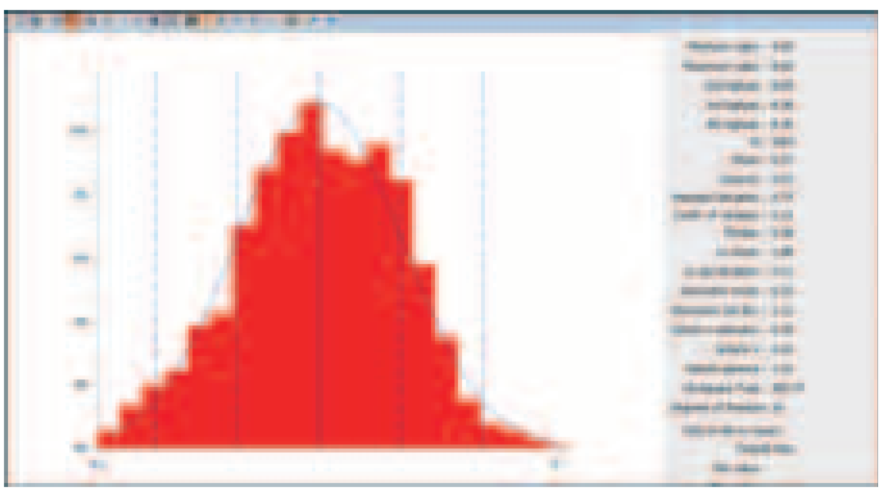

Figure 11-10: Histogram of TiO_2 grades inside the unweathered mineralised wireframe

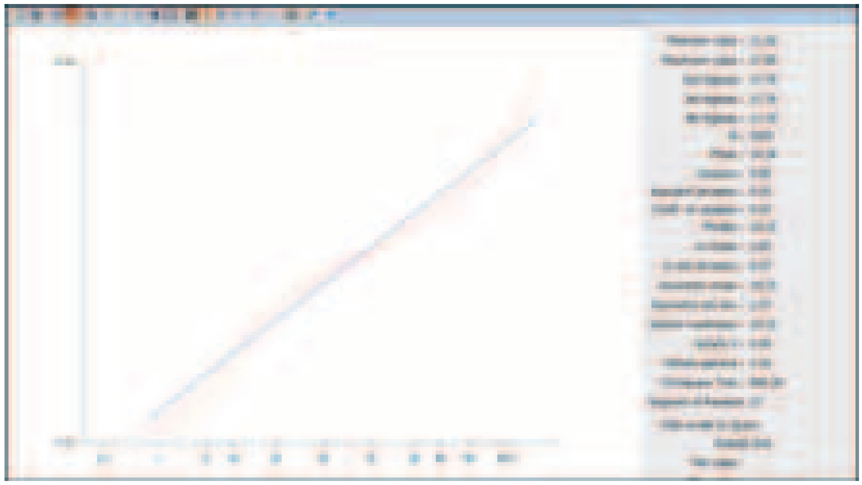

Figure 11-11: Probability plot of TFe grades inside the unweathered mineralised wireframe

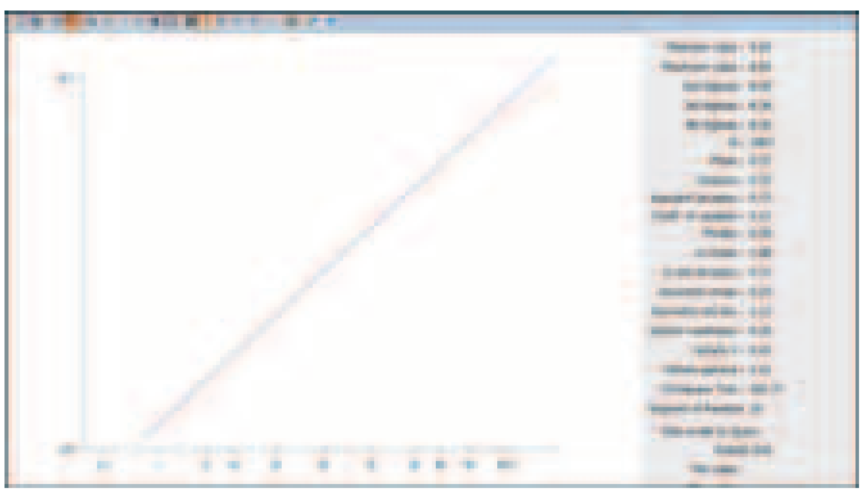

Figure 11-12: Probability plot of TiO_2 grades inside the unweathered mineralised wireframe

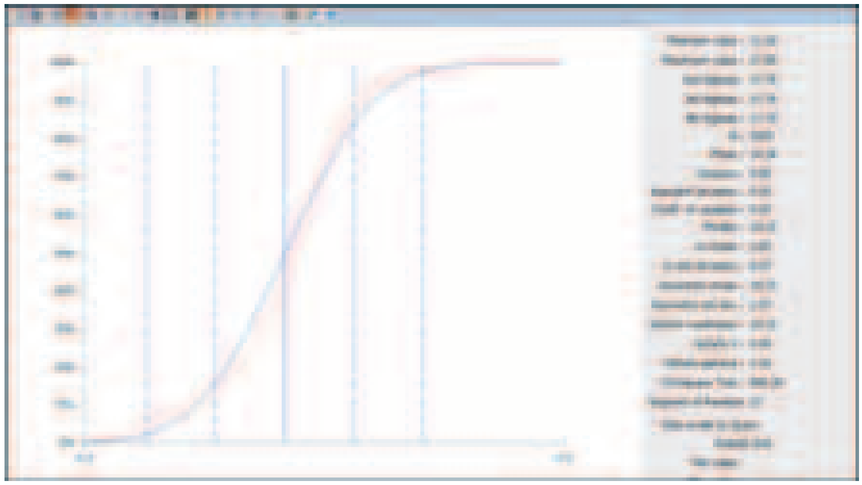

Figure 11-13: Cumulative frequency plot of TFe grades inside the unweathered mineralised wireframe

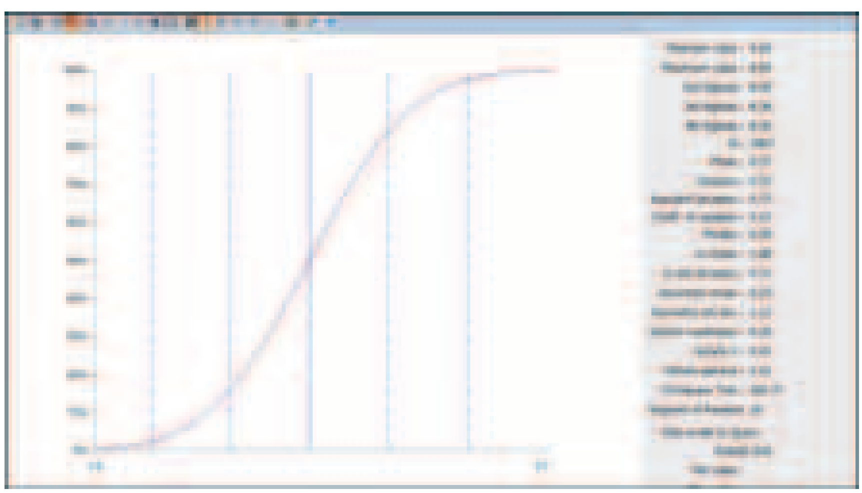

Figure 11-14: Cumulative frequency plot of TiO_2 grades inside the unweathered mineralised wireframe

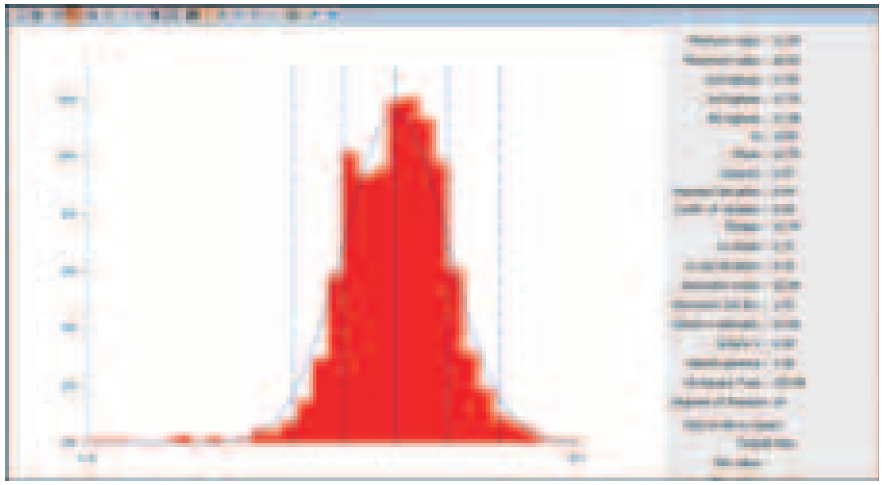

Figure 11-15: Histogram of TFe grades inside the weathered mineralised wireframe

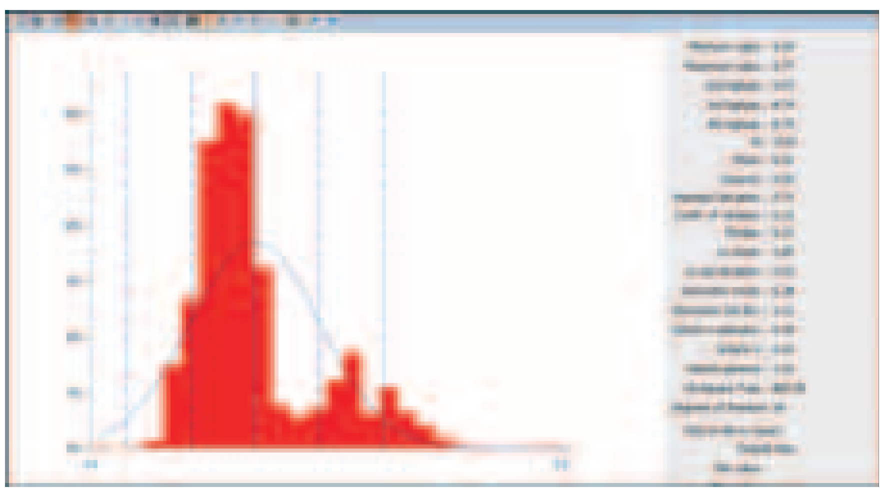

Figure 11-16: Histogram of TiO_2 grades inside the weathered mineralised wireframe

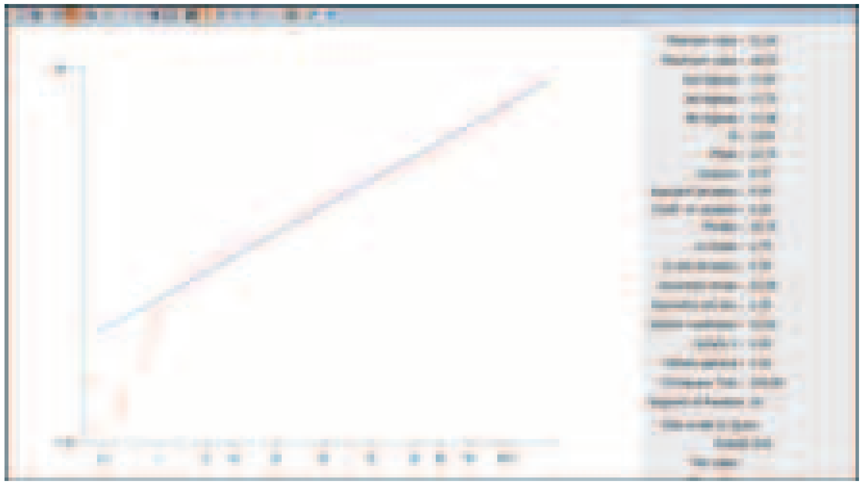

Figure 11-17: Probability plot of TFe grades inside the weathered mineralised wireframe

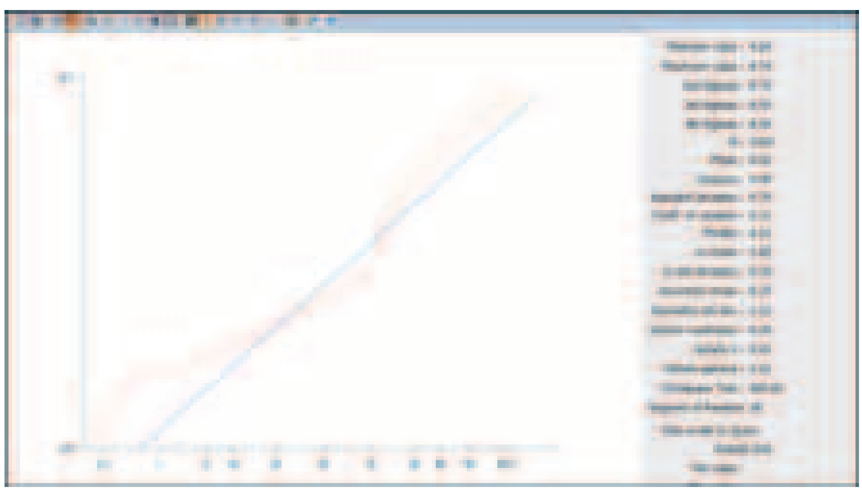

Figure 11-18: Probability plot of TiO_2 grades inside the weathered mineralised wireframe

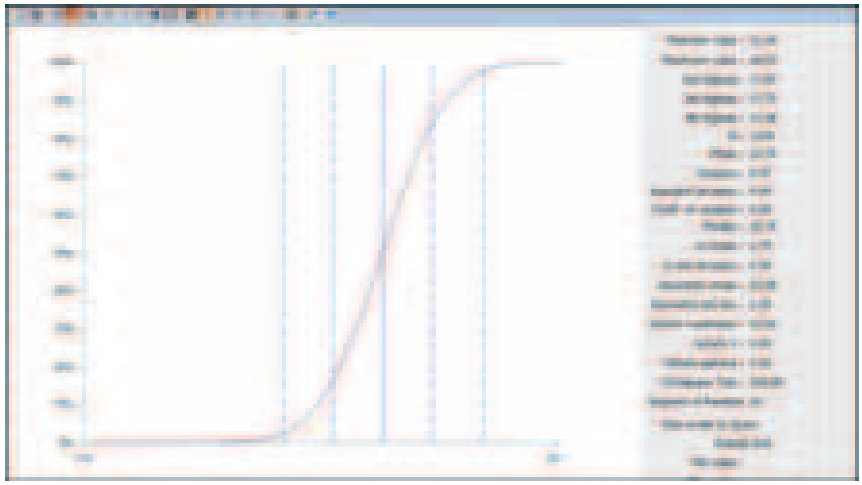

Figure 11-19: Cumulative frequency plot of TFe grades inside the weathered mineralised wireframe

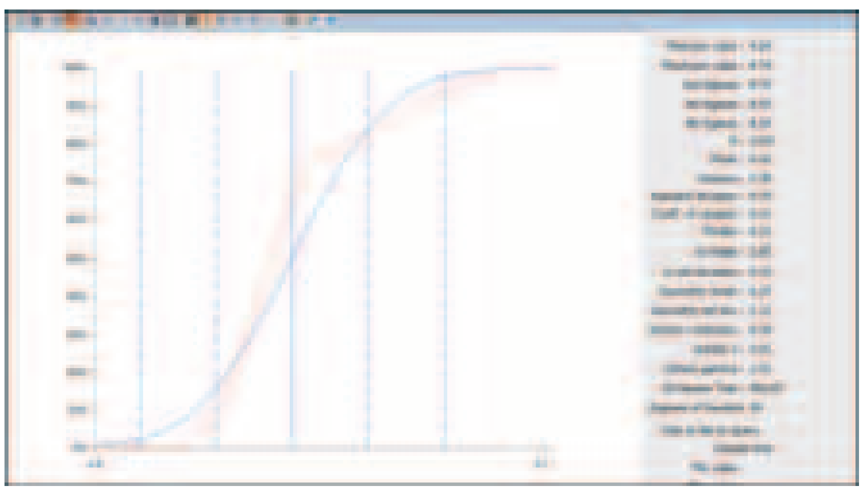

Figure 11-20: Cumulative frequency plot of TiO_2 grades inside the weathered mineralised wireframe

11.6 Interpretation

All available original cross-sections and geological maps at 1:2,000 scale were imported from MapGIS and georeferenced in MICROMINE. The geological interpretation on the cross-sections and the geological maps were used as a reference to honour the original geological interpretation where practical.

Interpretation was carried out interactively for 43 east-west cross-sections covering both ore bodies. Each section showing the drilling data and trench data was displayed in MICROMINE's Vizex environment. Total iron assays were composited to grades greater than 11.5% TFe to define the boundary between mineralised and unmineralised iron grades and TiO_2 assays were composited to grades greater than 4.6% TiO_2 to define the boundary between mineralised and unmineralised TiO_2 grades. The raw sample grades and the composited grades were displayed on the drillhole and trenches in order to allow the snapping of interpretation strings to separate mineralised and unmineralised units. All cross-sections, with additional sections for closing off wireframes, were interpreted.

A geological cut-off grade defining the boundary between mineralisation and country rock was selected at 11.5% TFe and 4.6% TiO_2. One string file was generated to interpret TFe mineralisation at greater than or equal to 11.5% and another string file was generated to interpret TiO_2 mineralisation at greater than or equal to 4.6%.

The following techniques were employed while interpreting the mineralization:

- All trench data was draped onto the topographic surface.
- Each section and plan view was displayed on screen and interpretation checked, Figure 11-21.
- All interpreted strings were snapped to the sample intervals on the drillhole, trench or adit, i.e. the interpretation was constrained in 3 dimensions.
- If a mineralized envelope (lode) terminated on a drill section, it was projected half way to the next section and terminated (this distance varied depending on the cross-section lines). The last string forming the envelope was reduced to 80% of that on the last section. The general dip and strike of the lode was maintained.
- The mineralisation was extended in a down-dip direction generally to a distance half that between adjacent drillholes on the cross-section (around 100 m). Where only one drillhole was present on a cross-section, mineralisation was extended down-dip to a distance of 100 m. Where continuity of mineralisation was inferred from information on adjacent cross-sections, this was taken into account and the extension was increased slightly to adjust for the mineralisation on the adjacent cross-sections.

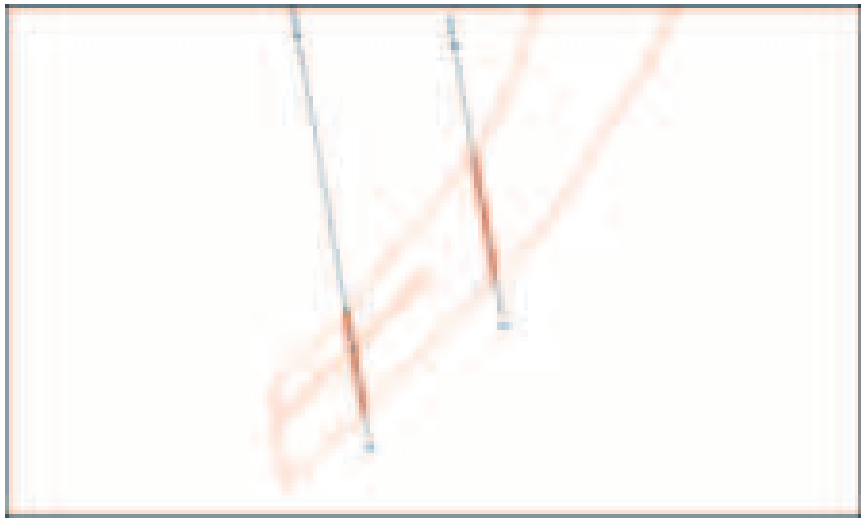

Figure 11-21: Example interpretation cross-section showing strings and composited total iron assays

11.7 Wireframing

The interpreted closed strings were used to generate three-dimensional solid wireframe models for the mineralized envelopes of TFe and TiO_2. For the weathered domains, all wireframes within each domain were created together. For the unweathered domains, each wireframe within each domain was created separately. A total of three weathered domain wireframes (one for TFe and two for TiO_2) and four unweathered domain wireframes (one each for the southern and northern orebodies for TFe and TiO_2) were created. The wireframes were created separately to allow independent data flagging and interpolation.

A 3D view of the wireframes of TiO_2 mineralisation is shown in Figure 11-22.

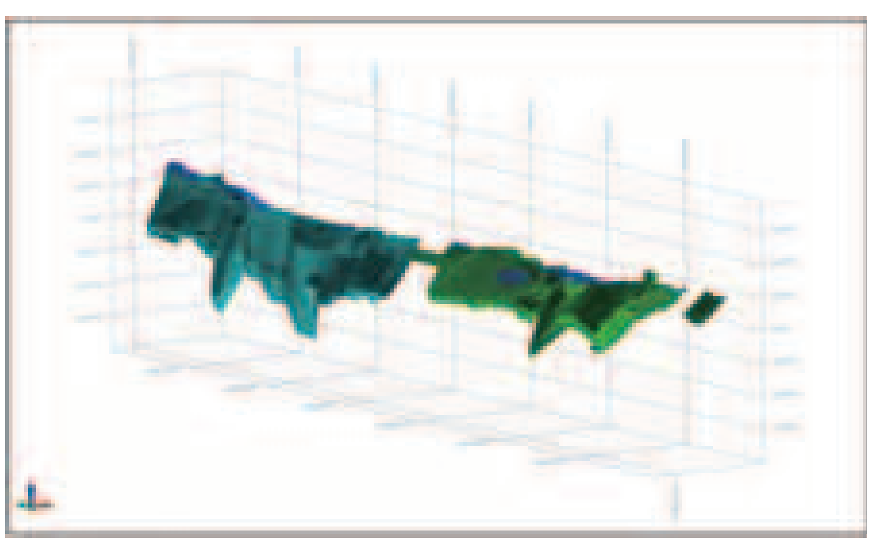

Figure 11-22: 3D view of wireframes of TiO_2 mineralisation

11.8 Drillhole Data Selection and Compositing

Drillhole data selection is a standard procedure which ensures that the correct samples are used in the classical statistical and geostatistical analyses and grade interpolation processes. For this purpose, the solid wireframes for each mineralized envelope were subsequently used to select the drillhole samples. Samples within each individual mineralized envelope were flagged and coded according to the name of the mineralized body.

Visual validation of the flagged samples was carried out in Vizex to make sure the correct samples were selected by the wireframes.

Classical statistical analysis was then repeated for the iron grades within the mineralized envelopes only, Figure 11-15 to 11-20. The analysis determined there was only one population within each mineralised wireframe for each of TFe and TiO_2.

A balancing cut is necessary to reduce the impact of a small number of very high-grade samples that can otherwise unduly influence the result. An additional field was inserted into the assay file and a balancing cut grade of 15.8% TFe was applied to the original assay data for those samples inside the unweathered iron mineralised envelopes. Balancing cuts were not required for the other mineralised wireframes.

All samples within the mineralised envelopes were composited to an equal sample interval length prior to geostatistical analysis and interpolation. A composite length of 2.0 metres was selected as it was the most prevalent interval length in the dataset. This is shown in the histogram of the interval lengths of all samples (Figure 11-23). The selected samples within each mineralized envelope were separately composite over 2.0 metre intervals, starting at the drillhole collar and progressing downhole. Trench and adit samples within the mineralized envelopes were also composited. Compositing was stopped and restarted at all boundaries between mineralized envelopes and waste material.

Basic statistical parameters were obtained for the composited data to ensure that the statistical parameters were not distorted by the compositing process (Figure 11-24 and Figure 11-25). There was no significant change to the minimum, maximum, mean, standard deviation and coefficient of variation of the data after the sample compositing.

