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

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Prepared by

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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 Qinjiazhuang 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 Limited ("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 the 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 Qinjiazhuang Iron and Titanium Project is located close to Qinjiazhuang village near Yangzhuang town in Yishui County, Shandong Province, People's Republic of China. The project is covered by exploration licence T37120080802012961 which covers both the Qinjiazhuang and Yang Zhuang deposits and is valid from the 4th of January 2011 to the 31st of December 2012, and was issued by the Shandong Provincial Bureau of Land and Mineral Resources.

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 primary host rock for mineralisation is the Sanguanzhai gabbro which intrudes the Aolaishan Monzogranite. The mineralisation is composed of two separate orebodies; orebody 1 and orebody 2. Orebody 1 is around 1,200 metres long and 50 to 130 metres in width. Average thickness of the orebody is 75 metres. Orebody 2 is around 600 metres in length and 200 metres in width. Mineralisation is ilmenite, magnetite, and pyrite.

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

The project site was visited from the 3rd to 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. JLL 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 many collar locations had been disturbed. MCS was able to locate and identify two collars on the geological plan and on the ground and found the coordinates in the database were within a few metres of the coordinate read from the GPS; an acceptable result. MCS was able to check a random selection of drillcore intervals from 4 drillholes. 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 found the geology, mineralisation and approximate grade of each interval inspected matched the original drill logs.

All exploration was carried out by the Shandong No. 8 Exploration Institute of Geology and Mineral Resources. For orebody 1, all drillholes were drilled on sections orientated south-west to north-east at a spacing of approximately 200 metres. On each exploration section line, drillholes were spaced between 150 metres and 220 metres. For orebody 2, the two most southern exploration lines have a spacing of 200 metres; the two northern lines have a spacing of 100 metres. 22 holes for 1,926.09 metres were drilled for orebody 1. For orebody 2, 2 holes for 101.09 m were drilled. All drilling was carried out by the No. 8 Exploration Institute of Geology and Mineral Resources using Jiang Tan XY-4 drill rigs. 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.

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

Core recovery data was recorded for 9 drillholes for orebody 1 and two drillholes for orebody 2. Linear core recovered length for orebody 1 was 1,581.44 metres compared to 1,622.75 drill metres, where core recovery was recorded. The mean drill hole core recovery was 97.60%. Linear core recovered length for orebody 2 was 86.30 metres compared to 101.09 drill metres. The mean drill hole core recovery was 85.37%. Core recovery for orebody 1 was acceptable while core recovery for orebody 2 was moderate.

Six trenches for 777.20 metres were excavated for orebody 1. All trenches were orientated approximately 45 degrees (south-west to north-east) and ranged in length from 50.1 metres to 192.5 metres. For orebody 2, four trenches for 814.0 metres were excavated orientated east-west and ranged in length from 108.0 metres to 274.0 metres. All trenches were sampled as continuous channel samples taken from the base of the trench 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 with Mr. Liu Jiazhao, the Manager of the No. 8 Exploration Institute of Geology and Mineral Resources 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. For orebody 1, the repeat data provided occurred at a frequency of 55 results from a total of 967 analyses (5.7% of total analyses). Assay precision for TFe was ±0.26%, while assay precision for TiO_2 was ±0.79%. Precision for both TFe and TiO_2 was strong.

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 30 samples out of 967 analyses (3.1% of the total analyses). For TFe, the data points all lie very close to the straight line on a quantile-quantile plot which indicates there is no assay bias present between the results of the two laboratories at different grade cut-offs, and for TiO_2, the results from the external laboratory are consistently slightly higher than the results from the primary laboratory indicating a minor amount of bias is present between the results of the two laboratories at different grade cut-offs.

Data was provided by the Shandong Xingsheng Mining Company Limited on the 11th and 20th of January 2011. The client provided MCS with additional data for a second orebody (orebody 2) of the Qinjiazhuang Project on the 24th of February 2011. The final database for the original data contained records for 22 drillholes and 6 trenches and the final database for the additional data (orebody 2) contained records for 4 trenches and 2 drillholes.

Resource Estimation

A geological cut-off grade of 8.7% TFe and 1.9% TiO_2 was determined from the classical statistical analysis of the data for both orebody 1 and orebody 2. These values were used as trigger values to create grade composites for mineralisation interpretation. Geological data was used to assist in the interpretation of mineralised envelopes. Interpretation and wireframing was then carried out for all mineralised envelopes using seven cross-sections for orebody 1 and four cross-sections for orebody 2.

A balancing cut grade of 18.4% TFe (chosen from examination of the histogram) and 7.5% TiO_2 (at the 97.7 percentile on the cumulative frequency plot) was chosen and applied to all assays inside the mineralised envelopes for orebody 1. For orebody 2 a balancing cut was not required. All samples within the mineralised envelopes were composited to an equal sample interval length before geostatistical analysis and interpolation. A composite length of 2.0 metres was selected as it was the most prevalent interval length in the dataset.

Empty block models were created and TiO_2, TFe grades and SG data was interpolated into the blocks. Geostatistical analysis was completed for TiO_2 and TFe for orebody 1 and used as input into the ordinary kriging algorithm which was used for interpolation into the block model. Orebody 2 was interpolated using the inverse distance weighting cubed algorithm.

QA/QC data supplied and obtained from the site visit was moderate to high in quality for orebody 1 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 150 m. For Indicated Resources this radius was 300 m. All other blocks in the model were classified as Inferred.

For orebody 2, the risk assessment demonstrated confidence in the data was low to moderate, as the data came from four trenches and only two drillholes. Additionally no analytical QA/QC data was provided and core recovery was less than 95%. As a result, no Measured Resources were estimated and for Indicated Resources, a minimum of two samples from two holes had to be within a radius of 150 m. The remainder of the resource for orebody 2 was classified as Inferred.

The resources reported for the Qinjiazhuang Iron and Titanium Project are stated by category with the total of Measured, Indicated and Inferred Resources for orebody 1 and total of Measured and Indicated Resources for orebody 2.

An economic cut-off grade was determined using the parameters from the MCS 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 26.9% and the sale price of the combined concentrate used was CN¥2,656. MCS calculated an economic cut-off grade of 9.2% TiO_2 equivalent using the following formula: Economic cut-off grade = CN¥64.86 / (26.9% * CN¥2,656).

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

Additional resource potential exists at both ends and at depth of orebody 1. Also infill drilling may upgrade the resource from Indicated and Inferred to Measured category. For orebody 2 additional resource potential exists in the southern part where there are no drillholes and the orebody has not been tested at depth. For the northern part of orebody 2 additional drilling with improved core recovery and provision of QA/QC data could upgrade the Indicated resource to Measured category.

Table 1-1: Total resource for the Qinjiazhuang Project

Resource Category	Tonnes	SG	TiO_2 equivalent	TiO_2	TFe
	(t)	*(t/m^3)*	*(%)*	*(%)*	*(%)*
Measured	46,210,000	3.23	72.61	4.9	14.72
Indicated	42,101,000	3.19	73.14	4.88	14.84
Total Measured and Indicated	88,311,000	3.21	72.86	4.89	14.78
Inferred	11,254,000	3.29	74.31	5.06	15.05
Total Resources	99,565,000	3.22	73.02	4.91	14.81

Note: Numbers have been rounded to reflect that the resources estimate is approximate.

Mining Study

The deposit is most suitable for open pit mining according to the size, depth and shape of the orebodies.

Production capacity is calculated to be two million tonnes per year.

The MCS reserve statement **(current reserve, revised October 2011)** for the Qinjiazhuang Project is shown in Table 1-2.

Table 1-2: Total reserve for the Qinjiazhuang Project

Reserve Classification	Ore	TiO_2 Grade	TFe Grade	Contained TiO_2	Contained TFe
	(Tonnes)	*(%)*	*(%)*	*(Tonnes)*	*(Tonnes)*
Proved	45,330,000	4.52	13.50	2,049,000	6,120,000
Probable	41,300,000	4.48	13.61	1,850,000	5,621,000
Total reserve	86,630,000	4.50	13.56	3,898,000	11,747,000

Note: Contained TFe and TiO_2 do not imply that all the TFe and TiO_2 can be recovered. Processing recovery has not been accounted for in the calculation.

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.

A schedule of tonnages was produced of the open pit. There were no declared underground reserves as they were uneconomic. The schedule assumes that the production commences when the Yang Zhuang reserves are depleted and the mining at Qinjiazhuang remains constant over the life of the mine at 2 million tonnes per annum for the open pit mine life.

The expected project life of the open pit is 43.3 years.

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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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 Qinjiazhuang 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"). The JORC standard reporting guidelines compliant resource and reserve estimation report would be used for a submission to the Stock Exchange of Hong Kong Limited ("HKEx") and would conform to the Chapter 18 requirements of the exchange.

The competent person for the project, MCS geologist Mr. David Allmark visited the site from the 2nd to 6th of March 2011, accompanied by Mr. Jeff Zhang of MCS and 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 assisted by Dr Matthew Godfrey, Mr. Alexander Winant and Mr. Andrew White of MCS. Mr. David Allmark completed the data validation, classical statistical analysis, sectional interpretation and wireframing, 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, Geology and Project History were provided by the JLL team led by Mr. Simon Chan and assisted by Ms. Annie Zhang of JLL. 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.

The client again commissioned MCS in September of 2011 to complete an update of the reserve estimation for the project due to the changes in modifying factor information. This report contains the updated and current reserve estimate for the project.

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

2 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 Qinjiazhuang Iron and Titanium Project ("the Project"), located in the Shandong Province of the People's Republic of China.

The specific objectives of the work were as follows:

Resource Estimation

- Import all 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, if 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 mineralisation (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.
- Statement of the grade and tonnage at a set of different cut-off grades.

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

Conduct open pit and underground mine design and scheduling, mining costs and other related parameters.

MCS will consider all modifying factors and if 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

The above work was supplemented by a site verification 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:

1. Methodology and quality of drilling;

2. Methodology and quality of sampling and assaying;

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

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

5. Specific gravity determination methodology.

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

3 LOCATION, ACCESS AND GENERAL INFORMATION

The Qinjiazhuang Iron and Titanium Project is located close to Qinjiazhuang village near Yangzhuang town in Yishui County, Shandong Province, People's Republic of China. The project is included in a tenement with the Yang Zhuang project which covers an area of 17.88 km^2. The geographical coordinates of the Qinjiazhuang Project are shown in Table 3-1.

Table 3-1: Geographical Coordinates of the Qinjiazhuang Iron and Titanium Project

	Longitude	Latitude
Minimum	118°46'46"	36°01'47"
Maximum	118°47'50"	36°02'36"

The project is located approximately 4.7 km from the Yangzhuang Highway, around 1 km from the Taixue Road (S329 provincial highway) and approximately 4 km from the Yanglin Road (S227 provincial highway) to the west (Figure 4-1).

Figure 3-1: Location of the Qinjiazhuang Project

3.1 Climate and Topography

This region experiences a continental monsoon climate and is in a temperate weather zone. The average annual temperature is 13°C, the average number of days of precipitation is 85.9 days and the average amount of precipitation is 851.8 millimetres. Most precipitation occurs in August and September and comprises 65% of the total annual precipitation. The prevailing wind direction in spring and summer is from the south-east and in autumn and winter from the north-west.

The topography in the project area consists of low hills with higher topography in the north-east and lower topography in the south-west. The highest elevation is 413.5 metres ASL in the south-east of the mining area and the lowest elevation is 201.0 metres ASL in the south-west of the mining area. The relative difference in elevation is 212.50 metres.

The Xiuzhen River flows through the area from north to south. The river is wide and meandering and has several dams along its course. The water flow in the river is significantly affected by seasons; in the summer and autumn the river has a powerful flow but in winter and spring the flow is much less and even discontinuous in some areas.

3.2 Licence Status

The Qinjiazhuang Iron and Titanium Project is covered by exploration licence T37120080802012961. This project was initially covered by a separate exploration licence which has now been combined with the original Yang Zhuang exploration licence. The current licence number T37120080802012961 covers both the Qinjiazhuang and Yang Zhuang deposits and is valid from the 4th of January 2011 to the 31st of December 2012, and was issued by the Shandong Provincial Bureau of Land and Mineral Resources.

The current tenement licence certificate is in Appendix 1: Tenement Licence Certificate.

3.3 Local Infrastructure and land use

The project area has access to an electricity supply via the East China Grid which has high voltage and low voltage lines. It also has access to communication facilities. In the project area there are many small reservoirs, sufficient rainfall and perennial water storage. The water quality meets or exceeds the national standards on drinking water.

Shandong Xingsheng Mining Co. Ltd is a large Company who owns many mines and has sufficient ability to source and maintain the required mechanical, automobile and electrical equipment and parts for a mining operation.

The economy in the project area is focused on agriculture including wheat, maize, sweet potato, peanut, cotton, tobacco, forest products, vegetables and medical materials. Mining is starting to become a significant economic factor in the region.

4 REGIONAL GEOLOGY

The following information is sourced from Shandong No. 8 Exploration Institute of Geology and Mineral Resources (2010).

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 amphibolite facies. West of the Yishui-Tangtou fracture, the Mesozoic-Cretaceous Dasheng Group is exposed, comprising dark purple sandstone and sandy glauconitic shale. The area is structurally complex.

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

5 GEOLOGY OF THE TENEMENT AREA

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

5.1 Stratigraphy

The stratigraphy of the project area consists of the Archaean Liuhang Formation of the Taishan Group and Cainozoic Quaternary unconsolidated sediments.

5.1.1 Archaean

The Liuhang Formation is part of the Taishan Group which is in the Proterozoic Aolaishan Monzogranite. It is exposed in the western part of the area, has a defined contact with the monzogranite, and is parallel to the regional schistosity ranging from 100 to 130 degrees azimuth and 50 to 70 degrees dip. It consists of biotite anorthosite, biotite amphibolites and magnetite quartz amphibolites.

5.1.2 Quaternary

Quaternary unconsolidated sediments are found in low-lying areas and consist of alluvium and colluvium of the Shanqian and Linyi formations.

The Shanqian formation is distributed through low hills and consists of gravelly sandy soil, clayey silt and sandy gravel beds. The Linyi formation is found on the floodplain on both banks of the river system and consists of fine sand, silty clay and gravel.

5.2 Structure

The structure of the area consists of a ductile shear belt and a brittle fracture belt.

The ductile shear belt extends from Gongshancun in the south to Eshan in the north for a distance of about five kilometres. The belt consists of weak gneissic, medium to fine grained monzonitic granite of the Songshan unit of the Proterozoic Aolaishan unit. The gneissic foliation of the rocks is generally subparallel to the mylonite foliation in the belt. The belt ranges in width from 800 to 1,000 metres. Along the mylonite zones the rocks consist of mica-quartz schist with amphibolite and biotite granulite inclusions and fuchsite-quartz schist. Structures are well developed inside the belt, with abundant s-c fabrics, stretching lineations and asymmetric folds. The foliation penetrates the middle of the shear zone and develops into lamellar-slip cleavages, producing a stratiform appearance similar to a sedimentary rock.

Brittle fracture structures within the project area are also well developed with two main fracture sets; the lower Yanglin fracture (F4) of the Qinjiazhuang orebody and the south end of Eshan fracture (F7).

The F4 fracture extends from south of Qinjiazhuang to Xiayanglin for a length of three kilometres. This fracture produces a right lateral translation in Liuhang Group rocks with a maximum horizontal displacement of around 700 metres.

The F7 fracture occurs at the south end of Eshan. It passes through the orebody and produces a maximum displacement of 70 metres.

5.3 Mineralisation

The primary host rock for mineralisation is the Sanguanzhai gabbro of the middle Proterozoic Era. The gabbro intrudes the Aolaishan Monzogranite. The mineralisation is composed of two separate orebodies; orebody 1 and orebody 2. Orebody 1 is around 1,200 metres long and 50 to 130 metres in width. Average thickness of the orebody is 75 metres. Orebody 2 is around 600 metres in length and 200 metres in width. Mineralisation is in the form of ilmenite, magnetite, and pyrite.

5.3.1 Ilmenite

Ilmenite mineralisation is not evenly distributed as most is concentrated in the upper part of the mineralisation.

5.3.2 Magnetite

Magnetite crystals are xenomorphic and in a star shaped distribution.

5.3.3 Pyrite

Pyrite mineralisation is concentrated in the lower part of the ore body. The mineral fills hairline fractures and forms veinlets. It is also found disseminated throughout the rocks, sometimes occurring as massive pyrite blebs. Intense pyrite mineralisation is associated with silicified rock.

6 PROJECT HISTORY

6.1 Ownership History

The Qinjiazhuang Iron and Titanium Project is currently owned by Shandong Xingsheng Mining Co. Ltd. The Company was founded in 2001 and at present is a foreign company joint venture with a registered capital of $16,850,903 USD. The Company is focused in iron exploration, mining, processing and import and export of iron ore and iron concentrate.

6.2 Exploration History

The following information is sourced from Shandong No. 8 Exploration Institute of Geology and Mineral Resources (2010) report.

6.2.1 Regional Exploration

1950-2005: Geological exploration of the area began in the 1950s and more regional geological survey and comprehensive research work was conducted in 1996.

2005: Shandong Xingsheng Mining Company Limited requested the No. 8 Exploration Institute of Geology and Mineral Resources of Shandong Province (N8GEP) to complete a general survey of the iron ore in the mining district in October of 2005. They determined a resource of 21.354 million tonnes of iron ore consisting of both controlled intrinsic economic resources (category 332) and predicted intrinsic economic resources (category 333). The report was filed as "LZJBZ [2005] No.79" Document by Department of Land and Resources of Shandong Province on December 28, 2005".

2007: In June of 2007, N8GEP undertook further exploration work for the client. This consisted of 1:2,000 scale geological mapping, a 1:100,000 scale high-resolution magnetic survey, field measurements and sampling in mining pits and drillholes and chemical analysis of composite samples.

6.2.2 Detailed Exploration

Exploration rights for 11.63 square kilometres in the Qingjiazhuang area were obtained by Shandong Xingsheng Mining Co. Ltd. on 18th January 2004. Exploration rights were extended and the current exploration license is valid until 31st December 2012.

7 QA/QC ANALYSIS

The quality assurance/quality control (QA/QC) analysis comes from a combination of information 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.

7.1 Drill hole sampling

All drill hole core sample boundaries were determined by lithology and mineralisation. 597 samples were taken from orebody 1 and 51 samples were taken from orebody 2. All samples had an average length of around 2 metres. Drill core was broken into 2 halves using a manual core splitter and half of the core was sampled.

7.2 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. For orebody 1, the repeat data occurred at a frequency of 55 results from a total of 967 analyses (5.7% of total analyses). The scatterplot for TFe results versus TFe repeat results is shown in Figure 7-1. Assay precision for TFe was ±0.26%. The scatterplot for TiO_2 results versus TiO_2 repeat results is shown in Figure 7-2. Assay precision for TiO_2 was ±0.79%.

The number of samples taken for the repeat analysis is representative of the population (5.7%). Precision for both TFe and TiO_2 is acceptable.

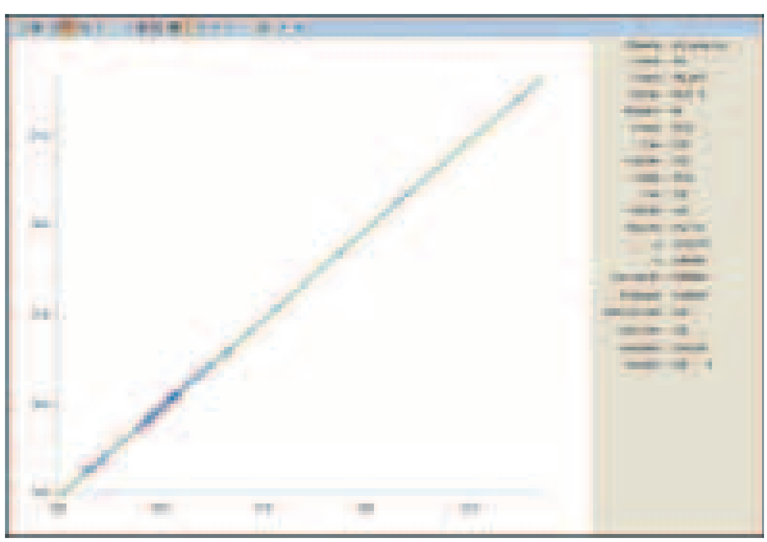


Figure 7-1: Scatterplot of TFe results versus TFe repeat results

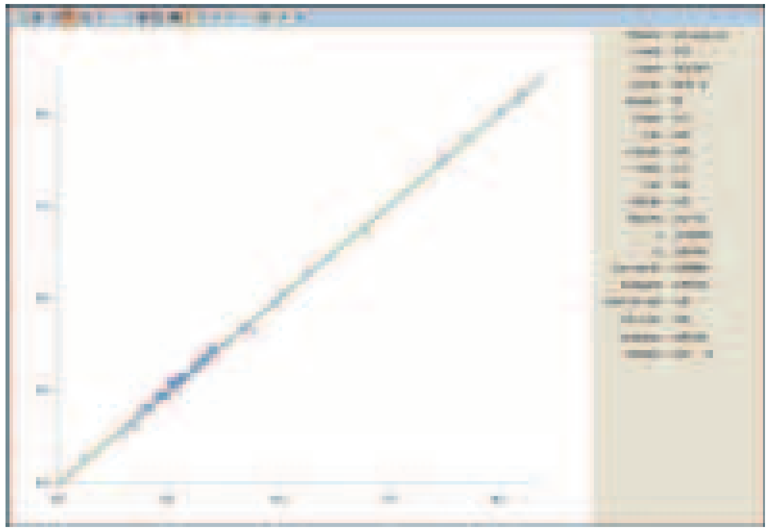


Figure 7-2: Scatterplot of TiO_2 results versus TiO_2 repeat results

7.3 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 30 samples out of 967 analyses (3.1% of the total analyses). A quantile-quantile plot of TFe results from the primary laboratory versus TFe results from the external umpire laboratory is shown in Figure 7-3. The data points all lie very close to the straight line which indicates there is no 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 primary laboratory versus TiO_2 results from the external umpire laboratory is shown in Figure 7-4. The results from the external laboratory are consistently slightly higher than the results from the primary laboratory. There is also some difference in results at low and high grades. There is some departure from the straight line which indicates a minor amount of bias present between the results of the two laboratories at different grade cut-offs.

