Technical Report on the Rambling Creek-North Whitemud River Oolitic Ironstone Deposit, Clear Hills, Alberta

Report Prepared for

Ironstone Resources Ltd.

Report Prepared by

SRK Consulting (Canada) Inc.
2CI012.001
July 27, 2012

Technical Report on the Rambling Creek-North Whitemud River Oolitic Ironstone Deposit, Clear Hills, Alberta

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SRK Project Number 2CA017.001

July 27, 2012

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Executive Summary

Ironstone Resources Ltd. ("Ironstone") has retained SRK Consulting Canada ("SRK") to prepare a National Instrument 43-101 ("NI43-101") compliant report for their oolitic iron deposit situated in the Clear Hills region of Alberta. This technical report provides the second NI43-101 resource estimate for the Clear Hills iron deposit and constitutes first time disclosure of mineral resources for the combined Rambling Creek-North Whitemud River portions for Ironstone. The Company retained SRK to prepare a mineral resource estimate on the Rambling Creek portion of the deposit in October of 2010.

The Rambling Creek-North Whitemud River iron deposit underlies the eastern edge of the Clear Hills in northwestern Alberta, which are about 80 kilometres ("km") northwest of the town of Peace River, Alberta, and about 480 km by air northwest of Edmonton. The property consists of twenty six Metallic and Industrial Mineral permits and four Mineral Leases comprising 190,868 hectares ("ha"). The Clear Hills property encompasses four main project areas; Rambling Creek, North Whitemud River, South Whitemud River and Worsley. Mineral resources presented in this report are derived from the Rambling Creek and North Whitemud River Project areas only and are contained within Lease Number 094 9405040583 and Permit numbers 093 9306040750, 093 9306050832, 093 9308050888 and 093 9310080616. Ironstone owns 100% interest in the property subject to a 2% Net Smelter Return ("NSR").

The southern parts of the Clear Hills iron deposits are accessible by gravel road extending northerly from the small community of Worsley. Farther north, the area along Rambling Creek (formerly called Swift Creek) is accessible by vehicle from a recently constructed all weather, graded gravel road that extends to the Notikewin forestry tower and airstrip. The rolling prairie topography in the vicinity of the Clear Hills has an average elevation of about 700 metres ("m"). The Clear Hills form a gently sloping upland that rises from east to west, locally reaching up to almost 1,100 m near their southwestern margin and to the north along Halverson Ridge. Local relief is about 300 m along the southern margins of the Clear Hills.

The iron deposit in the Clear Hills was initially discovered in 1924, and attracted considerable development interest during the late 1950s and the early 1960s. Testing by the Mines Branch in Ottawa in the early 1960s seemed to indicate that the Clear Hills iron ore would respond well to a process developed by R-N Corporation. To further evaluate the R-N process, a 5,286 ton bulk sample was excavated from beneath 15 m of overburden in the Swift Creek (Rambling Creek) segment of the deposit and shipped to the R-N pilot plant in Birmingham, Alabama. The pilot plant produced 1,000 tons of briquette iron ("HBI"). The estimated cost of the pilot plant operation was about $300,000. Sporadic studies have been carried out on the property since the early 1960s but very little work has been carried out on the property since 1974.

The Clear Hills region lies at the eastern margin of the foothills of the Rocky Mountains of Alberta. The area is about 80 km northwest of Peace River and about 480 km northwest of Edmonton. The Alberta-BC border is about 80 km west of the Clear Hills and Fort St John is approximately 140 km to the west-southwest. Two sedimentary groups dominate the sequence; the Colorado Group and the Smoky Group which overlap somewhat in definition, both including the Puskwaskau Formation. The Smoky Group is younger and includes the Wapiti, Puskwaskau and iron-bearing Bad Heart Formation which hosts the Clear Hills oolitic ironstone.

Within the Rambling Creek-North Whitemud River portions of the property, the geological units found are typical of the region. Glacial overburden consists of 1 to 72 m of glacial till, clay and gravel units although typical thickness is approximately 30 m. The glacial overburden in the Clear Hills is underlain in places by the Wapiti, Puskwaskau and Bad Heart Formations, which include light to dark grey shale, sandstone with or without oolites. In the west of the property, total overburden is higher, as it is made up of glacial overburden, Puskwaskau, and Wapiti Formations as elevation increases. Towards the east, total overburden decreases, as the erosional level is lower into the Puskwaskau or Bad Heart Formation. To the east of the zero-edge of the Bad Heart Formation, the glacial overburden directly overlies the Kaskapau Formation shales.