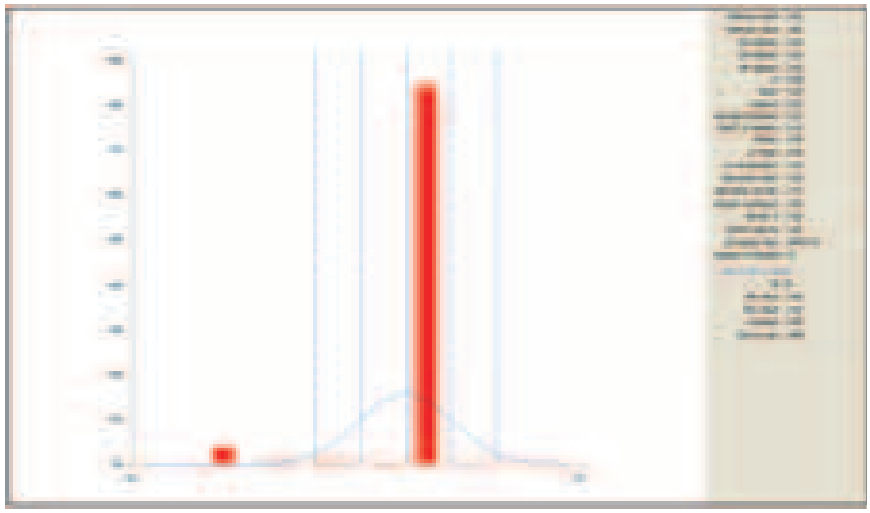

Figure 11-23: Histogram of all sample interval lengths

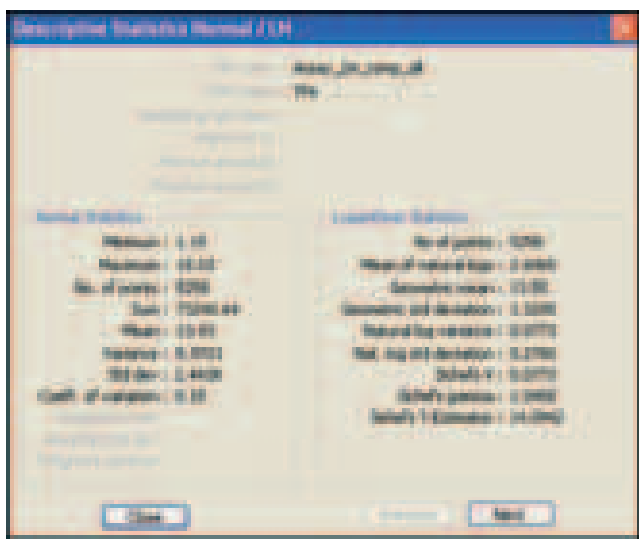

Figure 11-24: Descriptive statistics for all iron assays composited to 2 m interval lengths

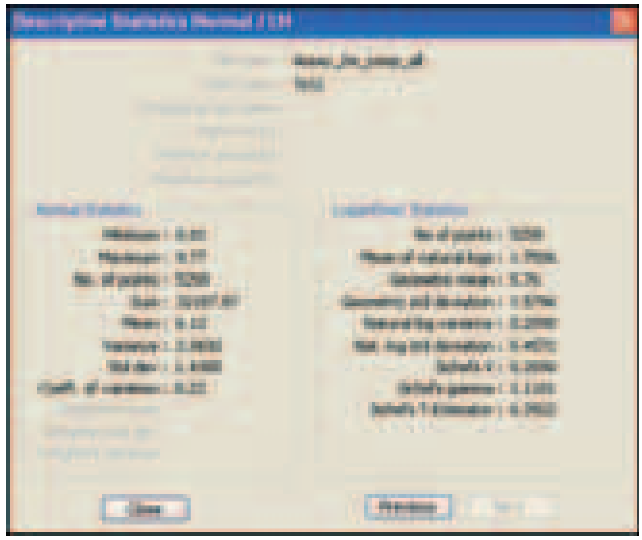

Figure 11-25: Descriptive statistics for all iron assays composited to 2 m interval lengths

11.9 Geostatistical Analysis

The purpose of geostatistical analysis is to generate a series of semivariograms for the Kriging algorithm to use for weighting the sample grades when estimating an unknown block value into the block model. The semivariogram ranges determined from this analysis can also be used to determine the search neighbourhood dimensions. Therefore geostatistical analysis was conducted in order to meet the following objectives:

- To estimate the presence of directional anisotropy of mineralisation for iron and titanium. This can be estimated by studying the directional semivariograms. There is a directional anisotropy if semivariograms reach the total sill at different distances in different directions;

- To obtain the semivariogram parameters (nugget effect, total sill and ranges) to be input into the interpolation process.

All semivariograms were modelled using the composite sample files with an applied top cut grade for the unweathered TFe domain only and constrained by the corresponding mineralised envelopes. Semivariograms were modelled for TFe and TiO_2 for the unweathered south domain and the unweathered north domain separately (four domains). Semivariograms were not modelled for the weathered domains as the number of samples was insufficient and the semivariograms would therefore not be reliable.

For each domain, a fan of horizontal semivariograms was generated to determine the direction of maximum continuity in plan. A vertical fan of semivariograms was then generated along the determined azimuth of maximum continuity in order to estimate the plunging component of the main axis. From the azimuth and plunge of the first axis, the azimuth of the second axis was calculated. A vertical fan of semivariograms was then generated to determine the plunge of the second axis. From the orientation of the first and second axes, the azimuth and plunge of the third axis was determined.

Geostatistical analysis of TFe for the south orebody showed the maximum continuity of mineralisation occurs along an axis of 2 degrees, roughly parallel to the strike of the ore zone, there was no plunge. The second direction has an azimuth of 92 degrees with no plunge, while the third direction has an azimuth of 0 degrees with a plunge of 90 degrees. The spherical experimental semivariograms and models for each direction are shown in Figure 11-26 to Figure 11-28.

Geostatistical analysis of TFe for the north orebody showed the maximum continuity of mineralisation occurs along an axis of 0 degrees, with a plunge of 3 degrees. The second direction occurs along an axis of 65 degrees, with a plunge of minus 83 degrees. The third direction occurs along an axis of 90 degrees with a plunge of 6 degrees. The spherical experimental semivariograms and models for each direction are shown in Figure 11-29 to Figure 11-31.

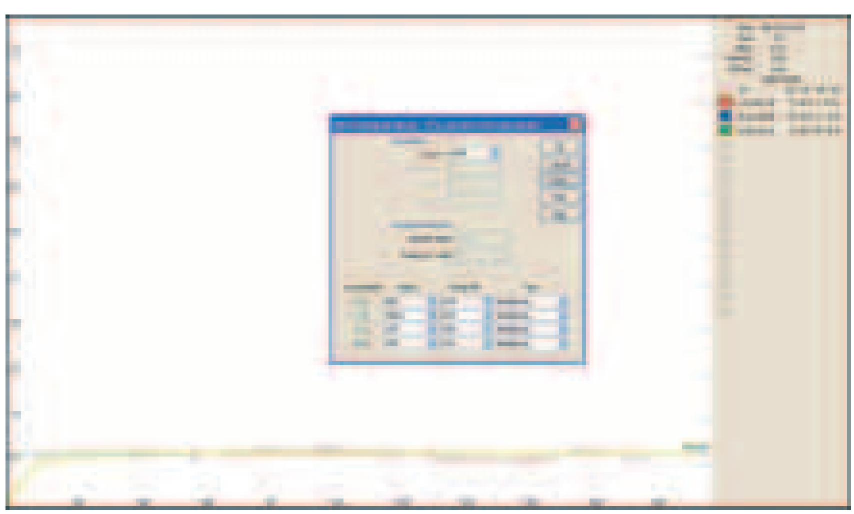

Figure 11-26: Semivariogram model for the main direction of continuity of TFe for the south orebody

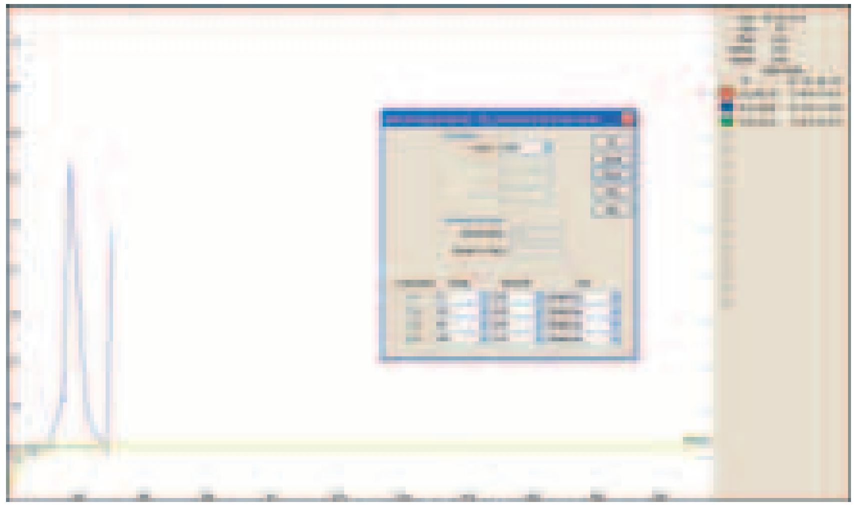

Figure 11-27: Semivariogram model for the second direction of continuity of TFe for the south orebody

Figure 11-28: Semivariogram model for the third direction of continuity of TFe for the south orebody

Figure 11-29: Semivariogram model for the main direction of continuity of TFe for the north orebody

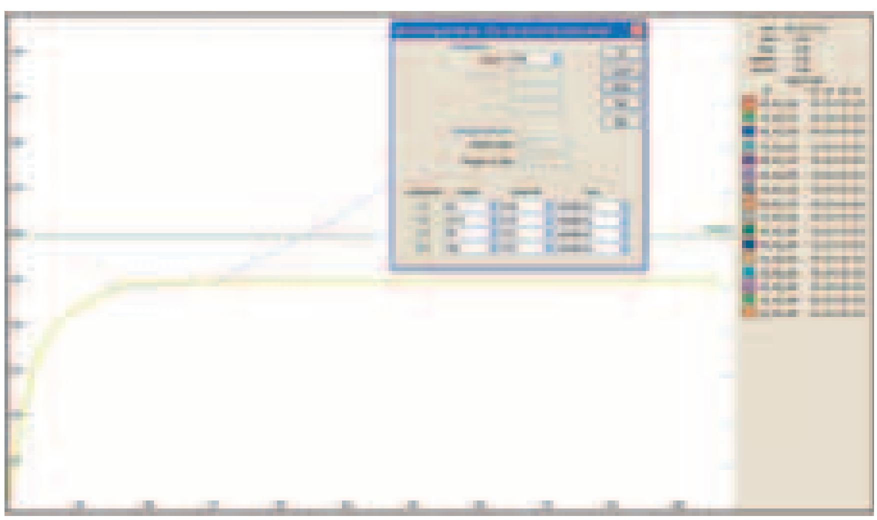

Figure 11-30: Semivariogram model for the second direction of continuity of TFe for the north orebody

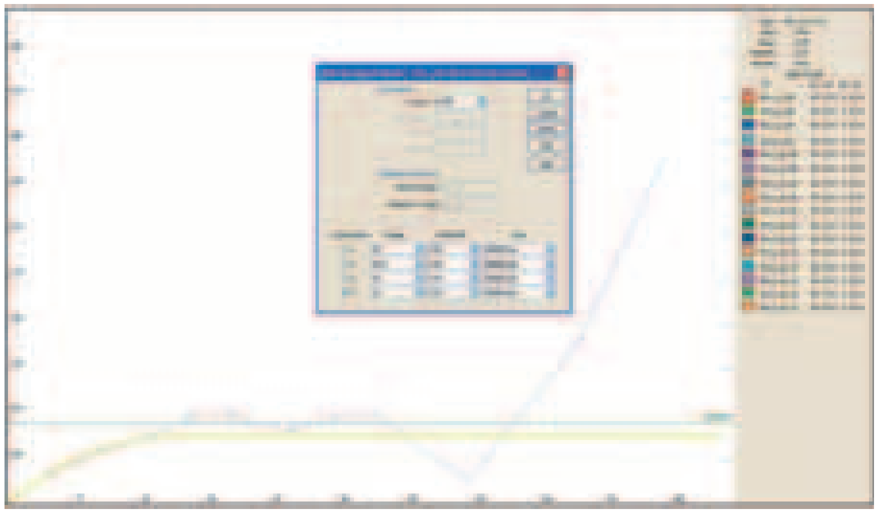

Figure 11-31: Semivariogram model for the third direction of continuity of TFe for the north orebody

Geostatistical analysis of TiO_2 for the south orebody showed the maximum continuity of mineralisation occurs along an axis of 4 degrees azimuth, with no plunge. The second direction occurs along an axis of 94 degrees, with a plunge of minus 24 degrees. The third direction occurs along an axis of 94 degrees with a plunge of 66 degrees. The spherical experimental semivariograms and models for each direction are shown in Figure 11-32 to Figure 11-34.

Figure 11-32: Semivariogram model for the main direction of continuity of TiO_2 for the south orebody

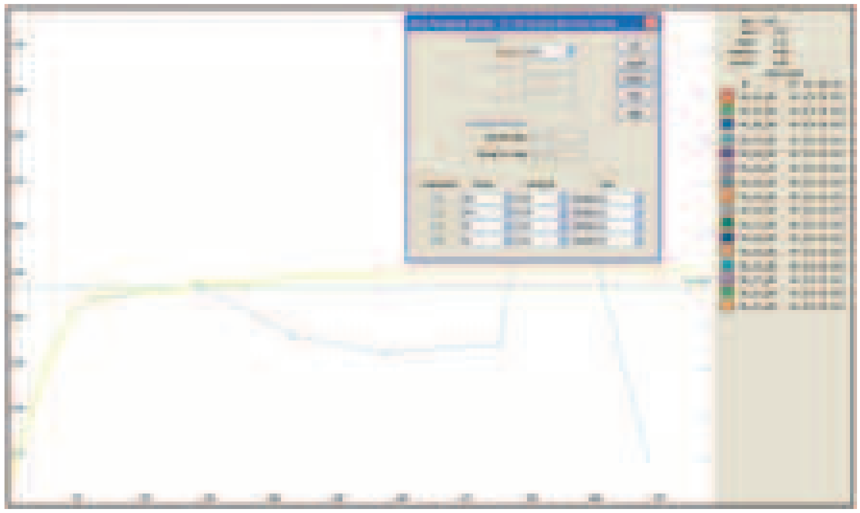

Figure 11-33: Semivariogram model for the second direction of continuity of TiO_2 for the south orebody

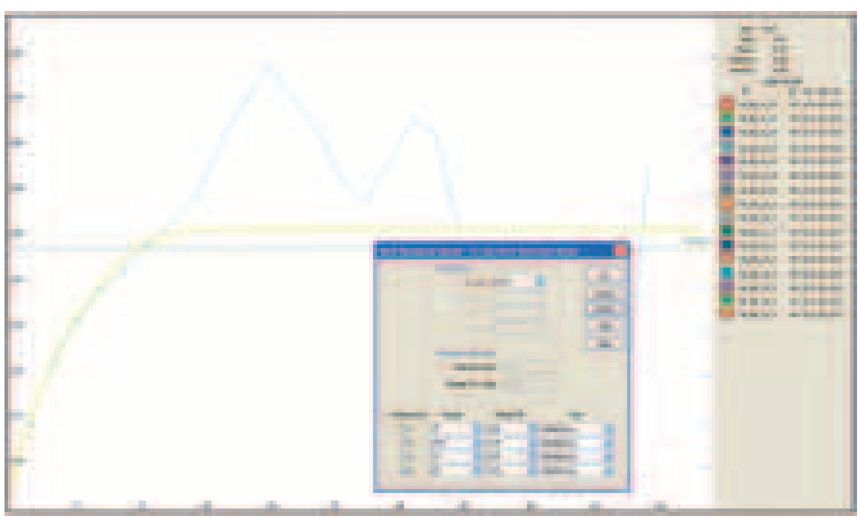

Figure 11-34: Semivariogram model for the third direction of continuity of TiO_2 for the south orebody

Geostatistical analysis of TiO_2 for the north orebody showed the maximum continuity of mineralisation occurs along an azimuth of 14 degrees, with no plunge. The second direction occurs along an axis of 104 degrees, with a plunge of minus 76 degrees. The third direction occurs along an axis of 104 degrees with a plunge of 14 degrees. The spherical experimental semivariograms and models for each direction are shown in Figure 11-35 to Figure 11-37.

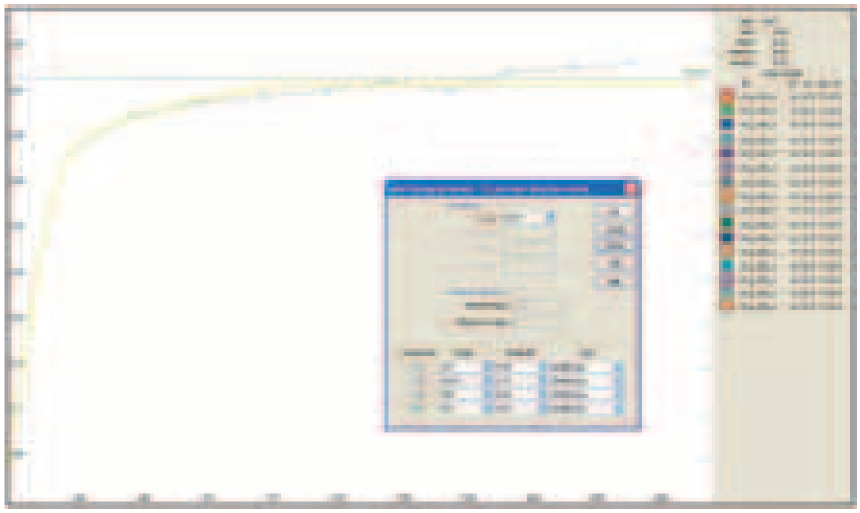

Figure 11-35: Semivariogram model for the main direction of continuity of TiO_2 for the north orebody

Figure 11-36: Semivariogram model for the second direction of continuity of TiO_2 for the north orebody

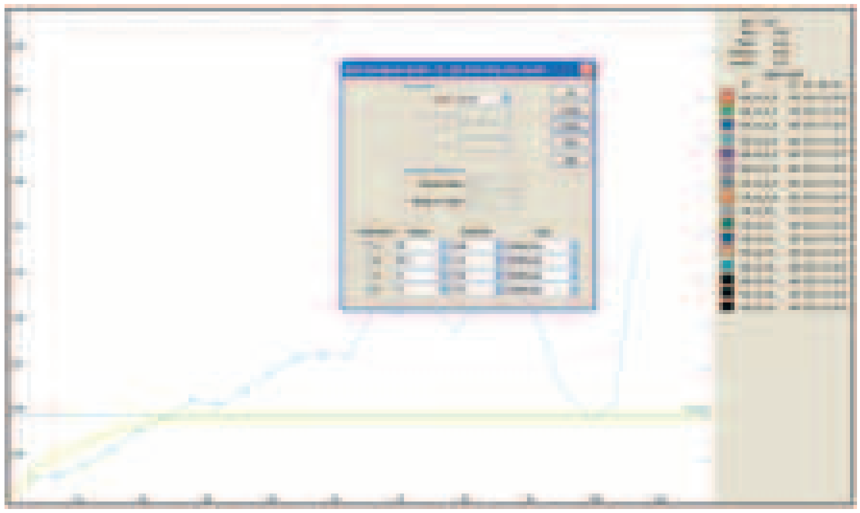

Figure 11-37: Semivariogram model for the third direction of continuity of TiO_2 for the north orebody

A summary of all semivariogram parameters is shown in Table 11-3.

Table 11-3: Summary of semivariogram parameters

Domain	Axis	Azimuth	Plunge	Lag	Nugget	Partial Sill1	Partial Sill2	Partial Sill3	Partial Sill4	Range 1	Range 2	Range 3	Range 4
TFe_sth	1	2	0	202	0	0.05	0.24	0.58	0.03	500	188.5	130	783
TFe_sth	2	92	0	45	0	0.05	0.24	0.58	0.03	17	2.8	90	402
TFe_sth	3	0	90	15	0	0.05	0.24	0.58	0.03	13	34.6	17	26
TFe_nth	1	0	3	200	0	0.08	0.2	0.23	0.03	60	289.6	102	896
TFe_nth	2	65	-83	150	0	0.08	0.2	0.23	0.03	60	174.9	58	386
TFe_nth	3	90	6	12	0	0.08	0.2	0.23	0.03	60	43	32	22
Ti_sth	1	4	0	200	0.017	0.08	0.35	0.04	0.03	20	281.1	1000	875
Ti_sth	2	94	-24	100	0.017	0.08	0.35	0.04	0.03	476	94.6	75	44
Ti_sth	3	94	66	4	0.017	0.08	0.35	0.04	0.03	15	34.9	12	65
Ti_nth	1	14	0	196	0.014	0.06	0.31	0.04	0.1	143	233.9	340	972
Ti_nth	2	104	-76	100	0.014	0.06	0.31	0.04	0.1	271	130.4	441	49
Ti_nth	3	104	14	5	0.014	0.06	0.31	0.04	0.1	35	36.1	8	9

11.10 Block Modelling

Empty block models were created within the closed wireframe models for the iron mineralisation and the titanium dioxide mineralisation and coded accordingly. The same parent block model was used to create separate block models for separate wireframed domains (3 iron mineralisation domains and 4 titanium dioxide mineralisation domains). Block extents and sizes are shown in Figure 11-38. Parent cells were sub blocked to 5 metre east, 2.5 metres north and 2.5 metre in elevation. The empty cell models were then interpolated.

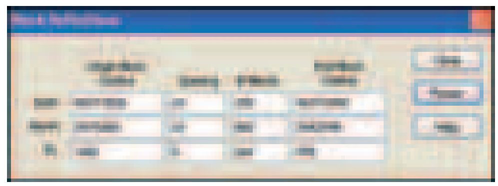

Figure 11-38: Block extents and sizes

11.11 Grade Interpolation

The three weathered domains were interpolated using the inverse distance weighting cubed algorithm, the four unweathered domains were interpolated using the ordinary kriging algorithm.

Interpolation was block kriging into parent cells only, with discretisation to 5 points east, 5 points north and 5 points in elevation. The grades from the estimated points were then averaged to produce the kriged block grade.

The search ellipsoids were oriented parallel to the mineralisation to include relevant samples and were sized to exclude redundant samples. Three different search ellipsoids were created for three different parts of the orebody with different orientations. One search ellipsoid was created for the weathering domains, one search ellipsoid was created for the unweathered southern orebody and one search ellipsoid was created for the unweathered northern orebody. Three runs were required at different radius lengths and parameters to populate all cells for all block models.

A "parent block estimation" technique was used, i.e. all subcells within a parent cell were given the same estimated grade value. The Ordinary Kriging estimation was performed at different search radii until all cells were populated. Grades were interpolated separately within each of the modelled mineralised zones using only assay composites restricted by the corresponding wireframe models. The search radii were determined by means of distance between drillholes for the inverse distance weighting estimation and by the evaluation of the semivariogram parameters for the ordinary kriging estimation, which determined the kriging weights to be applied to samples at specified distances. Model cells that did not receive a grade estimate from the first interpolation run were used in the next interpolation with greater search radii. Model cells that did not receive a grade estimate from the first two interpolation runs were used in the next interpolation with greater search radii.

Declustering was performed during the interpolation process by using eight sectors within the search neighbourhood. Each sector was restricted to a maximum of six samples, and the search neighbourhood was restricted to an overall minimum of two sample grades for the first two interpolation runs. Therefore the maximum combined number of samples allowable for the interpolation was 48.

For the unweathered iron mineralisation domain, the TFe grade with the balancing cut of 15.8% applied was used for the grade interpolation. For all other domains the raw grades were used. The assay file that was composited to 2.0 metre intervals was also used for the interpolation.