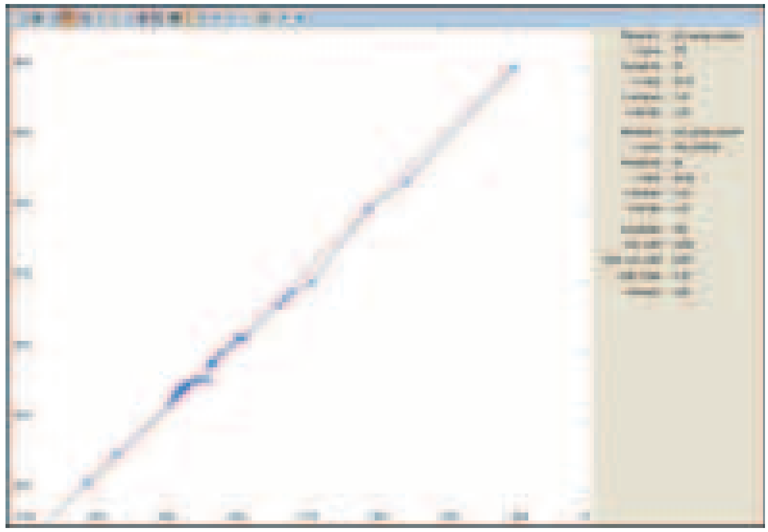


Figure 7-3: Quantile-quantile plot of TFe results from the primary laboratory versus those for the umpire laboratory

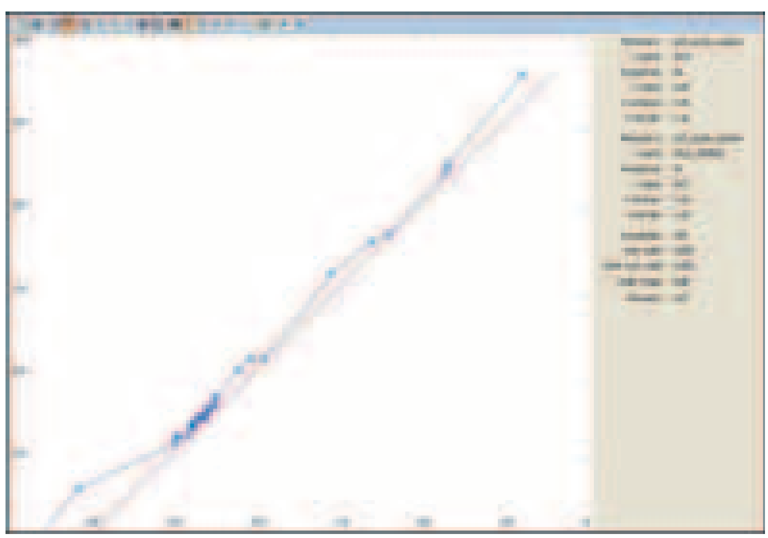


Figure 7-4: Quantile-quantile plot of TiO_2 results from the primary laboratory versus those for the umpire laboratory

7.4 Drilling Method

22 holes for 1,926.09 metres were drilled for orebody 1. For orebody 2, 2 holes for 101.09 m were drilled. 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.

7.5 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.

7.6 Core Recovery

Core recovery data was recorded for 9 drillholes for orebody 1, and 2 drillholes for orebody 2. Linear core recovered length for orebody 1 was 1,581.44 metres compared to 1,622.75 drill metres, 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 97.60%. This is acceptable and indicates that the drill core samples were representative of the drill interval.

Linear core recovered length for orebody 2 was 86.30 metres compared to 101.09 drill metres, 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 85.37%. Core recovery for orebody 2 is moderate.

7.7 Trenching and Trench Sampling

Six trenches for 777.20 metres were excavated for orebody 1. All trenches were orientated approximately 45 degrees (south-west to north-east) and ranged in length from 50.1 metres to 192.5 metres. For orebody 2 four trenches for 814.00 metres were excavated orientated east-west and ranged in length from 108.0 metres to 274.0 metres.

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

7.8 Standards and Blanks

The client did not provide any results of external standard analysis or details of the standards. Internal standards were implemented by No. 8 Exploration Institute of Geology and Mineral Resources 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.

7.9 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 Exploration Institute of Geology and Mineral Resources on 5th 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 7-5.

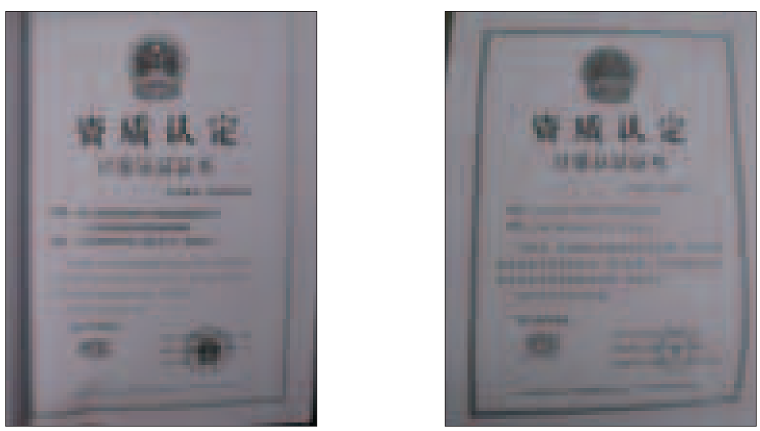


Figure 7-5: Laboratory accreditation certificates

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 a size of 10 millimetres. In the second stage, the sample was crushed further by 'cold crushers' to a size of 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 7-6 while the roll crusher machine for pulverisation is shown in Figure 7-7. The storage area for the pulverised sample is shown in Figure 7-8.

Figure 7-6: First stage jaw crusher (left) and second stage cold crusher (right)

Figure 7-7: Photograph of roll crushers for pulverisation stage

Figure 7-8: Storage of pulverised samples

7.10 Analytical Method

After sample preparation, the weight of each sample was checked by weighing on a set of scales and the weight was recorded. A mixture of sulphuric and phosphoric acid was added to the dry sample. The mixture was then heated on a hot plate if the sample did not dissolve. The final solution was analysed for total iron (TFe) and titanium dioxide (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 7-9.

Figure 7-9: Technician operating ICP-OES machine at the primary Rizhao laboratory

A second split of the pulverised sample was taken and analysed for magnetite Fe content (mFe). This was done simply by magnetic separation and weighing of the sample to determine the proportional magnetite content. The proportion of Fe in the magnetite was then calculated.

7.10.1 *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.

7.11 Site Visit

The Qinjiazhuang Project site was visited from the 3rd to 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. MCS visited the No. 8 Exploration Institute of Geology and Mineral Resources that had conducted the exploration.

7.11.1 ***Drillhole collar location verification***

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

Within the time permitting, 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. With the assistance of the Yang Zhuang Deputy Mine Manager, Mr. Li, MCS was able to locate and identify two collars on the geological plan and on the ground, ZK1202 (Figure 7-10) and ZK1601 of orebody 1. MCS used the client's GPS unit to locate the collar position and found the coordinates in the database were within 4 metres of the coordinate read from the GPS, an acceptable result.

Figure 7-10: Concrete cap on collar of ZK1202

7.11.2 ***Drill core verification***

MCS viewed the drillcore for the project at the Yang Zhuang minesite. Most of the core was in reasonably good condition, and appeared to be stored in discrete stacks for each drillhole (Figure 7-11). The core was stored in an unprotected area.

Figure 7-11: Drill core storage facilities for Qinjiazhuang Project

MCS was able to check a random selection of drillcore intervals from 4 drillholes. The details of the core inspected are given in Table 7-1.

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 found the geology, mineralisation and approximate grade of each interval inspected matched the original drillhole logs. 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 7-12 to Figure 7-15.

Table 7-1: Details of drillcore inspected

HoleID	Depth from *(m)*	Depth to *(m)*	Comments
ZK102	46.30	49.15	High grade TiO_2 ore, 8%. Checked with logs.
ZK402	161.80	163.80	Fe-Ti ore concurs with logs and assays.
ZK801	76.00	78.00	Fe-Ti ore concurs with logs and assays.
ZK1601	32.00	34.00	Fe-Ti ore concurs with logs and assays.

Figure 7-12: Drill core from ZK102 (46.30-49.15m)

Figure 7-13: Drill core from ZK402 (161.80-163.80 m)

Figure 7-14: Drill core from ZK801 (76.00-78.00 m)

Figure 7-15: Drill core from ZK1601 (32.00-34.00 m)

7.12 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

8 EXPLORATION GRID DENSITY

For orebody 1, all drillholes were drilled on sections orientated south-west to north-east at a spacing of approximately 200 metres. On each exploration section line, drillholes were spaced between 150 metres and 220 metres. One infill line at a spacing of around 100 m at the north end of the orebody was also drilled.

For orebody 2, the two most southern exploration lines have a spacing of 200 metres, while the two northern lines have a spacing of 100 metres.

9 PREVIOUS RESOURCE AND RESERVE ESTIMATES

In 2008, a resource estimate was carried out by the Shandong No. 8 Exploration Institute of Geology and Mineral Resources for orebody 1. The '332' category resource was 23,171,000 tonnes at a grade of 5.24% TiO_2 and 15.40% TFe, and the '333' category resource was 54,482,000 tonnes at a grade of 4.95% TiO_2 and 14.74% TFe. The combined '332' and '333' category resource was 77,653,000 tonnes at a grade of 5.03% TiO_2 and 14.94% TFe. The resource is shown in Table 9-1. Orebody 2 has not been estimated previously.

Table 9-1: Historic resource for the Qinjiazhuang Project

Areas	**Resource Category**	**Ore Qty** *($x10^4$ t)*	**Average Grade** *(%)* **TFe + TiO_2**	**TFe**	**TiO_2**
1	2	3	4	5	7
Ore Body I	332	2317.1	20.64	15.4	5.24
	333	5448.2	19.69	14.74	4.95
	332+333	7765.3	19.97	14.94	5.03

This resource estimate will be treated herein as a 'historic' resource. This resource is not JORC compliant.

10 RESOURCE ESTIMATION METHODOLOGY

10.1 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 were potentially economically viable.

10.2 Software

The Qinjiazhuang Project resources were estimated using MICROMINE (Version 12.0.4) software.

10.3 Database Compilation

Data was provided by Shandong Xingsheng Mining Company Limited on the 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 titled as follows:

1. Xinsheng drilling data – Yangzhuang part 2 – 70 million ton.xls

The contents of each worksheet in the Xinsheng drilling data – Yangzhuang part 2 – 70 million ton.xls spreadsheet is shown in Table 10-1.

Table 10-1: Contents of spreadsheet Xinsheng drilling data – Yangzhuang part 2 – 70 million ton.xls as supplied

Worksheet	No. of Holes and Trenches	No. of Records
Survey	28	28
Collar	28	28
Assay	26	967
Geology	15	94
Recovery	9	728
SG	20	51
Lookup Codes	NA	NA
Notes	NA	NA

The client provided MCS with additional data for a second orebody (orebody 2) of the Qinjiazhuang Project on the 24th of February 2011. The provided data consisted of one excel spreadsheet containing collar, survey, geology, assay, recovery, SG and other information including composite sample results in 8 worksheets. The spreadsheet was titled as follows:

1. Xingsheng additional drilling data – Qinjiazhuang.xls

The contents of each worksheet are shown below in Table 10-2.

Table 10-2: Contents of spreadsheet Xingsheng additional drilling data – Qinjiazhuang.xls as supplied

Worksheet	No. of Holes and Trenches	No. of Records
Collar	6	6
Survey	6	6
Geology	6	13
Composite Sample Res.	NA	8
Assay	6	445
Recovery	2	53
SG	6	30
Lookup codes	NA	NA

10.4 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 production 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: Database Validation and Acceptance Report. The final database for the original data contained records for 22 drillholes and 6 trenches.

The number of records in the final original database for each hole ID is shown in Table 10-3.

The final database for the additional data (orebody 2) was created in MICROMINE and contained records for 4 trenches and 2 drillholes. The number of records in the final database for orebody 2 for each hole ID is shown in Table 10-4.

Table 10-3: Number of records of each type for each hole ID in original database

Hole ID	Northing *(mN)*	Easting *(mE)*	RL *(m)*	Depth *(m)*	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
QZ1600	3990000.000	40391177.859	217.65	9.20	1	1	0	1	0
QZ1603	3990014.105	40391192.140	217.45	8.20	1	1	0	0	0
QZ1604	3989985.895	40391163.701	217.78	11.60	1	1	0	1	0
QZ1607	3990028.324	40391206.163	217.43	9.00	1	1	0	1	0
QZ1608	3989971.676	40391149.641	218.10	13.20	1	1	0	1	0
QZ1611	3990042.498	40391220.294	217.41	9.50	1	1	0	1	0
QZ1612	3989957.593	40391135.445	218.34	14.80	1	1	0	0	0
QZ1614	3989950.575	40391128.378	218.43	8.80	1	1	0	0	0
QZ1615	3990056.631	40391234.442	217.38	5.50	1	1	0	0	0
QZ1616	3989943.516	40391121.322	218.51	7.20	1	0	0	0	0
QZ1619	3990070.777	40391248.583	217.29	6.10	1	0	0	0	0
TC0	3990372.020	40390397.000	246.23	164.00	1	75	4	3	0
TC1	3990458.210	40390346.560	245.01	147.60	1	73	5	3	0
TC3	3990569.362	40390332.583	248.81	50.10	1	25	7	0	0
TC4	3990188.670	40390481.740	244.31	156.00	1	74	5	2	0
TC8	3990051.800	40390639.430	241.56	192.50	1	92	8	2	0
TC12	3989967.824	40390863.782	227.82	67.00	1	31	9	0	0
ZK0	3990409.820	40390455.980	250.57	100.08	1	50	0	5	0
ZK1	3990483.790	40390386.000	250.35	100.16	1	50	0	5	0
ZK102	3990556.762	40390513.825	256.68	129.45	3	43	4	3	50
ZK401	3990271.445	40390600.772	245.91	119.90	2	55	8	3	64
ZK402	3990379.342	40390708.834	240.94	180.30	2	59	7	3	96
ZK801	3990139.370	40390751.458	237.27	103.70	2	44	2	3	39
ZK802	3990250.742	40390863.984	234.26	170.60	2	36	6	4	65
ZK1201	3990086.551	40390982.336	230.51	126.90	2	42	4	3	50
ZK1202	3990237.340	40391139.471	217.12	242.00	4	54	7	3	110
ZK1601	3990092.638	40391274.436	214.45	211.50	3	94	7	2	108
ZK1602	3990235.470	40391413.278	216.15	338.40	4	61	11	2	146

Table 10-4: Number of records of each type for each HoleID in orebody 2 database

Hole ID	Northing *(mN)*	Easting *(mE)*	RL *(m)*	Depth *(m)*	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
GTC0	3989291.56	40391826.03	237.50	260.00	1	126	3	7	0
GTC1	3989393.02	40391828.12	228.35	274.00	1	134	2	8	0
GTC4	3989091.80	40391822.00	243.50	172.00	1	83	2	5	0
GTC8	3988891.92	40391818.05	257.30	108.00	1	51	2	4	0
GZK1	3989289.14	40391950.13	241.00	50.37	1	25	2	3	27
GZK2	3989389.50	40391951.92	235.00	50.72	1	26	2	3	26

An accurate DTM of the topographic surface was produced in MICROMINE software by MCS after surveyed 3D coordinate data of the surface of both areas (orebody 1 and orebody 2) was provided by the client on the 10th of March 2011. This DTM was used for the resource estimation.

A combination of both databases was used for the resource estimation of the Qinjiazhuang Project.

10.5 Exploratory Data Analysis

Classical statistical analysis was conducted twice for the Qinjiazhuang Iron and Titanium Project. Orebody 1 was analysed separately from orebody 2. The first study was undertaken with the entire data set 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 populations for orebody 1 and orebody 2 are shown in Figure 10-1 to Figure 10-4. The histograms of the exhaustive population for TFe and TiO_2 for both orebodies are shown in Figure 10-5 to Figure 10-8. The exhaustive grade populations for TFe and TiO_2 for orebody 1 consist of two approximately normally-distributed populations spread over a large range of values, but with most grades occurring in the higher grade population. The exhaustive populations for both TFe and TiO_2 for orebody 2 consist of one population at higher grades with a much smaller population at lower grades.

The probability plots and cumulative frequency plots for TFe and TiO_2 for both orebodies are shown in Figure 10-9 to Figure 10-16. For TFe in orebody 1, the two populations are separated at a grade of 8.7% TFe. This grade can be seen on the probability plot as the point where the line changes curvature (inflection point) representing the boundary between the mineralised and unmineralised grade populations of TFe. For TiO_2 for orebody 1, the two populations are separated at a grade of 1.9% TiO_2. This grade can be seen on the probability plot as the point where the line changes curvature (inflection point) representing the boundary between the mineralised and unmineralised grade populations of TiO_2.

For orebody 2, the same grades separating the mineralised and unmineralised populations can be seen and there is a large difference between the two populations.

The values of 8.7% TFe and 1.9% TiO_2 were therefore chosen as the geological cut-off grades for mineralisation of TFe and TiO_2 respectively, for both orebodies.

Figure 10-1: Descriptive statistics for total iron (TFe) for the exhaustive population for orebody 1

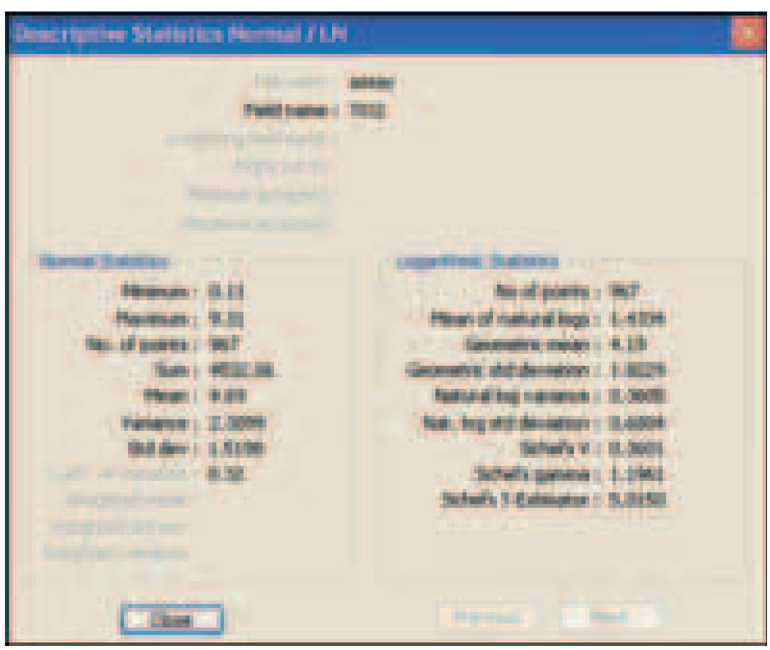


Figure 10-2: Descriptive statistics for titanium dioxide (TiO_2) for the exhaustive population for orebody 1

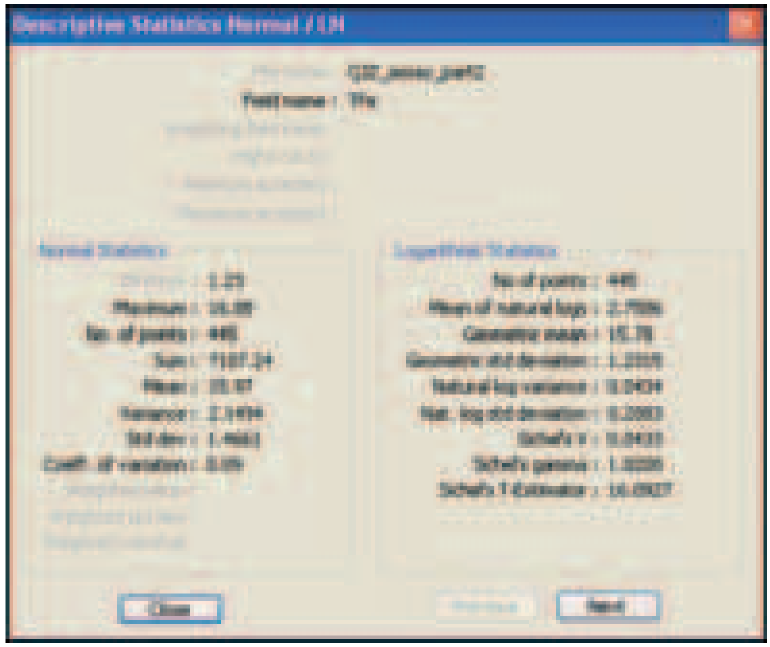


Figure 10-3: Descriptive statistics for total iron (TFe) for the exhaustive population for orebody 2

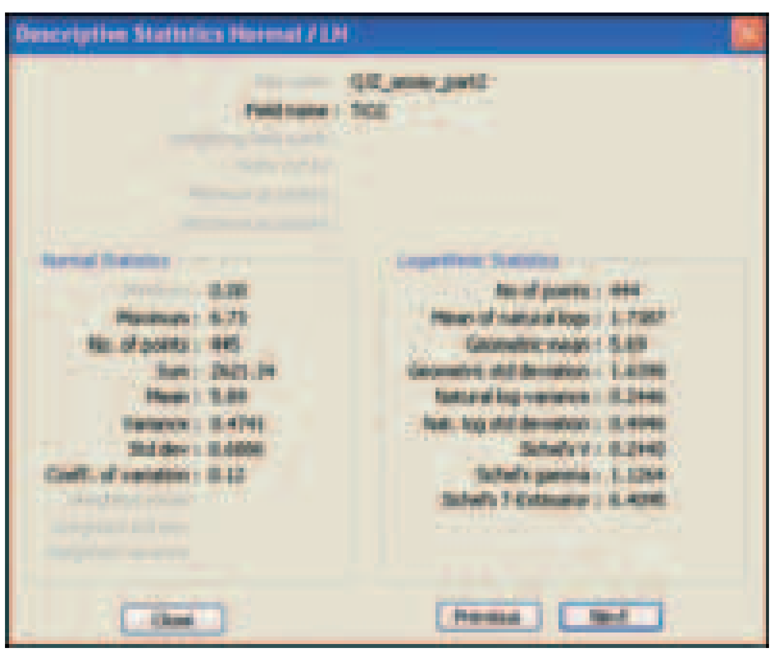


Figure 10-4: Descriptive statistics for titanium dioxide (TiO_2) for the exhaustive population for orebody 2