The Clear Hills Deposit is an oolitic ironstone deposit that is best classified as Minette type iron formation. The most prominent feature of these oolitic ironstones is the presence and abundance of oolites and pisolites composed of goethite and nontronite that were deposited in shallow water environments, close to shorelines or abandoned deltas.

The deposit is bedded, flat lying and has a maximum thickness of 15 m. The deposit is exposed on the banks of Rambling Creek and extends northwest and southeast of Rambling Creek for several kilometres. The ironstone consists of ooliths, siderite, and clastic material embedded in a clastic matrix and ferruginous cement. The ooliths consist of concentric layers of intimately intergrown goethite, nontronite, and amorphous phosphate around centres which are generally quartz.

During the months of February and March 2008, Ironstone conducted its first drilling program on the Rambling Creek area of the Clear Hills Property. The company successfully drilled 2,055 m and recovered 385 m of oolitic iron ore from 47 out of 51 holes. Geotech Drilling Ltd. of Prince George, BC was contracted by Ironstone to carry out the drilling program.

During February and March 2011, the Company carried out a second drill program focused on extending the known ironstone deposit south of the Rambling Creek permit on to the North Whitemud River project area. Ironstone drilled a total of 148 holes and recovered 12,086 m of core. Drill hole locations were set up at a nominal 400 m spacing with some holes drilled at a 250 m spacing to better define grade continuity within the ironstone.

During February 2012, Ironstone carried out a third drilling program on the property to evaluate the South Whitemud River portion of the deposit. The Company drilled 31 holes and recovered 1,403 m of core.

All cores were cut to fit inside 5-foot acrylic liners to avoid oxidation of the iron and maximize recoveries. To ensure all core would remain in its most pristine form, the core was subsequently sealed in poly-tubing before the core boxes were sealed. Each core tube was marked to identify the intervals. The core boxes were secured in a Sea-Can after the program concluded. The 2008 core was transported in the locked Sea-Can to a secure facility near Ft. St. John, BC while the 2011 core was logged on the property. Ironstone Resources hired an independent, qualified geologist to review the program and provide guidance during the core sampling program for both drilling campaigns.

All of the 2008 core intervals were submitted to SGS for chemical assay (Strong Acid Digest with Fusion of Residue ICP-OES Analysis & Borate Fusion WRA by XRF) and the 2011 core was submitted to Activation Laboratories Ltd. (“Actlab”). SRK is of the opinion that the level of sample security and analytical procedures are adequate for this type of deposit.

G. David Keller, P. Geol. of SRK carried out a site visit in 2010 and Michael Johnson, P. Geo. visited the property in 2011 to verify drill hole locations, check drill core, logging procedures and accuracy, and sampling recovery and documentation. SRK checked drill hole locations using hand held GPS and found that the field locations agreed well with the surveyed locations provided by Ironstone.

SRK re-logged nine of the Ironstone drill holes and found that the geological descriptions provided were generally good and acceptable for the estimation of mineral resources of a bulk iron deposit such as Clear Hills.

Concurrent with the 2011 drilling program, Ironstone extracted 11,000 tonnes of oolitic ironstone for process development, pilot plant tests and future use. 7,500 tonnes of material is stockpiled 60 km south of Rambling Creek near the town of Hines Creek on Ironstone's 48 ha property and 3,500 tonnes of material was stored at the airstrip.

In 2011, Ironstone commenced a program to commercialize a beneficiation process developed by the Alberta Research Council in the 1970s and early 80s.This process was successful in beneficiating the iron from the ore at a laboratory scale. The laboratory work was successful in that the companies involved at the time deemed it appropriate to move to a pilot plant program. The economic downturn in the early 80s precluded the project going beyond the design stage.

Prior to embarking on the Alberta Research Council iron beneficiation process, known as the Grain Enlargement or (“GE”) process, Ironstone contracted laboratories to investigate common mechanical beneficiation processes to determine their applicability in beneficiating the ore. These mechanical processes were not successful in mechanically beneficiating the ore to a commercial level. Ironstone decided to proceed with the commercialization of the GE process which was likely to result in the most economic process to produce a commercial iron product.