The search ellipsoid parameters used for each search ellipsoid and run is shown in Table 11-4. The search ellipsoids for run 1 are shown in Figure 11-39 and for run 2 in Figure 11-40.

Table 11-4: Search ellipsoid parameters

		Run 1			Run 2			Run 3		
Domain	**Parameter**	**1st axis**	**2nd axis**	**3rd axis**	**1st axis**	**2nd axis**	**3rd axis**	**1st axis**	**2nd axis**	**3rd axis**
Weathered orebody	Radius length (m)	300	150	50	600	300	120	3000	1500	500
Weathered orebody	Azimuth	0	90	0	0	90	0	0	90	0
Weathered orebody	Plunge	0	0	90	0	0	90	0	0	90
Weathered orebody	No. sectors	8	8	8	8	8	8	8	8	8
Weathered orebody	Max. samples per sector	6	6	6	6	6	6	6	6	6
Weathered orebody	Min. total samples	2	2	2	2	2	2	1	1	1
Unweathered southern orebody	Radius length (m)	300	150	60	600	300	120	3000	1500	600
Unweathered southern orebody	Azimuth	0	90	90	0	90	90	0	90	90
Unweathered southern orebody	Plunge	0	-35	55	0	-35	55	0	-35	55
Unweathered southern orebody	No. sectors	8	8	8	8	8	8	8	8	8
Unweathered southern orebody	Max. samples per sector	6	6	6	6	6	6	6	6	6
Unweathered southern orebody	Min. total samples	2	2	2	2	2	2	1	1	1
Unweathered northern orebody	Radius length (m)	300	150	60	600	300	120	3000	1500	600
Unweathered northern orebody	Azimuth	0	90	90	0	90	90	0	90	90
Unweathered northern orebody	Plunge	0	-70	20	0	-70	20	0	-70	20
Unweathered northern orebody	No. sectors	8	8	8	8	8	8	8	8	8
Unweathered northern orebody	Max. samples per sector	6	6	6	6	6	6	6	6	6
Unweathered northern orebody	Min. total samples	2	2	2	2	2	2	1	1	1

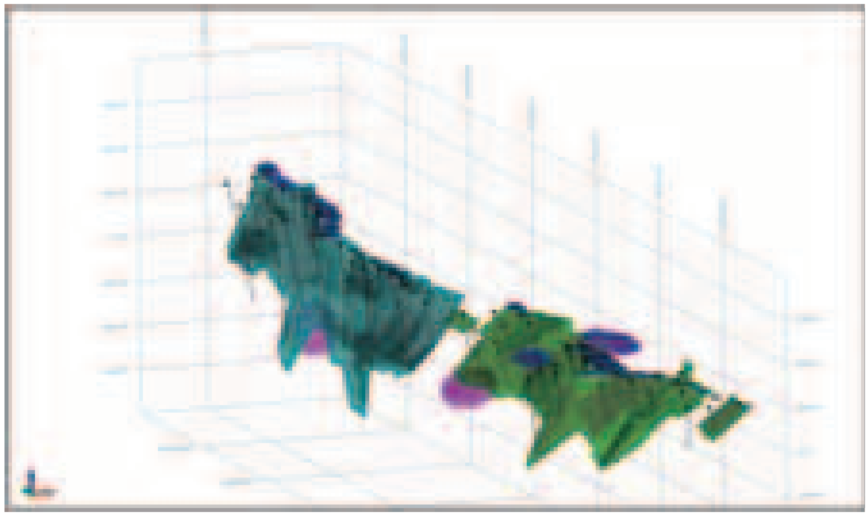

Figure 11-39: Search ellipsoids, run1

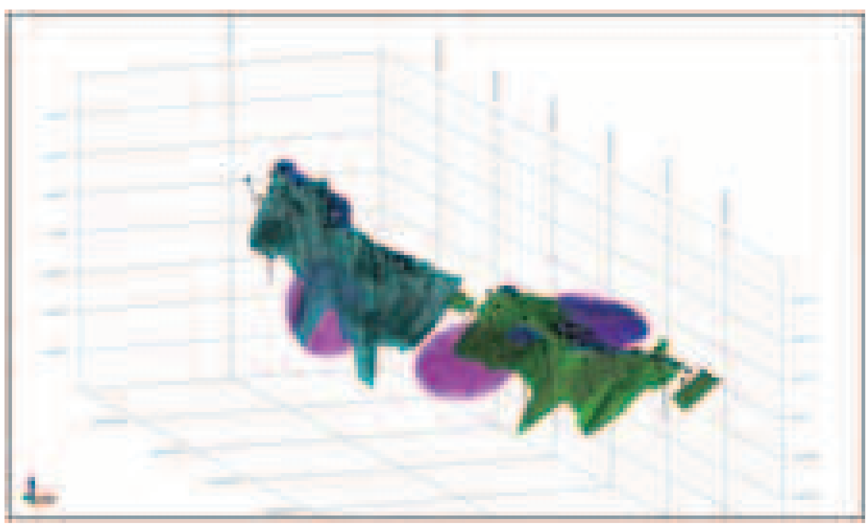

Figure 11-40: Search ellipsoids, run2

Two views are shown of the interpolated block model for each element, Figure 11-41 and Figure 11-42 show views of the interpolated TiO_2 block model and the interpolated TFe block model. Figure 11-43 and Figure 11-44 show side views of the interpolated TiO_2 block model and the interpolated TFe block model.

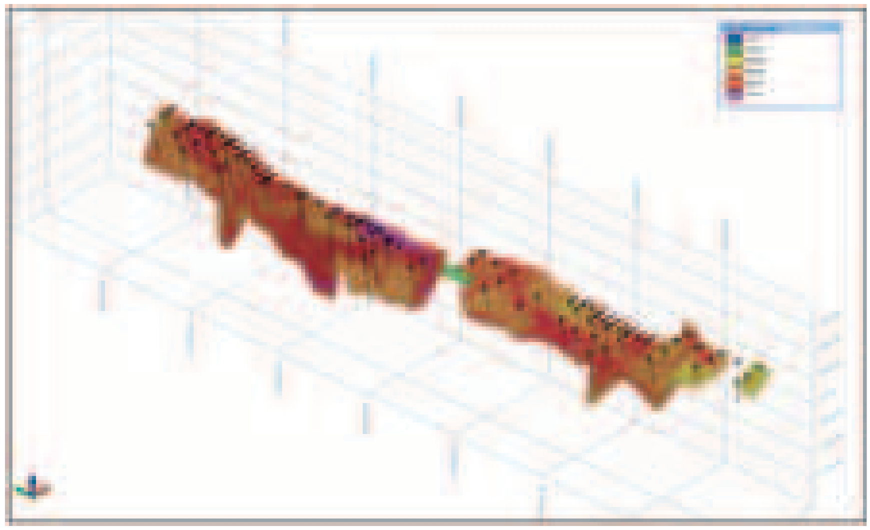

Figure 11-41: Interpolated TiO_2 block model showing interpolated TiO_2 grades

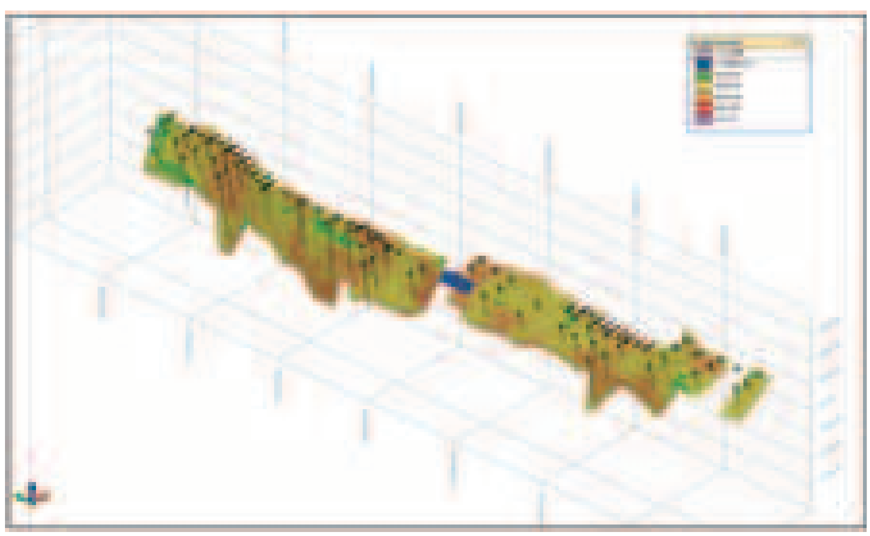

Figure 11-42: Interpolated TFe block model showing interpolated TFe grades

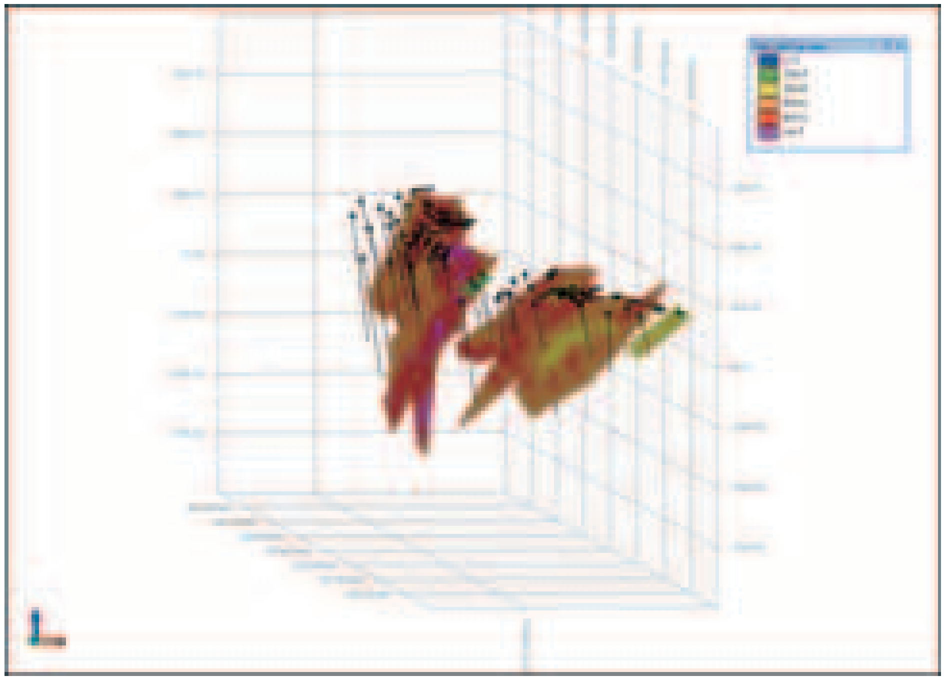

Figure 11-43: Interpolated TiO_2 block model showing interpolated TiO_2 grades, side view

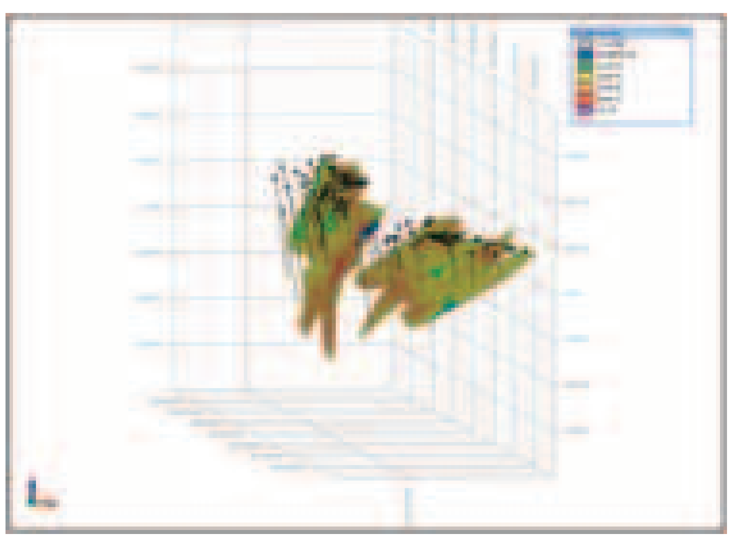

Figure 11-44: Interpolated TFe block model showing interpolated TFe grades, side view

11.12 Resource Classification Strategy

The purpose of resource estimation is to create a three-dimensional model of mineralisation that can be utilised for mining studies and economic calculations. Although the aim is to estimate as accurately as possible, there will be more confidence in some portions of the model than others.

The classification strategy was designed to reflect the level of confidence in different areas of the model based on the inherent variability of measurements, the level of support provided by the data, and the expected continuity of mineralisation provided by the geological context.

The data that was supplied to MCS and checked during the site visit, indicates that confidence in the data is moderate to high. The QA/QC data such as mean weighted core recovery, assay precision, assay bias, and verification of the data on site; supports this conclusion. The resource classification strategy was therefore based primarily on distance of samples and numbers of samples and holes used to estimate a block value. For Measured resources, a minimum of two samples from two holes had to be within a radius of 200 m. For Indicated resources, this radius was 400 m. The remainder of the resource were classified as Inferred.

After running the IDW cubed interpolation to determine the classification of the blocks, the classification was edited manually to reflect the competent person's confidence in different parts of the block model.

A view of the final, classified block model is shown in Figure 11-45.

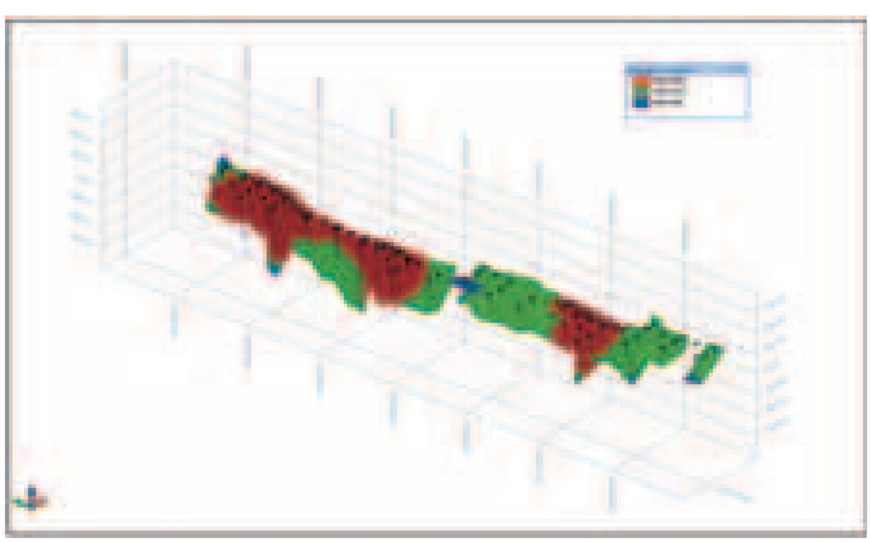

Figure 11-45: Final, classified block model

11.13 Specific Gravity Interpolation

A specific gravity database was supplied by the client that could be used for interpolation into the block model. A total of 120 specific gravity measurements spread throughout the deposit were included in the database. These measurements were interpolated into the block model using the IDW cubed interpolation method, resulting in every block in the block model containing a value for specific gravity.

11.14 Model Validation

Three methods were utilised to validate the ordinary kriged block model:

1. The ordinary kriged global grade was compared to the original sample grades in the wireframes,

2. The ordinary kriged global grade was compared to an inverse distance cubed model global grade,

3. The ordinary kriged model was checked locally in section to determine if the original sample grades were reflected in the block model grades.

The result from the interpolated block model compared to the wireframe model for both TiO_2 and TFe is shown in Table 11-5 and Table 11-6. There is a small difference in volume for the both TiO_2 and TFe; however this is less than 0.1% in both cases. For the grade, the raw grade compared to the interpolated block model grade is similar, the difference being less than 5% for TiO_2 and less than 2% for TFe. This can be explained by the fact that the kriging process tends to smooth the grade distribution, resulting in a slightly lower grade and is also a result of clustering of some of the original data points. Model and wireframe tonnages were very similar.

Table 11-5: Comparison of the interpolated model with the wireframe model for TiO_2

Category	Volume *(m^3)*	Tonnes *(t)*	SG *(t/m^3)*	TiO_2 *%*
Model	200,139,969	633,227,239	3.16	6.20
Wireframe	200,319,705	633,010,268	3.16	6.48

Table 11-6: Comparison of the interpolated model with the wireframe model for TFe

Category	Volume	Tonnes	SG	TFe cut 15.77
	(m^3)	*(t)*	*(t/m^3)*	%
Model	201,271,813	636,830,304	3.16	14.01
Wireframe	201,404,281	636,437,528	3.16	14.18

A comparison between the result from the ordinary kriging block model and the result from the inverse distance weighted (IDW) cubed block model is shown in Table 11-7 and Table 11-8. For TiO_2, the ordinary kriged grade is slightly lower than the inverse distance weighted grade, less than 3%. For TFe, the ordinary kriged grade is slightly higher than the inverse distance weighted grade, less than 0.5%.

As the difference between the results from the two models is not significant, the ordinary kriging interpolation model has been validated.

Table 11-7: Comparison of the result from the ordinary kriged model with the IDW cubed model for TiO_2

Category	Volume	Tonnes	SG	TiO_2
	(m^3)	*(t)*	*(t/m^3)*	%
OK Model	193,628,563	613,659,344	3.17	6.19
IDW3 Model	193,628,563	613,659,344	3.17	6.34

Table 11-8: Comparison of the result from the ordinary kriged model with the IDW cubed model for TFe

Category	Volume	Tonnes	SG	TFe
	(m^3)	*(t)*	*(t/m^3)*	%
OK Model	194,683,125	616,858,826	3.17	13.96
IDW3 Model	194,683,125	616,858,826	3.17	13.91

Local validation of the interpolated block model with the original drillhole sample values for TiO_2 and TFe is shown in Figure 11-46 and Figure 11-47. It can be seen there is a high correlation between the original sample grades and the interpolated block model grades. This together with the comparison of the ordinary kriging global grade with the raw sample grades and an IDW cubed model global grade supports that the ordinary kriged model is a reasonable estimate.

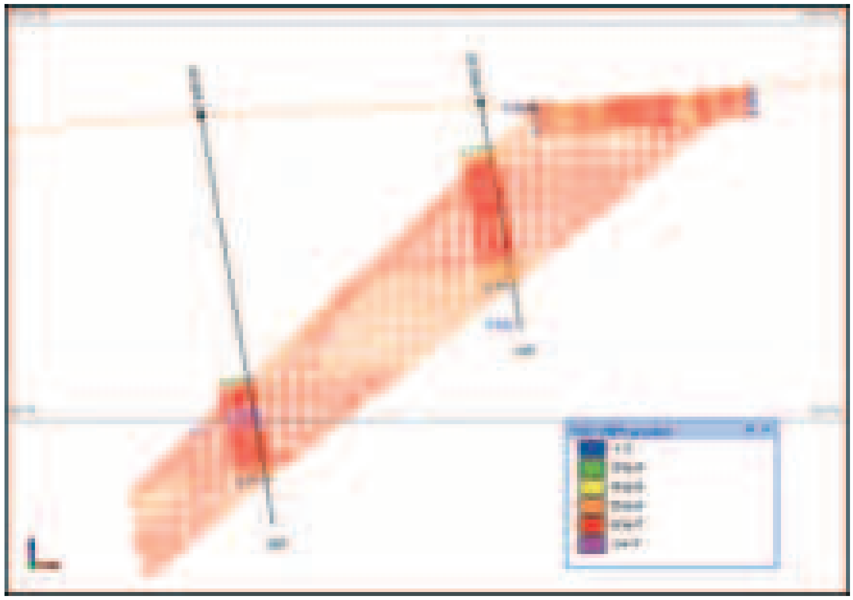

Figure 11-46: Cross-section showing local validation of raw TiO_2 grades compared to block model grades

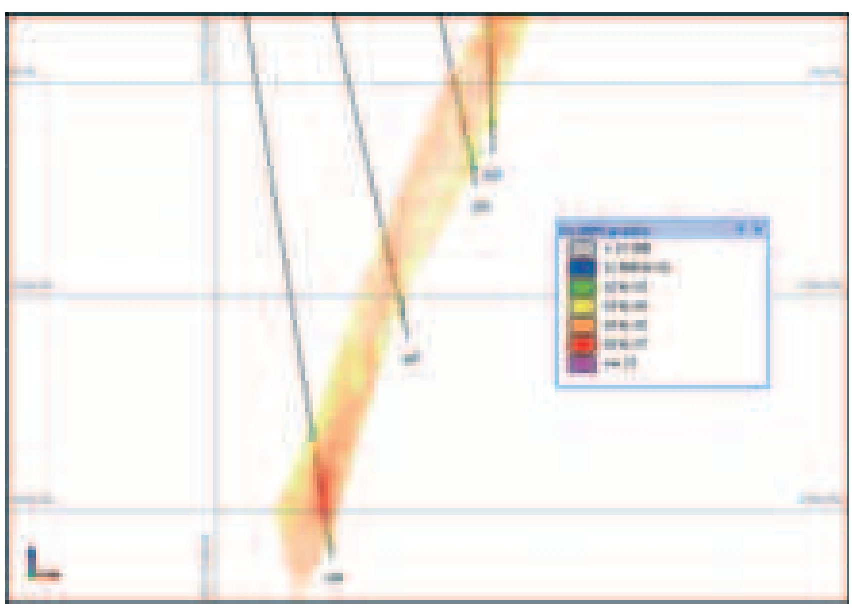

Figure 11-47: Cross-section showing local validation of raw TFe grades compared to block model grades

12 RESOURCE STATEMENT

The resources reported for the Zhuge Shangyu Iron and Titanium deposit are stated by category.

The value of contained metal per tonne of ore can be estimated for each block in the block model by creating a TiO_2 equivalent grade; this is done by adding the price weighted TFe grade to the TiO_2 grade. The TiO_2 equivalent grade was generated using annual forecast yield for TiO_2 and TFe and prices of the TiO_2 and TFe concentrate from the mining study. A ratio of 1:4.6 was determined for the value of TiO_2 to TFe. A TiO_2 equivalent grade was then determined for every block in the model. The processing recovery of TiO_2 equivalent was determined to be 27.8% and the price of the combined concentrate used was CN¥2,721 per tonne.

MCS calculated an economic cut-off grade of 9.2% TiO_2 equivalent using the following formula: Economic cut-off grade = CN¥60.43 / (27.8% * CN¥2,721)

The resource reported above a cut-off grade of 9.2% TiO_2 equivalent is shown in Table 12-1. The total resource at various TiO_2 equivalent cut-off grades is shown in Table 12-2. The Measured, Indicated and Inferred resources at various cut-off grades are shown in Table 12-3, Table 12-4 and Table 12-5 respectively.

Table 12-1: Resource statement for the Zhuge Shangyu Iron and Titanium deposit

Resource Category	Tonnes *(t)*	SG *(t/m³)*	TiO_2 equivalent %	TiO_2 %	TFe %
Measured	372,793,000	3.19	70.30	5.86	14.00
Indicated	260,565,000	3.13	70.31	5.81	14.03
Total Measured and Indicated	633,358,000	3.17	70.31	5.84	14.01
Inferred	3,472,000	3.13	69.30	3.63	14.27
Total Resources	636,830,000	3.16	70.30	5.83	14.01

Note: Numbers have been rounded to reflect that the resources are an estimate.