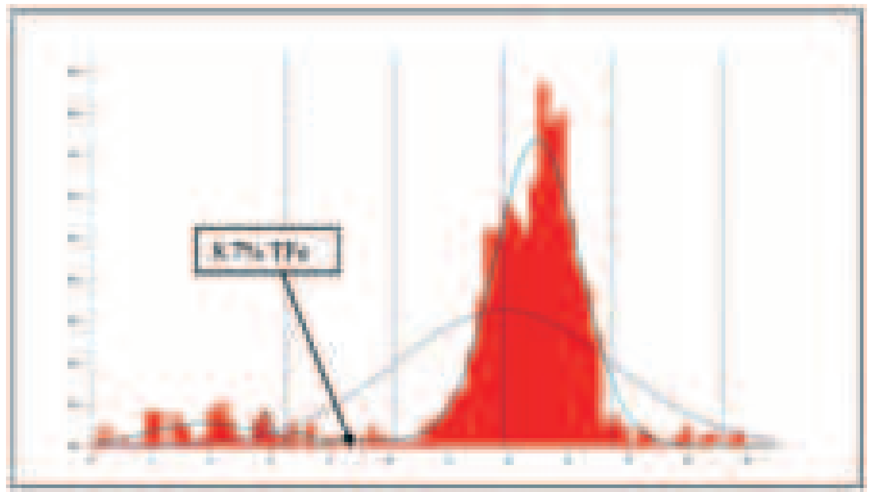


Figure 10-5: Histogram for TFe for the exhaustive population for orebody 1

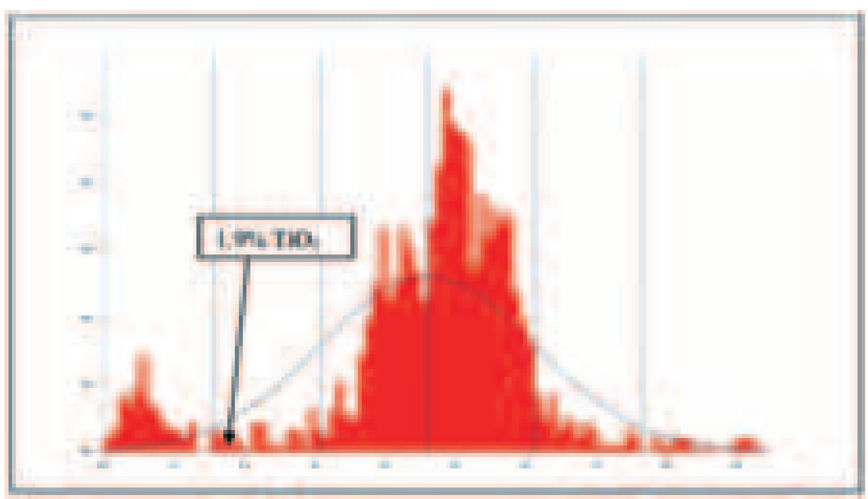


Figure 10-6: Histogram for TiO_2 for the exhaustive population for orebody 1

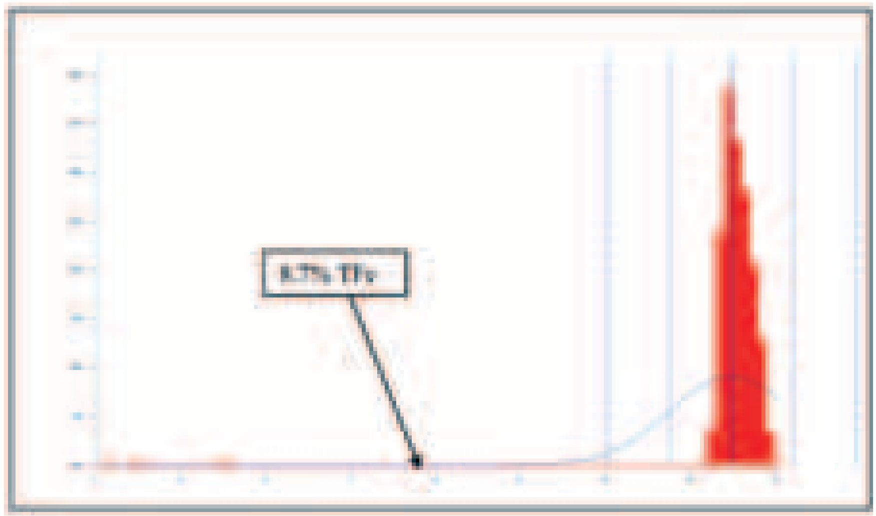


Figure 10-7: Histogram for TFe for the exhaustive population for orebody 2

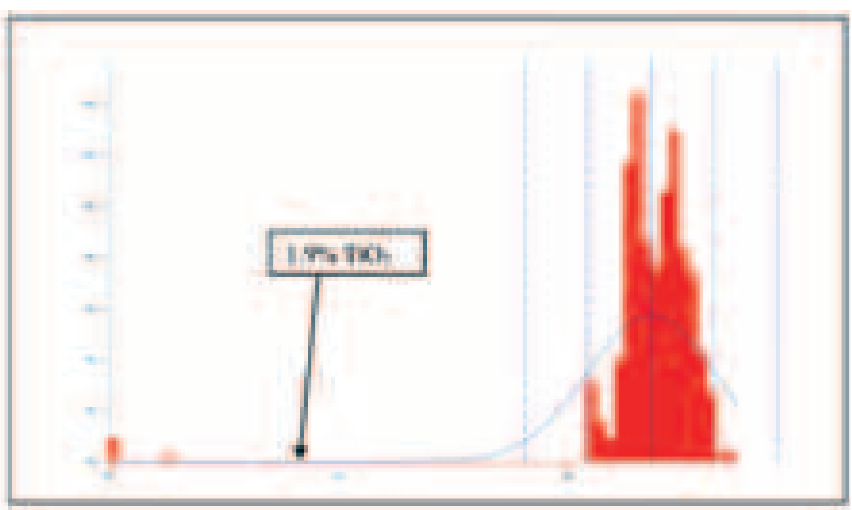


Figure 10-8: Histogram for TiO_2 for the exhaustive population for orebody 2

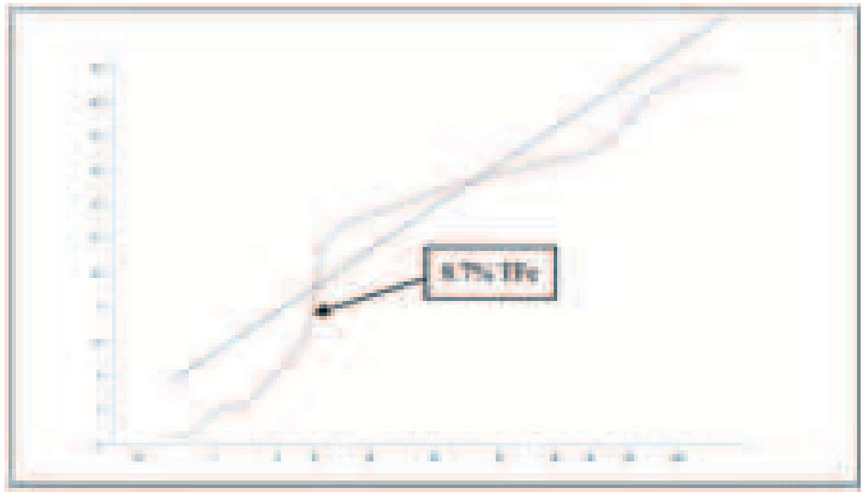


Figure 10-9: Probability plot for TFe for the exhaustive population for orebody 1.

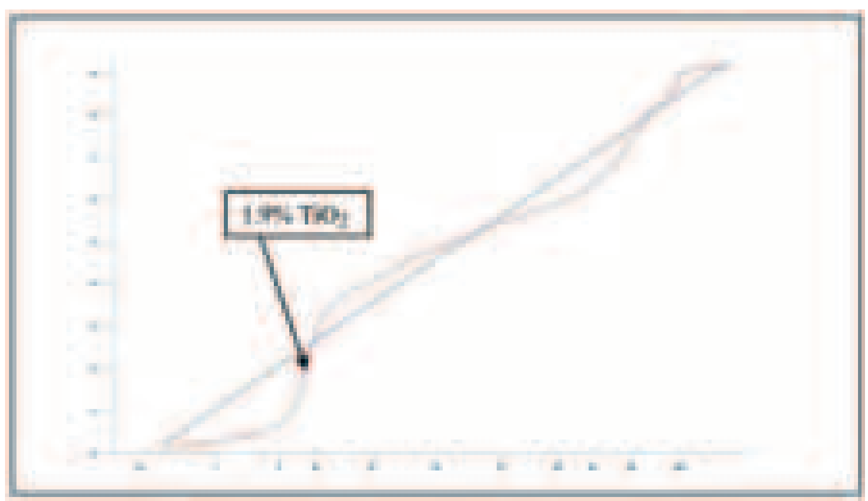


Figure 10-10: Probability plot for TiO_2 for the exhaustive population for orebody 1

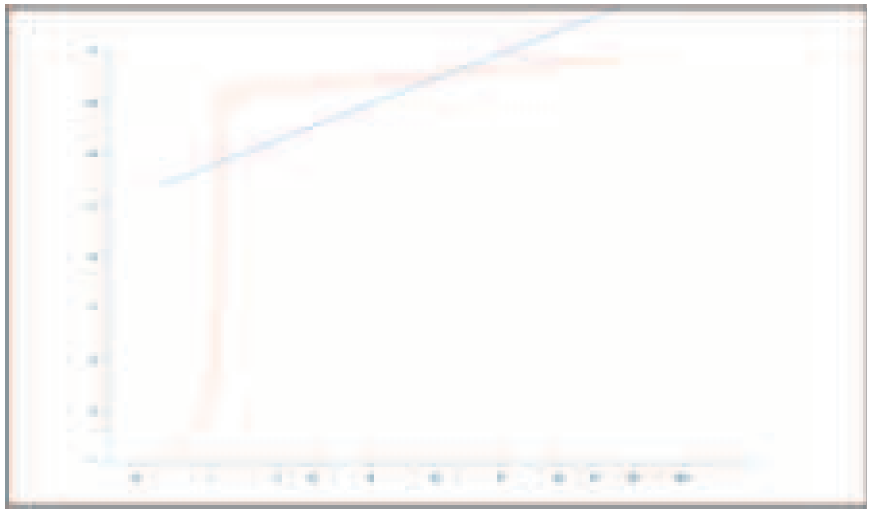


Figure 10-11: Probability plot for TFe for the exhaustive population for orebody 2

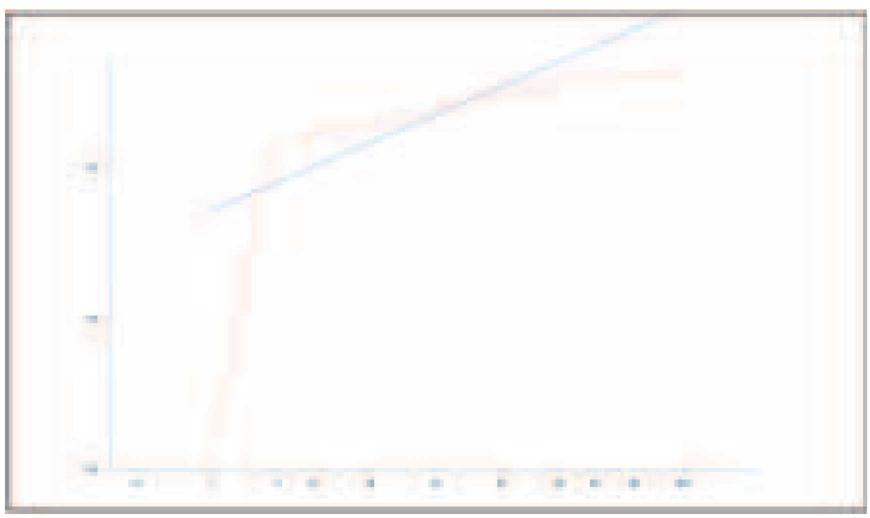


Figure 10-12: Probability plot for TiO_2 for the exhaustive population for orebody 2

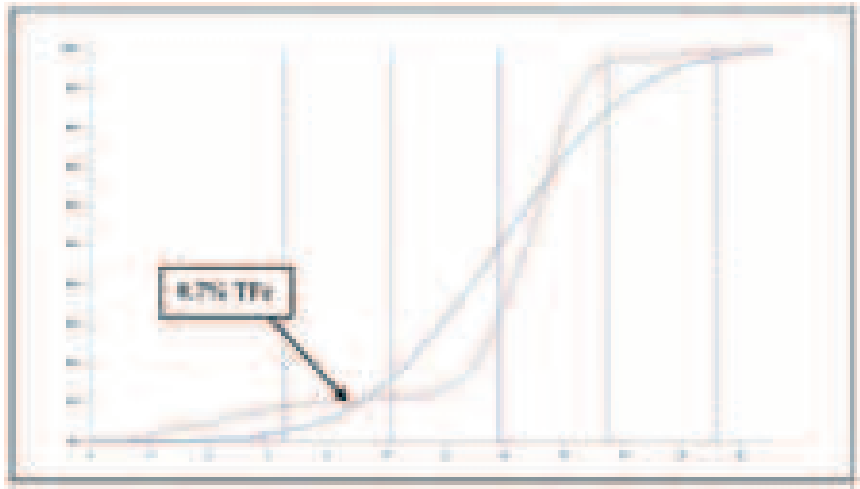


Figure 10-13: Cumulative frequency plot for TFe for the exhaustive population for orebody 1

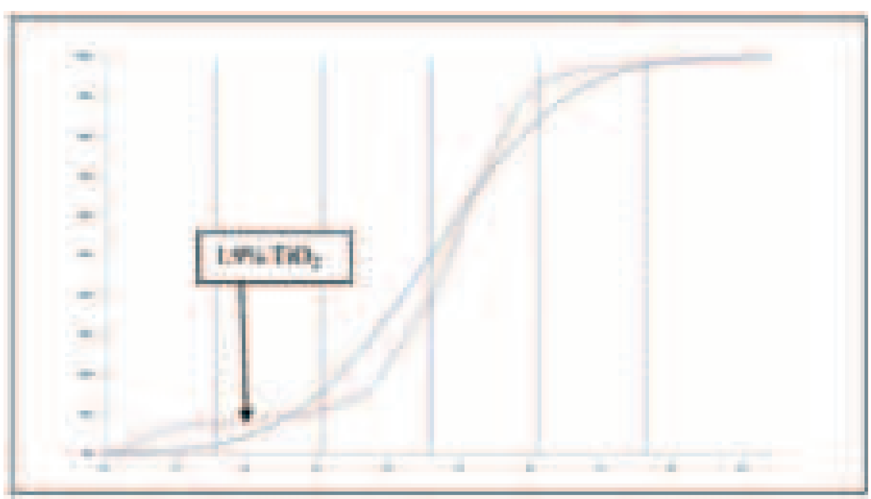


Figure 10-14: Cumulative frequency plot for TiO_2 for the exhaustive population for orebody 1

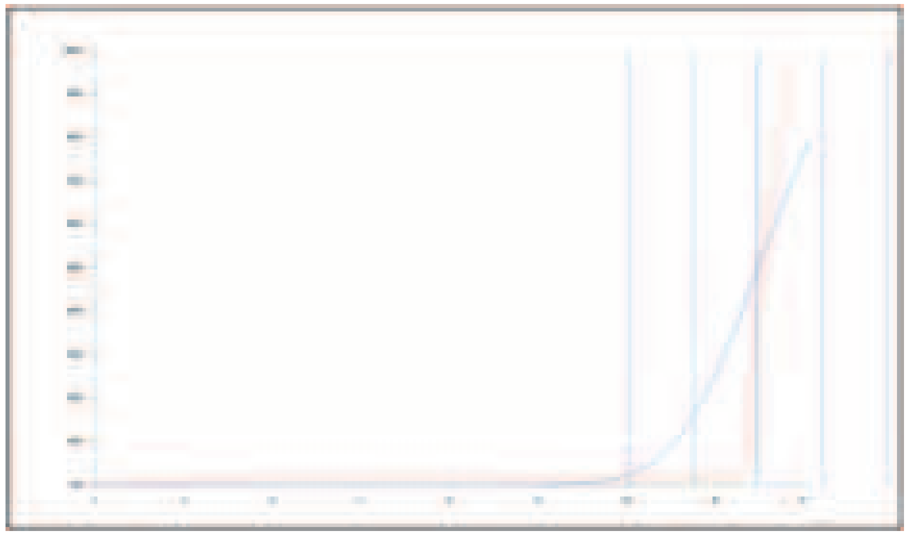


Figure 10-15: Cumulative frequency plot for TFe for the exhaustive population for orebody 2

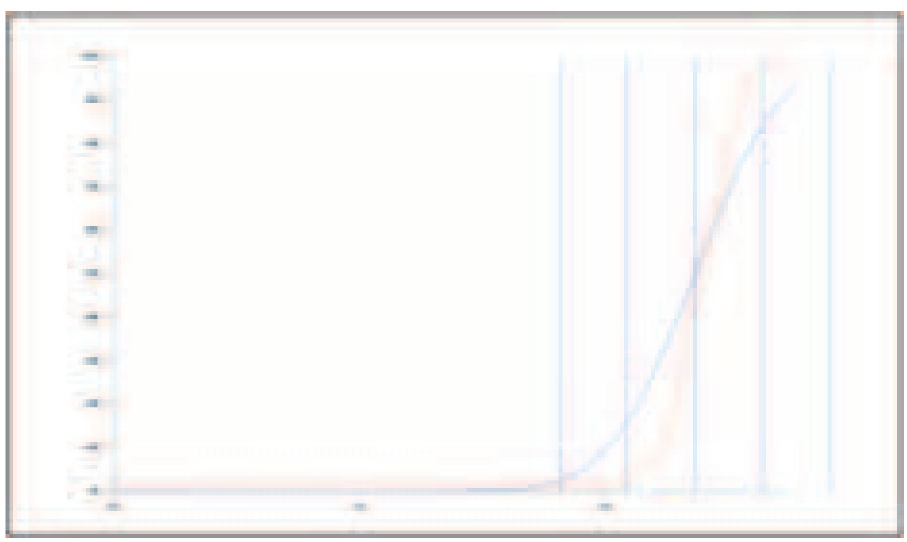


Figure 10-16: Cumulative frequency plot for TiO_2 for the exhaustive population for orebody 2

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 determine 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 histograms of the TFe and TiO_2 grade populations within the mineralised wireframes for both orebodies are shown in Figure 10-17 to Figure 10-20. The probability plots of the TFe and TiO_2 grade populations within the mineralised wireframes for both orebodies are shown in Figure 10-21 to Figure 10-24, while the cumulative frequency plots for the same data are shown in Figure 10-25 to Figure 10-28. The histograms for TFe and TiO_2 for orebody 1 indicate that there is only one approximately normally-distributed population within each wireframe. To reduce the small tail of spurious values at higher grade that would locally bias an estimated grade, a balancing cut of 18.4% TFe and 7.5% TiO_2 was applied to the assays in the wireframe. The balancing cut for TFe was determined from the histogram for TFe as it is the grade that separates the smaller population of the upper tail from the main part of the distribution (Figure 10-17). The 97.7 percentile on the cumulative frequency plots was used to determine the balancing cut for TiO_2 grades (Figure 10-26). A new field for TFe cut 18.4% and TiO_2 cut 7.5% was created in the assay file and the new assays cut to the respective values were generated.

For orebody 2, the histograms for TFe and TiO_2 (Figure 10-19 and Figure 10-20) indicate an approximately normally-distributed population with gaps due to the lower amount of data. No significant tail of high grades can be seen on the histogram for TFe or TiO_2, so a balancing cut was not required and not applied to the assay file for orebody 2.

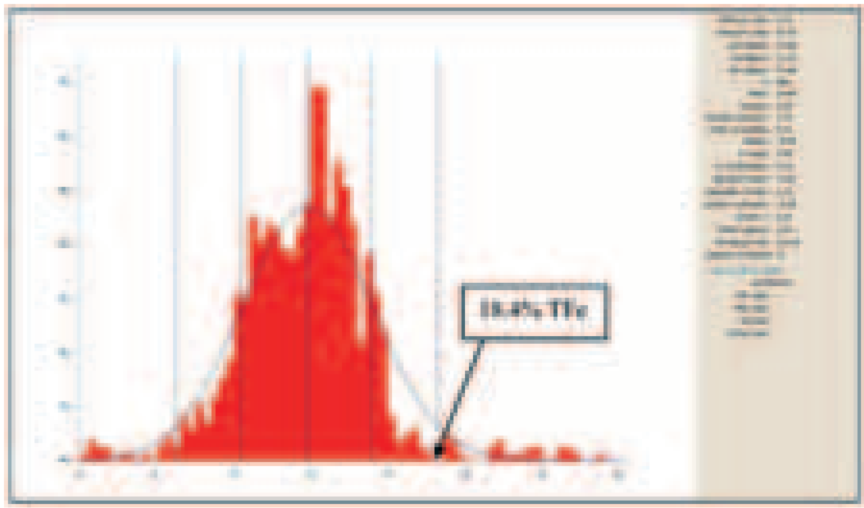


Figure 10-17: Histogram of TFe grades inside the mineralised wireframe for orebody 1

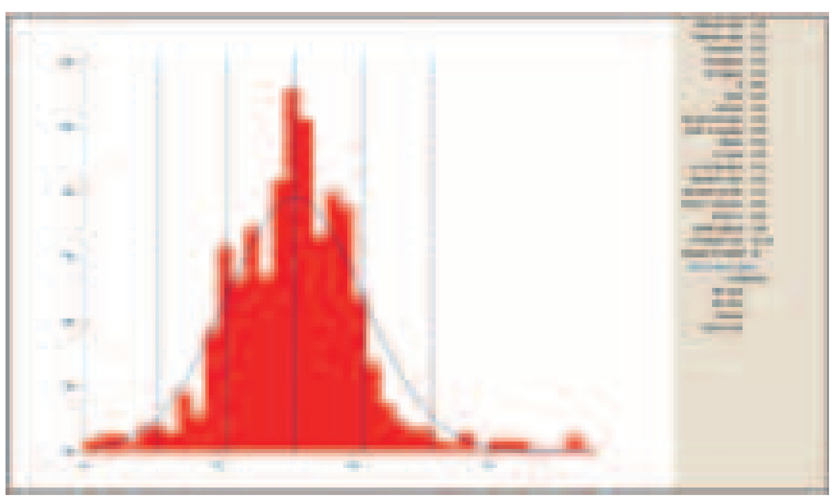


Figure 10-18: Histogram of TiO_2 grades inside the mineralised wireframe for orebody 1

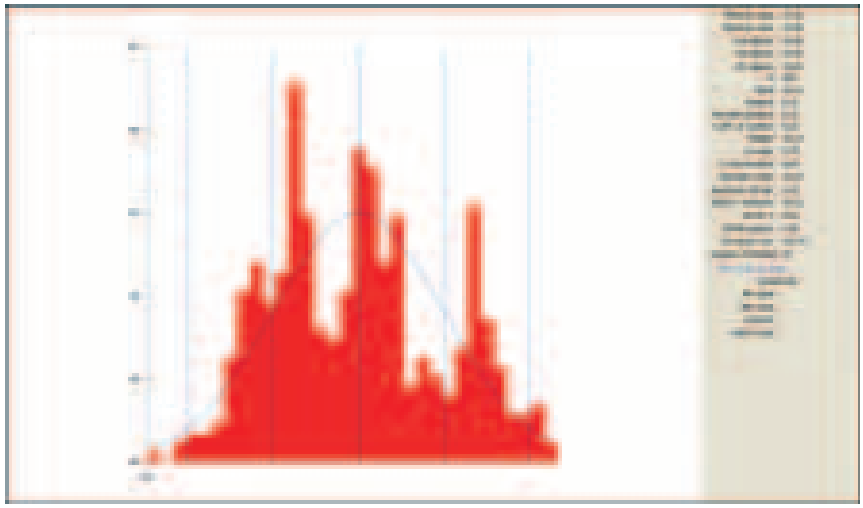


Figure 10-19: Histogram of TFe grades inside the mineralised wireframe for orebody 2

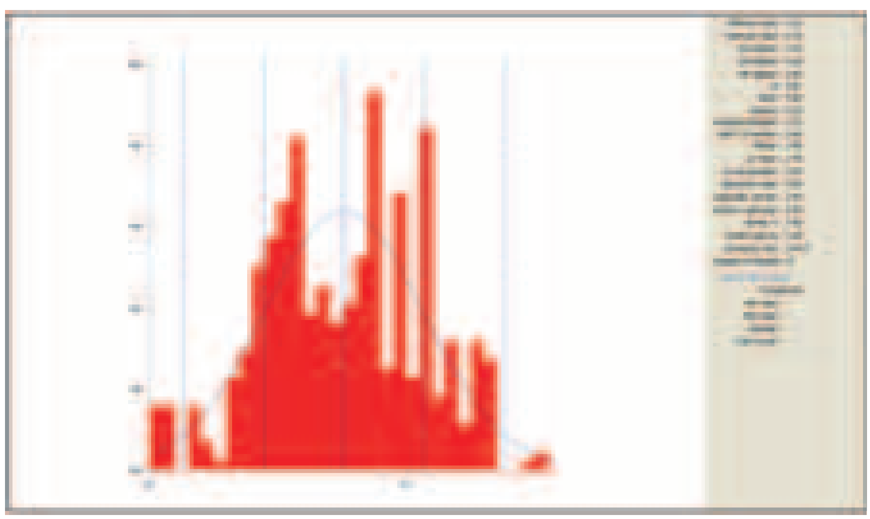


Figure 10-20: Histogram of TiO_2 grades inside the mineralised wireframe for orebody 2