Table 12-2: Total resources at various cut-off grades

TiO_2 equivalent COG (%)	Density (t/m^3)	Volume (m^3)	Tonnage (t)	TiO_2 equivalent grade (%)	TiO_2 grade (%)	TFe grade (%)
0.0	3.16	212,565,000	672,223,000	66.91	5.84	13.28
5.0	3.16	211,994,000	670,487,000	67.07	5.85	13.31
10.0	3.16	201,272,000	636,830,000	70.30	5.83	14.01
20.0	3.16	201,272,000	636,830,000	70.30	5.83	14.01
30.0	3.16	201,272,000	636,830,000	70.30	5.83	14.01
40.0	3.16	201,272,000	636,830,000	70.30	5.83	14.01
50.0	3.16	201,272,000	636,830,000	70.30	5.83	14.01
60.0	3.16	199,795,000	632,253,000	70.39	5.87	14.03
70.0	3.17	118,054,000	373,755,000	72.41	6.43	14.34
80.0	3.03	1,483,000	4,496,000	81.00	6.21	16.26

Note: Numbers have been rounded to reflect that the resources are an estimate.

Note: Resources may not ultimately be extracted at a profit.

Table 12-3: Measured resources at various cut-off grades

TiO_2 equivalent COG (%)	Density (t/m^3)	Volume (m^3)	Tonnage (t)	TiO_2 equivalent grade (%)	TiO_2 grade (%)	TFe grade (%)
0.0	3.19	124,292,000	396,378,000	66.46	5.88	13.17
5.0	3.19	124,113,000	395,806,000	66.55	5.88	13.19
10.0	3.19	116,858,000	372,793,000	70.28	5.86	14.00
20.0	3.19	116,858,000	372,793,000	70.28	5.86	14.00
30.0	3.19	116,858,000	372,793,000	70.28	5.86	14.00
40.0	3.19	116,858,000	372,793,000	70.28	5.86	14.00
50.0	3.19	116,858,000	372,793,000	70.28	5.86	14.00
60.0	3.19	116,337,000	371,125,000	70.33	5.89	14.01
70.0	3.18	67,913,000	215,961,000	72.44	6.47	14.34
80.0	3.03	1,480,000	4,488,000	81.00	6.21	16.26

Note: Numbers have been rounded to reflect that the resources are an estimate.

Note: Resources may not ultimately be extracted at a profit.

Table 12-4: Indicated resources at various cut-off grades

TiO_2 equivalent COG (%)	Density (t/m^3)	Volume (m^3)	Tonnage (t)	TiO_2 equivalent grade (%)	TiO_2 grade (%)	TFe grade (%)
0.0	3.12	87,038,000	271,980,000	67.63	5.82	13.44
5.0	3.13	86,684,000	270,936,000	67.87	5.82	13.49
10.0	3.13	83,303,000	260,565,000	70.34	5.82	14.03
20.0	3.13	83,303,000	260,565,000	70.34	5.82	14.03
30.0	3.13	83,303,000	260,565,000	70.34	5.82	14.03
40.0	3.13	83,303,000	260,565,000	70.34	5.82	14.03
50.0	3.13	83,303,000	260,565,000	70.34	5.82	14.03
60.0	3.13	82,529,000	258,207,000	70.45	5.87	14.04
70.0	3.15	49,543,000	155,921,000	72.33	6.37	14.34
80.0	3.03	3,000	9,000	80.24	6.08	16.12

Note: Numbers have been rounded to reflect that the resources are an estimate.

Note: Resources may not ultimately be extracted at a profit.

Table 12-5: Inferred resources at various cut-off grades

TiO_2 equivalent COG (%)	Density (t/m^3)	Volume (m^3)	Tonnage (t)	TiO_2 equivalent grade (%)	TiO_2 grade (%)	TFe grade (%)
0.0	3.13	1,235,000	3,864,000	62.80	3.80	12.83
5.0	3.13	1,197,000	3,746,000	64.69	3.83	13.23
10.0	3.13	1,110,000	3,472,000	69.31	3.66	14.27
20.0	3.13	1,110,000	3,472,000	69.31	3.66	14.27
30.0	3.13	1,110,000	3,472,000	69.31	3.66	14.27
40.0	3.13	1,110,000	3,472,000	69.31	3.66	14.27
50.0	3.13	1,110,000	3,472,000	69.31	3.66	14.27
60.0	3.14	929,000	2,921,000	72.23	4.17	14.80
70.0	3.13	598,000	1,873,000	75.67	5.75	15.20

Note: Numbers have been rounded to reflect that the resources are an estimate.

Note: Resources may not ultimately be extracted at a profit.

13 COMPARISON WITH HISTORIC RESOURCE

According to Shandong Lianchuang Architectural Design Co. Ltd (2011), the total resource amounted to 462.894 Mt of ore containing 30.692 Mt of TiO_2 at a grade of 6.63% TiO_2. In comparison, the MCS resource is approximately 29% larger in tonnage and slightly lower in TiO_2 grade (around 6%) and slightly lower in TFe grade (around 4%). The larger tonnage can be explained by the fact that the previous resource did not include the entire area of the orebody. This can be seen in Figure 13-1, with the boundary of mineralisation included in the MCS estimate annotated. In addition, a slightly larger mineralised envelope was interpreted by MCS compared to the historic resource.

The difference in TiO_2 and TFe grades can be explained by the choice of interpolation method. The ordinary kriging method tends to smooth the grade distribution resulting in slightly lower grades compared to the polygonal method.

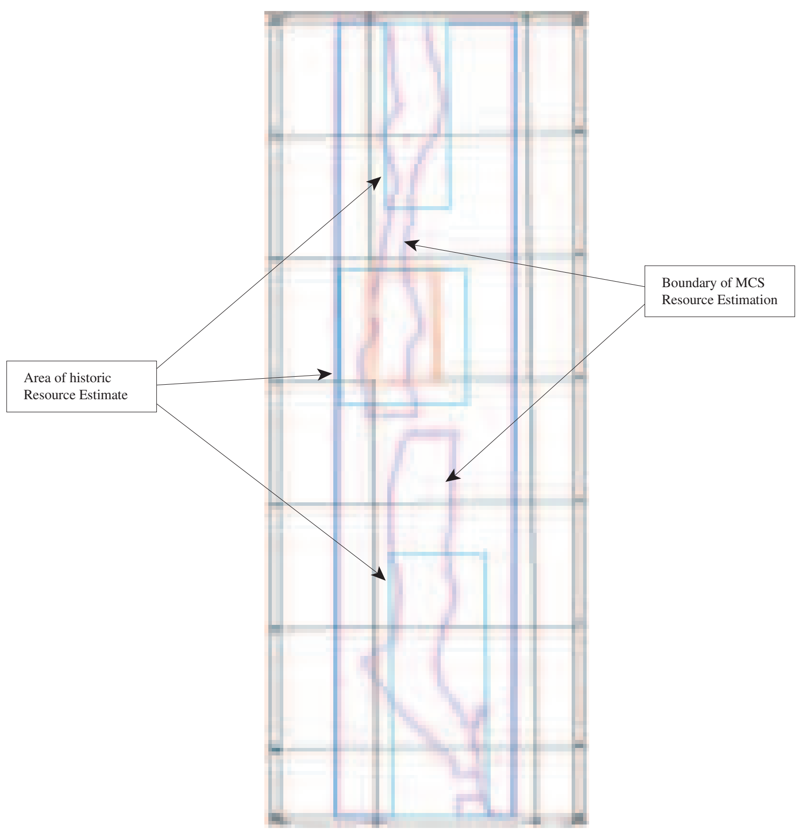

Figure 13-1: Area of historic resource estimate

Source: Shandong No.8 Exploration Institute of Geology and Mineral Resources (2009)

14 METALLURGY AND MINERAL PROCESSING

14.1 Metallurgy

According to Shandong Lianchuang Architectural Design Co. Ltd (2011), the metallurgical properties of the Zhuge Shangyu Iron and Titanium ore are:

- Grade of raw ore of TFe 14.24% and TiO_2 6.43%;
- Grade of extracted ore of TFe 14.24% and TiO_2 6.43%;
- Maximum lumpiness of ore of 1,000 mm;
- Ore density of 3.09 t/m^3;
- Loosening coefficient of 1.6;
- Physio-mechanical property of f=6-7 (soft ore).

14.2 Mineral Processing

The processing plant would consist of a three-section closed circuit crushing unit and a four-stage ore separation plant.

Processing recoveries stated in the Feasibility Study for Zhuge Shangyu (Shandong Lianchuang Architectural Design Co. Ltd, 2011) sent to MCS on 15th September 2011 stated recoveries as 45.00% for iron and 45.00% for titanium. MCS considers processing recoveries of 45.00% for iron and 45.00% for titanium as 'unlikely' and that a processing recovery rate of 23.22% for iron and 12.70% for titanium is more realistic.

On the basis of the processing circuit design, the characteristics of the ore, and comparisons with similar operations, MCS expects the proposed processing plant to process approximately 8 million t/pa with an annual concentrate output of approximately 150,000 tonnes of 44% titanium concentrate and 450,000 tonnes of 61% iron concentrate. If the recoveries stated in the Feasibility Study for Zhuge Shangyu (Shandong Lianchuang Architectural Design Co. Ltd, 2011) were achieved, the processing plant would be expected to produce approximately 840,000 tonnes of iron concentrate and 526,100 tonnes of titanium concentrate.

MCS acknowledges that some discrepancies exist between processing recovery rates provided in different revisions of feasibility reports provided by the client, and that there is a lack of results from metallurgical test work performed to support the revised numbers. The recovery rates used in this estimation are based on the experience of the Competent Person and are considered comparable to recovery rates for other mines with similar ore types and grades. MCS recommends that pilot-scale mineral processing testwork be carried out to determine the true recovery rates for the particular ores, processing equipment and design parameters of this project. Based on the results of processing testwork recovery rates may need to be revised either upwards or downwards.

14.2.1 Crushing Circuit

The following details have been sourced from the preliminary design report of the Shandong Lianchuang Architectural Design Co. Ltd (2011). The crushing circuit consists of coarse crushing stage, medium crushing stage, a screening stage then dry concentration stage finishing with the fine ore removal and fine crushing stage.

The coarse crushing plant is 33 m in length and 18 m in width, with 50 tonne bridge cranes and overhaul space and a set of PXZ-1400/1700 type hydraulic heavy gyratory crushers. Ore is fed into the hopper of the crusher directly by tramcars. The broken ores will be sent by conveyor belt to the electric vibrating feeder and finally sent to the medium-crushing circuit. The maximum grain size after the coarse crushing stage is 225 millimetres.

The medium crushing process occurs in a separate area which is 63 m long and 18 m wide, with a 16/3.2 t type bridge crane, overhaul space and 2 sets of HP800C type standard and high efficiency cone crushers. In front of each crusher are surge bins with capacities of 500 tonnes each. The volume of ore that can be stored is sufficient for 40 minutes of production.

The screening room is 63 m long and 18 m wide with 10 tonne single-beam electric cranes and overhaul space and 5 sets of Nordberg shakers. Surge bins are installed in front of each shaker with a capacity of 500 tonnes each and can store the volume of ore for 35 minutes of production.

In the medium and fine crushing areas, crushed ore will be discharged to the surge bin and then sent to shakers to sieve through electric vibrating feeders. Material on the shaker should be returned to the fine crushing workshop to be broken again, while the materials under the shaker should be sent to the fine ore bin. The shakers are of XH3085 type, and have a screen size of 14 mm, and screening efficiency of 65%.

Fine crushing process takes place separately in an area 54 m in length and 18 m in width with 16/3.2 t type bridge cranes, overhaul space and finished by 4 sets of HP800 medium size short head cone crushers. Surge bins are installed in front of each fine crusher with a capacity of 500 tonnes each which can store volume of ore for 40 minutes production.

Five percent of the waste is removed before the sieved ores go into the fine crushing stage. The waste should be sent out of the medium-fine crushing circuit through conveyor belts and sent to a waste dump. Electric jaw valves should be installed under the waste storage area, enabling waste to be removed from the plant by trucks, Figure 14-1.

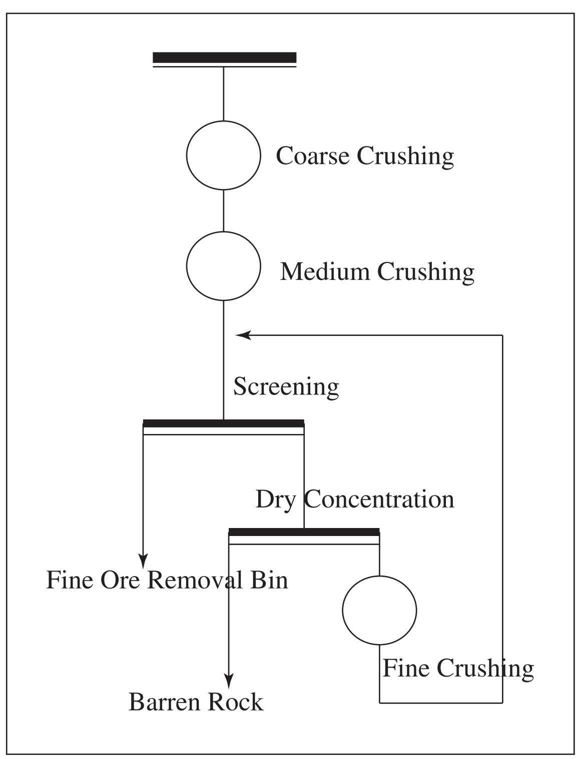

Figure 14-1: Zhuge Shangyu ore crushing flow chart

The operation of ore grinding and separating consists of four stages. Ore grinding involves two stages of grinding processes, while separation involves magnetic processes to concentrate the iron ores and the methods of re-election spiral chute, table concentrator and flotation are used to concentrate titanium ores. The flow chart of the process is shown in Figure 14-2.

The ore grinding process involves two stages of grinding and cyclone classification. The primary grinder is of the type MQG5200×6400 with an effective volume of 123 m^3, achieving a fineness of 200 microns accounting for 60%. The secondary grinder is of the type MQY5030×8000, with an effective volume of 145 m^3 achieving a fineness of 200 microns accounting for 85%. Both of the stages involve the use of swirlers to grade the ores.

The grading of iron ore concentrate should involve two magnetic separating processes; one for the coarse fraction and another for the fine fraction. The primary magnetic extractor is of type CTB-1540, with a magnetic field intensity of 110 mT, while the secondary magnetic extractor type is of type CTB-1540, with a magnetic field intensity of 90 mT. The result will be an iron concentrate with a grade of 61.00% TFe and production 5.244%, with a recovery of 23.22%. The iron ore tailings will pass to the titanium separating stage.

The grading of titanium concentrate involves separation using the magnetic process. After the iron tailings are concentrated by the thickener, they pass through one coarse separating process, two fine concentrating processes and three stages of spiral chute separation. Concentrate ores should be sent to the table concentrator for further separation while the intermediate products in the primary spiral chute should return to the concentrate thickener. The diameter of the primary spiral chute is 1,200 mm, while the secondary is 900 mm, and the third 600 mm. Concentrate ores in the table concentrator should be passed to a flotation process. The final grade of titanium concentrate is 44.00% with production 1.90% and a recovery ratio of 12.70%. Fourth stage tailings and the flotation tailings will be collected in the total tailings and then pass to the concentrate thickener.

Magnetic iron concentrate will be dewatered directly in 2 sets of 45 m^2 ceramic filters and finally become dry mine with 10% water content. The dry mine will be sent to the iron concentrate ore storage by conveyor belt and loaded onto trucks with a grab bucket crane. Finally the dry ores will be transported outside. The iron concentrate storage is of the semi-underground type, with the length of 60 m, width of 15 m and the depth of 3 m.

Flotation titanium concentrate should initially pass a thickener with a diameter of 30 m, and secondly, the concentrate should be dewatered in a set of 45 m^2 ceramic filters and finally become dry mine with 10% water content. The dry mine will be sent to the titanium concentrate ore storage by conveyor belt and loaded onto trucks with a grab bucket crane. Finally the dry ores will be transported outside. The titanium concentrate storage is of the semi-underground type, with the length of 24 m, width of 15 m and the depth of 3 m.

The density of the whole plant tailing pulp is about 8%, which will become 30% after passing through two sets of thickeners with diameters of 100 m. Slurry pumps will send the tailings to the pressure and filtration area, where the tailings will be dewatered. The tailings pressure and filtration plant is 142.5 m in length and 42 m in width, equipped with two sets of 10 tonne single-beam electric cranes, overhaul space and 30 sets of 600 m^2 plate and frame filter press machines. 28 sets will be operational while 2 sets will be standby. Tailings should be dewatered to 20% moisture content by plate and frame filter press. Dry tailings will fall to the ground directly and be sent to tailings storage by trucks.

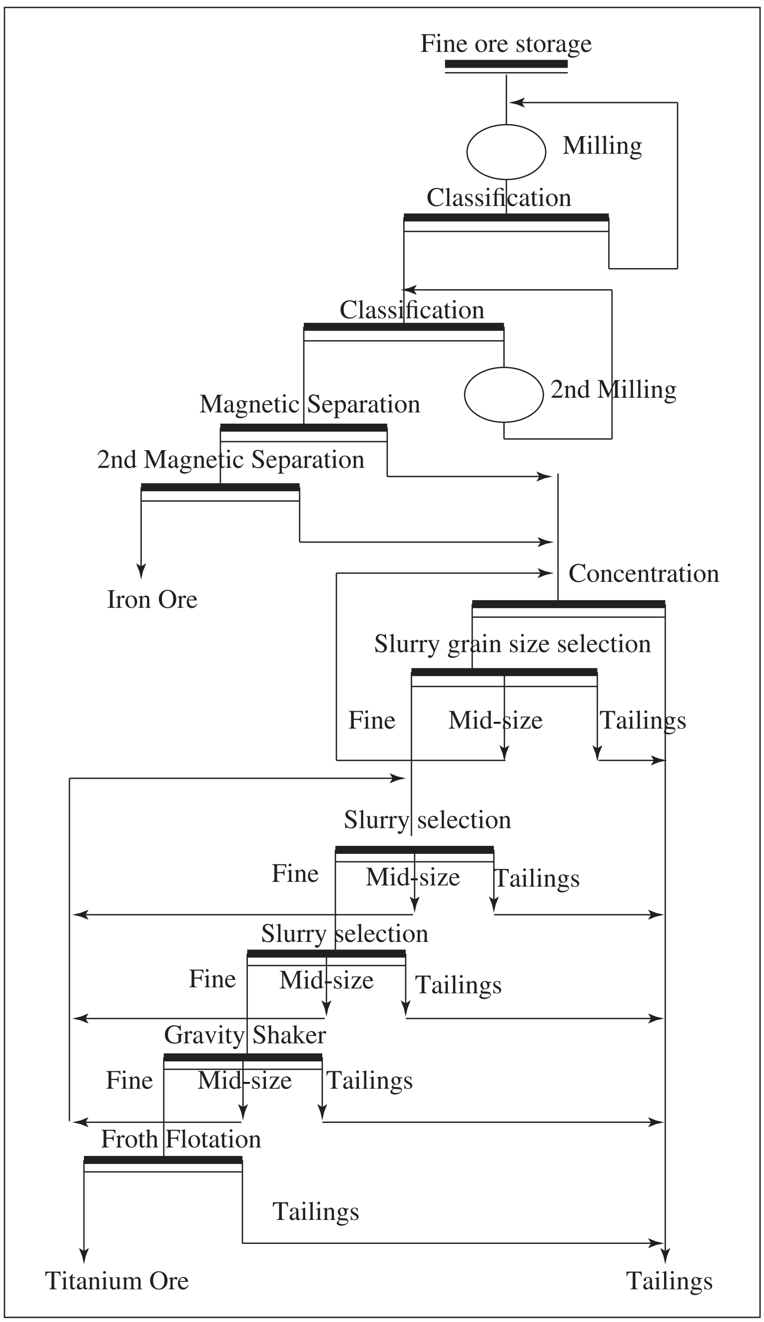

Figure 14-2: Zhuge Shangyu ore grinding and separation flow chart

15 MINING STUDY

15.1 Scope of Work

The scope of work for the mining study was to convert the resources to reserves. This involved:

- calculating cut-off grades;
- optimisation using whittle 4D;
- checking the optimisation results with the open pit design produced by the Shandong Lianchuang Architectural Design Co. Ltd (2011);
- assessing the proposed mining method;
- producing a life of mine schedule;
- assessing the cost and revenue estimates for the project.

MCS had previously completed a resource and reserve estimate of the project in June 2011. The client commissioned MCS to complete an update of the reserve estimate for the project due to changes in modifying factor information outlined in the Feasibility Study Report for Zhuge Shangyu Ilmenite Mining and Processing Project (Shandong Lianchuang Architectural Design Company Ltd, 2011). The changes in modifying factor information were as follows:

- A reduction in capital expenditure from CN¥1.61 billion previously to CN¥998.94 million.
- An increase in titanium concentrate selling price from CN¥890.00 per tonne previously to CN¥1,650.00 per tonne.

All possible modifying factors are to be considered for the conversion of resources to reserves.

15.2 Open Pit

The following information has been sourced from the Preliminary Design report of Shandong Lianchuang Architectural Design Co. Ltd (2011).

The deposit is most suitable for open pit mining due to the size, depth and shape of the orebodies, as well as the geology of the area.

The planned mining bench height is 12 metres. The geotechnical analysis indicates that a hanging wall slope angle of less than or equal to 51° and a footwall slope angle of less than or equal to 47°, are acceptable. The bench batter angle in Quaternary sediments and weathered bedrock will be 40° and the batter angle in fresh bedrock will be 60°.

The proposed production capacity is eight million tonnes of ore to be delivered to the process plant per year. This will be achieved using conventional open pit mining methods. The proposed mining equipment includes KQG-150 high pressure percussion drill rigs, 4.3 m^3 hydraulic excavators, and 50 tonne mining dump trucks.

It is noted however that the mining of some parts of the orebody will be difficult as sections of it are on the sides of steep hills. Mining of these sections will be less productive than in the main open pit area due to the need to create access and the small mining areas. For these sections a pioneering approach will be taken using vertical stripping. That is, the open pit stripping working face will be along the longitudinal line (the orebody strike), and the stripping will advance from the hanging wall downward to the footwall of the orebody.

As only a small percentage of the mining is considered as pioneering, the proposal is to maintain output by matching the relationship between the output of the last stage with the next stage. Each new level preparation of most benches will require a pioneer cut. The gradient of the pioneer cut should be 8%, the width of the trench floor should be 15 m, the slope angle should be 70° and the trench length usually should be between 150 to 300 m.

The production of the mine refers to single-bench production in most years and double-bench production for the new level preparation stage only. Multi-bench production will be required in the lower sections of the orebody when the pit is close to final depth.

MCS has reviewed the designs and reports and considers the open pit mining proposal by Shandong Lianchuang Architectural Design Co. Ltd. to be appropriate for the mining of the orebody.

15.3 Underground

A combination of shaft and decline development is preferred for underground mining. Both orebodies would share the same slope ramp for large vehicles.

There are five shafts for orebody 1 with two air shafts with a diameter of 5.5 m in the south and north parts of the deposit, which function as an upcast air shaft and emergency outlet. Inside the shaft is a metal ladderway. A skip shaft with a diameter of 5.0 m for all hoisting work of ore is located in the middle of the deposit and can also act as the return air shaft and emergency outlet. An auxiliary shaft with a diameter of 6.5 m is located 150 m north of the skip shaft and can also act as the intake shaft and emergency outlet. The shaft contains a cage and hoisting equipment for hoisting staff, equipment, materials and waste rock. A special intake shaft with a diameter of 5.0 m is located 300 m south of the skip shaft and will act as the intake shaft and emergency outlet. The shaft contains a metal ladderway rather than hoisting facilities.

For orebody 2 there are four vertical shafts. Two intake shafts are located in southern and northern parts of the orebody and will be separately used as an intake shaft and emergency outlet. The diameter of the intake shafts is 4.5 m. Metal ladderways should be included in the shafts, and they should not contain hoisting equipment. A skip shaft should be located in the middle part of the ore body, with a diameter of 5.5 m, responsible for all ore hoisting, and should double as a return air shaft and emergency outlet. An auxiliary shaft should be located 150 m north of the skip shaft. The diameter of the auxiliary shaft is 5.5 m. Cage hoisting equipment should be installed in this shaft which will be responsible for the tasks such as hoisting of the mine personnel, equipment, materials and waste rock. The auxiliary shaft should double as an intake shaft and emergency outlet.

Slope ramps, to be used for ore removal by dump trucks, are located in the middle of the two ore bodies and are of the switchback type.

The underground mining height is 50 to 60 m. There will be 7 levels for orebody 1; -20 m (return air level), -80 m, -140 m, -200 m, -260 m, -320 m and -380 m. For orebody 2 there will be 4 levels; +30 m (return air level), -20 m, -80 m and -140 m.

According to the mining level and the type of ore body, the sublevel mining method (subsequent fill) and VCR mining method (subsequent fill) will be used. For the mining facilities, efficient drilling facilities and ore removal facilities involving trucks are suitable. It is estimated that the comprehensive recovery rate may reach about 74% and extracted ore throughput of the two mines may reach 122,730,000 t. Based on the dilution ratio of 9%, the raw ore throughput may reach 134,870,000 t.

The stopes are arranged along the strike of the orebody, with a length of 60 m, height of 70 m and the width equal to the width of the ore body. Rib pillars are included in the stope, with a width of 6 m and length of stope room of 54 m. There is no sill pillar and supporting pillar. The basic structure of the stope is the trench-type stope.

Development work other than mining includes the ore removal roadway, whose layout is the same as subsequent fill mining method of the sublevel open stoping. The project of mining cutting includes ore removal roadway, service ventilation rise and footway, stope drift and ore-pass.

Stoping work includes rock drilling, blasting, ventilation, partial ore drawing, scaling, field flatting, supporting and ore drawing in large quantities. Stoping is implemented from bottom to top according to layers with the height of 2 m. Rock drilling is conducted by the upward and short-hole hammer drill of YSP45, which is charged manually with #2 rock explosive and detonated by a non-electric system. After blasting, the area must be ventilated and the fumes discharged. Partial ore drawing is implemented after each layer is detonated completely. About 1/3 ores are drawn, scaling and field flatting is implemented, and in unstable areas, support work with concrete rock bolts with a length of 2 to 2.5 m is carried out. The ore can be removed in quantity after the stoping has been finished completely for all layers. For partial ore drawing and ore drawing in quantity, TORO007 diesel fuelled scrapers (equipped with 5 m^3 bucket capacity) are used to transport the ores to the ore pass.

Fresh air is introduced through the roadway, ore roadway and service ventilating rise to the stoping working level. The exhaust air is discharged to the upper and middle section through the service ventilating rise and then discharged to the surface through the return air shaft. To speed up the discharge, fans can be used inside the stope.

Filling in the stope is basically the same with that of subsequent fill mining method of the sublevel open stoping.

16 RESERVE ESTIMATION

16.1 Introduction

In the case of the Zhuge Shangyu project there are two commodities Iron and Titanium. The Resources and Reserves are given separately for these two commodities although they occur contiguous. Also at Zhuge Shangyu there are Surface mining resources and underground mining resources and hence there are two tables that show Resources and Reserves.

The JORC code and definitions have been used for the conversion of Resources to Reserves.

These Reserves were based on the Resource model dated 17/3/2011 and the Reserves are therefore deemed to have the same date. However, the modifying factor parameters were changed and the reserves were recalculated with these new parameters in November 2011. It should be noted that the Reserves quoted here are a "snapshot" at a specific point in time. Should any of the inputs change, such as the Resource model, the Reserves should be recalculated.

The information given in the Feasibility study was used to split the Resources into surface and underground resources.

16.2 Surface Reserves

The Resource has been classified as Measured. Indicated, and Inferred. By definition Reserves may not include Inferred Resources. Like Resources, Reserves, by definition, have two components; a quantity component (value) and a classification component (risk).

The quantity component of Resources is termed Gross Tons In Situ, (GTIS) and is the starting point in the derivation of Reserves. The process used to convert GTIS to Reserves is as follows:

- Step 1 GTIS is converted to Mineable Tons In Situ (MTIS);
- Step 2 MTIS is converted to Reserves.

The classification component of Reserves is based on the classification of the Resource.

Step 1 the conversion of the GTIS, into MTIS

Initially GTIS is split into Resources that will be mined utilising surface mining techniques and Resources that are below the optimised shell for open pit mining.

All Inferred Resources are excluded.

Step 2 the conversion of MTIS into Reserves

During this step appropriate factors are applied to the MTIS to obtain the Reserve.

These factors include grade cut-offs (where appropriate), economic cut-offs (such as block volumes) and losses due to the mining method envisaged.

A modelling estimation error is also applied.

The Reserve classification is based on the Resource classification. Once the Inferred Resources have been excluded the Reserve is classified. Indicated Resources can only go to Probable and Measured to Proven but if the bulk of the remaining Resource is Indicated then the whole of the Reserve will be classified as Probable.

Resource to Reserve Calculation

In the case of the Zhuge Shangyu project there are two commodities iron and titanium as well as Measured, Indicated and Inferred resources. In the process of converting the Resources to Reserves, all the Inferred Resources have been excluded from MTIS. Table 16-1 shows the total Resource (GTIS) and the MTIS for the Resource.

Weathered material has not been included in the Reserve as the metallurgical properties are usually different and no information is given as to any of the tests performed on the compatibility of the weathered and fresh material.

The factors applied to MTIS include the following.

- A mining loss of 10%. The plan extent of the ore-body is such that 10% is appropriate as the mining loss will only occur at the ore/gangue boundary around the edges.

- A modelling estimation error of 3%. This is an industry norm. For Measured Resources a factor of 3% is used and for Indicated a factor of 5% is used. In the case of Zhuge Shangyu the majority of the ore is Measured.

The final pit designs are shown in Figure 16-2 and Figure 16-1.

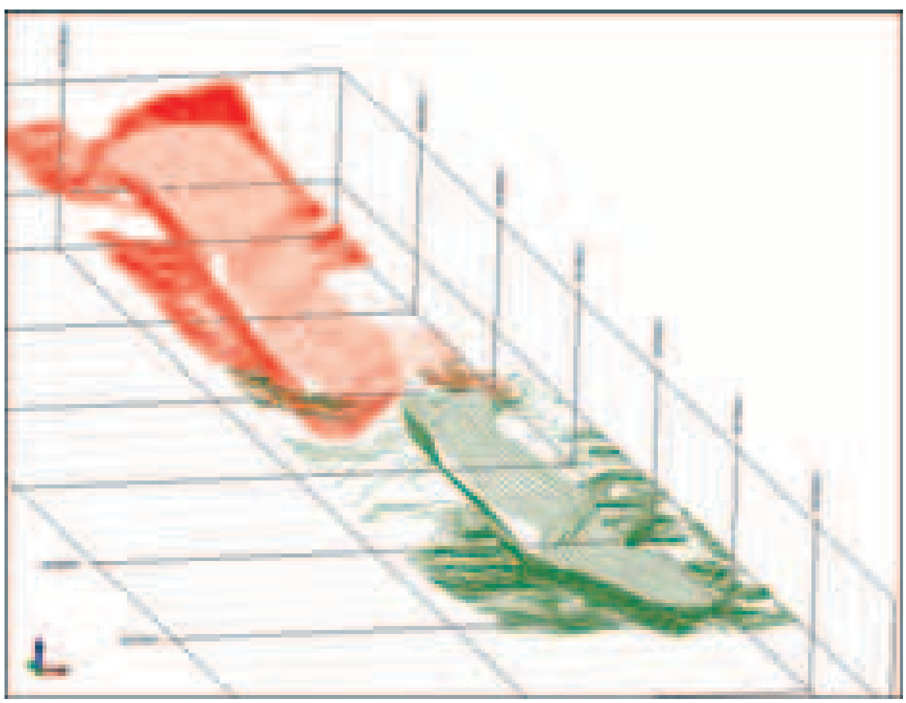

Figure 16-1: Oblique view of final pit design

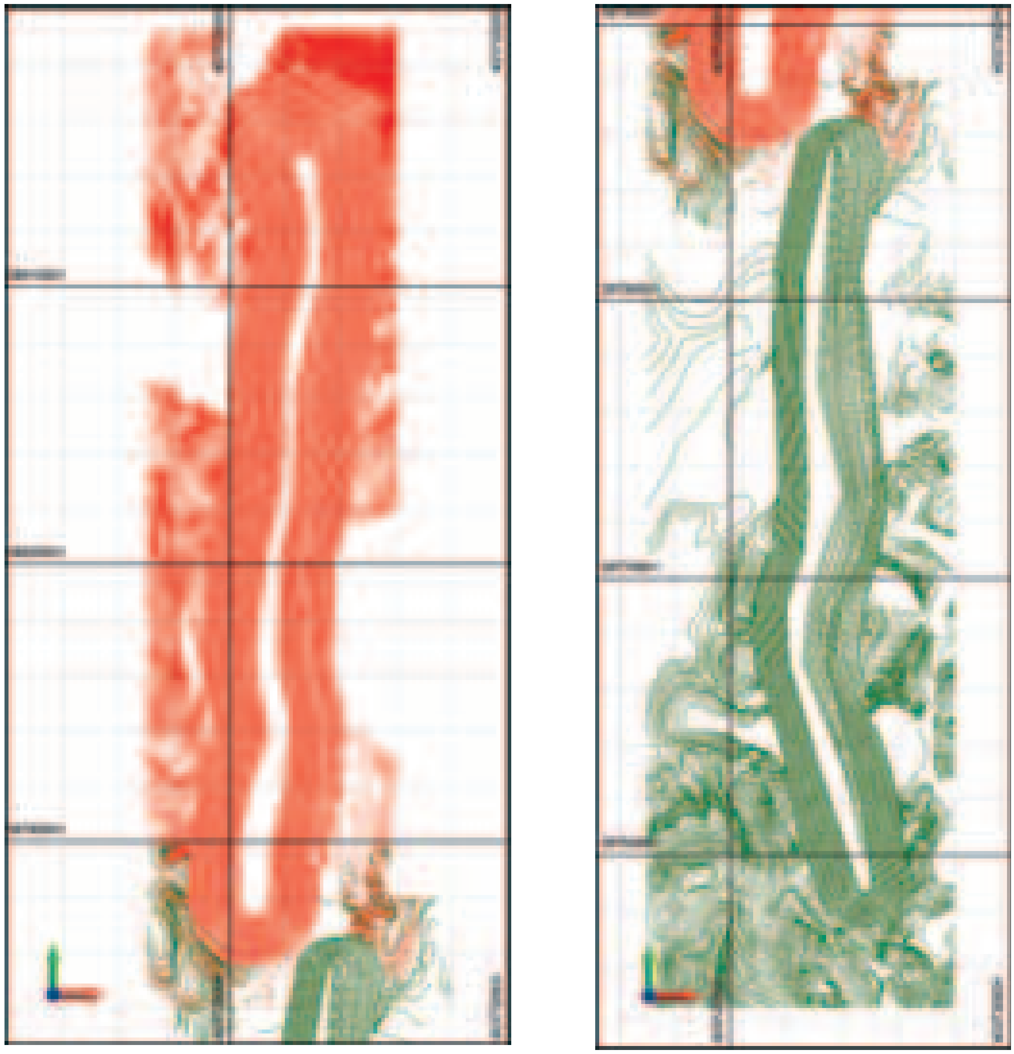

Figure 16-2: Plan views of pit design for north pit (left) and south pit (right)

Table 16-1: Statement of Open Pit JORC compliant reserves for the Zhuge Shangyu deposit, November 2011

Orebody Name	Class	GTIS	GRADE Ti	GRADE Fe	MTIS	GRADE Ti	GRADE Fe	Mining Recovery	Dilution	Proved Reserves	Probable Reserves	GRADE Ti	GRADE Fe
		(Mt)	*(%)*	*(%)*	*(Mt)*	*(%)*	*(%)*	*(%)*	*(%)*	*(Mt)*	*(Mt)*	*(%)*	*(%)*
T_nth_1	MEASURED	278.644	6.30	13.95	168.751	6.36	13.94	87.0%	9.0%	160.026	–	5.84	12.79
T_nth_1	INDICATED	101.840	6.40	14.02	24.803	6.44	13.89	87.0%	9.0%	–	23.520	5.91	12.74
Total		380.485			193.553					160.026	23.520		
T_nth_1	MEASURED	0.000	0.00	0.00	0.000	–	–	87.0%	9.0%	0.000	0.000	–	–
T_nth_1	INDICATED	0.729	4.74	13.55	0.661	4.74	13.55	87.0%	9.0%	–	0.627	4.35	12.43
Total		0.729			0.661					0.000	0.627		
T_nth_1	MEASURED	80.730	6.04	13.87	42.240	5.95	13.92	87.0%	9.0%	40.056	–	5.46	12.77
T_nth_1	INDICATED	150.213	5.95	13.98	69.350	5.88	13.93	87.0%	9.0%	–	65.765	5.39	12.78
Total		230.943			111.590					40.056	65.765		
Grand total		612.156			305.805					200.082	89.913		

16.3 Underground Reserves

For Zhuge Shangyu there are Measured, Indicated and Inferred resources. In the process of converting the Resources to Reserves, all the Inferred Resources have been excluded from MTIS. Table 16-3 shows the GTIS and MTIS for the underground resources.

To convert the MTIS to Reserves the layout as defined by the Vertical Crater Retreat (VCR) mining method was applied to the ore wireframes. This had the effect of "blocking out" the ore wireframe with the VCR mine design parameters. These parameters are listed in Table 16-2. Figure 16-3 and Figure 16-4 shows the blocking out of the Resource based on the parameters given in Table 16-2.

Table 16-2: Parameters for Vertical Crater Retreat mining method

Description	Unit	Short Hole Shrinkage Mining Method Parameters
Length of Block	m	60
Pillar between Blocks	m	6
Distance between levels	m	60

The resulting blocks then constituted the MTIS. This MTIS was then further manipulated using factors to derive the Reserve.

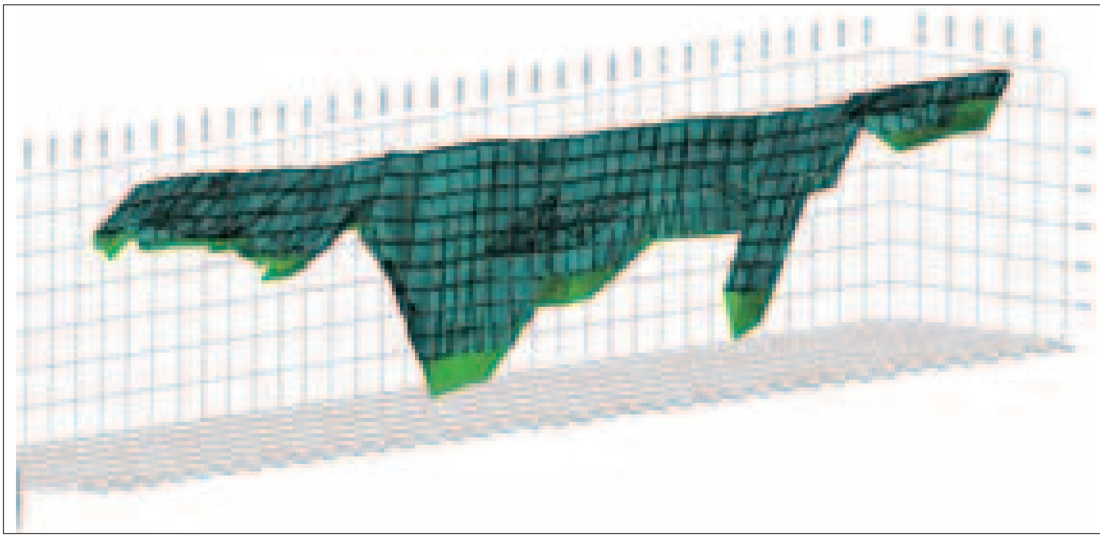

Figure 16-3: Showing the blocked out Reserves for the North Block

The factors applied to MTIS include the following.

- A loss of 10% which represents the ore left in pillars around the potential stopes.

- A modelling estimation error of 3%. This is an industry norm. For Measured Resources a factor of 3% is used and for Indicated a factor of 5% is used. In the case of Zhuge Shangyu the majority of the ore is Measured.

A schedule of tonnages was produced of the open pit and the underground levels. The schedule assumes that the production volume ramps up to 8 million tonnes per annum for the open pit and 6 million tonnes for the underground. The financial analysis was limited to 20 years. The expected project life of the open pit is 36 years and the underground mine is approximately 40 years.

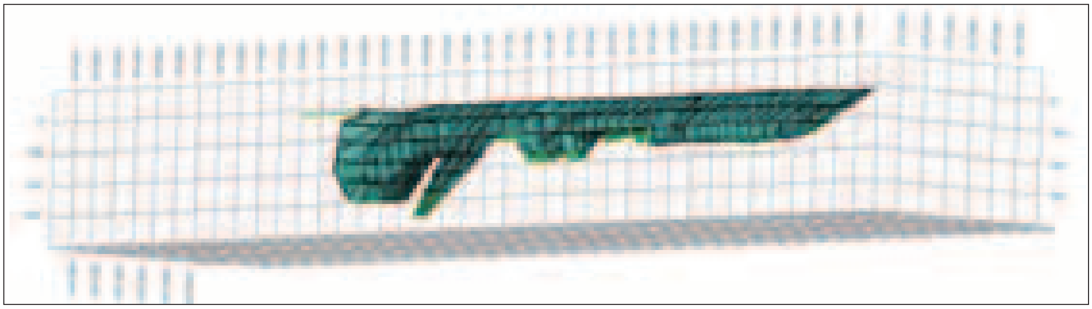

Figure 16-4: Showing the blocked out Reserves for the South Block

Table 16-3: Summary of JORC compliant underground mining reserves for the Zhuge Shangyu deposit, November 2011

Orebody Name	Class	GTIS	GRADE	GRADE	MTIS	GRADE	GRADE	Mining Recovery	Dilution	Proved Reserves	Probable Reserves	GRADE	GRADE
		(Mt)	*Ti%*	*Fe%*	*(Mt)*	*Ti%*	*Fe%*	*(%)*	*(%)*	*(Mt)*	*(Mt)*	*Ti%*	*Fe%*
T_nth_1	MEASURED	278.644	6.30	13.95	51.011	6.24	14.03	87.0%	9.0%		48.374	5.72	12.87
T_nth_1	INDICATED	101.840	6.40	14.02	113.064	6.32	14.01	87.0%	9.0%		107.218	5.80	12.86
Total		380.485			164.075						155.592		
T_nth_1	MEASURED												
T_nth_1	INDICATED	0.729	4.74	13.55	0.000	0.00	0.00	87.0%	9.0%			0.00	0.00
Total		0.729											
T_nth_1	MEASURED	80.730	6.04	13.87	26.550	6.14	13.85	87.0%	9.0%		25.177	5.64	12.71
T_nth_1	INDICATED	150.213	5.95	13.98	79.643	6.05	14.02	87.0%	9.0%		75.525	5.55	12.86
Total		230.943			106.193						100.703		
Grand total		612.156			270.268						256.295		

17 RESERVE STATEMENT

The JORC Code provides guidelines which set out minimum standards, recommendations and guidelines for the Public Reporting of exploration results, mineral resources and ore reserves. Within the code is a "Checklist of Assessment and Reporting Criteria" (Table 1 – JORC Code). This checklist is a useful method for reviewing JORC compliance. A summary of the key points are listed in Table 17-1.

Table 17-1: JORC Code Compliance Checklist for Zhuge Shangyu

	Section	Comment
1.	Is the Reserve derived from JORC compliant Resource Statement? Who are the competent persons?	This JORC Reserve is derived from JORC compliant Mineral Resources Statement signed by Mr. David Allmark of MCS.
2.	What is the current project status?	The mine is in development. A feasibility study has been completed and life of mine plan has been prepared.
3.	What cut off parameters and physical limits have been applied in estimating the Reserves?	A cut-off grade based on economic factors has been calculated and applied. Factors have been used for mining recovery and dilution based on the orebody shapes and the selected mining method.
4.	What mining and geotechnical assumptions have been made?	Geotechnical assumptions have been considered in the design of both the open pit mine and the underground mine. Ore quality is as per the geological model combined with recovery, dilution, and moisture adjustments.
5.	Is there a metallurgical process used and what is suitability to the type of operation?	The project proposal is to expand the capacity of a nearby process plant owned by the Company. Ore is crushed, milled, and separated into two concentrate streams.
6.	How have the project capital, operating costs and royalties been derived?	The Capital and Operating costs are based on estimates using quotes as well as costs from similar mining projects. Royalties are based on government requirements.
7.	What is the market demand and supply of this commodity and what are the price and volume forecasts of the Reserves based upon?	The Ore from the two mining operations is separated to produce a titanium concentrate and an iron concentrate to meet customer requirements.

	Section	Comment
8.	Any other factors that may potentially affect the viability of the project and the status of titles and approvals required for the project?	All mining projects operate in an environment of geological uncertainty. MCS is not aware at this point in time of any other potential factors that could affect the operation viability. Approvals for the proposed mining operation and process plant expansion have been applied for.
9.	What is the basis for the classification of the ore reserves and proportion of ore reserves which have been derived from Measured mineral resources?	Classification of Ore Reserves has been derived by considering the Measured and Indicated Resources and the level of mine planning. Inferred resources have been excluded from the estimate.
10.	Results of audits or reviews of Reserves Statements	As per findings in this review, plus internal reconciliation and peer review.
11.	Relative accuracy and confidence of the Reserves Estimate	The Reserve estimate for the open pit is supported by greater than 50% of Measured resources. More metallurgical testing is required, however there is a fair level of confidence in the estimate. For the underground, less than 30% of the resource is Measured and the reserve classification has been assessed as Probable.

Following on from the calculations in Table 16-1 and Table 16-1 and the checklist in Table 17-1, shows the diluted and recoverable reserves for the Zhuge Shangyu project. Only Measured Resources have been considered for conversion to Proved Reserves and only Measured and Indicated Resources have been considered for Probable Reserves.

The MCS reserve statement (**current Reserve, November 2011**) for the Zhuge Shangyu deposit is shown in Table 17-2.

Table 17-2: Reserve for the Zhuge Shangyu deposit

Reserve Classification	Ore *(Tonnes)*	TiO_2 Grade *(%)*	TFe Grade *(%)*	Contained TiO_2 *(Tonnes)*	Contained TFe *(Tonnes)*
Open Pit					
Proved	200,080,000	5.76	12.78	11,525,000	25,577,000
Probable	89,910,000	5.52	12.77	4,964,000	11,481,000
Total Open Pit	289,990,000	5.69	12.78	16,489,000	37,058,000
Underground					
Proved	–	–	–	–	–
Probable	256,290,000	5.69	12.85	14,595,000	32,922,000
Total Underground	256,290,000	5.69	12.85	14,595,000	32,922,000
Combined					
Proved	200,080,000	5.76	12.78	11,525,000	25,577,000
Probable	346,210,000	5.65	12.83	19,559,000	44,402,000
Total reserve	546,290,000	5.69	12.81	31,084,000	69,979,000

Notes:

- *The ore resources are inclusive of the ore reserve.*
- *The reserve includes diluting material with an assumed diluent grade of 0%, total dilution used was 9%.*
- *The MCS reserve is stated based on titanium with an iron credit.*

18 COSTS

18.1 Open Pit Cash Operating Costs

All open pit cash operating costs have been supplied by the Client. MCS has not been able to independently verify these costs, however they appear appropriate considering the mining method used and are comparable to other mines located in China that have similar mining methods and orebody characteristics. MCS has assessed the cost estimates provided in the Preliminary Design report and made some modifications including the addition of an environmental allowance (refer Chapter 22) and a contingency of 5%. These modifications bring the estimated operating costs (excluding capital expenditure) up to RMB60.38 per tonne of ore processed.