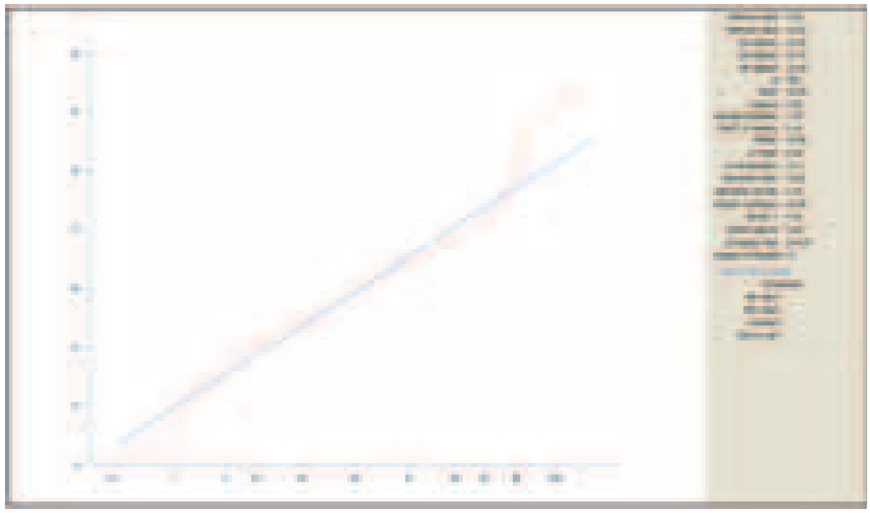


Figure 10-21: Probability plot of TFe grades inside the mineralised wireframe for orebody 1

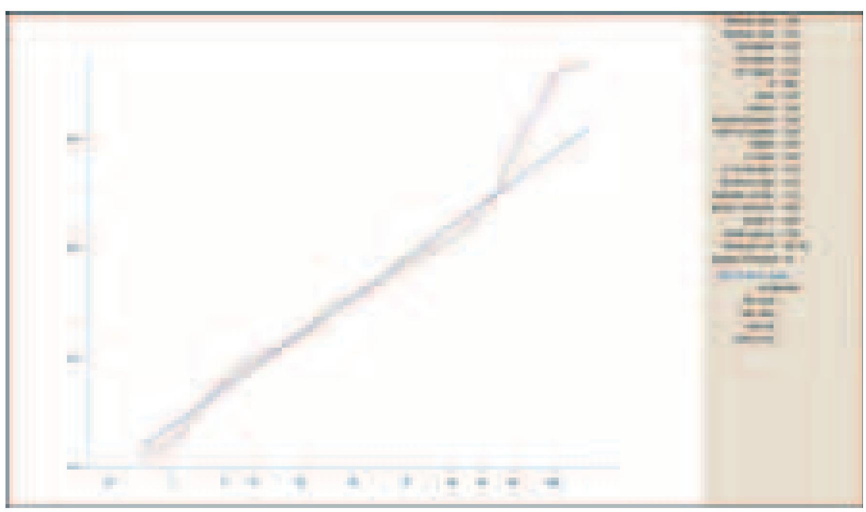


Figure 10-22: Probability plot of TiO_2 grades inside the mineralised wireframe for orebody 1

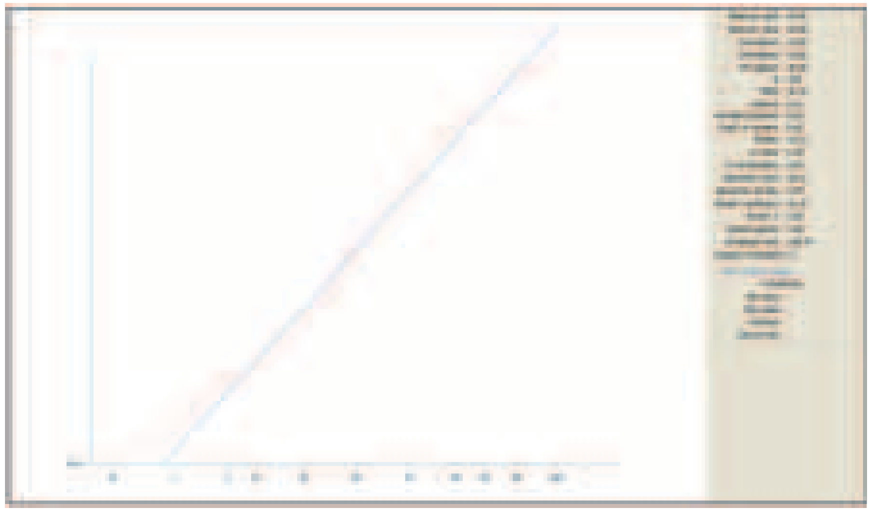


Figure 10-23: Probability plot of TFe grades inside the mineralised wireframe for orebody 2

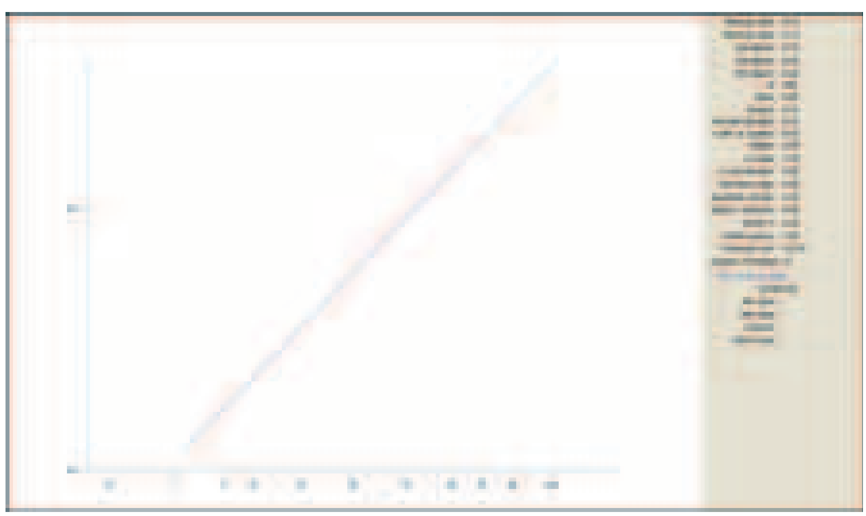


Figure 10-24: Probability plot of TiO_2 grades inside the mineralised wireframe for orebody 2

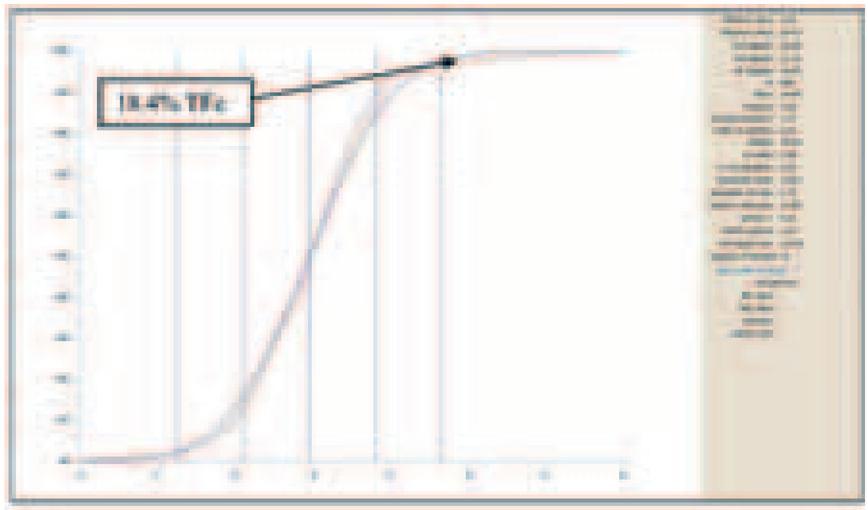


Figure 10-25: Cumulative frequency plot of TFe grades inside the mineralised wireframe for orebody 1

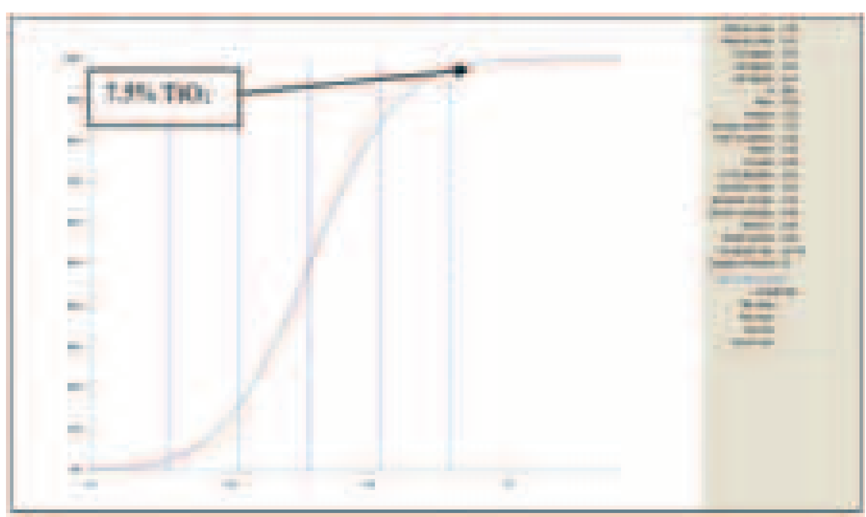


Figure 10-26: Cumulative frequency plot of TiO_2 grades inside the mineralised wireframe for orebody 1

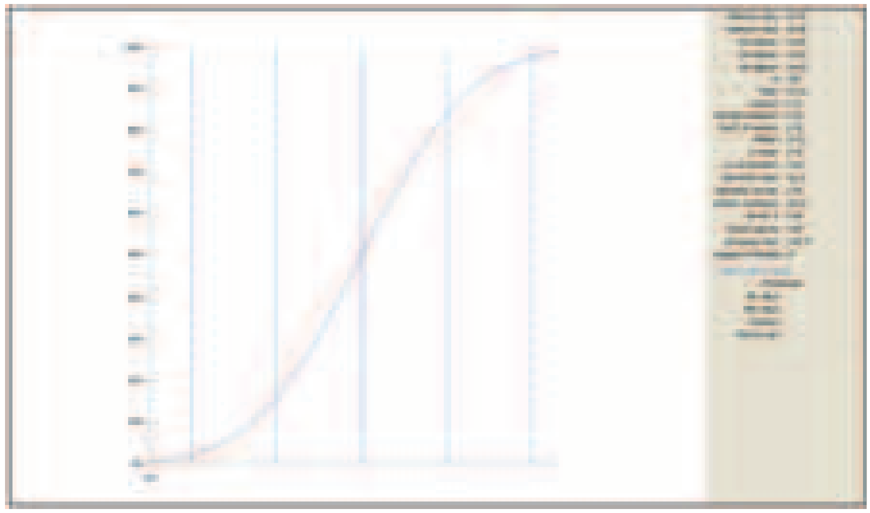


Figure 10-27: Cumulative frequency plot of TFe grades inside the mineralised wireframe for orebody 2

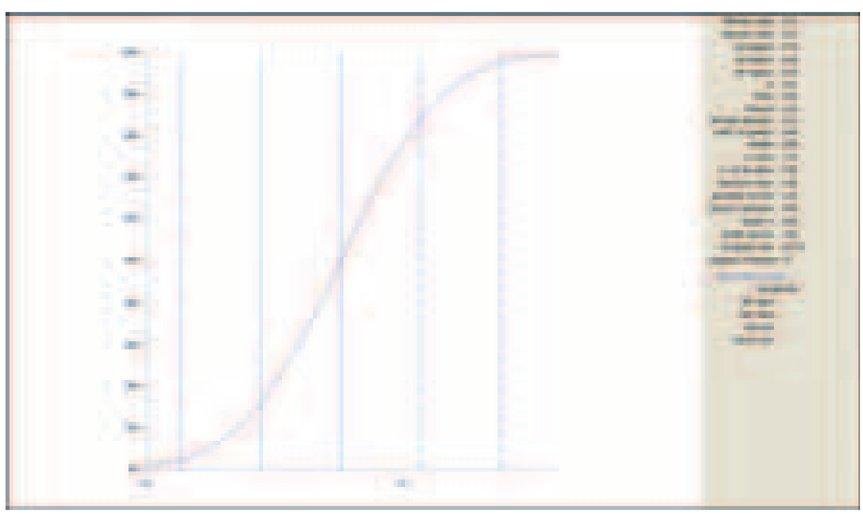


Figure 10-28: Cumulative frequency plot of TiO_2 grades inside the mineralised wireframe for orebody 2

10.6 Interpretation

All available original cross-sections and geological maps at 1:2,000 scale were imported from MapGIS and georeferenced in MICROMINE software. 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 7 oblique cross-sections oriented south-west to north-east at 45 degrees for orebody 1 and 4 east-west cross-sections for orebody 2. 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 8.7% TFe to define the boundary between mineralised and unmineralised iron grades and TiO_2 assays were composited to grades greater than 1.9% TiO_2 to define the boundary between mineralised and unmineralised titanium dioxide grades for both orebodies. The raw sample grades and the composite grades were displayed on the drillhole and trenches in order to allow the snapping of interpretation strings to separate mineralised and unmineralised units. A total of 16 cross-sections including additional sections for closing off wireframes, were interpreted.

A geological cut-off grade defining the boundary between mineralisation and country rock was selected at 8.7% TFe and 1.9% TiO_2. One string file was generated to interpret TFe mineralisation at greater than or equal to 8.7% and another string file was generated to interpret TiO_2 mineralisation at greater than or equal to 1.9%.

Some internal waste was interpreted for both the TFe and TiO_2 wireframes of orebody 1. Internal waste had a minimum length of 2 m, and was interpreted separately

The following techniques were employed while interpreting the mineralisation:

- All trench data was draped onto the topographic surface.
- Each section and plan view was displayed on screen and interpretation checked.
- All interpreted strings were snapped to the sample intervals on the drillhole or trench, i.e. the interpretation was constrained in 3 dimensions.
- If a mineralised 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 mostly 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. However, 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.

An example interpretation section is shown in Figure 10-29.

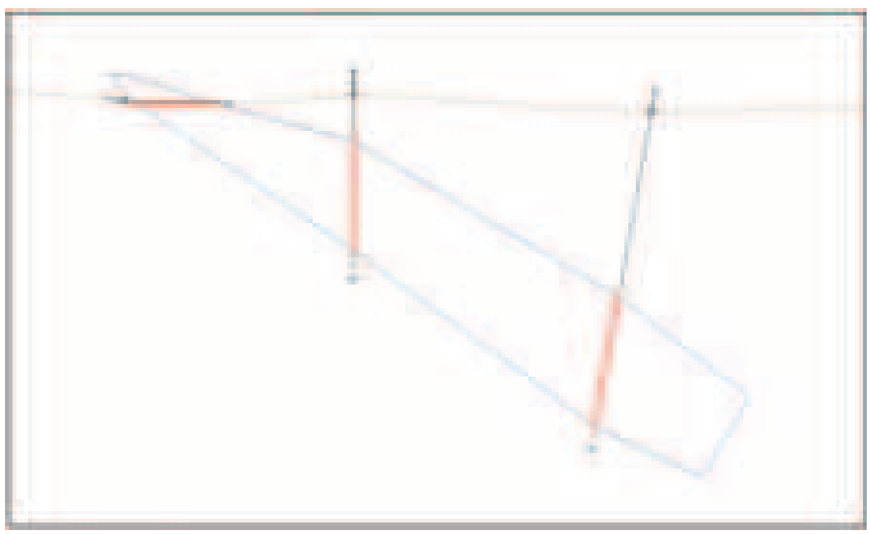


Figure 10-29: Example interpretation cross-section showing strings and composited TiO_2 assays

10.7 Wireframing

The interpreted closed strings were used to generate three-dimensional solid wireframe models for the mineralised envelopes of TFe and TiO_2 separately. This later resulted in some blocks in the model containing titanium and no iron, and some blocks containing iron and no titanium.

Orebody 1 and orebody 2 were also wireframed separately. A total of 4 wireframes were created for the deposit.

The wireframes were created separately to allow independent data flagging and interpolation. Internal waste areas for both wireframes of orebody 1 were wireframed separately then removed from the appropriate wireframe by a Boolean operation to produce the final mineralised wireframes.

A 3D view of the wireframes of TiO_2 mineralisation is shown in Figure 10-30.

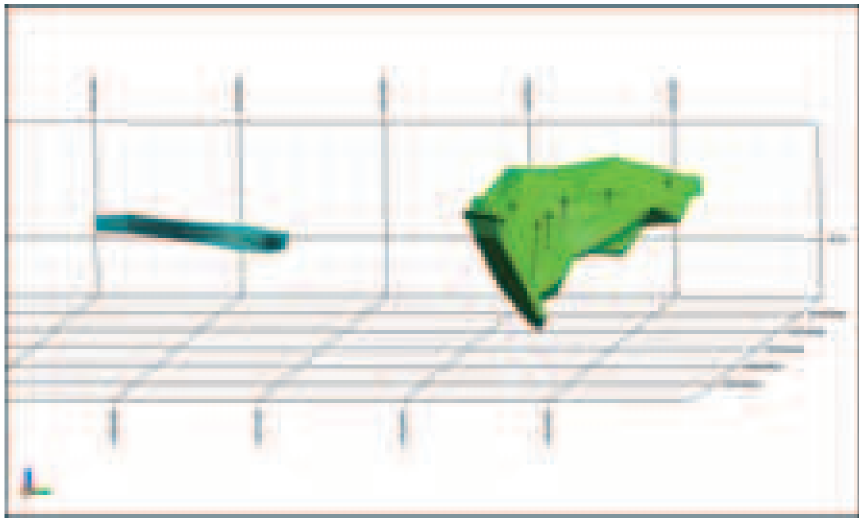


Figure 10-30: 3D view of wireframes of TiO_2 mineralisation for orebody 1 (green) and orebody 2 (blue)

10.8 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 wireframe for each mineralised envelope was subsequently used to select the drillhole samples. Samples within each individual mineralised envelope were flagged and coded according to the name of the mineralised 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 TiO_2 and the TFe grades within the mineralised envelopes only. The analysis determined there was only one population within each mineralised wireframe for each of TFe and TiO_2, for both orebodies.

Additional fields were inserted into the assay file for orebody 1 and balancing cut grades of 18.4% TFe and 7.5% TiO_2 were applied to the original assay data for the relevant higher grade samples inside the iron and titanium dioxide mineralised envelopes. Balancing cuts were not required for the mineralised wireframes for orebody 2.

All samples within the mineralised envelopes were composited to an equal sample interval length before 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 can be seen in the histograms of the interval lengths of all samples for orebodies 1 and 2 (Figure 10-31 and Figure 10-32). The selected drillhole samples within each mineralized envelope were separately composited over 2.0 metre intervals, starting at the drillhole collar and progressing downhole. Trench samples within the mineralised envelopes were also composited separately then combined with the composited drillhole assays to form the final composite assay file. Compositing was stopped and restarted at all boundaries between mineralized envelopes and waste material.

Basic statistical parameters were obtained for the composite data to ensure that the statistical parameters were not distorted by the compositing process, (Figure 10-31 and Figure 10-32). There was no significant change to the minimum, maximum, mean, standard deviation and coefficient of variation of the data after the sample length compositing process.

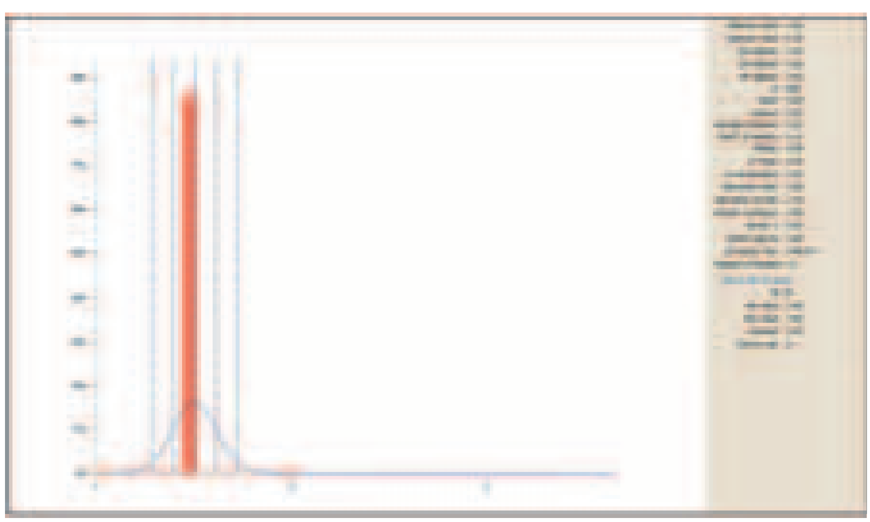


Figure 10-31: Histogram of sample interval lengths for orebody 1

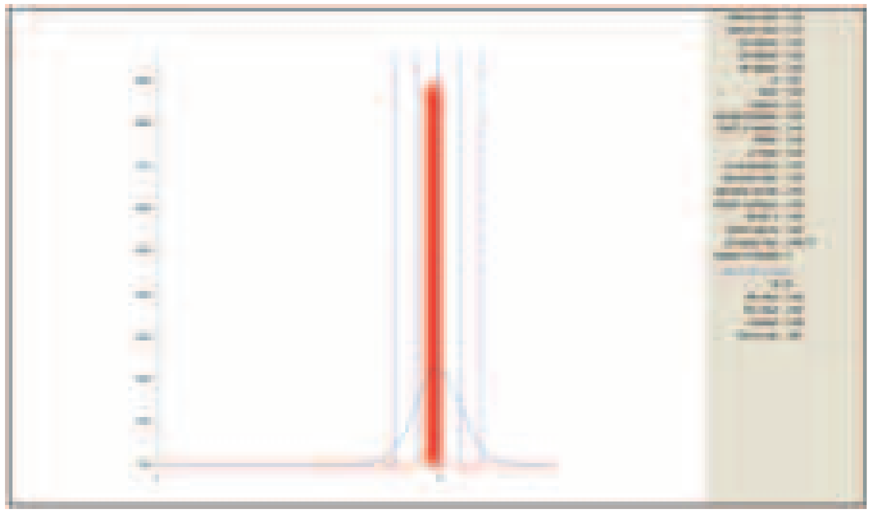


Figure 10-32: Histogram of sample interval lengths for orebody 2

Figure 10-33: Descriptive statistics for all TFe assays composited to 2 m interval lengths for orebody 1

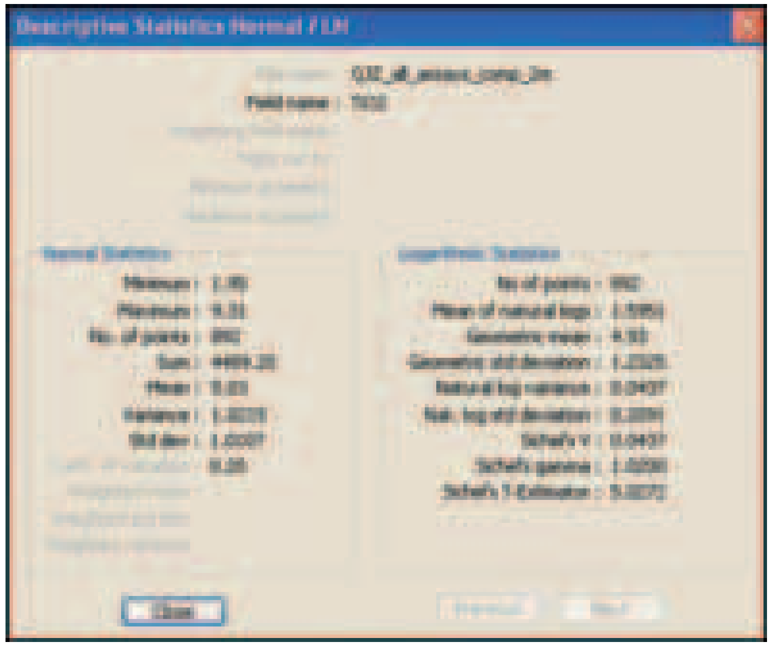


Figure 10-34: Descriptive statistics for all TiO_2 assays composited to 2 m interval lengths for orebody 1

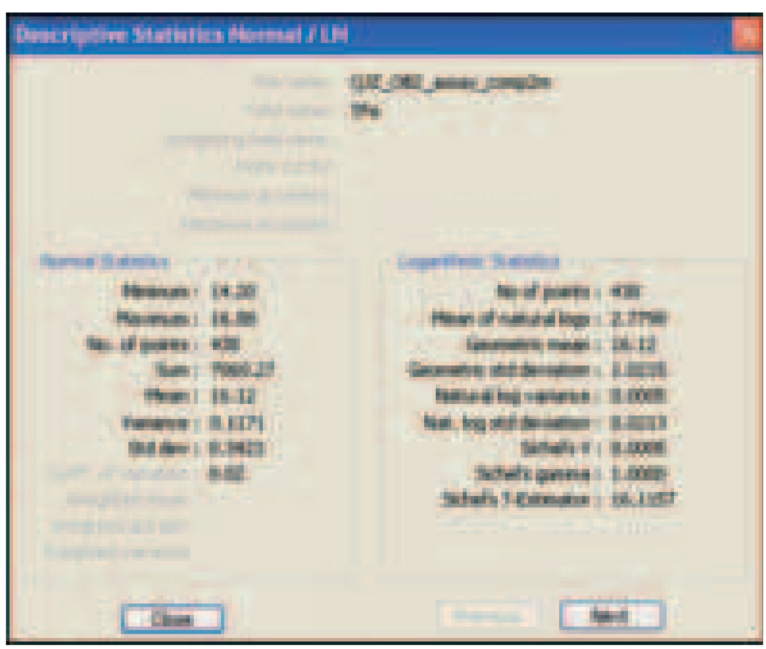


Figure 10-35: Descriptive statistics for all TFe assays composited to 2 m interval lengths for orebody 2

Figure 10-36: Descriptive statistics for all TiO_2 assays composited to 2 m interval lengths for orebody 2

10.9 Geostatistical Analysis

The purpose of geostatistical analysis is to generate a series of semivariograms for the Kriging algorithm to use as a means of weighting the sample grades when estimating an unknown block value in 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 TFe and TiO_2 domains for orebody 1 and constrained by the corresponding mineralised envelopes. Semivariograms were modelled for TFe and TiO_2 for orebody 1 separately. Semivariograms were not modelled for the orebody 2 as the number of samples was too small and the semivariograms would 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 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 orebody 1 was carried out first. The maximum continuity of mineralisation occurs along an azimuth of 97 degrees, there was no plunge component. The second direction of continuity occurs along an axis of 187 degrees with a plunge of minus 50 degrees. The third direction occurs along an axis of 187 degrees with a plunge of 40 degrees. The spherical experimental semivariograms and models are shown in Figure 10-37 to Figure 10-39.