Table 18-1 below summarises the open pit operating costs presented in the preliminary design report.

Table 18-1: Zhuge Shangyu Open Pit – Average Cash Operating Costs

No.	Item	Unit cost *(RMB/t Ore)*	Annual total cost *(10,000 RMB)*
	Mining Cost		
I	Material	15.89	12,713.92
II	Fuel and power	4.57	3,654.90
III	Wage and welfare expense	0.62	496.80
	Total Mining cost	21.08	16,865.62
	Process Cost		
I	Material	18.64	14,913.58
II	Fuel and power	14.58	11,661.36
III	Wage and welfare expense	0.88	701.04
	Total Processing cost	34.10	13,300
	Other Costs		
	Overheads and Admin	2.18	1,747.46
	Environmental Allowance	0.15	117.35
	Total Other Cost	2.33	1,864.81
	Contingency (5%)	2.88	2,300.32
	Total Operating Cost	60.38	48,306.73

Source: Shandong Lianchuang Architectural Design Co. Ltd (2011)

18.2 Underground Cash Operating Costs

All underground cash operating estimates have been supplied by the Client. MCS has not been able to independently verify these costs, however they appear appropriate considering the mining method used and are comparable to other mines located in China that have similar mining methods and orebody characteristics. MCS has assessed the cost estimates provided in the Preliminary Design reports and made some modifications including the addition of an environmental allowance (refer Chapter 20) and a contingency of 5%. These modifications bring the estimated operating costs (excluding capital expenditure) up to RMB117.05 per tonne of ore processed.

Table 18-2 below summarises the underground operating costs presented in the preliminary design report.

Table 18-2: Zhuge Shangyu Underground – Average Cash Operating Costs

No.	Item	Unit cost	Annual total cost
		(RMB/t Ore)	*(10,000 RMB)*
	Mining Cost		
I	Material	20.37	16,216
II	Fuel and power	13.86	11,088
III	Wage and welfare expense	9.45	7,560
IV	Maintenance and Repair	31.47	25,176
	Total Mining cost	75.05	60,040
	Process Cost		
I	Material	18.64	14,913.58
II	Fuel and power	14.58	11,661.36
III	Wage and welfare expense	0.88	701.04
	Total Processing cost	34.10	13,300
	Other Costs		
	Overheads and Admin	2.18	1,747.46
	Environmental Allowance	0.15	117.35
	Total Other Cost	2.33	1,864.81
	Contingency (5%)	5.57	4,459.20
	Total Operating Cost	117.05	93,643.2

Source: Shandong Lianchuang Architectural Design Co. Ltd (2011)

18.3 Capital Costs

The Zhuge Shangyu project will be developed in two Phases:

1. Phase 1: 8 Mtpa Process Facility with Open Pit Mine

2. Phase 2: Underground Mine when Open Pit Reserves are exhausted

18.3.1 Phase 1

The total estimated capital expenditure for Phase 1 is 999 Million RMB which will be spent in three stages. A brief summary of the estimate is provided and Table 18-3 and a summary of the stages with proposed timings is shown in Table 18-4 below.

Table 18-3: Zhuge Shangyu Project Capital Phase 1

SN.	Items	Construction Buildings *(10,000 RMB)*	Equipment *(10,000 RMB)*	Installation *(10,000 RMB)*	Others *(10,000 RMB)*	Total *(10,000 RMB)*
1	Construction	28,293.05	25,377.23	7,843.48	0	61,513.76
2	Others	0	0	0	16,321.28	16,321.28
2.1	Other	0	0	0	9,911.28	9,911.28
2.2	Relocate	0	0	0	6,410.00	6,410
3	Contingencies	0	0	0	7,783.50	7,783.50
4	**Total Construction**	28,293.05	25,377.23	7,843.48	24,104.78	85,618.54
5	Interest During Construction Period	0	0	0	4,239.11	4,239.11
6	Working Capital	0	0	0	6,572.02	6,572.02
7	**Total Capital**	28,293.05	25,377.23	7,843.48	34,915.91	96,429.67

Source Data: Shandong Lianchuang Architectural Design Co. Ltd (2010 and 2011)

Table 18-4: Zhuge Shangyu Project Capital Stages for Phase 1

Stages	Date	Construction Items	Construction Capital *Million RMB*
1st	June 2012-December 2013	Finish off the basic engineering design, Safety chapter and approvals, equipment purchase tendering and construction design, land acquisition, road facilities area earth work, connect water and power etc. Complete the construction work and equipment installations, as well as commissioning. Then production achieves 2 million tonnes per annum.	228.2287
2nd	January 2014-December 2014	Achieve 4 million tonnes per annum production capacity.	239.5
3rd	January 2015-June 2016	Achieve 8 million tonnes per annum production capacity.	496.5652

Source Data: Shandong Lianchuang Architectural Design Co. Ltd (2010 and 2011)

18.3.2 *Phase 2*

The proposed capital expenditure to develop the underground mine when the open pit reserve has been depleted has been estimated to be 709 million RMB. Based on the current reserve and proposed mining rates, this expenditure will not be incurred before 2040.

19 PRICE ESTIMATION AND FORECAST

19.1 Titanium Concentrate Prices

The following information on Titanium concentrate price forecasts was sourced directly from the Feasibility Study report prepared by Shandong Lianchuang Architectural Design Co. Ltd (2011).

"Although titanium products are widely applied in cutting-edge industries, titanium concentrate, which is the main product of titanium (occupying 90% of TiO_2 output), is also used in general industrial fields like coating factory. Usually, the price of titanium changes with economic situation and fluctuate periodically. In 2006, the average price of domestic titanium concentrate (TiO_2>45%) was RMB664 Yuan/ton. The price rose to RMB1,100 Yuan/ton during the upsurge period of economic development at home and

abroad in 2007. However, it dropped to RMB900 Yuan/ton affected by international financial crisis in 2008 and dropped to RMB705 Yuan/ton in 2009. With the remission of international financial crisis in 2010, the price of titanium concentrate presented the status of slow growth. The quotation of titanium concentrate (TiO_2>45%) reached RMB780~800 Yuan/ton at the end of June, 2010, while the port price of titanium concentrate (TiO_2>50%) imported from abroad is between RMB920~1,100 Yuan/ton. The price of titanium concentrate of 43%-45% arrived RMB2,050/t in 3rd Quarter of 2011. It is predicted that the titanium concentrate price of 43%-45% will be between RMB1,500 and 2,300 in coming years and medium and long term pricing will be between RMB1,800 and 2,500".

A marketing study was not part of the scope of this report, however MCS is aware that prices for titanium concentrate in China increased markedly this year due to a ban on exports of titanium concentrates by Vietnam. There is a risk of this ban being lifted hence the market price could return to pre-ban prices. Assuming this does not happen, MCS still considers that the price analysis provided by the client seems optimistic when compared to historical prices and other forecasts used by companies within China.

The titanium product from the Zhuge Shangyu project is expected to have an average grade of 44% titanium. Whilst MCS is in agreement with the analysis that future demand for titanium in China will remain strong assuming the Vietnam export ban remains in place, for the purposes of this report, MCS has elected use a more conservative price of RMB1,650/tonne for the 44% titanium product from Zhuge Shangyu.

19.2 Iron Concentrate Prices

The following information on iron concentrate price forecasts was sourced directly from the Feasibility Study report prepared by Shandong Lianchuang Architectural Design Co. Ltd (2011).

"In 2010, the price of iron concentrate powders (58% grade) in domestic was between RMB1,400 to RMB1,500/tonne, and the average price in December was RMB1,380/tonne.

Analysing the fluctuation of iron ores prices and market factors at home and abroad, forecast the selling prices of iron concentrate (58% grade) will remain approximately at RMB1,480/tonne. The four trillion investment item and the top ten industry plan are under execution at present. The demand for steel and iron will increase continuously and stably for a long time. The iron ore price will remain synchronous and stable growth."

A marketing study was not part of the scope of this report, however MCS considers that the financial analysis provided by the client seems slightly optimistic when compared to forecasts used by companies outside of China.

The product from the Zhuge Shangyu project is expected to be 61% Fe iron concentrate which would ordinarily attract a small premium to the price quoted for 58% Fe concentrate. Whilst MCS tends to agree with the analysis that future demand for iron ore in China will remain strong, given that recent prices have been in the range of RMB1,200/tonne to RMB1,300/tonne for 58% Fe concentrate, MCS has elected to use the price of RMB1,390/tonne for the 61% Fe product from Zhuge Shangyu.

20 ENVIRONMENTAL PROTECTION

20.1 Design Standards and Environmental Regulations

The Company has undertaken to conform to the following design standards and regulations:

(1) *Regulations on the Administration of Construction Project Environmental Protection* Promulgated by Decree No. 253 of the State Council;

(2) GuoHuan Zi (87) No. 002 Document *Design Regulations of Construction Project Environmental Protection;*

(3) *Design Regulations of Environmental Protection for Metallurgical Industry* YB9066-95;

(4) *Regulations on Environmental Protection Facilities Division Scope for Metallurgical Industry* YB9067-95;

(5) *Integrated Emission Standard of Air Pollutants* GB16297-1996;

(6) *Emission Standard of Air Pollutants for Coal-burning Oil-burning Gas-fired Boiler* GB13271-2001;

(7) *Integrated Wastewater Discharge Standard* GB8978-1996;

(8) *Standard of Noise at Boundary of Industrial Enterprises* GB12348-90.

20.2 Major Pollutants and the Control Measures

20.2.1 Mining operations

Mining operations such as drilling, blasting, and ore movement produce dust and noise, as well as noise produced by motors and compressors etc. Preventive measures are designed to reduce or prevent pollution to the ambient environment.

(1) Dust suppression during drilling

Dust suppression measures shall be taken into consideration when selecting the drilling equipment. The KQG-150 drill rig is equipped with a dry dust remover, with dust collection efficiency greater than 95%. Specifications given for the FC-20 dry type dust remover at various distances are shown in Table 20-1.

Table 20-1: Table of dust concentrations

Measurement location	**Dust concentration** *mg/m^3*	**Distance from the dust emission point** *(m)*	**Air temperature** *(℃)*
Drill hole	19	0.5	22
Adjacent Drill hole	5	5	22
Return air exit	53	0.2	22
Operator position	7	0.5	22

The dust concentration of the discharged air after treatment by the dust remover is 53 mg/m^3, which is lower than the permissible limit of 150 mg/m^3 specified by the national concentration emission standard.

(2) Dust suppression on haul roads

Heavy traffic on haul roads will produce dust, especially during dry seasons. A water sprinkler system will be used in order to keep dust concentrations below the 10 mg/m^3 level specified by the national standard. Saline water will be used on the roads during winter to prevent the water freezing. Trees will be planted beside the mining roads for dust retention and noise abatement.

(3) Dust suppression in mining and loading

Dust control measures during mining and loading mainly involve minimising the dumping height to reduce the amount of dust generated during dumping and transferring loads. Dust can be suppressed further by spraying water.

(4) Dust generated by blasting

Dust concentrations in the mine immediately after a blast can exceed 100 mg/m^3. This dust will naturally dissipate and settle, and its impact is largely confined to the mine environment, so will cause minimal environmental pollution outside the mining area.

(5) Noise suppression

Mining operations have a large footprint and make extensive use of motorised and electromechanical equipment which can generate considerable noise (Table 20-2). Noise from blasting and movement of rock also contribute significantly to ambient noise levels.

Table 20-2: Sound levels produced by operating mining equipment

Name of equipment	Sound level (decibels)	Spectral characteristic	Remarks
Drill rig	107	High frequency	Working environment
Excavator	88-98		
Movable air compressor	85	Ingersoll Rand VHP-750E Type	
50 t Haul truck	75-95		

Noise control measures:

(a) Control noise source by selecting equipment fitted with noise suppression devices. Equipment to be regularly inspected to ensure normal and safe operation of noise suppression devices. The selected air compressor is of low noise design (85dB), which is lower than the 90dB limit specified by national standards.

(b) Ensure earplugs or earmuffs are worn at all times by mine personnel.

(c) Blasting to take place infrequently and only during daytime to reduce impact on the environment and people.

The above measures are expected to be sufficient to minimise the impact on workers and operators. Additionally, there are no accommodation within 400 meters of the mine so as to reduce the impact of noise pollution outside of the mine environment.

(6) Greening

The greening works comprise a combination of strategic planting and general greening. Trees and plants will be established in administrative and living areas to improve the living environment, provide shade and block noise and dust. Barriers of vegetation around the mining & dressing yard, will similarly reduce the spread of noise and dust. Waste dumps and tailing ponds will be replanted and rehabilitated after completion of operations.

Plans allow for greening at the road sides and building surrounds to an area of 3.3ha, or a greening rate of 15%.

20.2.2 Beneficiation operations

(1) Dust

Dust will be produced during the crushing and screening process, and in fine ore bins. Wet scrubbers of type CJ1226 and CJ1223 are designed to be equipped to the intermediate and fine crushing plants respectively, with designed air capacities of 42,000 m^3/h and 36,000 m^3/h respectively. Four sets of CJ1220 type wet scrubbers and one set CJ1200 type wet scrubber is designed to be equipped to the screening plant, with air flow capacity of 25,000 m^3/h. One set CJ1213 type wet scrubber will be fitted to the fine ore bin, with designed air flow capacity of 12,000 m^3/h. Scrubbers are expected to perform with a collection efficiency is 99% and a tolerable dust discharge concentration not larger than 80 mg/m^3.

(2) Waste water

Waste water from the beneficiation plant will be discharged into the tailing pond and reused for ore processing after sediments have settled out.

Total water consumption of the project is 47,240 m^3/d (including 1,700 m^3/d contingency). Recycled water comprises 27,460 m^3/d; the ratio of water reuse is 64%. Drainage requirements for the mine are anticipated to be up to 920 m^3/d (includes 850 m^3/d excess capacity). Domestic sewage amount is 60 m^3/d, which could be used for greening and agricultural irrigation after treatment by septic tank.

(3) Equipment noise

The design includes an anti-vibration pad and building insulation to reduce noise intensity, such that the noise beyond the boundary of the plant site will meet the requirements of the *Standard of Noise at Boundary of Industrial Enterprises GB12348-90.*

20.2.3 Auxiliary production facilities and living quarters

(1) Boiler Flue Gas; The design incorporates two sets of 4.2 MW hot-water boilers for shower and heating purposes, with both run during the winter period and one run intermittently during other seasons for shower heating.

(2) An industrial boiler will consume 5,000 tonnes per annum of bituminous coal. A multicyclone will be fitted to remove dust from boiler flue gas, with a collection efficiency of 92%~95%. Smoke and dust emission from boiler flues will be less than 144 mg/m^3 with SO_2 emission concentrations around 505 mg/m^3. The boiler flue gas smokestack will be 40 m high to minimise the impact at ground level.

(3) Domestic sewage of 60 m^3/d could be used for greening and agricultural irrigation after be treated by septic tank.

(4) Boiler ash of 1,250 t/a can be used in various applications.

(5) Air blower noise; The boiler air blower is positioned in the ventilator room, which will be insulated to reduce noise propagation.

20.3 Environmental Impact Analysis of Mine Construction to the Surrounding Region

The ground water near the mining area and in local villages is of average quality and generally free from pollution. No significant geothermal anomaly or harmful gases have been found within the mine rocks. The chemical composition of the ore is stable and considered unlikely to cause harmful pollution of groundwater. The area is hilly but is considered to have a low risk of geological hazards such as mass slumping, landslides and debris flows. No radioactive elements are found in the ore and surrounding rocks.

Dust suppression will be carried out by spraying dust generating areas with water and using wet scrubbers with 99% collection efficiency fitted to coarse crushing plant, intermediate and fine crushing plants, screening plant and ore bins. Discharged waste gases will have a low concentration of dust, CO and NOX. The discharged waste gas should have an insignificant impact on atmospheric air quality after dilution and diffusion by the air.

Waste water from processing, beneficiation and mine dewatering will be allowed to settle and precipitate suspended solids before recycling or discharge. The majority can be reused without any discharging, so will have no impact on the surrounding environment or water quality.

The amount of domestic sewage production is small, and can be used for greening and agricultural irrigation after be treatment, which should have minimal adverse impact on environmental water quality.

The ratio of water reuse for the project is 64%, which is lower than the lowest permissible ratio of water reuse for non-ferrous metal system of 75% specified by the *Integrated Wastewater Discharge Standard* GB8978-1996. The reason is that the partial wastewater from the beneficiation process will be used to cover tailings surface and for dust suppression. Other treated tailings water can be fully recycled after treatment without discharging into the environment, but water used in drilling and dust suppression is less than is available from recycling.

Barren rocks and tailings in mining are all solid wastes. During later stage underground mining, the majority of barren rocks and tailings can be used for backfilling of underground stopes, and will reduce the size of waste dumps and environmental impact. Tailings will be accumulated in the tailing pond if not used for backfilling operations.

Boiler ashes are mostly inert solid wastes which can be completely consumed in road works and coal ash brick making, with minimal adverse impact on the environment.

The mine site will be sufficiently distant from surrounding accommodation and villages, and the noise from equipment and the boiler air blower can be reduced by vibration reduction and building insulation, such that there will be limited impact on the surrounding sound environmental quality.

The use of a multicyclone will remove dust from the boiler flue gas with an efficiency of 92%~95%. Smoke and dust emission from boilers of 144 mg/m^3 and SO_2 emission concentrations of 505 mg/m^3 meet the permissible concentrations (200 mg/m^3) for Class II area II time interval smoke and dust of coal-fired boiler, and the maximum permissible SO_2 emission concentration 900 mg/m^3 specified in *Emission Standard of Air Pollutants for Coal-burning Oil-burning Gas-fired Boiler* GB13271-2001.

The environmental impact of the Shangyu ilmenite mine meets the applicable standards, so the construction is feasible.

20.4 Environmental Management and Monitoring

20.4.1 Environmental management organization

Environmental protection and labour safety & health management of the Shangyu Project apply at the institutional and management levels. A department of Security and Environmental Protection will be established to implement and manage the environmental protection and monitoring processes. Part-time environmental protection and labour safety & health personnel will be appointed in the mine, processing plant and each working department to assist the Security and Environmental Protection management team, by monitoring emission levels and ensuring the safety and health of the labourers.

The main responsibilities of the Security and Environmental Protection Department are:

(1) Implement codes and standards of environmental protection across the scope of operations, establish an environmental protection work plan for the mine;

(2) Monitor operating conditions and environmental protection facilities to ensure normal and effective control of pollution;

(3) Conduct investigations and tests, and report on any environmental incidents;

(4) Comply with statutory environmental reporting requirements in accordance with regulations of the environmental protection authorities at the provincial, municipal and county levels;

(5) Coordinate with the environmental protection administrative departments to administrate and monitor the environment of the enterprise.

20.4.2 Environmental monitoring

The Yishui County or Linyi City Environmental Monitor Station is authorised to conduct regular environmental monitoring to check whether the pollutant emission levels of the mine meet the standards and requirements, and to understand the environmental quality and its impact in and around the mining area.

Tailings and water discharges from the mine will be monitored for pH, SS etc.

20.5 Environmental Protection Investment

Projected expenditure for environmental protection totals RMB42.54 million, which constitutes approximately 4.79% of the total project investment.

20.6 Water & Soil Conservation and Reclamation

The water and soil conservation program aims to control water loss and soil erosion around the mining area, processing plant, roads, excavated slopes and waste dumps etc. during the construction period and to minimise the environmental impact from mining operations.

Most of the preventive measures will be implemented in the construction phase of the project. Additional controls will be implemented according to requirements at various stages though the life of mining operations.

Reclamation works involve stabilising slopes by injecting cement or by covering with soil and vegetation. Rehabilitation of waste dumps and tailing ponds will be conducted at the end of their service life by replacing topsoil and planting grasses and trees.

21 HEALTH, SAFETY AND FIRE FIGHTING

21.1 Labour Safety & Health

21.1.1 Design Standards and Principles

(1) *Production Safety Law* of the People's Republic of China;

(2) *Law of the People's Republic of China on Safety in Mines,* No. 65 Decree of the President of the People's Republic of China, 1992;

(3) *Regulations for the Implementation of the Law of the People's Republic of China on Safety in Mines,* 1996.10.30;

(4) *No. 3 Decree of the Ministry of Labor, Supervisory Provisions of Labor Safety and Health in Construction Project* (Engineering);

(5) *Safety Regulation of Metal and Non-metal Mine* GB16424-1996;

(6) *Safety regulations for Blasting* GB6722-2003;

(7) *Mine Safety Signs* GB14161;

(8) *Hygienic Standards for the Design of Industrial Enterprises* GBZ1-2002;

(9) *Standard for the Design of Noise Control System in Industrial Enterprises* GBJ87-85;

(10) Sanitary Standard for Drinking Water GB5749-85.

21.1.2 Environmental and other Hazards

(1) Thunder and lightning.

(2) Earthquakes-earthquake intensity in this area is 7-magnitude.

(3) Landslides-localised landslides are likely around excavations.

(4) Mine flooding.

(5) Mining and earthmoving equipment hazards.

(6) Blasting hazards (explosives).

(7) Explosive material management.

(8) Pollution hazards; Smoke, dust and noise produced by rock drilling and blasting, as well as the dust emission and gases produced by mining equipment and other vehicles.

(9) Processing plant hazards; Personal injury may be caused by equipment failure, improper use, mechanical damage of moving parts, as well as dust and noise.

21.1.3 *Hazard control measures*

21.1.3.1 *Stability and hazard control of slopes*

The open cut mine has been designed to take into account the rock properties and fracture characteristics to reduce the likelihood of dangerous slope failure. The final slope angle is designed to be between 33°~49°, with permanent bench slope angles of 50~60° and bench height of 12 m. The minimum bench width is 3 m with minimum operating platform width of 6 m.

Slope stability management measures aim to reduce the hazards to people and minimise environmental impacts:

(1) Control of mine design parameters

Mine design parameters are the primary method of preventing rock falls and landslides in the mine environment. Parameters include mining (bench) height, mining sequence and stripping. Slope angles will be less than 70° at working faces and less than 60° for other slopes.

(2) Control of blasting parameters

The use of reliable and predictable blasting technology will reduce the impact of blasting on slope degradation as far as possible.

21.1.3.2 *Control of falling hazards*

(1) Loose rocks and rubble will be removed from slopes and roads to reduce the likelihood of falling debris.

(2) Safety harnesses will be used when working at heights above 2 m or on slopes where the angle exceeds 30°. The safety harness shall be fastened by rope to a secure fastening point, and only one harness per rope is permitted.

(3) The operators shall not work on collapsed rock and rubble or ride on equipment. Upper and lower benches of the mine will not be worked on simultaneously.

21.1.3.3 Flood control and drainage

Flood retention ditches will be dug around the pit to avoid surface rainwater runoff from draining into the mine. Pumps will be used to drain out normal daily water inflows and maximum daily water inflows within 20 hours.

21.1.3.4 Hazards during mining and loading

(1) According to requirements of Safety Regulation of Metal and Non-metal Mine, the step height and slope angle of mining shall not be larger than the design values;

(2) Safety and hazard identification training will be mandatory for operators, who will work to safe operating procedures;

(3) The safety rope shall be firmly fastened when takes rock drilling on steep slopes;

(4) When overhanging rocks are present at the mining and working face, the operation of excavators is not allowed;

(5) Excavators are to be operated by trained personnel in accordance with operating instructions and safe work practices;

(6) Persons are not allowed below the scraper bucket or near working face when the excavator is in operation;

(7) Work must stop if there are dangerous suspended rocks, collapses, or in the event of a misfire;

(8) Horns and warning alarms shall be fitted to excavators, and warning signals shall be used in accordance with safe working practices during operation;

(9) Dust suppression measures are to be taken at the working face, to protect operators' health and minimise environmental pollution.

21.1.3.5 Safety operation of vehicles in the mine

(1) Vehicles will be maintained to ensure safe operation at all times.

(2) Operating areas must be adequately lit for night work.

(3) Road maintenance personnel shall be assigned in the mine to conduct daily road maintenance work. The maintenance personnel shall check the roads regularly, clear road shoulders and side ditches, and repair uneven road surfaces. Speed limits will be imposed on mining roads, with reduced spends at corners and on slopes or other hazardous locations. Speed limits will be reduced in areas where people are working or in hazardous or wet conditions.

(4) Personnel are not to approach dump trucks when tipping or when the bucket is rising and falling. The tipping bucket shall be operated only by the vehicle operator. Inflammables and explosives are not allowed to be carried by dump truck. Personnel will not be transported on dump trucks or on any other vehicles not designed for the transport of people. The tipping bucket shall not be raised while the vehicle is moving.

(5) All vehicle operators must have the correct licenses, and must not operate vehicles overweight or overloaded. Drunk driving is strictly prohibited and should be enforced through mandatory testing of operators prior to commencement of shift.

(6) Continuous improvement of safety will be implemented through education, training, and the implementation of rules and procedures to minimise hazards and encourage safe work practices.

21.1.3.6 *Blasting safety*

(1) Safety regulations for blasting will be strictly followed. Blast design will be carried out in accordance with safe blasting practices and adjusted according to rock properties;

(2) All full-time and part-time blasting personnel shall be certified according to local regulations and must receive training in safe blast practices;

(3) Alerts and warnings will be sounded prior to blasting, and checks must be performed to ensure nobody is within the alert zone before blasting. Personnel will not be permitted into the blast area until the all-clear is given;

(4) Non-blasting personnel shall be outside the security cordon during blasting operation. Blasting personnel shall enter a blast-proof room during blasting;

(5) The direction and size of blast shall be designed to minimise the amount of explosive required, so as to reduce the amount and distance of fly-rock;

(6) The mine shall provide steel blast-proof room for blasting personnel, the room shall be welded with steel plates, and located more than 75 m from the blasting point.

21.1.3.7 *Safety measures for blasting materials management*

An appropriate blasting system will be adopted for the mine design, and blasting for mining will be conducted once a week. The specific consumption of explosive should not exceed 0.22 kg/t. Blasting (ore) volume for each blast is 38,190 t and the maximum explosive load is 8.56 t.

Blasting will be conducted only by certified companies to ensure safe blasting. Blast parameters shall be designed and adjusted by the blasting company according to the specific onsite conditions. The processing, transport and storage of explosives shall be done only by qualified and certified persons.

Blasting materials must be of approved type and design and shall be stored and transported securely. The working face and areas where explosives are stored shall be protected against fire, water and explosion. Blast signs will be prominently displayed to indicate the presence of explosive hazards (red flag at daytime and red light at night-time). Explosive and blasting caps shall not be blended.

21.1.3.8 *Protection of Electrical Equipment*

Electrical equipment should be isolated and protected with appropriate devices to prevent electrical shock.

(1) Mine electrical installations should comply with GBJ70 and related specifications and procedures.

(2) Regular checks and maintenance of electrical equipment shall be performed to prevent hazards developing due to wear and tear.

(3) Power transmission systems and maintenance of power supply equipment shall be carried out in strict accordance with the regulations and design principles.

(4) Lock-out systems will be implemented during maintenance or when working on electrical systems to prevent them being turned on.

(5) Overriding of safety trip-outs on power transmission lines is not allowed. Causes of any faults or leakage shall be immediately identified and power transmission is not allowed until faults have been rectified.

21.1.3.9 *Measures against Lightning*

(1) Mine buildings require third class lightning protection. Appropriate measures should be taken for protecting facilities against lightning based on the lightning activity, topography and surface features of the mine.

(2) Pipelines and transmission lines will be protected from lightning strike using appropriate lightning strike protection measures.

(3) Electrical equipment should be in suitably locked and earthed enclosures. The grounding resistance should not exceed 4 ohms.

(4) Grounding wires should be installed in parallel. It is prohibited to ground the earth wires of electrical equipment in series.

(5) Grounding resistance shall be measured once a year and the measurement work shall be done in the driest season when the groundwater level in the region is the minimum.

(6) Lightning protection measures should be prepared in the open-pit mine. The weather forecast should be closely monitored and mining is to cease and personnel are to be evacuated during thunderstorms.

21.1.3.10 *Protective Measures for Severe Weather*

In the summer (winter) season, open-air operations and equipment operators may be at risk of heatstroke (frostbite) due to the high (low) temperature; the impact of thunder, rain and snow weather on mine production may be significant, and preventive measures must be taken.

(1) Schedule work appropriately to the seasonal conditions.

(2) Establish shade/cooling for summer and heating equipment for winter in rest and accommodation areas.

(3) In summer, set up fans or air conditioners in cabs of excavators and motor vehicles. Provide protective clothing, cold drinks and electrolytes for preventing heatstroke and sunburn.

(4) Provide heating equipment and appropriate warm clothing for winter.

(5) Provide washing and shower facilities in the accommodation area.

(6) In storms and rainy season, when roads are slippery, anti-slip measures are required and the speed on roads shall be lowered. Distances from the car in front shall be not less than 40 m. Hard braking, overtaking or towing other vehicles is not allowed; if it is necessary to pull other vehicles, then effective security measures should be taken, and should be conducted by trained personnel. Roads are to be kept free of snow. Transport vehicles should be equipped with tire chains in icy conditions.

21.1.4 Occupational Health Design

21.1.4.1 Dust Control

In the production process of open-pit mine, rock drilling, blasting, ore loading, ore transportation, ore unloading (waste rock) and other production processes will produce large amounts of dust. It is directly affected by the surface wind sources and other weather conditions. If effective dust control measures are not taken, dust can seriously affect the health of workers.

Dust and noise control measures also applicable to occupational health and safety are detailed in Section 20.2 (Major Pollutants and the Control Measures).

21.1.4.2 Water Supply Hygiene

Domestic water is taken from the Bashan Reservoir. After clarification and disinfection, the water quality shall meet the Sanitary Standard for Drinking Water GB5749-85.

21.1.5 Occupational Safety and Health Management

Mine Department has a safety and environmental protection agency with 6 members, the details of which are contained in Section 20.4 Environmental Management and Monitoring.

21.2 Fire Water Supply

21.2.1 Fire Water Standards and Water Consumption

Fire suppression systems must meet or exceed the following designed capabilities:

Outdoor fire water supply	20L/s
Indoor fire water supply	10L/s

The number of fire at the same time is one.

Continuous supply for up to 2h

Water consumption of up to 216 m^3 for each fire.

21.2.2 Fire Water Supply System

Water for fire fighting is supplied using the mine and production water supply piping system. The supply network is ring-shaped, with dual-port underground fire hydrants. Fire water is stored in a 3,000 m^3 water tank. In the event of fire, water will be pressurised with a fire pump. Two XBD6.8-30 fire pumps are to be installed in the pressure pump room of the fire station, one for use and one as backup. In order to ensure safe water supply, water pumps are to be equipped with a redundant power supply.

21.2.3 Personnel Quota

When full production of 8,000,000 t/a is reached, the total workforce of the project is 974 people, including 669 in the mining plant and 208 for the beneficiation plant. See Table 21-1 below for details. Personnel quota were determined on the basis of the planned equipment and processing facilities with reference to similar mines.

Table 21-1: Project Personnel Quota Estimation

No.	Department	Number of people in the register	Production workers	Management and service personnel	Maximum group size
1	Mining workshop	669	639	30	223
2	Ore beneficiation workshop	208	198	10	69
3	Flexible workshop	34	27	7	12
4	Ore Department	63	–	63	21
	Total	974	864	110	325

22 RISK ASSESSMENT

The Mining Industry and the projects within it, are relatively high risk when compared to projects in industrial and commercial spheres. Each project is based on an estimate of the mineral deposit and each deposit has unique quality characteristics and response to mining and processing operations which, despite many advances in technology can still not be wholly predicted.

A risk analysis has been undertaken of the financial implications of using AS 4360 as the basis, in line with the requirements of the Valmin Code (2005).

The MCS risk analysis (Table 22-1 and Table 22-2) of the Zhuge Shangyu project has not indicated that there are any risks with catastrophic consequences in the data presented for review. It is MCS view that the Zhuge Shangyu project has a project risk profile that is typical of mining projects at similar levels of resource estimation, mine planning and project development. Information from the risk assessment was used for the resource and reserve categorisation.

MCS notes that in most instances the risk identified in Table 22-2 could be mitigated by undertaking more detailed technical studies and providing additional information.

Table 22-1: Risk Assessment Matrix

Consequence →					
Financial (Value of Project)	1% of Project Value	2.5% of Project Value	> 5% of Project Value	> 15% of Project Value	Project Failure

Likelihood	Numerical:	Historical:			Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
↑	>1 in 10	Is expected to occur in most circumstances	Almost Certain	5	6	7	8	9	10
	1 in 10 - 100	Will probably occur	Likely	4	5	6	7	8	9
	1 in 100 – 1,000	Might occur at some time in the future	Possible	3	4	5	6	7	8
	1 in 1,000 – 10,000	Could occur but doubtful	Unlikely	2	3	4	5	6	7
↑	1 in 10,000 – 100,000	May occur but only in exceptional circumstances	Rare	1	2	3	4	5	6

Table 22-2: Project Risk Summary

Items	Discussion	Risk
Geological/Resource Risk		
Drilling Techniques	Standard industry methods of diamond drilling were used, with regular downhole surveys taken.	4
Drill Sample Recovery	Mean weighted core recovery 96%.	2
Sampling Techniques and Sample Preparation	Core was split and samples prepared using industry standard methods. Documented sample handling procedures appear appropriate.	3
Quality of Assay Data	Assay precision 412 samples (7.7% all assays) 3.10% TFe, 5.29% TiO_2. Assay bias of 206 samples (3.9% all assays) no sig bias.	3
Verification of Sampling and Assaying	A selection of diamond drill core was checked on site. All results checked were verified.	3
Location of Sampling Points	Surveying methods were adequate and but no collar locations could be identified as all under farm land. Plans and data independently verified. Downhole surveys utilised industry standard methods.	5
Data Density and Distribution	Mineralisation defined on adequate drill spacing and with trenches for the type of deposit and style of mineralisation. Sparser data at margins and deeper parts of the mineralisation reflected by lower confidence.	4
Audits and Reviews	Micromine is unaware of any external reviews.	3
Database Integrity	Verification of original drawings by MCS.	3
Geological Interpretation	The mineralisation constraints are considered appropriate for the type and grade of mineralisation.	3

Items	Discussion	Risk
Specific Gravity Determinations	SG database from drillhole samples, representative throughout deposit.	4
Estimation and Modelling Techniques	Domaining and interpolation by Ordinary Kriging with the result cross-checked by Inverse Distance Weighting.	2
Mining/Reserve Risk		2
Mining Method	The proposed mining method is standard open pit mining using owner operated equipment. No significant problems are expected.	3
Pit Optimisation and Design	No optimisation has been carried out for the project at this stage and the final designs have been prepared manually. MCS checked the design against an optimised shell created using the parameters in this report and found the designs reasonably approximated the optimised shell.	4
Mine Scheduling	MCS developed a simple life of mine schedule based on sequential development of the proposed pit. No optimisation of the schedule and/or selection of pushbacks to improve cash flow has been carried out as yet. MCS believes there may be scope to improve the cash flow of the project by undertaking this work.	2
Reserves Estimation	The reserves have been calculated using a block model as well as, product prices, costs and assumptions that are all susceptible to change.	7
Processing	Producing Titanium and Iron concentrates from the Zhuge Shangyu ore is possible using conventional methods widely used in China. Although more testing is required, the proposed recoveries are within the ranges achieved at other mining operations in the region. Provided the ore characteristics are relatively homogeneous, the risk of failing to achieve planned recoveries is minor to moderate.	5

This information was used for the resource and reserve categorisation.

23 CONCLUSIONS AND RECOMMENDATIONS

23.1 Resource Estimation

The resource statement for the Zhuge Shangyu project as estimated by MCS is shown in Table 23-1.

The resource is reported to a cut-off grade of 9.2% TiO_2 equivalent with a top cut of 15.8% applied to TFe and no top cut applied to TiO_2.

Table 23-1: Resource statement for the Zhuge Shangyu Iron and Titanium deposit

Resource Category	Tonnes	SG	TiO_2 equivalent	TiO_2	TFe
	(t)	*(t/m^3)*	*(%)*	*(%)*	*(%)*
Measured	372,793,000	3.19	70.30	5.86	14.00
Indicated	260,565,000	3.13	70.31	5.81	14.03
Total Measured and Indicated	633,358,000	3.17	70.31	5.84	14.01
Inferred	3,472,000	3.13	69.30	3.63	14.27
Total Resources	636,830,000	3.16	70.30	5.83	14.01

Note: Numbers have been rounded to reflect that the resources are an estimate.

Additional resource potential could be realised at both ends of the southern orebody and at depth for both orebodies where the orebodies remain open. Additional infill drilling could upgrade the Indicated and Inferred resource to Measured category.

23.2 Mining Study

The scope of work for the mining study was to convert the resources to reserves.

The deposit is most suitable for open pit mining due to the size, depth and shape of the orebodies, as well as the geology of the area.

The original preliminary design report prepared by the Shandong Lianchuang Architectural Design Co. Ltd. contained a design and reserves calculations for an underground mine which would extend the mine life beyond the life of the open pit. Only Measured Resources have been considered for conversion to Proved Reserves and only Measured and Indicated Resources have been considered for Probable Reserves.

The MCS reserve statement (**current Reserve, November 2011**) for the Zhuge Shangyu deposit is shown in Table 23-2.

Table 23-2: Reserves for the Zhuge Shangyu deposit

Reserve Classification	Ore *(Tonnes)*	TiO_2 Grade *(%)*	TFe Grade *(%)*	Contained TiO_2 *(Tonnes)*	Contained TFe *(Tonnes)*
Open Pit					
Proved	200,080,000	5.76	12.78	11,525,000	25,577,000
Probable	89,910,000	5.52	12.77	4,964,000	11,481,000
Total Open Pit	289,990,000	5.69	12.78	16,489,000	37,058,000
Underground	–	–	–	–	–
Proved	–	–	–	–	–
Probable	256,290,000	5.69	12.85	14,595,000	32,922,000
Total Underground	256,290,000	5.69	12.85	14,595,000	32,922,000
Combined	–	–	–	–	–
Proved	200,080,000	5.76	12.78	11,525,000	25,577,000
Probable	346,210,000	5.65	12.83	19,559,000	44,402,000
Total reserve	546,290,000	5.69	12.81	31,084,000	69,979,000

Notes:

- *The ore resources are inclusive of the ore reserve.*
- *The reserve includes diluting material with an assumed diluent grade of 0%, total dilution used was 9%.*
- *The MCS reserve is stated based on titanium with an iron credit.*

It is recommended that the following actions be undertaken to increase the amount of Proved reserves:

- Additional holes be drilled to upgrade the Resource so additional Resource falls into the Measured category to enable detailed mine planning to be undertaken on the remainder of the resource.
- Perform metallurgical tests on the fresh and weathered material for compatibility.
- Metallurgical testwork be conducted to determine the levels of the penalty elements in the final concentrates.
- MCS recommends that pilot-scale mineral processing testwork be carried out to determine the true recovery rates for the particular ores, processing equipment and design parameters of this project. Based on the results of processing testwork recovery rates may need to be revised either upwards or downwards.

24 COMPETENT PERSON STATEMENT

This report was prepared and signed herein by Competent Persons who, having relevant experience to the style of mineralisation and the type of the deposit under consideration, are thereby considered Competent Persons according to the definition explained in the JORC Code.

Neither MCS nor any of the authors of this Report has any material, present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of MCS. MCS' fee for completing this Report is based on its normal professional daily rates plus reimbursement of incidental expenses. Payment of that professional fee is not contingent upon the outcome of the Report.

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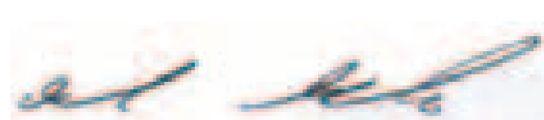
The issuer has not provided any indemnities to the Competent Person. By signing this report, we hereby confirm that the reporting terminology, mineral resource classification, and estimation results in this report are compliant with the policy and procedures (required for the control of the quality of reporting of mineral resource estimates) as specified by the JORC Code.

17 April 2012

Signed by

David Allmark
MCS Senior Geological Consultant
Micromine Pty Ltd



Tony Cameron
Mining Engineer
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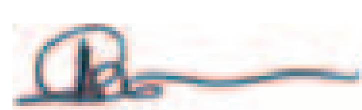

David Allmark, Senior Resource Estimation Consultant; BSc (Geology), MAIG, MAusIMM, graduated in 1993 from Curtin University of Technology in Perth, Western Australia with a Bachelor of Science (Applied Geology) and Postgraduate Diploma in Applied Geology. David later completed an Advanced Diploma of Business Systems majoring in Java programming from Spherion Institute. David has twelve years experience in the mining and exploration industry involved predominantly in iron ore, base metals and gold exploration and mining. David has worked on the Higginsville and Chalice Gold Projects and the Bulong Nickel Project for Resolute Ltd, the Koolyanobbing and Windarling iron ore projects for Portman Ltd and the West Pilbara iron ore project for Aquila Resources. David has recent experience as Senior Project Geologist for Dragon Mountain Gold's Lixian Project in Gansu Province, China, and has conducted JORC resource estimate related work on gold and base metals projects in Mongolia for Micromine Pty Ltd.

Tony Cameron, Associate Mining Consultant; B Eng (Mining), Grad Dip Bus, M Comm Law, FAusIMM, graduated in 1987 from the University of Queensland and also has a Graduate Diploma in Business from Curtin University (WA), and a Masters in Commercial Law from Melbourne University. Tony has more than 20 years' experience in the mining industry involved predominantly in iron ore, base metals, gold, copper, and mineral sands mining. He held senior management positions with mining companies in Western Australia including St Barbara Mines, Sons of Gwalia, Tiwest, and McMahon between 1995 and 2001. Tony has worked as an independent mining consultant since 2001 and is expert in the use of mine optimisation, design, and scheduling software, having evaluated numerous international minerals projects to JORC and NI-43101 standards.

25 ACKNOWLEDGEMENTS

MCS would like to acknowledge the staff of JLL, particularly Mr. Jack Li and Ms. Annie Zhang, all the staff of Shandong Xingsheng Mining Company Limited and the Shandong No.8 Exploration Institute of Geology and Mineral Resources who assisted on site and in the preparation of this independent technical report. Report sections for Location and Transport, Geology and Project History were provided by the JLL team led by Mr. Simon Chan and assisted by Ms. Annie Zhang of JLL.

26 REFERENCES

1. Shandong Lianchuang Architectural Design Co. Ltd., (2011). *Feasibility Study Report for Shangyu Ilmenite Mining and Processing Project of Shandong Xingsheng Mining Co. Ltd (Revised).*

2. Shandong No.8 Exploration Institute of Geology and Mineral Resources (2009), *Report of Detailed Survey on Titaniferous Iron Ore in Shangyu Mining Area, Yishui County, Shandong Province.*

27 DISCLAIMER

Micromine Consulting Services has compiled this document for Shandong Xingsheng Mining Company Co. Ltd., based on the assumptions therein identified and upon reports, drawings, designs, data and other information provided by Shandong Xingsheng Mining Company Co. Ltd., and others. Micromine Consulting Services was unable to check the veracity of the supplied data. Micromine Consulting Services has relied upon information that has been prepared by **non-qualified** persons during the preparation of this report. Micromine Consulting Services are not in a position to, and do not, verify the accuracy of, or adopt as their own, the information and data supplied by others. Parts of the document have been prepared by others or extracted from documents prepared by others, as identified in the document; the documents have not been audited by Micromine Consulting Services.

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28 APPENDIX 1: TENEMENT LICENCE CERTIFICATES

Figure 28-1: Zhuge Shangyu mining licence

Figure 28-2: Detailed exploration licence

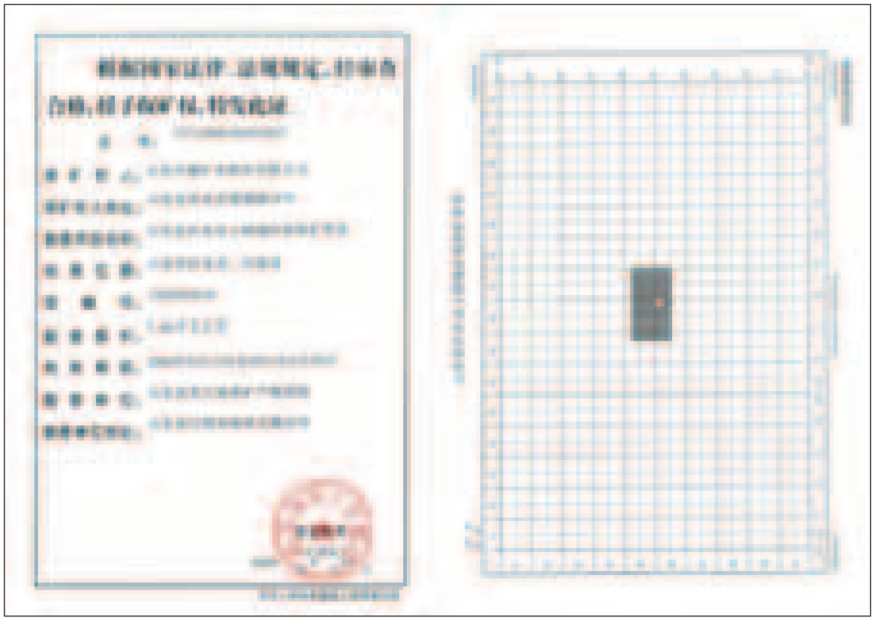

Figure 28-3: Reconnaissance exploration licence

29 APPENDIX 2: DATABASE VALIDATION AND ACCEPTANCE REPORT

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Zhuge Shangyu Iron and Titanium Project

Database Validation and Acceptance Report

For

Shandong Xingsheng Mining Company Limited

12 February 2011

DATA FOR ACCEPTANCE

Database Contents

Data was provided by Shandong Xingsheng Mining Company Limited on 11th and 20th January 2011 and was compiled by JLL.

The provided data consisted of one Excel spreadsheet, containing collar, survey, assay, core recovery, specific gravity data and lithological descriptions and other information in 8 worksheets.

The Excel spreadsheet provided was titled as follows:

2. Xingsheng drilling data – Shangyu.xls

The contents of each worksheet in the Xingsheng drilling data – Shangyu.xls spreadsheet is shown in Table 29-1.

Table 29-1: Contents of spreadsheet Xingsheng drilling data – Shangyu.xls as supplied

Worksheet	No. of Holes and Trenches	No. of Records
Survey	156	156
Collar	156	156
Assay	104	5,336
Geology	100	450
Recovery	61	8,781
SG	67	120
Lookup Codes	NA	NA
Notes	NA	NA

Database Preparation and Validation

The spreadsheet was prepared so it could be imported into MICROMINE. To import the spreadsheet, the following was carried out:

1. Hole IDs were sorted A-Z for all excel worksheets.

2. Unmerge cells in Assay worksheet and copy value to all cells previously merged.

3. Concatenate and change sample numbers in both assay and SG files so sample numbers are unique. Change all double dashes '—' to single dash '–' in sample and hole ID.