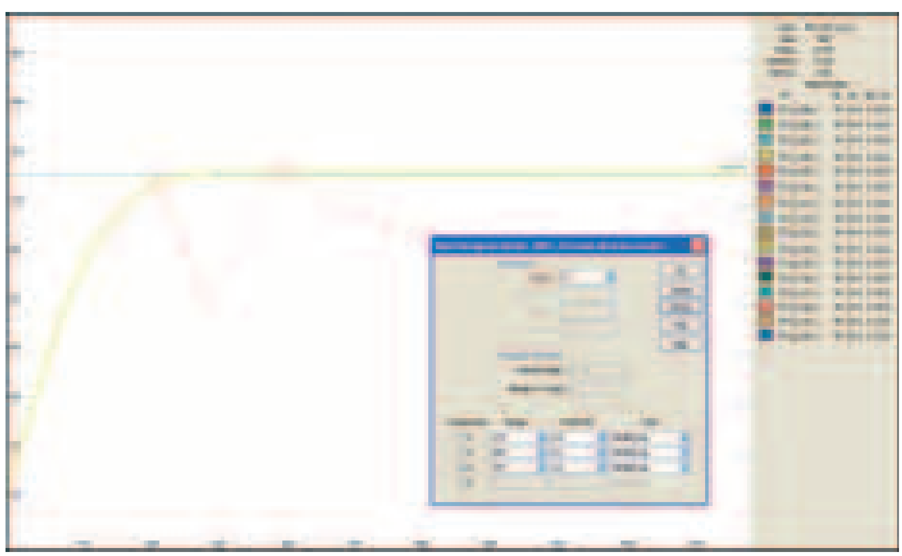


Figure 10-37: Semivariogram model for the main direction of continuity of TFe for orebody 1

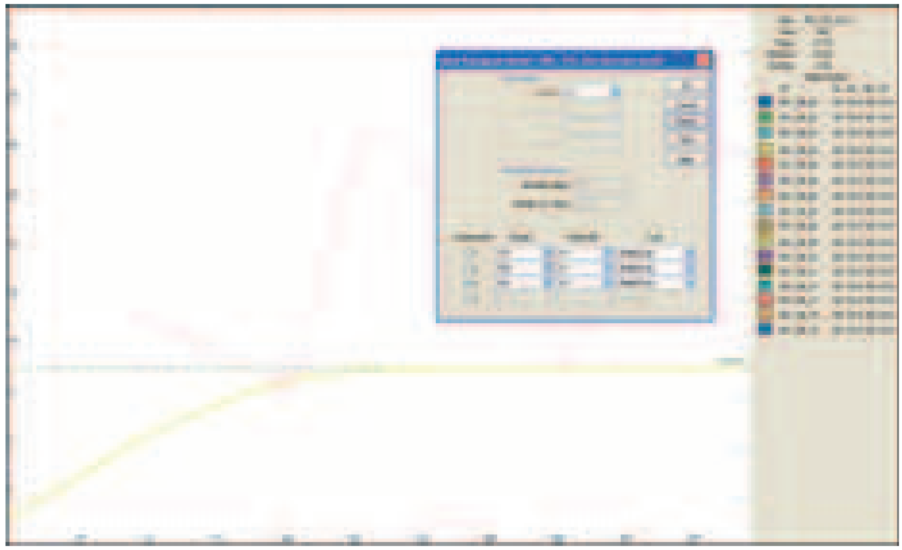


Figure 10-38: Semivariogram model for the second direction of continuity of TFe for orebody 1

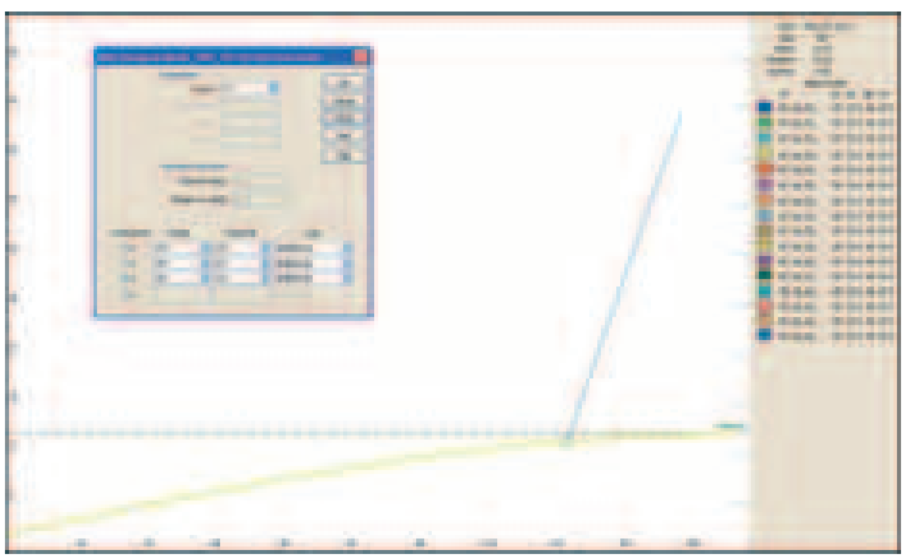


Figure 10-39: Semivariogram model for the third direction of continuity of TFe for orebody 1

Geostatistical analysis of TiO_2 for orebody 1 was carried out next. The maximum continuity of mineralisation occurs along an azimuth of 89 degrees, while there was no plunge component. The second direction of continuity occurs along an axis of 179 degrees with a plunge of minus 51 degrees. The third direction occurs along an axis of 179 degrees with a plunge of 39 degrees. The spherical experimental semivariograms and models are shown in Figure 10-40 to Figure 10-42.

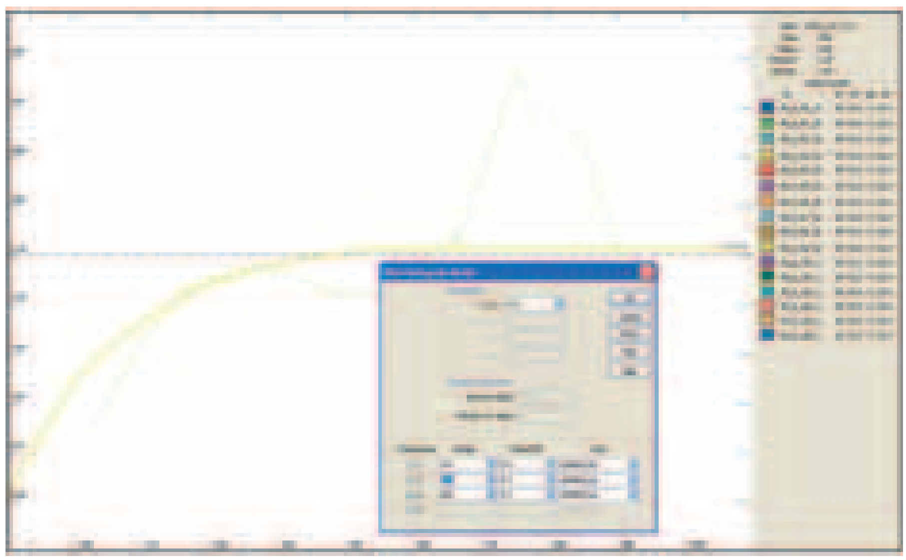


Figure 10-40: Semivariogram model for the main direction of continuity of TiO_2 for orebody 1

Figure 10-41: Semivariogram model for the second direction of continuity of TiO_2 for orebody 1

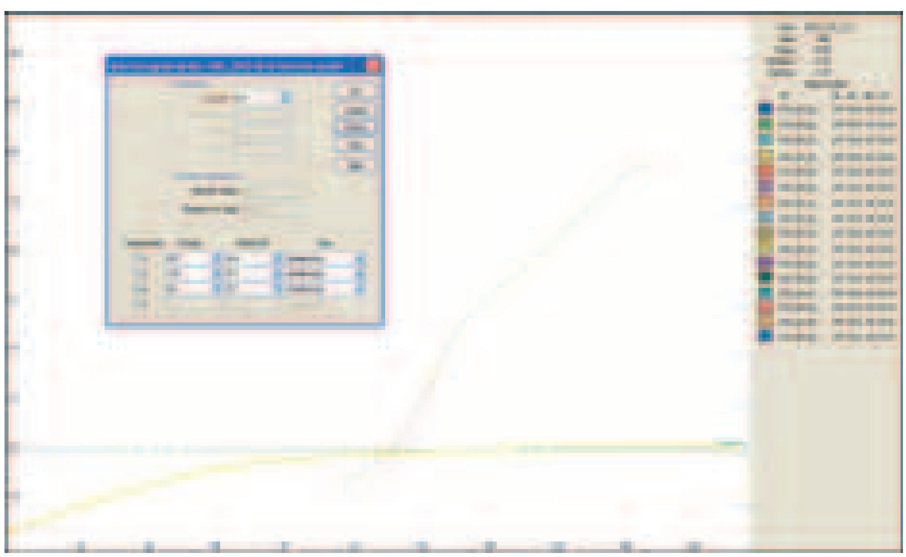


Figure 10-42: Semivariogram model for the third direction of continuity of TiO_2 for orebody 1

A summary of all semivariogram parameters is shown in Table 10-5.

Table 10-5: Summary of semivariogram parameters for orebody 1

						Partial Sills			Range *(m)*			
Domain	**Element**	**Direction**	**Azimuth**	**Dip**	**Nugget Effect**	**Comp. 1**	**Comp. 2**	**Comp. 3**	**Comp. 1**	**Comp. 2**	**Comp. 3**	**Lag** *(m)*
OB1	TFe	First	97	0	1.7	3.9	5.1	2	173	289	376	120
OB1	TFe	Second	187	-50	1.7	3.9	5.1	2	173	238	191	73
OB1	TFe	Third	187	40	1.7	3.9	5.1	2	173	197	141	65
OB1	TiO_2	First	89	0	0.4	0.4	0.7	0.7	147	373	651	100
OB1	TiO_2	Second	179	-51	0.4	0.4	0.7	0.7	227	178	116	58
OB1	TiO_2	Third	179	39	0.4	0.4	0.7	0.7	227	139	86	33

10.10 Block Modelling

Empty block models were created within the closed wireframe models for the iron mineralization and the titanium dioxide mineralisation and coded accordingly. One parent block model was used to create block models for separate wireframed domains for orebody 1 and one parent block model was used to create block models for separate wireframed domains for orebody 2. Block extents and sizes are shown in Figure 10-43 and Figure 10-44. Parent cells were sub blocked to 10 metre east, 10 metres north and 5 metres in elevation. The empty cell models were then interpolated into.

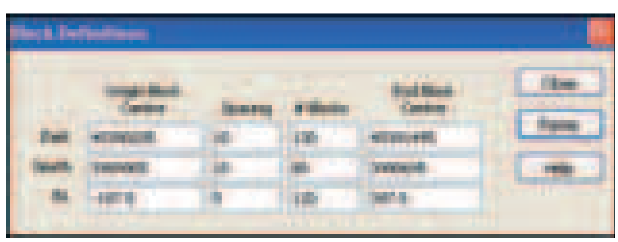


Figure 10-43: Block definitions for orebody 1

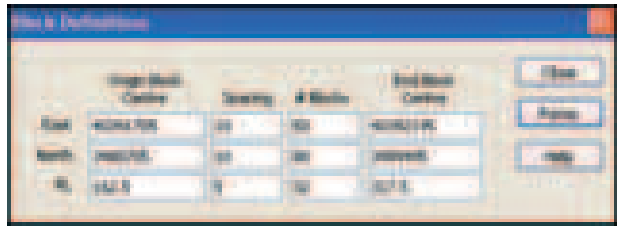


Figure 10-44: Block definitions for orebody 2

10.11 Grade Interpolation

Orebody 1 was interpolated using the ordinary kriging algorithm while orebody 2 was interpolated using the inverse distance weighting cubed algorithm.

The interpolation method 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. One search ellipsoid was created for orebody 1 and one search ellipsoid was created for orebody 2. 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 populated 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. The maximum combined number of samples allowable for the interpolation of a single cell was 48.

For orebody 1, the TFe and TiO_2 composited sample grades with the balancing cut applied were used for the grade interpolation. For orebody 2, composited sample grades were used with no balancing cut. The search ellipsoid parameters used for each search ellipsoid and run is shown in Table 10-6. The search ellipsoids for run 1 are shown in Figure 10-45 and for run 2 in Figure 10-46.

Results of the block models grade distribution are shown in Figure 10-47 to Figure 10-50.

Table 10-6: Search ellipsoid parameters

Domain	Parameter	Run 1			Run 2			Run 3		
		1st axis	2nd axis	3rd axis	1st axis	2nd axis	3rd axis	1st axis	2nd axis	3rd axis
Orebody 1	Radius length (m)	300	200	100	600	400	200	1000	1000	1000
Orebody 1	Azimuth	130	220	140	130	220	140	130	220	140
Orebody 1	Plunge	0	-40	50	0	-40	50	0	-40	50
Orebody 1	No. sectors	8	8	8	8	8	8	8	8	8
Orebody 1	Max. samples per sector	6	6	6	6	6	6	6	6	6
Orebody 1	Min. total samples	2	2	1	2	2	1	2	2	1
Orebody 2	Radius length (m)	300	200	100	600	400	200	1000	1000	1000
Orebody 2	Azimuth	0	90	0	0	90	0	0	90	0
Orebody 2	Plunge	0	0	90	0	0	90	0	0	90
Orebody 2	No. sectors	8	8	8	8	8	8	8	8	8
Orebody 2	Max. samples per sector	6	6	6	6	6	6	6	6	6
Orebody 2	Min. total samples	2	2	1	2	2	1	2	2	1

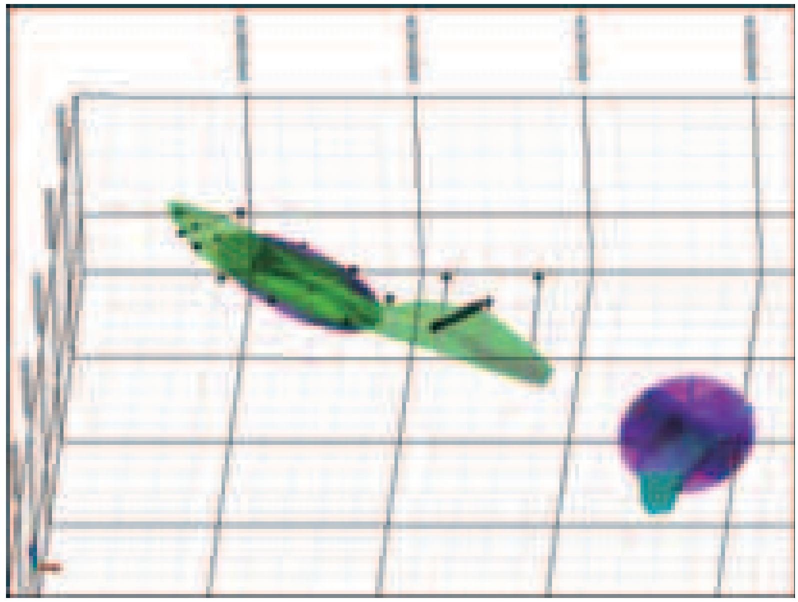


Figure 10-45: Search ellipsoids for run 1 for orebody 1 (left) and orebody 2 (right)

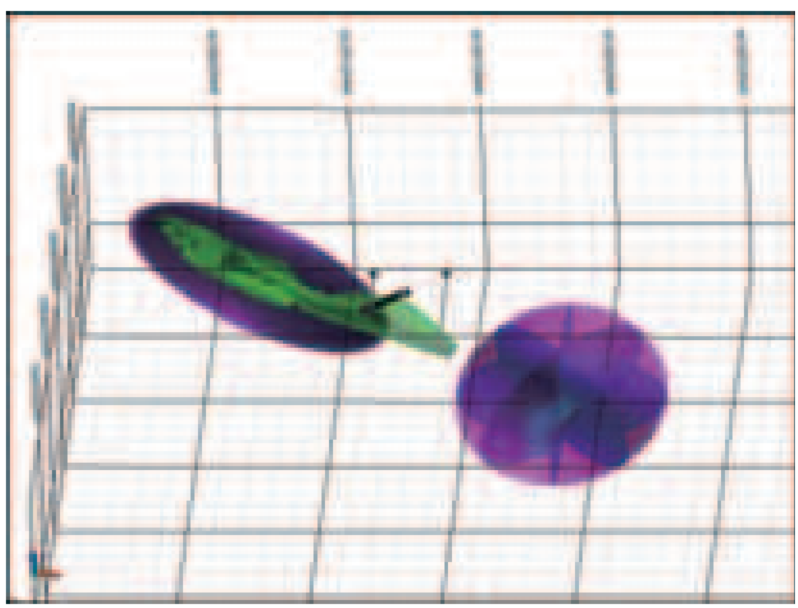


Figure 10-46: Search ellipsoids for run 2 for orebody 1 (left) and orebody 2 (right)

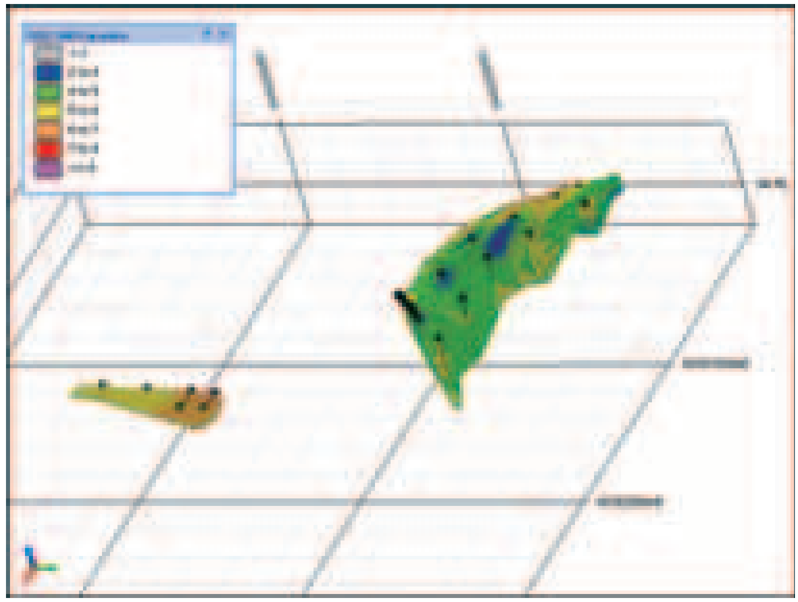


Figure 10-47: View of interpolated TiO_2 block models showing interpolated TiO_2 grades

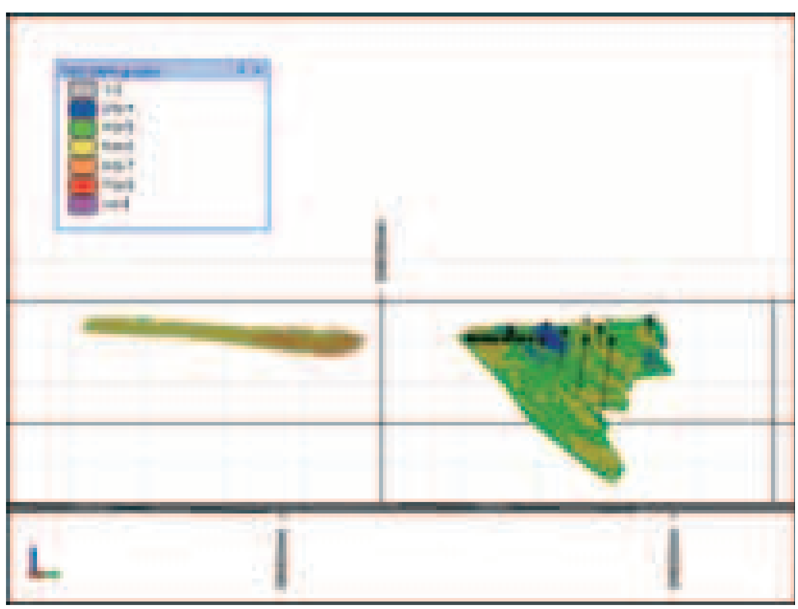


Figure 10-48: View of interpolated TiO_2 block models showing interpolated TiO_2 grades, side view

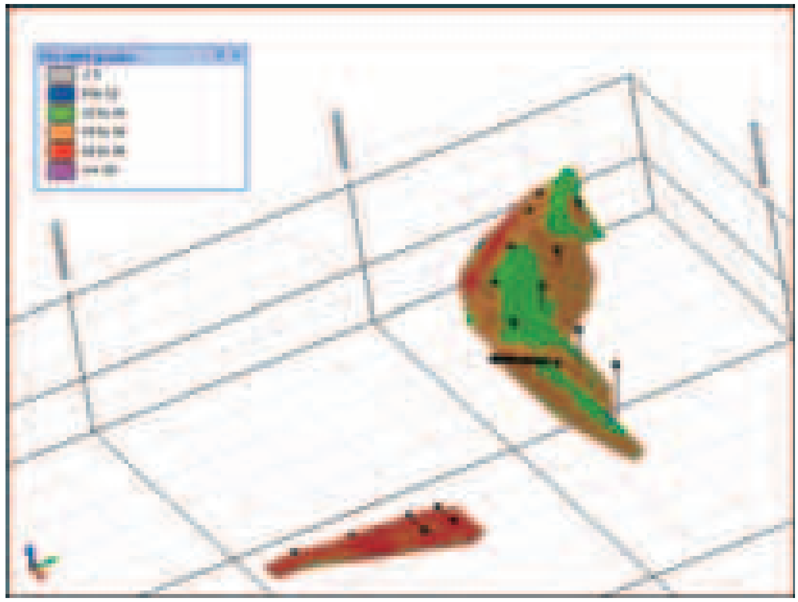


Figure 10-49: View of interpolated TFe block models showing interpolated TFe grades

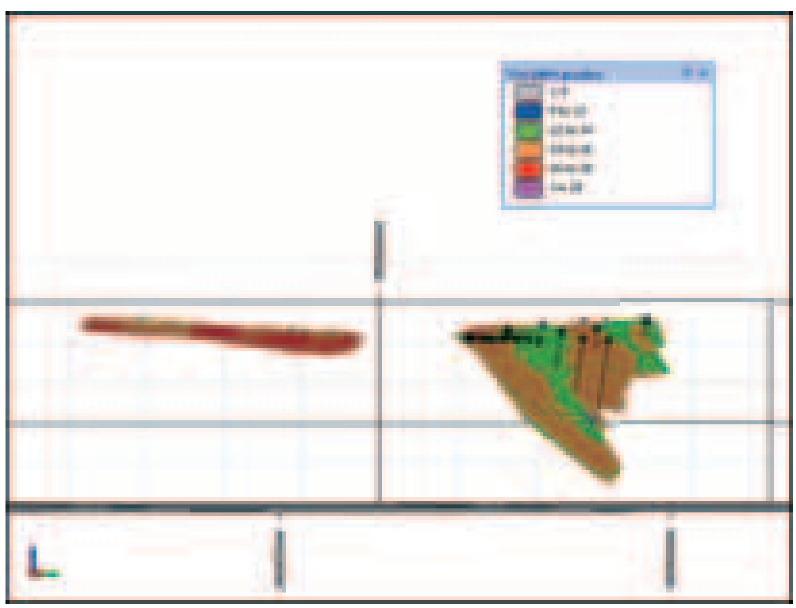


Figure 10-50: View of interpolated TFe block models showing interpolated TFe grades, side view

10.12 Risk Assessment

The confidence level of key criteria for data used in the resource estimation is shown in Table 10-7 and Table 10-8.

Table 10-7: Confidence levels of key criteria orebody 1

		Orebody 1
Items	**Discussion**	**Confidence**
Drilling Techniques	Standard industry methods of diamond drilling were used, with regular downhole surveys taken.	Moderate
Drill Sample Recovery	Mean weighted core recovery 97.6%.	High
Sampling Techniques and Sample Preparation	Core was split and samples prepared using industry standard methods. Documented sample handling procedures appear appropriate.	Moderate to high
Quality of Assay Data	Assay precision 55 samples (5.7% all assays) 0.26% TFe, 0.79% TiO_2. Assay bias of 30 samples (3.1% all assays) TFe no bias, TiO_2 slight bias.	Moderate
Verification of Sampling and Assaying	A selection of diamond drill core was checked on site. All results checked were verified.	High

	Orebody 1	
Items	**Discussion**	**Confidence**
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.	Moderate
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.	Moderate to High
Audits and Reviews	Micromine is unaware of any external reviews	Moderate to High
Database Integrity	Verification of original drawings by MCS	Moderate to High
Geological Interpretation	The mineralisation constraints are considered appropriate for the type and grade of mineralisation.	High
Specific Gravity Determinations	SG database from drillhole samples, representative throughout deposit	High
Estimation and Modelling Techniques	Domaining and interpolation by Ordinary Kriging with the result cross-checked by Inverse Distance Weighting.	High

Table 10-8: Confidence levels of key criteria orebody 2

	Orebody 2	
Items	**Discussion**	**Confidence**
Drilling Techniques	Standard industry methods of diamond drilling were used, with regular downhole surveys taken.	Moderate
Drill Sample Recovery	Mean weighted core recovery 85.4%	Moderate
Sampling Techniques and Sample Preparation	Core was split and samples prepared using industry standard methods. Documented sample handling procedures appear appropriate.	Moderate to high
Quality of Assay Data	No analytical QA/QC data provided	Low to Moderate
Verification of Sampling and Assaying	Core was not inspected	Low to Moderate
Location of Sampling Points	Surveying methods were adequate but no collar locations could be identified as all under farm land. Plans and data independently verified. Downhole surveys utilised industry standard methods.	Low to Moderate

Orebody 2

Items	Discussion	Confidence
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.	Moderate to High
Audits and Reviews	Micromine is unaware of any external reviews	Moderate to High
Database Integrity	Verification of original drawings by MCS	Moderate to High
Geological Interpretation	The mineralisation constraints are considered appropriate for the type and grade of mineralisation.	High
Specific Gravity Determinations	SG database from drillhole samples, representative throughout deposit	High
Estimation and Modelling Techniques	Domaining and interpolation by Inverse Distance Weighting.	Moderate

10.13 Resource Classification

The purpose of resource estimation is to create a three-dimensional model of mineralisation that can be utilised for mining studies and economic calculations. While 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.

From the risk assessment (Table 10-7), confidence in the data for orebody 1 is moderate to high. The QA/QC data such as mean weighted core recovery, assay precision and assay bias and the results of the site visit support 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 150 m. For Indicated Resources, this radius was 300 m. The remainder of the resource was classified as Inferred.

For orebody 2 (Table 10-8), the risk assessment indicates confidence in the data was low to moderate, as the data came from four trenches and only two drillholes. In addition, no analytical QA/QC data was provided and core recovery was lower. As a result, no Measured Resources were estimated, and for Indicated Resources, a minimum of two samples from two holes had to be within a radius of 150 m. The remainder of the resource for orebody 2 was classified as Inferred.

After distance based classification of the blocks, the classification was edited manually to reflect the competent person's confidence in different parts of the block model.

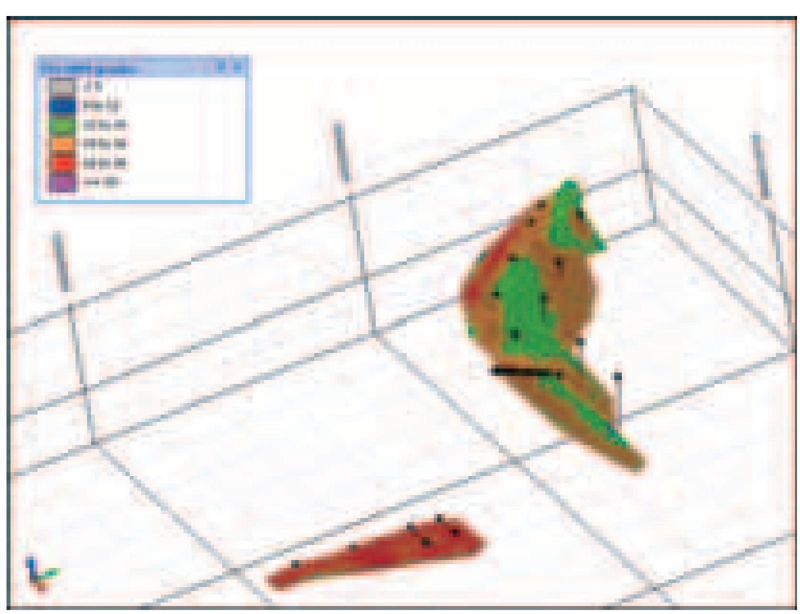


Figure 10-51: Classified block models, orebody 1 (larger) and orebody 2

10.14 Specific Gravity Values

A specific gravity database was supplied by the client that could be used for the interpolation into the block models. Fifty one specific gravity measurements spread throughout orebody 1 and thirty measurements were spread throughout orebody 2. 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.

10.15 Model Validation

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

1. The ordinary kriged global grade was compared to the raw sample grades;

2. The ordinary kriged global grade was compared to an inverse distance weighted 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 10-9 and Table 10-10. There is a small difference in volume and tonnage for the both TiO_2 and TFe; however this is less than 0.2% in both cases. For the grade, the raw grade compared to the interpolated block model grade is similar, with the model grade being slightly lower than the wireframe. The difference is around 1.7% for TiO_2 and 1.2% 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 the raw data was clustered.

Table 10-9: 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	39,999,557	131,104,661	3.28	5.08
Wireframe	40,027,247	131,289,370	3.28	5.17

Table 10-10: Comparison of the interpolated model with the wireframe model for TFe

Category	Volume (m^3)	Tonnes (t)	SG (t/m^3)	TFe %
Model	39,515,386	129,535,947	3.28	14.94
Wireframe	39,589,030	128,268,458	3.24	15.10

A comparison between the result from the ordinary kriging block model and the result from the inverse distance weighted (IDW) cubed block model for orebody 1 is shown in Table 10-11 and Table 10-12. For both TiO_2 and TFe, the difference between the results for the ordinary kriging model and the IDW cubed model is that the grade from the ordinary kriging model is around 0.4% lower than that for the IDW cubed model.

As the difference between the results from the two models is not significant, our choice of the ordinary kriging interpolation method for orebody 1 has been validated.

Table 10-11: Comparison of the result from the ordinary kriging model with the IDW cubed model for TiO_2 for orebody 1

Category	Volume (m^3)	Tonnes (t)	SG (t/m^3)	TiO_2 %
OK Model	33,217,953	107,626,168	3.24	4.91
IDW3 Model	33,217,953	107,626,168	3.24	4.93

Table 10-12: Comparison of the result from the ordinary kriging model with the IDW cubed model for TFe for orebody 1

Category	Volume (m^3)	Tonnes (t)	SG (t/m^3)	TFe %
OK Model	32,733,782	106,057,454	3.24	14.70
IDW3 Model	32,733,782	106,057,454	3.24	14.76

Local validation of the ordinary kriging block model with the original drillhole sample values for TiO_2 is shown in Figure 10-52 and Figure 10-53. It can be seen there is a high correlation between the original sample grades and the interpolated block model grades. Strong local validation together with the close comparison of the ordinary kriging global grade with the raw sample grades and an IDW cubed power model global grade, validates the use of the ordinary kriging interpolation method and the final result.

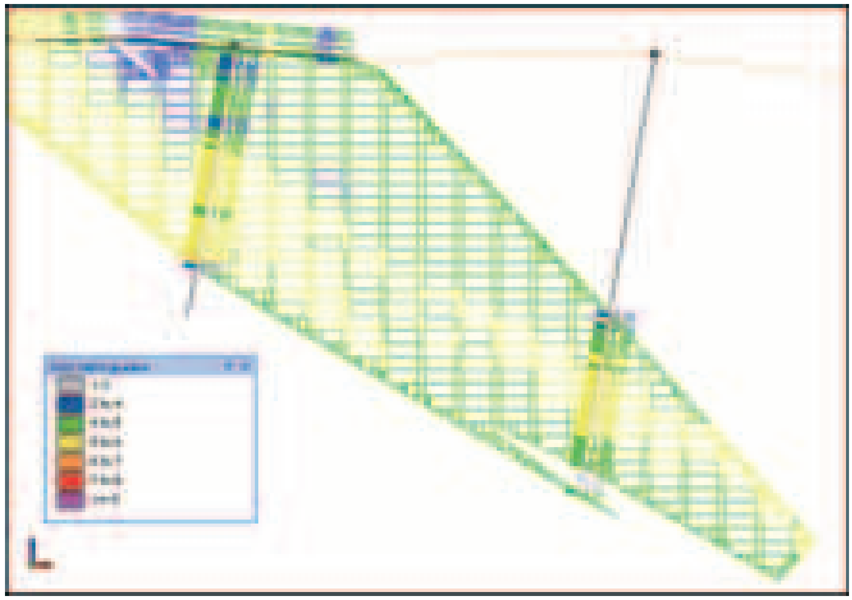


Figure 10-52: Cross-section showing local validation of block model and raw TiO_2 grades for orebody 1

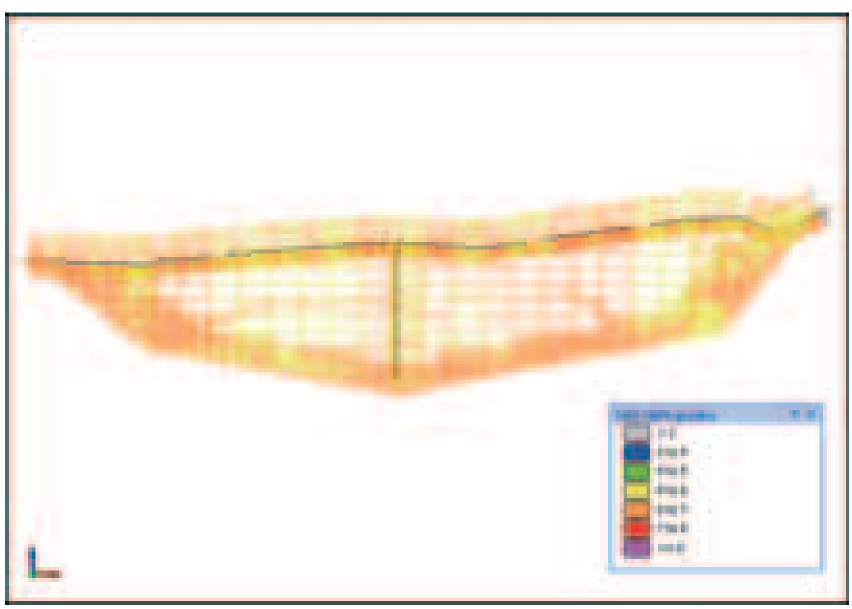


Figure 10-53: Cross-section showing local validation of block model and raw TiO_2 grades for orebody 2

11 RESOURCE STATEMENT

The total Resources for orebody 1 and orebody 2 reported above a cut-off grade of 9.2% TiO_2 equivalent is shown in Table 11-1.

Table 11-1: Total Resources for Qinjiazhuang Project

Resource Category	**Tonnes**	**SG**	**TiO_2 equivalent**	**TiO_2**	**TFe**
	(t)	*(t/m^3)*	*(%)*	*(%)*	*(%)*
Measured	46,210,000	3.23	72.61	4.9	14.72
Indicated	42,101,000	3.19	73.14	4.88	14.84
Total Measured and Indicated	88,311,000	3.21	72.86	4.89	14.78
Inferred	11,254,000	3.29	74.31	5.06	15.05
Total Resources	99,565,000	3.22	73.02	4.91	14.81

Numbers have been rounded to reflect that the resource estimate is an approximation.

Note that the reported resource is based on the titanium equivalent cut-off and reports iron for blocks that contain titanium and in some instances do not contain titanium; and also is based on the titanium equivalent cut-off and reports titanium for blocks that contain iron and in some instances do not contain iron. This is due to two independent wireframes being used to delineate the iron and the titanium mineralisation separately.

A cut-off grade for reporting potentially economically extractable resources was determined using the parameters from the MCS mining study. A 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 26.9% and the sale price of the combined concentrate used was CN¥2,656. MCS calculated an economic cut-off grade of 9.2% TiO_2 equivalent using the following formula: Economic cut-off grade = CN¥64.86 / (26.9% * CN¥2,656).

The resource reported above a cut-off grade of 9.2% TiO_2 equivalent for orebody 1 is shown in Table 11-2 and for orebody 2 in Table 11-3. The total resource at various TiO_2 equivalent cut-off grades for orebody 1 is shown in Table 11-4 while the total resource at various TiO_2 equivalent cut-off grades for orebody 2 is shown in Table 11-5. The Measured, Indicated and Inferred Resources at various cut-off grades for both orebodies separately are shown in Table 11-6, Table 11-7, Table 11-8, Table 11-9 and Table 11-10 respectively. There are no Measured Resources for orebody 2.

Table 11-2: Resource statement for orebody 1 of the Qinjiazhuang Project

Resource Category	Tonnes (t)	SG (t/m^3)	TiO_2 equivalent (%)	TiO_2 (%)	TFe (%)
Measured	46,210,000	3.23	72.61	4.90	14.72
Indicated	35,821,000	3.14	71.99	4.69	14.63
Total Measured and Indicated	82,031,000	3.19	72.34	4.81	14.68
Inferred	6,403,000	3.15	70.45	4.54	14.33
Total Resources	88,434,000	3.19	72.20	4.79	14.65

Numbers have been rounded to reflect that the resource estimate is an approximation.

Table 11-3: Resource statement for orebody 2 of the Qinjiazhuang Project

Resource Category	Tonnes (t)	SG (t/m^3)	TiO_2 equivalent (%)	TiO_2 (%)	TFe (%)
Indicated	6,280,000	3.46	79.70	5.98	16.03
Inferred	4,851,000	3.47	79.40	5.74	16.01
Total Resources	11,131,000	3.46	79.57	5.88	16.02

Numbers have been rounded to reflect that the resource estimate is an approximation.

Table 11-4: Total resources for orebody 1 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	3.18	28,366,000	90,343,000	70.77	4.79	14.34
5.0	3.18	27,892,000	88,835,000	71.90	4.79	14.59
10.0	3.18	27,767,000	88,434,000	72.20	4.79	14.65
20.0	3.18	27,767,000	88,434,000	72.20	4.79	14.65
30.0	3.18	27,767,000	88,434,000	72.20	4.79	14.65
40.0	3.18	27,767,000	88,434,000	72.20	4.79	14.65
50.0	3.18	27,767,000	88,434,000	72.20	4.79	14.65
60.0	3.18	27,735,000	88,332,000	72.21	4.79	14.66
70.0	3.19	19,620,000	62,625,000	74.13	5.05	15.02
80.0	3.39	12,978,000	4,393,000	81.60	5.95	16.45

Numbers have been rounded to reflect that the resource estimate is an approximation.

Table 11-5: Total resources for orebody 2 at various cut-off grades

TiO_2 equivalent COG	Density	Volume	Tonnage	TiO_2 equivalent grade	TiO_2 grade	TFe grade
(%)	*(t/m^3)*	*(m^3)*	*(t)*	*(%)*	*(%)*	*(%)*
0.0	3.46	3,216,000	11,131,000	79.57	5.88	16.02
5.0	3.46	3,216,000	11,131,000	79.57	5.88	16.02
10.0	3.46	3,216,000	11,131,000	79.57	5.88	16.02
20.0	3.46	3,216,000	11,131,000	79.57	5.88	16.02
30.0	3.46	3,216,000	11,131,000	79.57	5.88	16.02
40.0	3.46	3,216,000	11,131,000	79.57	5.88	16.02
50.0	3.46	3,216,000	11,131,000	79.57	5.88	16.02
60.0	3.46	3,216,000	11,131,000	79.57	5.88	16.02
70.0	3.46	3,213,000	11,123,000	79.58	5.88	16.02
80.0	3.46	1,412,000	4,886,000	80.30	5.99	16.16

Numbers have been rounded to reflect that the resource estimate is an approximation.

Table 11-6: Measured resources for orebody 1 at various cut-off grades

TiO_2 equivalent COG	Density	Volume	Tonnage	TiO_2 equivalent grade	TiO_2 grade	TFe grade
(%)	*(t/m^3)*	*(m^3)*	*(t)*	*(%)*	*(%)*	*(%)*
0.0	3.23	14,743,000	47,552,000	70.67	4.90	14.30
5.0	3.23	14,412,000	46,498,000	72.19	4.91	14.63
10.0	3.23	14,321,000	46,210,000	72.61	4.90	14.72
20.0	3.23	14,321,000	46,210,000	72.61	4.90	14.72
30.0	3.23	14,321,000	46,210,000	72.61	4.90	14.72
40.0	3.23	14,321,000	46,210,000	72.61	4.90	14.72
50.0	3.23	14,321,000	46,210,000	72.61	4.90	14.72
60.0	3.23	14,320,000	46,209,000	72.61	4.90	14.72
70.0	3.23	10,256,000	33,159,000	74.77	5.14	15.14
80.0	3.42	774,000	2,645,000	81.12	5.96	16.34

Numbers have been rounded to reflect that the resource estimate is an approximation.

Table 11-7: Indicated Resources for orebody 1 at various cut-off grades

TiO_2 equivalent COG	Density	Volume	Tonnage	TiO_2 equivalent grade	TiO_2 grade	TFe grade
(%)	*(t/m^3)*	*(m^3)*	*(t)*	*(%)*	*(%)*	*(%)*
0.0	3.14	11,559,000	36,280,000	71.15	4.69	14.45
5.0	3.14	11,443,000	35,908,000	71.83	4.69	14.60
10.0	3.14	11,416,000	35,821,000	71.99	4.69	14.63
20.0	3.14	11,416,000	35,821,000	71.99	4.69	14.63
30.0	3.14	11,416,000	35,821,000	71.99	4.69	14.63
40.0	3.14	11,416,000	35,821,000	71.99	4.69	14.63
50.0	3.14	11,416,000	35,821,000	71.99	4.69	14.63
60.0	3.14	11,405,000	35,786,000	72.00	4.69	14.63
70.0	3.15	8,182,000	25,736,000	73.52	4.94	14.91
80.0	3.34	524,000	1,748,000	82.29	5.92	16.60

Numbers have been rounded to reflect that the resource estimate is an approximation.

Table 11-8: Indicated Resources for orebody 2 at various cut-off grades

TiO_2 equivalent COG	Density	Volume	Tonnage	TiO_2 equivalent grade	TiO_2 grade	TFe grade
(%)	*(t/m^3)*	*(m^3)*	*(t)*	*(%)*	*(%)*	*(%)*
0.0	3.46	1,817,000	6,280,000	79.70	5.98	16.03
5.0	3.46	1,817,000	6,280,000	79.70	5.98	16.03
10.0	3.46	1,817,000	6,280,000	79.70	5.98	16.03
20.0	3.46	1,817,000	6,280,000	79.70	5.98	16.03
30.0	3.46	1,817,000	6,280,000	79.70	5.98	16.03
40.0	3.46	1,817,000	6,280,000	79.70	5.98	16.03
50.0	3.46	1,817,000	6,280,000	79.70	5.98	16.03
60.0	3.46	1,817,000	6,280,000	79.70	5.98	16.03
70.0	3.46	1,816,000	6,277,000	79.71	5.98	16.03
80.0	3.45	1,046,000	3,608,000	80.33	6.03	16.15

Numbers have been rounded to reflect that the resource estimate is an approximation.

Table 11-9: Inferred Resources for orebody 1 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	2,063,000	6,511,000	69.39	4.55	14.10
5.0	3.15	2,038,000	6,429,000	70.20	4.55	14.27
10.0	3.15	2,030,000	6,403,000	70.45	4.54	14.33
20.0	3.15	2,030,000	6,403,000	70.45	4.54	14.33
30.0	3.15	2,030,000	6,403,000	70.45	4.54	14.33
40.0	3.15	2,030,000	6,403,000	70.45	4.54	14.33
50.0	3.15	2,030,000	6,403,000	70.45	4.54	14.33
60.0	3.15	2,009,000	6,337,000	70.58	4.59	14.35
70.0	3.15	1,183,000	3,730,000	72.84	4.95	14.76

Numbers have been rounded to reflect that the resource estimate is an approximation.

Table 11-10: Inferred Resources for orebody 2 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	3.47	1,399,000	4,851,000	79.40	5.74	16.01
5.0	3.47	1,399,000	4,851,000	79.40	5.74	16.01
10.0	3.47	1,399,000	4,851,000	79.40	5.74	16.01
20.0	3.47	1,399,000	4,851,000	79.40	5.74	16.01
30.0	3.47	1,399,000	4,851,000	79.40	5.74	16.01
40.0	3.47	1,399,000	4,851,000	79.40	5.74	16.01
50.0	3.47	1,399,000	4,851,000	79.40	5.74	16.01
60.0	3.47	1,399,000	4,851,000	79.40	5.74	16.01
70.0	3.47	1,398,000	4,847,000	79.41	5.74	16.01
80.0	3.49	366,000	1,278,000	80.23	5.86	16.17

Numbers have been rounded to reflect that the resource estimate is an approximation.