4. Delete top header rows of Chinese characters.

5. Unmerge cells in recovery worksheet, cut and paste and calculate values for depths in new cells.

The resulting MICROMINE files were named as follows:

- collar.DAT
- survey.DAT
- assay.DAT
- recovery.DAT
- SG.DAT
- geology.DAT

In addition, minor changes were made to the files after import into MICROMINE to enable production of a drillhole database in MICROMINE:

1. There were 2 trenches with the hole ID ‘STC1’. One of them was changed to have the hole ID ‘STC1A’ (collar coordinates 3979191.000 N, 40372123.000 E, RL 216.00 m). The hole ID was changed in all applicable files (collar, survey, assay and SG files).

2. There were 2 trenches with the hole ID ‘STC4’. One of them was changed to have the hole ID ‘STC4A’ (collar coordinates 3979489.000 N, 40372169.000 E, RL 220.11 m). The hole ID was changed in all applicable files (collar, survey and assay files).

3. A minus sign ‘-’ was prefixed for all dip values in the survey.DAT file.

4. All blank records were replaced with ‘ND’ in required fields in all files.

5. Changed name of field in survey.DAT from ‘Depth (m)’ to ‘SDepth’.

6. Changed names of fields in SG.DAT from ‘Depth (from)’, ‘Depth (to)’ and ‘Length (cm)’ to ‘From’, ‘To’ and ‘Interval’ respectively.

7. Changed all interval lengths in SG.DAT to metres from centimetres.

The original drawings from the exploration report were then supplied by the client on 20th January 2011 and MCS performed the following:

- Displayed geology plans and cross-sections in MapGIS then imported into MICROMINE. The plans and sections were then geo-referenced in MICROMINE and the collar positions and traces were checked

- Checked collar coordinates, survey and assay data with the original data on the drawings

- Entered additional downhole survey data for each drillhole that had not been included in the supplied data previously

Several mistakes were discovered and corrected as detailed below:

File collars.DAT:

- For drillhole ZK219-2, easting coordinate was changed from 4037216.200 E to 40372116.200 E.

- For drillhole ZK203-3, coordinates changed from 3977304.000 N, 40372371.700 E, RL 185.87 m to 3977300.000 N, 40372177.160 E, RL 175.384 m.

- For trench TC113, easting was changed from 40392246.000 E to 40372246.000 E.

- For trench TC109, easting was changed from 40392169.000 E to 40372169.000 E.

File surveys.DAT:

- All dips for trenches were changed to '0.00' from '90.00' or '95.00'.

- The azimuth for trench STC4A was changed from '90.00' to '95.00'.

File assays.DAT:

- For drillhole ZK100-1, interval 398.00 m to 390.40 m, the 'From' value was changed from '398.00'.

- For ZK114-1, interval for the sample H66 was previously incorrectly entered as 101.30-103.30 m and resulted in the entire sequence of samples from 101.30 m to 139.30 m having incorrect intervals.

- The interval for sample H66 was corrected to 137.30-139.30 from 101.30-103.30 and the entire sequence of sample numbers and intervals was adjusted to 139.30 m.

- For trench STC1, the 'From' value was missing from the interval ending at 88.00 m. The problem was corrected by inserting '86.00' as the 'From' value.

- For trench TC201, the entire sequence of intervals from 4.50-106.00 m was incorrectly entered after verification with the original data. The interval data was re-entered.

- For trench STC24, interval 129.60-131.40 m, the 'From' value was changed from '129.00' to '129.60'.

- For trench STC3, interval 110.20-112.40 m, the 'To' value was changed from '12.40' to '112.40'.

- For trench TC107, the hole ID was changed to STC8. The original drawings were checked and confirmed that the assays assigned to TC107 were those for STC8.

The altered versions of the MICROMINE files were resaved under a different filename as below:

- collars.DAT saved as (v.2)collar.DAT

- surveys.DAT saved as (v.2)survey.DAT

The final database compiled from the altered files and to be used for resource estimation contains records for 64 drillholes and 92 trenches.

The number of records in the final database for each hole ID is shown in Table 2.

Table 2: Number of records of each type for each hole ID

Hole ID	Northing (mN)	Easting (mE)	RL (m)	Depth (m)	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
QZ130-1	3978788.000	40372138.000	189.00	9.50	1	0	0	0	0
QZ130-2	3978788.000	40372155.000	189.00	9.50	1	0	0	0	0
QZ130-3	3978788.000	40372146.000	189.00	10.00	1	0	0	0	0
QZ130-4	3978788.000	40372138.000	189.00	18.00	1	0	0	0	0
QZ130-5	3978788.000	40372255.000	183.65	16.25	1	0	0	0	0
QZ130-6	3978788.000	40372138.000	183.65	6.50	1	0	0	0	0
QZ130-7	3978788.000	40372265.000	183.65	4.80	1	0	0	0	0
QZ130-8	3978788.000	40372270.000	183.65	11.00	1	0	0	0	0
QZ134-1	3978588.000	40372150.000	186.25	13.00	1	0	0	0	0

Hole ID	Northing (mN)	Easting (mE)	RL (m)	Depth (m)	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
QZ134-2	3978588.000	40372170.000	185.80	13.00	1	0	0	0	0
QZ134-3	3978588.000	40372160.000	185.95	16.00	1	0	0	0	0
QZ134-4	3978588.000	40372155.000	186.00	16.00	1	0	0	0	0
QZ134-5	3978588.000	40372230.000	184.40	17.00	1	0	0	0	0
QZ134-6	3978588.000	40372250.000	184.00	11.00	1	0	0	0	0
QZ134-7	3978588.000	40372240.000	184.20	11.00	1	0	0	0	0
QZ134-8	3978588.000	40372235.000	184.35	15.00	1	0	0	0	0
QZ138-1	3978388.000	40372048.000	184.80	5.70	1	0	0	0	0
QZ138-2	3978388.000	40372067.000	185.35	9.00	1	0	0	0	0
QZ138-3	3978388.000	40372097.000	184.96	12.00	1	0	0	0	0
QZ138-4	3978388.000	40372117.000	184.78	11.00	1	0	0	0	0
QZ138-5	3978388.000	40372138.000	183.23	14.00	1	0	0	0	0
QZ138-6	3978388.000	40372157.000	183.00	13.00	1	0	0	0	0
QZ138-7	3978388.000	40372203.000	182.20	17.50	1	0	0	0	0
QZ138-8	3978388.000	40372183.000	182.20	11.00	1	0	0	0	0
QZ138-9	3978388.000	40372213.000	182.13	16.50	1	0	0	0	0
QZ138-10	3978388.000	40372233.000	182.00	16.20	1	0	0	0	0
QZ138-11	3978388.000	40372253.000	181.84	17.40	1	0	0	0	0
QZ138-12	3978388.000	40372280.000	181.48	16.40	1	0	0	0	0
QZ138-13	3978388.000	40372300.000	181.16	13.50	1	0	0	0	0
QZ211-1	3977700.000	40372485.000	179.70	12.50	1	0	0	0	0
QZ211-2	3977700.000	40372465.000	179.00	8.00	1	0	0	0	0
QZ211-3	3977700.000	40372445.000	178.42	7.00	1	0	0	0	0
QZ211-4	3977700.000	40372425.000	176.45	7.50	1	0	0	0	0
QZ211-5	3977700.000	40372435.000	178.15	10.00	1	0	0	0	0
QZ211-6	3977700.000	40372440.000	178.28	9.00	1	0	0	0	0
QZ211-7	3977700.000	40372505.000	180.20	15.00	1	0	0	0	0
QZ211-8	3977700.000	40372515.000	180.55	11.00	1	0	0	0	0
QZ215-1	3977900.000	40372446.000	178.00	10.00	1	0	0	0	0
QZ215-2	3977900.000	40372466.000	178.16	13.00	1	0	0	0	0
QZ215-3	3977900.000	40372456.000	178.16	17.00	1	0	0	0	0
QZ215-4	3977900.000	40372500.000	178.40	15.00	1	0	0	0	0
QZ215-5	3977900.000	40372510.000	178.40	6.50	1	0	0	0	0
QZ215-6	3977900.000	40372520.000	179.00	15.50	1	0	0	0	0
QZ215-7	3977900.000	40372530.000	179.46	22.00	1	0	0	0	0
QZ215-8	3977900.000	40372540.000	179.88	18.00	1	0	0	0	0
QZ215-9	3977900.000	40372550.000	180.50	10.00	1	0	0	0	0
QZ219-1	3978100.000	40372521.000	179.38	14.00	1	0	0	0	0
QZ219-2	3978100.000	40372526.000	179.34	14.00	1	0	0	0	0
QZ219-3	3978100.000	40372541.000	179.23	6.00	1	0	0	0	0

Hole ID	Northing *(mN)*	Easting *(mE)*	RL *(m)*	Depth *(m)*	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
QZ219-4	3978100.000	40372533.000	179.30	10.00	1	0	0	0	0
STC0	3981030.050	40372300.000	243.00	138.40	1	67	3	2	0
STC1	3981130.310	40372328.220	244.06	124.00	1	58	3	1	0
STC1A	3979191.000	40372123.000	216.00	115.00	1	50	0	3	0
STC2	3979389.000	40372170.000	215.00	151.50	1	71	3	4	0
STC3	3979588.000	40372178.000	219.51	114.00	1	57	3	6	0
STC3-1	3981230.010	40372357.020	251.91	122.00	1	59	3	0	0
STC4	3980830.050	40372204.120	224.00	123.00	1	60	3	3	0
STC4A	3979489.000	40372169.000	220.11	130.30	1	61	0	2	0
STC7	3981430.060	40372348.500	264.14	104.00	1	50	3	2	0
STC8	3980630.120	40372180.050	221.30	94.00	1	0	3	2	0
STC11	3981630.050	40372322.000	287.15	89.00	1	44	3	2	0
STC15	3981870.000	40372294.000	326.94	84.00	1	42	3	1	0
STC20	3977300.820	40372456.750	196.35	104.80	1	47	3	2	0
STC24	3977108.030	40372393.820	189.21	135.40	1	68	5	2	0
STC26	3977004.020	40372366.570	189.82	146.00	1	70	3	2	0
STC28	3976906.050	40372350.220	197.48	141.00	1	69	6	2	0
STC32	3976600.000	40372364.120	195.74	127.60	1	61	3	2	0
STC36	3976505.750	40372364.250	193.80	133.00	1	61	3	2	0
SZK0	3981030.230	40372333.120	240.25	81.69	1	24	0	2	0
SZK1	3979386.120	40372212.400	207.79	50.00	1	25	1	8	50
SZK2	3979583.000	40372227.000	211.03	50.00	1	25	3	8	42
SZK3	3981230.050	40372373.210	250.87	65.43	1	28	0	2	0
SZK24	3977106.080	40372416.000	186.20	100.00	1	43	0	2	0
SZK28	3977297.000	40372177.220	175.58	57.74	1	23	0	2	0
TC100	3980230.000	40372190.000	210.33	53.00	1	22	3	0	0
TC103	3980430.000	40372200.000	208.35	56.00	1	27	4	0	0
TC104	3980030.000	40372150.000	227.90	55.00	1	23	7	0	0
TC108	3979830.000	40372170.000	227.20	54.00	1	23	4	0	0
TC109	3980730.000	40372169.000	216.80	153.00	1	75	7	0	0
TC112	3979688.000	40372147.000	221.80	112.00	1	49	4	0	0
TC113	3980930.000	40372246.000	232.58	140.00	1	64	4	0	0
TC120	3979288.000	40372146.000	214.87	103.00	1	51	5	0	0
TC121	3981330.000	40372354.000	265.40	109.00	1	51	4	0	0
TC124	3979088.000	40372115.000	203.00	122.00	1	60	4	0	0
TC125	3981530.000	40372334.000	279.73	116.00	1	59	3	0	0
TC201	3977200.000	40372450.002	199.24	108.00	1	51	9	0	0
TC205	3977421.020	40372415.050	183.85	104.00	1	50	4	0	0
TC206	3976800.000	40372340.000	191.20	138.00	1	69	4	0	0
TC210	3977103.430	40372416.000	189.47	93.00	1	46	3	0	0

Hole ID	Northing *(mN)*	Easting *(mE)*	RL *(m)*	Depth *(m)*	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
TC216	3976300.000	40372513.000	218.10	42.00	1	8	4	0	0
TC216-1	3976300.000	40372657.000	219.55	38.00	1	19	4	0	0
TC219	3978100.000	40372444.000	185.27	21.60	1	10	3	0	0
TC220	3976100.000	40372561.000	210.70	103.00	1	51	3	0	0
TC223	3978300.000	40372462.000	190.90	95.00	1	35	4	0	0
TC224	3975900.000	40372638.280	200.60	35.00	1	17	5	0	0
TC227	3978500.000	40372502.000	193.15	56.00	1	28	3	0	0
TC228	3975700.000	40372633.000	197.86	32.50	1	15	3	0	0
TC232	3975500.000	40372696.180	196.83	23.50	1	12	4	0	0
ZK100-1	3980229.020	40372123.360	224.35	608.40	6	112	4	2	306
ZK100-2	3980229.980	40372121.360	224.70	445.50	10	89	3	2	219
ZK107-1	3980630.020	40372112.040	214.93	480.60	5	70	4	1	234
ZK107-2	3980630.000	40372154.880	217.30	329.20	4	88	8	1	173
ZK108	3979831.010	40372118.000	225.31	500.10	5	191	9	2	303
ZK108-1	3979828.150	40372044.630	226.14	808.00	5	124	6	2	466
ZK114-1	3979588.030	40372175.890	218.90	245.80	3	115	3	0	110
ZK114-2	3979588.040	40372121.730	221.54	351.75	4	117	10	1	165
ZK114-3	3979587.980	40372031.720	239.50	446.00	5	11	4	0	215
ZK115-1	3981030.010	40372311.510	241.92	324.80	3	88	6	2	109
ZK115-2	3981029.000	40372226.300	241.20	369.80	4	59	4	1	124
ZK115-3	3981035.010	40372100.451	234.98	546.80	5	51	4	1	187
ZK115-4	3981030.000	40372012.000	222.05	785.80	5	72	4	1	407
ZK118-1	3979388.000	40372186.320	211.65	284.60	3	138	8	1	109
ZK118-2	3979388.000	40372102.140	223.80	348.20	4	62	4	1	139
ZK118-3	3979388.000	40371980.770	211.16	495.90	5	62	4	1	190
ZK119-1	3981229.020	40372362.450	251.57	198.90	2	88	2	1	84
ZK119-2	3981229.000	40372302.890	253.80	310.00	3	53	3	1	114
ZK119-3	3981234.000	40372152.170	239.56	436.50	4	35	3	2	153
ZK122-1	3979207.000	40372102.520	214.90	336.00	4	142	4	2	193
ZK122-2	3979188.000	40372060.210	209.15	380.30	4	97	4	1	204
ZK122-3	3979188.000	40371893.040	194.82	428.00	5	23	6	1	211
ZK122-4	3979188.000	40371780.340	207.77	501.00	5	0	2	0	249
ZK123-1	3981430.000	40372349.130	264.25	216.30	3	80	4	0	83
ZK123-2	3981430.020	40372302.050	263.80	306.90	3	81	4	2	113
ZK123-3	3981430.000	40372143.120	256.84	364.40	4	28	4	1	133
ZK123-4	3981419.000	40371984.660	251.85	541.70	5	0	2	0	286
ZK127-1	3981631.980	40372313.080	288.00	195.50	2	68	6	1	66
ZK127-2	3981629.000	40372240.220	279.72	262.40	5	40	4	2	90
ZK127-3	3981630.000	40372125.630	270.64	425.10	4	60	4	1	143
ZK130-1	3978788.000	40372081.940	191.80	258.60	3	63	4	1	87

Hole ID	Northing *(mN)*	Easting *(mE)*	RL *(m)*	Depth *(m)*	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
ZK130-2	3978788.000	40371933.200	201.88	386.10	4	51	4	1	134
ZK131-1	3981869.000	40372230.410	304.10	234.90	3	52	4	0	82
ZK131-2	3981872.000	40372070.630	283.03	419.10	5	40	3	1	148
ZK200-1	3977100.000	40372318.720	182.86	179.00	2	26	6	0	101
ZK200-2	3977095.060	40372123.700	183.07	334.40	4	63	7	1	187
ZK203-1	3977301.000	40372448.740	196.61	118.40	1	29	3	1	68
ZK203-2	3977304.000	40372371.700	185.87	176.10	2	44	10	0	99
ZK203-3	3977300.000	40372177.160	175.38	284.70	3	39	8	1	160
ZK204-1	3976900.020	40372317.250	199.75	143.60	2	46	4	1	79
ZK204-2	3976899.070	40372141.600	191.65	259.60	3	34	5	1	129
ZK208-1	3976700.000	40372335.050	199.52	117.80	2	40	4	1	39
ZK208-2	3976700.000	40372249.060	194.10	148.80	2	31	4	1	51
ZK208-3	3976700.000	40372067.930	188.30	330.80	4	29	4	0	111
ZK208-4	3976744.000	40371920.000	174.30	482.20	5	14	4	1	162
ZK211-1	3977700.000	40372322.620	175.60	201.80	2	23	4	1	74
ZK211-2	3977700.000	40372096.000	177.68	300.60	3	34	4	1	112
ZK216-1	3976292.250	40372522.180	219.75	258.00	3	7	6	1	92
ZK216-2	3976294.000	40372364.630	199.85	362.50	4	74	8	1	125
ZK216-3	3976288.000	40372175.000	192.92	470.00	5	63	6	1	180
ZK219-1	3978100.000	40372290.210	177.80	167.00	2	27	4	1	65
ZK219-2	3978117.000	4037216.200	178.30	301.00	3	33	4	1	116
ZK224-1	3975900.000	40372520.810	196.64	122.20	2	20	6	1	88
ZK224-2	3975900.000	40372328.280	212.17	222.10	3	6	6	0	129
ZK227-1	3978501.350	40372384.280	179.65	128.40	2	15	4	2	69
ZK227-2	3978500.030	40372201.620	184.30	266.30	3	32	8	0	156
ZK232-1	3975497.500	40372529.220	185.65	167.40	2	11	8	1	125
ZK232-2	3975503.000	40372399.170	196.74	235.40	3	22	12	0	137

- A file containing elevations of the topographic surface for a total of 4,116 points in the project area has been supplied to MCS. A DTM of the topographic surface will be constructed from this data.

Missing Data

- All 50 drillholes prefixed QZ- in the database have no assay data. MCS queried this with the client and were informed that assays were not available for these drillholes.

- All data available for resource estimation has been supplied to MCS by the client.

4 Authorisation

12 February 2011

The Company representative of Micromine confirms that he is an authorised agent of the Company to legally sign off that the supplied data is complete for resource estimation purposes.

Signed for Micromine Pty Ltd

Dean O'Keefe

Asia CEO ____________________

Shandong Xingsheng Mining Company Limited confirms that the data supplied and described in this document is complete and will be utilised for the resource estimation part of the scope of work described in the document entitled "Resources and Reserves Estimation for the Shang Yu Iron and Titanium Project, Shandong Province, People's Republic of China for Shandong Xingsheng Mining Company Limited" (proposal CN2085).

The Company representative of Shandong Xingsheng Mining Company Limited confirms that he/she is an authorised agent of the Company to legally provide the data to Micromine and that he/she is an authorised agent to sign off that the data as supplied can be utilised by Micromine to commence the resource estimation part of the scope of work described in proposal CN2085.

Signed for [illegible] Mining Company Limited

Position: ____________________

Name: ____________________

Signed: ____________________

30 APPENDIX 3: GLOSSARY OF TECHNICAL TERMS & ABBREVIATIONS

3D	Three-dimensional.
%	Percentage.
Anisotropy	Quality of a variably to having different physical properties when measured in different directions.
ASL	Above sea level.
Assay	A measured quantity of material within a sample.
Azimuth	Azimuth angle on which an exploration hole was drilled (deviation to North).
Balancing cut	Value to which erratic high grades should be reduced to prevent bias in estimation. Also known as a top cut.
Coefficient of variation (CV)	In statistics, a normalised measure of the variation present in a sample population.
Collar	Geographical co-ordinates of a drillhole or shaft starting point.
Compositing	In sampling and resource estimation, process designed to carry all samples to certain equal length.
Correlation coefficient	A statistical measure of the degree of similarity between two parameters.
Cumulative frequency graph	Graphical representation of data ranked in ascending or descending order, which are shown in a non-decreasing function between 0% and 100%. The percentage frequency and cumulative percentage frequency forms are interchangeable, since one can be obtained from the other.
Cut-off grade	The threshold above which material is selectively mined or queried.

Declustering	In geostatistics, the procedure allowing for restricted grouping of samples within octant sectors.
DTM	Digital Terrain Model.
Geostatistics	Science studying and describing the spatial continuity of any kind of natural phenomena: Zn grades in this study.
GTIS	Gross Tons In Situ
Histogram	A graphical presentation of the distribution of data by frequency of occurrence.
IDW	Inverse Distance Weighting.
Inverse Distance Weighting	Geostatistical method to calculate mineral resource. Since this method makes the weight for each sample inversely proportional to its distance from the point being estimated it gives more weight to the closest samples and less to those that are farthest away. Method works very efficiently with regularly gridded data. Extreme versions of inverse distance weighting are the global declustering methods like the polygonal method and the local sample mean method.
JORC Code	Australasian Code for Reporting of Mineral Resources and Ore Reserves
L/s	Litres per second
m	Metre
M	Million or mega (10^6).
Mean	Average.
Median	Value of the middle sample in a data set arranged in rank order.
mFe	Iron in magnetite.

MICROMINE.	Mining and exploration software.
Micromine	Micromine Pty Ltd.
Micromine Consulting Services	Consulting division of Micromine Pty Ltd.
Mt	Million tonnes.
MTIS	Mineable Tons In Situ.
Nugget effect	Measure of the variability in re-analysing a sample due to sampling errors or short scale variability. Though the value of a variogram at 0 distance should be 0, several factors, such as sampling errors and short scale variability, may cause sample values to be separated by extremely small distances. The vertical jump at the origin of a variogram graph from 0 to a certain value at extremely small separation distance is called the nugget effect.
Omni	In all directions.
OK	Ordinary Kriging interpolation method.
Operating cost	The threshold cost below which mining a block would be un-economic.
Percentile	One hundredths of the total data. 50th percentile corresponds to the median.
Population	In geostatistics population encompasses grades which show the same or close geostatistical characteristics. Ideally, one population is characterised by linear distribution.
Probability plot	Plot showing cumulative frequencies over different intervals on a log scale probability plot.
Range	Distance at which a variogram reaches its plateau.
Recovery ratio	Proportion of mineral or metal recovered from the ore.

Resource	Geological mineral resource (mineable and unmineable).
RL	Reduced Level i.e. elevation relative to a local datum.
SEHK	Stock Exchange of Hong Kong.
SG	Specific gravity (unit tonnes per cubic metre).
Short-hole shrinkage stoping	Underground mining method in which blasted ore is left in the stope for support purposes until it is to be mined. Blasting resulting from the drilling and loading of short holes.
Sill	Distance at which variogram reaches its sill. Physically, there is no correlation between paired samples at that distance.
Spatial continuity	The description or function how continuous is the data values over a certain distance in three dimensions.
Standard deviation	A statistical measure of the dispersion of sample data around the mean value.
Stope	Open space left behind after the removal of ore from an under-ground mine.
t	Tonne.
TFe	Total iron.
TiO_2	Titanium dioxide.
t/m^3	Tonne per cubic metre.
TO	End of an intersection.
Top cut	See balancing cut.

Variance	In statistics, a measure of dispersion about the mean value of a data set.
Wireframe	Three-dimensional surface defined by triangles.
Wireframe solid	Closed wireframe.