12 COMPARISON WITH HISTORIC RESOURCE

The historic resource estimate for orebody 1 was 77,653,000 tonnes at a grade of 5.03% TiO_2 and 14.94% TFe. Orebody 2 was not estimated for the historic resource. In comparison, the MCS resource (the current resource) for orebody 1 is 13.9% larger in tonnage, with a slightly lower TiO_2 grade (4.8% lower) and slightly lower TFe grade (1.9% lower). The larger tonnage can be explained by the slightly larger mineralised envelope defined by MCS compared to the historic resource. MCS used a geological cut-off grade of 1.9% TiO_2 and 8.7% TFe; this was the 16.2% TiO_2 equivalent. The historic resource used a cut-off of greater than 17% TFe + TiO_2. The interpretation methods were also different, and the methods used by MCS resulted in a slightly larger current resource. The decrease in grade can be explained by the ordinary kriging interpolation method which tends to smooth the grade distribution and result in slightly lower estimated grades versus polygonal estimation which over estimates grade and under estimates tonnage.

13 METALLURGY AND MINERAL PROCESSING

13.1 Metallurgy

No information has been provided for metallurgy for the project except that the current Yang Zhuang processing plant will be modified and utilised for the ore, as the client believes the ore is similar in characteristics.

13.2 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 Qinjiazhuang (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 believes a 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 2 million t/pa with an annual concentrate output of approximately 150,000 tonnes of 44% titanium concentrate and 420,000 tonnes of 61% iron concentrate. If the recoveries stated in the Feasibility Study for Qinjiazhuang (Shandong Lianchuang Architectural Design Co. Ltd, 2011) were achieved, the processing plant would be expected to produce approximately 220,600 tonnes of iron concentrate and 102,900 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 are no results of 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.

The process flow is summarised in section 13.2.1.

13.2.1 Iron ore processing procedure

The following details are according to the preliminary design report of the Shandong Lianchuang Architectural Design Co. Ltd (2011).

Iron ore will be processed using wet magnetic separation, two-stage crushing, dry separation, two-stage closed-circuit grinding, coarse ore separation, and magnetic concentration. The ore separation flow chart is shown in Figure 13-1. A summary of the procedure is as follows:

- Crushing: maximum rock size is 500 mm; crushed ore maximum grain size is 20 mm.
- Dry magnetic separation: separates ore from gangue.
- Ball milling: ore is ground to 200 mesh.
- Ore slurry separation: coarse ore slurry is sent to fine grinding, fine ore slurry is sent to level 2 high intensity magnetic separation.
- Magnetic separation: magnetic iron ore is separated from non-magnetic ore.
- Fine sieving: ore under 200 mesh is stored in an ore powder reservoir, ore over 200 mesh returns to ball grinding.
- Iron concentrate tailings are sent for weak magnetic separation, re-separation then multi-separation stages.
- The final iron concentrate should have a grade of 56-63% TFe with a tailings grade of 7.98% TFe and a recycling rate of 22.0%.

13.2.2 Titanium ore processing procedure

Titanium ore (ilmenite) is processed using the following procedures (Figure 13-1):

- Intense magnetic separation: separates ilmenite from gangue.
- Gravity separation: shaker is used to separate ilmenite from remaining gangue.
- Flotation to recover final titanium (ilmenite) concentrate.

- The final titanium (ilmenite) concentrate should have a grade of 43.50% TiO_2 with a tailings grade of 3.58% TiO_2, and a recycling rate of 48.70%.

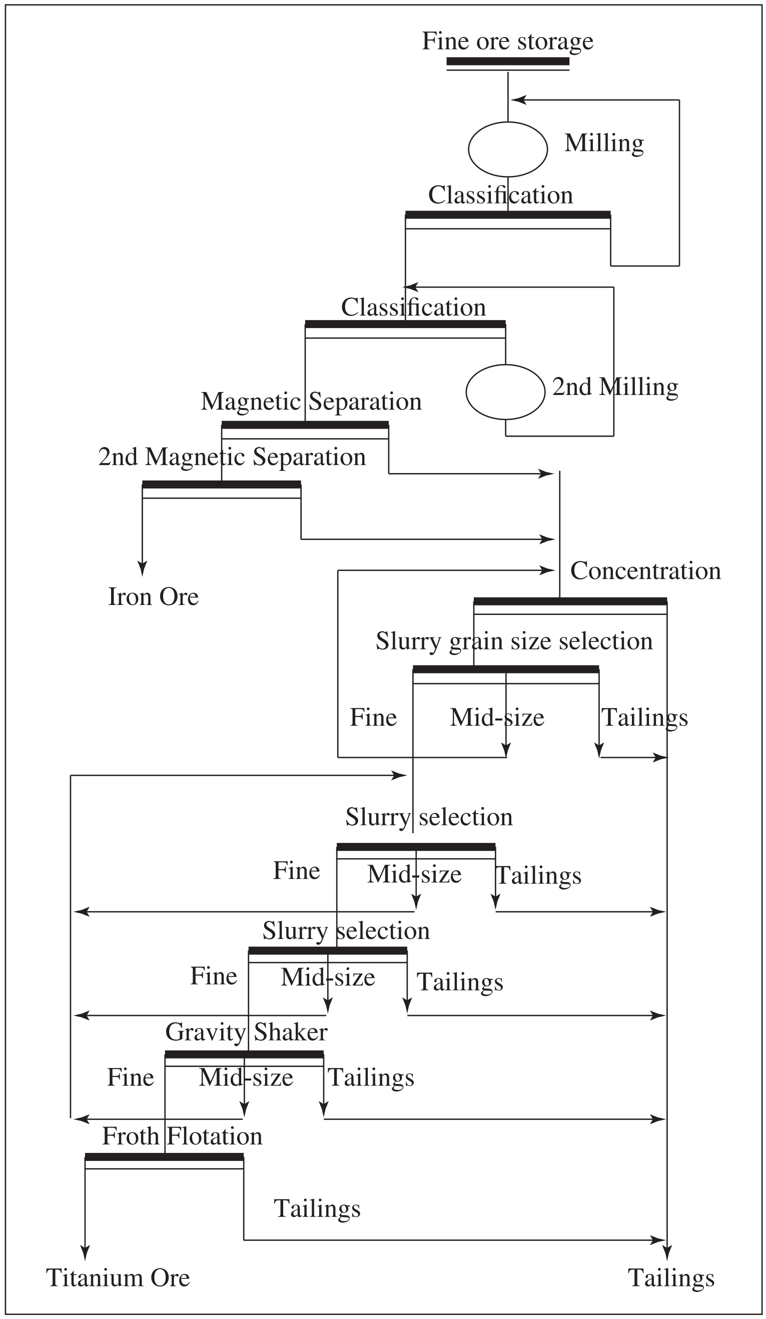


Figure 13-1: Ore Separation Flow Chart

MCS has not been provided with any further details on the processing of the Qinjiazhuang ore and metallurgical assessment was not included in the scope of work for this review.

14 MINING STUDY

14.1 Scope of Work

The scope of work for the mining study was to convert the Resources to Reserves. This involved the following:

- calculating cut-off grades;
- optimisation using Whittle 4D software;
- checking the optimisation results with the open pit design produced by the Shandong Lianchuang Architectural Design Co. Ltd (2011);
- assessing the proposed mining method and applying modifying factors as applicable;
- 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 Qinjiazhuang Mine (Shandong Lianchuang Architectural Design Company Ltd, 2011). The changes in modifying factor information were as follows:

- A reduction in capital expenditure from CN¥275.78 million previously to CN¥238.58 million.
- An increase in titanium concentrate selling price from CN¥890.00 per tonne previously to CN¥1,770.00 per tonne.
- An increase in mining expenditure from CN¥37.09 per tonne previously to CN¥44.60 per tonne.
- An increase in processing expenditure from CN¥13.34 per tonne previously to CN¥38.80 per tonne.

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

14.2 Open Pit

The following information is sourced from Shandong Lianchuang Architectural Design Co. Ltd., (2011) report.

The deposit is most suitable for open pit mining according to the size, depth and shape of the orebodies. Production capacity is calculated to be two million tonnes per year. The geology of the deposit is also suitable for open pit mining. Rock below the surface and the weathered horizon is exceptionally hard. Ground water is not abundant and the hydrogeology is not complex. The planned bench height will be 12 metres. The bottom of the pit is planned to be at minus 14 metres RL, with a hanging wall slope angle of less than or equal to 51° and a slope angle of less than or equal to 47°. The bench angle in Quaternary sediments and weathered bedrock will be 65°; the angle in fresh bedrock will be 50°. The maximum excavation height will be 10.71 metres.

Shovelling equipment will consist of hydraulic excavators with four and two cubic metre capacities.

Ore will be transported by trucks along the haulroads. The haulroad system within the open pit will be in the form of switchbacks and spiral style, depending on the size of the pit. The haulroad width will be eleven metres including two lanes with a 6% to 8% incline. The road will be composed of clay-bound gravel. The main haulage road will be at +214 metres which is the elevation of the closed-loop road.

A residential area exists on the southeast margin of the orebody. Some of these houses are within the blasting boundary and will need to be relocated.

15 RESERVE ESTIMATION

15.1 Introduction

The JORC code and definitions have been used for the conversion of Resources to 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 will be mined utilising Underground mining techniques. The reason being that different sets of infrastructure and equipment are used for Surface and Underground mining which translates into different capital and working costs and mining rates.

Secondly, 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.

15.2 Qinjiazhuang Resource to Reserve Calculation

These Reserves were based on the Resource model dated 22/3/2011, and the Reserves were therefore deemed to have the same date. However, the modifying factors parameters were changed and the Reserves were recalculated with these new parameters in October 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.

For the Qinjiazhuang Project there are two commodities; Iron and Titanium. The Resources and Reserves are given separately for these two commodities as they are not entirely contiguous. Also at Qinjiazhuang there are Surface mining resources and underground mining resources and hence there are two tables that show Resources and Reserves. The underground Reserves pertain to Orebody 1 only; there are no underground Resources in Orebody 2.

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

15.2.1 Surface Resources and Reserves

For Qinjiazhuang 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 15-1 shows the total Resource (GTIS) and the MTIS for the Surface portion of the Resource.

The MTIS for Orebody 1 is 73.828 Mt. For Ore body 2 the MTIS is 5.652 Mt. A tonnage of approximately 6 Mt for an Open pit operation is small and therefore Orebody 2 should be mined in conjunction with Orebody 1.

The factors applied to MTIS include the following.

- A mining loss of 7%. The planned extent of the orebody is such that 5% to 10% is appropriate as the mining loss will only occur at the ore/gangue boundary around the edges. But in the case of Qinjiazhuang most of the Open pit Resource is Measured and therefore a factor of 7% is used.

- 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 Qinjiazhuang the majority of the ore is Measured.

15.2.2 Underground Resources and Reserves

For the section of the ore body below the proposed open pit at Qinjiazhuang, there are no Measured Resources; only Indicated and Inferred. In the process of converting the Resources to Reserves, all the Inferred Resources have been excluded from MTIS. From Figure 15-1 it can be seen how small the underground portion of the Resources are and hence **no underground Reserves can be reported.** The total MTIS is 0.023 Mt for Titanium ore and 0.023 Mt for Iron ore.

Given that:

(a) If the Inferred Resources were to be added to the MTIS, the Resource is still not large enough to establish a reasonable mine (2.378 Mt Titanium ore and 2.325 Mt Iron ore respectively); and

(b) The majority of the underground Resources (>50%) are classified as Inferred; no underground Reserve has been calculated at this stage.

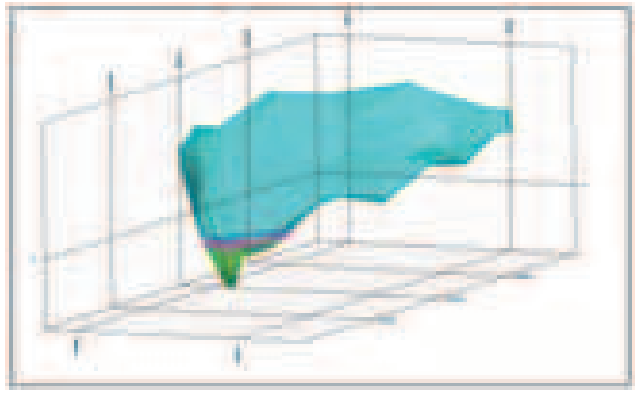


Figure 15-1: The Mining methods for Orebody 1- blue is open pit and green is underground. The purple is the crown pillar

Table 15-1: Statement of JORC compliant open pit mining reserves for the Qinjiazhuang Project

Orebody Name	Class	GTIS	GRADE Ti	GRADE Fe	MTIS	GRADE Ti	GRADE Fe	Mining Recovery	Dilution	Proved Reserves	Probable Reserves	GRADE Ti	GRADE Fe
		(Tonnes)	*(%)*	*(%)*	*(Tonnes)*	*(%)*	*(%)*	*(%)*	*(%)*	*(Mt)*	*(Mt)*	*(%)*	*(%)*
OBM1	Measured	46.210	4.93	14.72	41.589	4.93	14.72	90.0	9.0	45.332	–	4.52	13.50
OBM1	Indicated	35.821	4.69	14.63	32.239	4.69	14.63	90.0	9.0	–	35.140	4.30	13.42
Total		82.031			73.828					45.332	35.140		
OBM2	Measured	–	–	–	–	–	–	90.0	9.0	–	–	–	–
OBM2	Indicated	6.280	5.98	16.03	5.652	5.98	16.03	90.0	9.0	–	6.161	5.49	14.70
Total		6.280			5.652					–	6.161		
Grand Total		88.311			79.480					45.332	41.302		

16 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 shown in Table 16-1.

Table 16-1: JORC Code Compliance Checklist for Qinjiazhuang

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 planning. A 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 the open pit 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 use the nearby Yang Zhuang process plant owned by the Company which is currently processing iron ore. Ore will be 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.

Section	Comment
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 this mine is separated to produce a titanium concentrate and an iron concentrate to meet customer requirements. Both products have good markets in China.
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 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 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.

Following on from the calculations in Table 15-1 and the checklist in Table 16-1, Table 16-2 shows the diluted and recoverable underground reserves for the Qinjiazhuang Project. Only Measured Resources have been considered for conversion to Proved Reserves and only Indicated Resources have been considered for Probable Reserves.

The Open-pitable Reserves for the Qinjiazhuang orebody 1 are 80.472346 Mt of ore at a grade of 4.43% TiO_2 and 13.47% TFe. For orebody 2 the reserves are 6.161 Mt of titanium ore at a grade of 5.49% TiO_2 and 14.70% TFe.

The MCS reserve statement (current reserve, October 2011) for the Qinjiazhuang Project is shown in Table 16-2.

Table 16-2: Total reserve for the Qinjiazhuang Project

Reserve Classification	Ore *(Tonnes)*	TiO_2 Grade *(%)*	TFe Grade *(%)*	Contained TiO_2 *(Tonnes)*	Contained TFe *(Tonnes)*
Proved	45,330,000	4.52	13.50	2,049,000	6,120,000
Probable	41,300,000	4.48	13.61	1,850,000	5,621,000
Total reserve	86,630,000	4.50	13.56	3,898,000	11,747,000

Note: Contained TFe and TiO_2 does not imply that all the TFe and TiO_2 can be recovered. Processing recovery has not been accounted for in the calculation.

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

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%. Dilution is always incurred in the mining process and occurs due to the unavoidable inclusion of waste material into the mined ore.

The MCS reserve is stated based on titanium with an iron credit.

The expected project life of the open pit is 43.3 years.

17 COSTS

17.1 Operating Costs

All mine 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 RMB64.86 per tonne of ore processed.

Table 17-1 below summarises the operating costs presented in the Feasibility Study report.

Table 17-1: Qinjiazhuang Mine – Average Operating Costs

No.	Item	Unit cost *(RMB/t Ore)*	Annual total cost *(10,000 RMB)*
	Mining Cost		
I	Material	13.67	2,734.48
II	Fuel and power	5.69	1,137.29
III	Wage and welfare expense	1.83	496.8
	Total Mining cost	21.19	4,238.85
	Process Cost		
I	Material	19.69	3,937.49
II	Fuel and power	16.22	3,243.7
III	Wage and welfare expense	0.88	176.0
	Total Processing cost	36.79	7,357.19
	Other Costs		
	Overheads and Admin	3.64	727.71
	Environmental Allowance	0.15	30.0
	Total Other Cost	3.79	757.71
	Contingency (5%)	3.09	624.17
	Total Operating Cost	64.86	13,107.64

17.2 Capital Costs

The Qinjiazhuang mine will be developed to commence mining when the Yang Zhuang orebodies are exhausted. Although the proposed mining rate is 2 Mtpa which less than the 3.5 Mtpa capacity of the plant, a second separation circuit will be added to the Yang Zhuang concentrator plant so as to be able to produce the Titanium concentrate as well as the iron concentrate it already produces. Capital expenditure for the Qinjiazhuang projects will include the addition of the second separation circuit to the Yang Zhuang process plant as well as the purchase of equipment for and the pre-strip of the open pit operation.

The proposed capital expenditure for Qinjiazhuang is CNY255.36 million which consists of CNY229.23 million for construction capital and CNY21.13 million for working capital. The most recent Preliminary Design reports state that the basis of estimation of capital expenditure was by use of quotes for Major Equipment items and estimations using approved tables, work rates, and escalation factors for installation and construction. MCS was not provided with any further details relating to the proposed capital expenditure.

18 PRICE ESTIMATION AND FORECAST

18.1 Titanium Concentrate Price

The following information on titanium concentrate price forecasts was sourced 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/tonne. The price rose to RMB1,100/ton during the upsurge period of economic development at home and abroad in 2007. However, it dropped to RMB900/tonne affected by international financial crisis in 2008 and dropped to RMB705/tonne in 2009. With the remission of the 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 to RMB800/tonne at the end of June, 2010, while the port price of titanium concentrate (*TiO_2*>50%) imported from abroad is between RMB920 to RMB1,100/ton. The price of titanium concentrate of 43% to 45% arrived RMB2,050/tonne in 3rd Quarter of 2011. It is predicted that the titanium concentrate price of 43% to 45% will be between RMB1,500 and RMB2,300/tonne in coming years and medium and long term pricing will be between RMB1,800 and RMB2,500/tonne".*

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 a little optimistic when compared to other forecasts used by companies within China.

The titanium product from the Qinjiazhuang Project is expected to average at a grade of 44% titanium. Whilst MCS tends to agree 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 to use a more conservative price of RMB1,600/tonne for the 44% titanium product from Qinjiazhuang.

18.2 Iron Concentrate Price

The following information on iron concentrate price forecasts was sourced 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."

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

The product from the Qinjiazhuang Project is expected to be 61% iron concentrate which would ordinarily attract a 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 to RMB1,300/tonne for 58% iron concentrate, MCS has elected to use the price of RMB1,390/tonne for the purposes of this review.

19 ENVIRONMENTAL PROTECTION

19.1 Design Basis

The following sources of information were used to guide the environmental protection initiatives:

- Regulations on the Administration of Construction Project Environmental Protection Promulgated by Decree No. 253 of the State Council;
- GuoHuan Zi (87) No. 002 Document Design Regulations of Construction Project Environmental Protection;
- Design Regulations of Environmental Protection for Metallurgical Industry YB9066-95;
- Regulations on Environmental Protection Facilities Division Scope for Metallurgical Industry YB9067-95;

- Integrated Emission Standard of Air Pollutants GB16297-1996;
- Emission Standard of Air Pollutants for Coal-burning Oil-burning Gas-fired Boiler GB13271-2001;
- Integrated Wastewater Discharge Standard GB8978-1996;
- Standard of Noise at Boundary of Industrial Enterprises GB12348-90.

19.2 Major Pollutants and Control Measures

19.2.1 Mining operations

Each process in the mining cycle will produce certain amount of dust and noise. For example, the waste-rock yard will produce a certain amount of dust during stockpiling and the noise produced by air compressor will affect the ambient environment. Mine yard will produce little domestic sewage and it will produce no pollution to ambient environment. In order to prevent such pollution to the ambient environment, preventive measures are designed to be adopted to minimise pollution during the production process.

19.2.1.1 Dust Minimisation in Rock Drilling

Appropriate equipment will be selected during rock drilling to minimise dust pollution. KQG-150 down-the-hole drill rig will be used and equipment with dry dust separator units will be selected during the purchase of equipment. Dust-removal exceeds 95% when a FC-20 dry dust collector is employed. The dust concentration of the dust that is discharged to the air after having been treated by dust remover is 53 mg/m^3, which meets the national permissible (150 mg/m^3) emission standard.

19.2.1.2 Dust Minimisation on Haul Roads

Due to the heavy traffic on the haul roads and in loading areas, especially in the dry season, dust suppression will need to be employed. The national standard for dust emission is 10 mg/m^3. It is recommended that a water sprinkler is used on the mining roads to suppress dust. Additionally, saline water should be used on the road during winter to minimise dust and prevent the road surface from freezing. Plants and trees should be planted beside the mining roads for dust retention and noise abatement. After taking these measures, the dust on the mining road can be largely controlled.

19.2.1.3 Dust from Blasting Operations

Dust emanating from blasting exceeds 100 mg/m^3 and the dust can only be naturally scattered and diluted. This will more or less affect the ambient environment, however the mine is far away from cities and villages so it will not cause a significant environmental problem.

19.2.1.4 Noise Minimisation

The noise emanating from mining operations will pollute the ambient environment to some degree. Noise levels of the key types of mining equipment are shown in Table 19-1.

Table 19-1: Noise levels for key types of equipment in the mining process

Equipment Type	Sound level dB(A)	Spectral characteristic	Remarks
Down-the-hole drill	107	High frequency	Noise of the working place
Excavator	88-98		
Movable air compressor	85		Ingersoll Rand VHP-750E Type
10-20t vehicles	75-95		

The following noise control measures will be employed to minimise environmental disturbance:

- Ensure the use of down-the-hole drill rigs, using silencing equipment on the excavator as much as possible and ensuring all equipment is properly maintained so that it operates properly and with the least amount of noise.. The selected air compressor emits noise at 85dB(A), which is lower than national standard of 90 dB(A).

- Adopt personal protective equipment to minimise the damage to personnel.

- The bursting on site is undertaken during the day and its frequency is low, so it has a little impact on the surrounding environment.

The measures taken above, coupled with the fact that there are no villages within 400 metres of the mine will ensure the effect of noise is minimised.

19.2.1.5 Greening

The greening works will both be targeted in certain areas and completed throughout the tenement. Planting will be done in the administrative welfare area around the mining & dressing yard. Additionally, planting will be completed after each section of the waste rock area is no longer used. Greening of the site will also take place at the tailings pond after completion and on the road sides and surrounding areas of the buildings. The total area to be rehabilitated with planting is 3.3 ha and the greening rate is 15%.

19.3 Environmental Impact Analysis

The quality of the groundwater in the surrounding villages is average to good. The ore to be mined is stable is most aspects; there is no geothermal anomaly, harmful gas is not present and the ore is chemically stable. The area is hilly, so there is a small possibility of geologic hazards, such as slumps, landslides and debris flow. No radioactive elements occur in the ore or the surrounding rocks. The only pollutants discharged into the environment during mine production are dust and *water*.

Wet scrubbers with 99% collection efficiency are equipped on the coarse crushing station, intermediate and fine crushing plant, screening plant and fine ore bin. Exhaust gases contain dust and minor CO and NOX, which will be discharged from the pit via ventilation facilities. The discharged waste gas has an insignificant impact on atmospheric quality after it has been diluted by the air in the environment.

The amount of domestic sewage is small so it could be used for greening and agricultural irrigation after being treated by a septic tank. It has no impact on water environmental quality.

Barren rocks and tailings in mining are all general solid wastes. When dumping tailings in the tailings ponds, the design can be created such that water is diverted to the dry slope sections, thereby avoiding emission of tailings. In other parts of the dam, water spraying can ensure moisture is maintained where the tailings evaporate. Thus, accumulated waste residues have little impact on ambient air quality and eco-system, and won't exert adverse influence on atmospheric environmental *quality*.

The barren rocks and tailings are properly disposed of and have minimal impact on the environment. The solid waste from boiler ash can be comprehensively used in road works, coal ash brick making and so on. This is a profitable way of using the waste by-product and ensures it has no impact on environment.

19.4 Environmental Management and Monitoring

19.4.1 Environmental Management Organization

Environmental protection and occupational health and safety (OHS) works of the Qinjiazhuang Project makes use of the level 1 institution and level 2 management. In detail, the Security Environmental Protection Section will consist of six people and it is set up to strengthen the environmental management of the Company. Part-time environmental and OHS personnel are employed in the production area, dressing plant and each working section to assist in emissions meet the standards and to ensure safety and health of the workforce.

The main responsibilities of Security Environmental Protection Section in environmental protection management are:

- (1) Implement codes and standards about environmental protection, be responsible for environmental protection for the whole mine, work out environmental protection work plan of the whole mine, and perfect rules and regulations of the environmental protection organization;

- (2) Monitor operating conditions of environmental protection processing facilities and ensure effectiveness of pollution control facilities of the mine;

- (3) Supervise environmental incident reporting and undertake incident investigations;

- (4) Comply with environmental reporting standards specified at Provincial, Municipal and National levels;

- (5) Undertake environmental monitoring of the mine site.

19.4.2 Environmental Monitoring

Yishui County or Yishui City Environmental Monitor Station is authorised to undertake anural environmental monitoring. The monitoring audits the pollutant emissions of the mine to ensure it meets the standards and requirements, and to determine the effect of these emissions on the local environment. The following items would be including in the annual monitoring process:

- Tailings exterior draining monitoring

- Monitoring items: pH, SS etc.

- Coordinate with Yishui County or Yishui City Environmental Monitor Station to take one or two times survey on key pollution sources every year.

20 WATER & SOIL CONSERVATION AND RECLAMATION

The predominant aim of the water and soil conservation plan is to effectively prevent and control the potential water loss and soil erosion of the project area during construction period. Additionally, any change to the ecological environment of the project area will be rehabilitated.

Preventative measures to be implemented include checking the dam in waste-rock yard, planting trees, sowing grass seeds and laying turf.

Numerous rehabilitation initiatives will be implemented upon the completion of mining to restore the environment to its original state. In particular, cement mortar will be injected on slopes and ground surfaces for slope protection and slopes will be covered with soil and plant vegetation. Grass seeds will be sowed at the waste-rock yard and tailings pond to restore the ecosystem.

20.1 Working System and Fixed Number of Workers

20.1.1 Working System

There will be two systems of working systems at the operation; one continuous system and one intermittent work system. Under the continuous working system, the work will continue for 330 days in the year, only stopping for necessary equipment maintenance. The work day will consist of three eight hour working shifts.

The Intermittent working system is applied to function the management departments and other production posts. The legal working week is 40 h/week and work will be undertaken for 251 working days each year.

20.1.2 Personnel Quota

When the production rate reaches 2,000,000 tpa of ore production, the total capacity of the project is 231 people, including 72 in the mining plant and 78 for the beneficiation plant. The personnel required for the mine to operate is listed in Table 20-1. This data has been from personnel figures at similar mines and it assists in the planning of the production process and the selection of equipment. Average attendance rates of mining and mineral processing workshops are 94% and 96% respectively.

Table 20-1: Estimated results of fixed number of project personnel

No.	Department	No. people in register	Production workers	Management and service personnel	Maximum group size
1	Mining workshop	72	65	7	25
2	Ore beneficiation workshop	78	70	8	26
3	*Automotive* fleet	61	60	1	20
4	Ore Department	20		20	20
	Total	231	195	36	91

21 RISK ASSESSMENT

As an industry, 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 21-1 and Table 21-2) of the Qinjiazhuang project has not indicated that there are any risks with catastrophic consequences in the data presented for review. It is MCS' view that the Qinjiazhuang 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 21-2 could be mitigated by undertaking more detailed technical studies and providing additional information.

Table 21-1: 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
	Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
	1	**2**	**3**	**4**	**5**

Likelihood ↑ Numerical:	Historical:			1	2	3	4	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 21-2: 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

Items	Discussion	Risk
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
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

Items	Discussion	Risk
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 NPV has been carried out as yet. MCS believes there may be scope to improve the value 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 homogenous, the risk of failing to achieve planned recoveries is minor to moderate.	5
Sales	No testwork has been carried out on penalty elements to date. Whilst it is expected that most penalty elements will be liberated and removed during concentrating as with other projects in the area, this should be confirmed by further testing.	4

This information was used for the resource and reserve categorisation.

22 CONCLUSIONS AND RECOMMENDATIONS

22.1 Resource Estimation

The resources for the Qinjiazhuang Iron and Titanium Project stated by category and reported above an economic cut-off grade of 9.2% TiO_2 equivalent is shown in Table 22-1.

Table 22-1: Total resource for Qinjiazhuang Project

Resource Category	Tonnes	SG	TiO_2 equivalent	TiO_2	TFe
	(t)	*(t/m^3)*	*(%)*	*(%)*	*(%)*
Measured	46,210,000	3.23	72.61	4.9	14.72
Indicated	42,101,000	3.19	73.14	4.88	14.84
Total Measured and Indicated	88,311,000	3.21	72.86	4.89	14.78
Inferred	11,254,000	3.29	74.31	5.06	15.05
Total Resources	99,565,000	3.22	73.02	4.91	14.81

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

The resources reported for the Qinjiazhuang Iron and Titanium Project are stated by category.

A cut-off grade for reporting potentially economically extractable resources was determined using the parameters from the MCS mining study. A 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 26.9% and the sale price of the combined concentrate used was CN¥2,656. MCS calculated an economic cut-off grade of 9.2% TiO_2 equivalent using the following formula: Economic cut-off grade = CN¥64.86 / (26.9% * CN¥2,656).

Additional resource potential exists at both ends and at depth of orebody 1, where infill drilling can upgrade the resource from Indicated and Inferred to Measured category. For orebody 2 potential exists in the southern part where there are no drillholes and the orebody has not been tested at depth. For the northern part of orebody 2 additional drilling with improved core recovery and provision of QA/QC data could upgrade the Indicated Resource to Measured category.

22.2 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 according to the size, depth and shape of the orebodies.

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.

The factors applied to MTIS include the following.

- A mining loss of 7%. The planned extent of the orebody is such that 5% to 10% is appropriate as the mining loss will only occur at the ore/gangue boundary around the edges. But in the case of Qinjiazhuang most of the Open pit Resource is Measured and therefore a factor of 7% is used.
- 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 Qinjiazhuang the majority of the ore is Measured.

The MCS reserve statement **(current reserve, October 2011)** for the Qinjiazhuang Project is shown in Table 19-2.

Table 22-2: Total Reserve for the Qinjiazhuang Project

Reserve Classification	Ore *(Tonnes)*	TiO_2 Grade *(%)*	TFe Grade *(%)*	Contained TiO_2 *(Tonnes)*	Contained TFe *(Tonnes)*
Proved	45,330,000	4.52	13.50	2,049,000	6,120,000
Probable	41,300,000	4.48	13.61	1,850,000	5,621,000
Total reserve	86,630,000	4.50	13.56	3,898,000	11,747,000

Note: Contained TFe and TiO_2 does not imply that all the TFe and TiO_2 can be recovered. Processing recovery has not been accounted for in the calculation.

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.

23 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's 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.

None of MCS or any authors of this report have any direct or indirect economic or beneficial interest (present or contingent) in any contained in this Report or any assets which had been acquired, or disposed of by, or leased to any member of the Company or any of its subsidiaries within the two years immediately preceding the issue of this Report.

None of MCS or any authors of this report has any shareholding, directly or indirectly in any member of the Group or any right (whether legally enforceable or not) to subscribe for or to nominate persons to subscribe for securities in any member of the Group or is an associated company of the Company. None of the authors of this Report is an officer, employee or proposed officer of the Company or any group, holding or associated company of the Group.

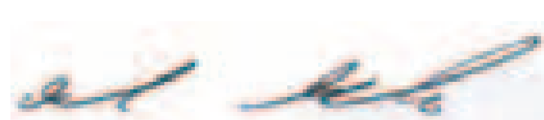
The issuer has not provided any indemnities to the Competent Person.

By signing this report, we hereby confirm that the reporting terminology, mineral resource and reserve 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 and reserve 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
Micromine Pty Ltd

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.

24 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.

25 REFERENCES

1. Shandong Lianchuang Architectural Design Co. Ltd., (2011), *Feasibility Study for Qinjiazhuang Mine Iron & Titanium Orebody 1 and Yangzhuang Gongdanshan Iron & Titanium Mine Orebody 2. (Revised)*

2. Shandong No. 8 Exploration Institute of Geology and Mineral Resources (2010), *Qin Jia Zhuang Ilmenite Deposit Detailed Geological Survey Report Orebody 1.*

26 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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27 APPENDIX 1: TENEMENT LICENCE CERTIFICATE

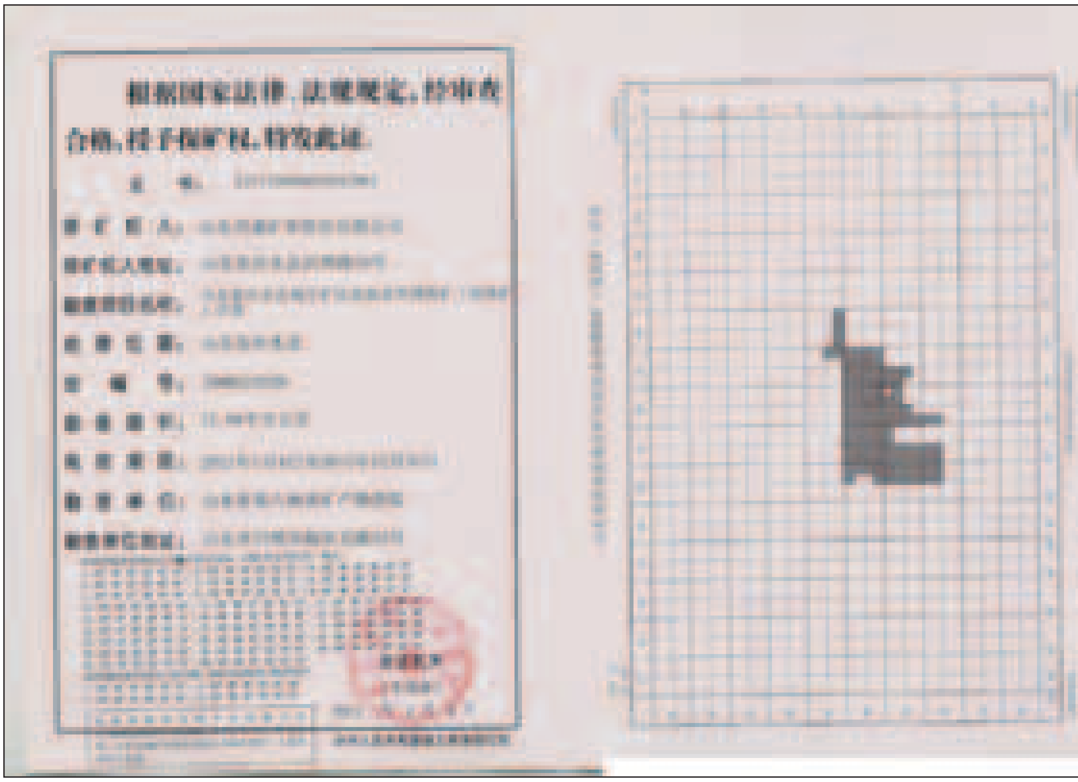

Figure 27-1: Current exploration licence

28 APPENDIX 2: DATABASE VALIDATION AND ACCEPTANCE REPORT

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Jones Lang LaSalle Corporate Appraisal and Advisory Limited
仲量聯行企業評估及咨詢有限公司

Qin Jia Zhuang Iron and Titanium Project

Database Validation and Acceptance Report

For

Shandong Xingsheng Mining Company Limited

10 March 2011

DATA FOR ACCEPTANCE

28.1 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:

1. Xinsheng drilling data – Yangzhuang part 2 – 70 million ton.xls

The contents of each worksheet in the Xinsheng drilling data – Yangzhuang part 2 – 70 million ton.xls spreadsheet is shown in Table 10-1.

Table 28-1: Contents of spreadsheet Xinsheng drilling data – Yangzhuang part 2 – 70 million ton.xls as supplied

Worksheet	No. of Holes and Trenches	No. of Records
Survey	28	28
Collar	28	28
Assay	26	967
Geology	15	94
Recovery	9	728
SG	20	51
Lookup Codes	NA	NA
Notes	NA	NA

28.2 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. A minus sign '-'was prefixed to all dip values in the all_surveys.DAT file.

2. All blank spaces in required fields in all files were replaced with 'ND' (NO DATA).

3. Changed field name in all_surveys.DAT file from 'DEPTH (m)' to 'SDepth'.

4. Changed field names in SG.DAT file from 'Depth (from)' and 'Depth (to)' to 'From' and 'To'.

5. Changed all intervals in SG.DAT file from '8.00' to '0.08'.

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 errors were discovered and corrected as detailed below:

File collars.DAT:

- For drillhole ZK402, changed depth value from '129.45 m' to '180.30 m'.
- For ZK1202, changed collar coordinates from 3990243.890 N, 40391408.785 E, RL 217.648 m to 3990237.340 E, 40391139.471 N, RL 217.123 m.

File surveys.DAT:

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

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

- collars.DAT saved as QJZ_collars.DAT
- surveys.DAT saved as QJZ_surveys.DAT
- assays.DAT saved as QJZ_assays.DAT

The final database contained records for 11 drillholes, 11 shallow pits (QZ-) and 6 trenches.

The number of records in the final database for each hole ID is shown in Table 10-3.

Table 28-2: 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
QZ1600	3990000.000	40391177.859	217.65	9.20	1	1	0	1	0
QZ1603	3990014.105	40391192.140	217.45	8.20	1	1	0	0	0
QZ1604	3989985.895	40391163.701	217.78	11.60	1	1	0	1	0
QZ1607	3990028.324	40391206.163	217.43	9.00	1	1	0	1	0
QZ1608	3989971.676	40391149.641	218.10	13.20	1	1	0	1	0
QZ1611	3990042.498	40391220.294	217.41	9.50	1	1	0	1	0
QZ1612	3989957.593	40391135.445	218.34	14.80	1	1	0	0	0

Hole ID	Northing (mN)	Easting (mE)	RL (m)	Depth (m)	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
QZ1614	3989950.575	40391128.378	218.43	8.80	1	1	0	0	0
QZ1615	3990056.631	40391234.442	217.38	5.50	1	1	0	0	0
QZ1616	3989943.516	40391121.322	218.51	7.20	1	0	0	0	0
QZ1619	3990070.777	40391248.583	217.29	6.10	1	0	0	0	0
TC0	3990372.020	40390397.000	246.23	164.00	1	75	4	3	0
TC1	3990458.210	40390346.560	245.01	147.60	1	73	5	3	0
TC3	3990569.362	40390332.583	248.81	50.10	1	25	7	0	0
TC4	3990188.670	40390481.740	244.31	156.00	1	74	5	2	0
TC8	3990051.800	40390639.430	241.56	192.50	1	92	8	2	0
TC12	3989967.824	40390863.782	227.82	67.00	1	31	9	0	0
ZK0	3990409.820	40390455.980	250.57	100.08	1	50	0	5	0
ZK1	3990483.790	40390386.000	250.35	100.16	1	50	0	5	0
ZK102	3990556.762	40390513.825	256.68	129.45	3	43	4	3	50
ZK401	3990271.445	40390600.772	245.91	119.90	2	55	8	3	64
ZK402	3990379.342	40390708.834	240.94	180.30	2	59	7	3	96
ZK801	3990139.370	40390751.458	237.27	103.70	2	44	2	3	39
ZK802	3990250.742	40390863.984	234.26	170.60	2	36	6	4	65
ZK1201	3990086.551	40390982.336	230.51	126.90	2	42	4	3	50
ZK1202	3990237.340	40391139.471	217.12	242.00	4	54	7	3	110
ZK1601	3990092.638	40391274.436	214.45	211.50	3	94	7	2	108
ZK1602	3990235.470	40391413.278	216.15	338.40	4	61	11	2	146

An accurate DTM of the topographic surface was produced in MICROMINE software by MCS after digitising contour lines with a 2 m interval from the original 1:2000 scale geological map supplied in MapGIS format. This DTM will be used for the resource estimation.

28.3 Additional Data

The client provided MCS with additional data for a second orebody of the Qin Jia Zhuang deposit on 24th February 2011. The provided data consisted of one excel spreadsheet containing collar, survey, geology, assay, recovery, SG and other information including composite sample results in 8 worksheets. The spreadsheet was titled as follows:

1. Xingsheng additional drilling data – Qinjiazhuang.xls

The contents of each worksheet are shown below in Table 10-2.

Table 28-3: Contents of spreadsheet Xingsheng additional drilling data – Qinjiazhuang.xls as supplied

Worksheet	No. of Holes and Trenches	No. of Records
Collar	6	6
Survey	6	6
Geology	6	13
Composite Sample Res.	NA	8
Assay	6	445
Recovery	2	53
SG	6	30
Lookup codes	NA	NA

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

1. Delete top header rows of Chinese characters.

2. Unmerge cells in Composite sample results and Recovery worksheets 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.

The resulting MICROMINE files were named as follows:

- QJZ_collar_part2.DAT
- QJZ_survey_part2.DAT
- QJZ_assay_part2.DAT
- QJZ_recovery_part2.DAT
- QJZ_SG_part2.DAT
- QJZ_geology_part2.DAT
- QJZ_comp_samp_part2.DAT

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

1. A minus sign '-' was prefixed to all dip values in the QJZ_survey_part2.DAT file.

2. Changed field name in QJZ_survey_part2.DAT file from 'DEPTH (m)' to 'SDepth'.

3. Changed field names in QJZ_comp_samples_part2.DAT file from 'Sample No.', 'Samples Combined', 'Combined Length' and 'Lab No.' to 'SampleID', 'Samples_comp', 'Comp_length' and 'LabID' respectively.

4. Changed field name in QJZ_recovery_part2.DAT from 'Footage Per Round Trip' to 'Interval".

5. Changed field names in QJZ_SG_part2.DAT from 'Sample No.', 'Depth (from)' and 'Depth (to)' to 'SampleID', 'From' and 'To' respectively.

6. Changed all intervals in QJZ_SG_part2.DAT file from '8.00' to '0.08'.

The original drawings from the exploration report that were supplied previously were then checked 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 errors were discovered and corrected as detailed below:

File QJZ_assay_part2.DAT:

- Samples GTC0-H51 to GTC0-H54 had incorrect 'From' and 'To' values resulting in overlapping intervals. It appears '10' was incorrectly not entered at the start of every number. This was corrected and the changes made are shown below in Table 28-4.

- All data in the file for GTC0 from 0.00 m to 36.20 m is not the same as that on the original drawing. This has resulted in overlapping intervals for samples GTC0-H18 and GTC0-H19.

The intervals for HoleID GTC0 were changed to those on the original drawing for samples GTC0-H1 to GTC0-H18. The data that was entered from the original drawing is shown in Table 28-5.

Table 28-4: Corrections made to file QJZ_assay_part2.DAT

HoleID	Previous 'From'	Changed 'From'	Previous 'To'	Changed 'To'
GTC0	0.70	100.70	2.70	102.70
GTC0	2.70	102.70	4.70	104.70
GTC0	4.70	104.70	6.70	106.70
GTC0	6.70	106.70	7.70	107.70

Table 28-5: Data entered from original drawing to replace supplied data for GTC0 assays

HoleID	From	To	Interval	SampleNo	TFe	TiO_2	$TFe+TiO_2$
GTC0	0.40	2.20	1.80	GTC0-H1	16.60	6.10	22.70
GTC0	2.20	4.20	2.00	GTC0-H2	15.87	6.08	21.95
GTC0	4.20	6.20	2.00	GTC0-H3	15.66	6.21	21.87
GTC0	6.20	8.20	2.00	GTC0-H4	16.67	6.13	22.70
GTC0	8.20	10.20	2.00	GTC0-H5	15.73	5.92	21.65
GTC0	10.20	12.20	2.00	GTC0-H6	15.63	5.65	21.28
GTC0	12.20	14.20	2.00	GTC0-H7	16.26	6.17	22.43
GTC0	14.20	16.20	2.00	GTC0-H8	15.66	6.28	21.94
GTC0	16.20	18.20	2.00	GTC0-H9	15.91	5.81	21.72
GTC0	18.20	20.20	2.00	GTC0-H10	16.29	6.50	22.79
GTC0	20.20	22.20	2.00	GTC0-H11	16.35	5.73	22.08
GTC0	22.20	24.20	2.00	GTC0-H12	16.55	5.68	22.23
GTC0	24.20	26.20	2.00	GTC0-H13	16.37	5.79	22.16
GTC0	26.20	28.20	2.00	GTC0-H14	16.43	5.98	22.41
GTC0	28.20	30.20	2.00	GTC0-H15	15.94	6.06	22.00
GTC0	30.20	32.20	2.00	GTC0-H16	16.16	6.03	22.19
GTC0	32.20	34.20	2.00	GTC0-H17	15.89	6.17	22.06
GTC0	34.20	36.20	2.00	GTC0-H18	15.79	5.63	21.42

The final database for the additional data was created in MICROMINE and contained records for 4 trenches and 2 drillholes. The number of records in the final database for each hole ID is shown in Table 10-4.

Table 28-6: Number of records of each type for each hole ID in part 2 database

Hole ID	Northing *(mN)*	Easting *(mE)*	RL *(m)*	Depth *(m)*	Survey Records	Assay Records	Geology Records	SG Records	Recovery Records
GTC0	3989291.56	40391826.03	237.50	260.00	1	126	3	7	0
GTC1	3989393.02	40391828.12	228.35	274.00	1	134	2	8	0
GTC4	3989091.80	40391822.00	243.50	172.00	1	83	2	5	0
GTC8	3988891.92	40391818.05	257.30	108.00	1	51	2	4	0
GZK1	3989289.14	40391950.13	241.00	50.37	1	25	2	3	27
GZK2	3989389.50	40391951.92	235.00	50.72	1	26	2	3	26

- An accurate DTM of the topographic surface was produced in MICROMINE software by MCS after surveyed 3D coordinate data of the surface of both areas was provided by the client on 10th March 2011. This DTM will be used for the resource estimation.

A combination of both databases will be used for the resource estimation of the Qin Jia Zhuang project.

28.4 Missing Data

- A total of 2 drillholes in the database have no assay data. MCS queried this with the client and were informed that assays were not performed on the samples from these drillholes.

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

5 Authorisation

19 March 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 Yang Zhuang and Yang Zhuang satellite deposit iron projects, Shandong Province, People's Republic of China for Shandong Xingsheng Mining Company Limited" (proposal CN2065).

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 CN2065.

Signed for Shandong Xingsheng Mining Company Limited

Position: ....

Name: ....

Signed: ....

29 APPENDIX 3: GLOSSARY OF TECHNICAL TERMS & ABBREVIATIONS

3D	Three-dimensional.
%	Percent.
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 percent frequency and cumulative percent 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.
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.
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.