The 2011 program undertaken by Ironstone was designed to establish block flow diagrams, process design criteria, process flow diagrams and major equipment selection up to and including the reduction part of the process. It also established a plan for the development of the remainder of the iron recovery process. This part of the program was concluded in December 2011. The remainder of the program to commercialize the iron beneficiation process will be completed in 2012. The vanadium recovery process will be developed in 2013.

Ironstone has retained Hatch (Mississauga, Ontario) to design process flowsheets and to manage the conceptual engineering study for the Clear Hills Ironstone project. The scope of the work encompasses ore preparation and calcining, iron reduction, integrated pilot plant testing of calcining and reduction steps, and modeling of the chloride segregation process as well as delineation of a program to develop the process further. This program was concluded by December 15, 2011.

Considerable progress has been made to date in understanding the process fundamentals as well as the design and other issues involved in developing the process flowsheet as defined by the current block flow diagrams. Current findings indicate several opportunities:

- It will be relatively easy to prepare the ironstone for processing due to its low crushing strength. Test work shows that the energy requirements for ore preparation would be relatively low.
- Pilot plant test work suggests that the fines produced in the commercial kiln will be significant (~20% by weight of the ore), but they can be successfully pelletized using a

commercial pin pelletizer with the addition of minimal quantities of clay from the ironstone deposit.

- MetSim modelling indicates that most of the energy requirements would be supplied by coal, with minimum net energy requirements for calcining and drying, due to use of kiln off-gas energy.
- Although early pilot plant testing resulted in lower than expected iron reduction (49%), it did indicate design considerations that will be applied to a reactor built for that purpose.
- Pilot plant testing also established operating parameters for the kilns and, in specific, a maximum temperature of 1050° C and a minimum temperature of 800° C.

Some process issues were identified during the 2011 test program; these will be addressed as part of the 2012 test program:

- Chloride segregation process has never been applied for iron before on a commercial scale and direct heating during chloride segregation has never been attempted at a pilot plant scale.
- Designing of the off-gas cleaning system, including handling of chloride containing gases and removal of chlorides will also be a challenge.
- The process flowsheet is intricate and the design and implementation stages will be demanding.
- Environmental issues need careful consideration and resolution. Satisfying process water requirements and effluent treatment will be some of the other challenges.
- Designing a marketable product also remains to be developed in the future.
- Test results show that vanadium tends to concentrate in the tailings; however, characterization of the tails is yet to be done and extraction of vanadium from the tails is yet to be tackled.

Mineral resources for the Rambling Creek-North Whitemud River iron deposit were estimated by SRK using 3-dimensional block modelling software provided by Gemcom Software International Inc. of Vancouver, GEM version 6.3.0. There are 579 drill holes in the Ironstone database, 347 are drilled in the Rambling Creek-North Whitemud River area representing 21,365 m of drilling. A large proportion of the drilling, 148 holes, were drilled thirty to forty years ago and by operators other than Ironstone and, as a result, most of the original assay records have been misplaced, lost or destroyed. However, assay records are available for 72 of the historical drill holes through the Alberta Government assessment records. The historical data contains only Fe and SiO_2 assay values.

A total of 437 historical Fe and SiO_2 assay records representing 489 m of drilling have been used as part of this estimate. Assay values were composited to a fixed length of 1m to assure that all data were evenly weighted before block model grade interpolation. Composites were generated starting from the collar of the drill hole downwards and incorporated only the assays contained within the interpreted mineralized zones. Two mineralized zones were modelled; a densely oolitic ("DOIS") and a moderately oolitic ("MOIS") zone. Grade interpolation was carried out into blocks 50 m by 50 m by 2 m to reflect drill spacing and the size of the deposit, 21 km by 4 km by 10 m. The grade interpolation was carried out in two successive passes using flat search ellipses. The second pass represents a larger search neighbourhood and only blocks that had insufficient data for interpolation during the first pass were interpolated. Mineral resources were classified in accordance with definitions provided by the Canadian Institute of Mining ("CIM") as stipulated in NI43-101.

In order to validate the reasonable prospect test, SRK applied a Whittle shell to the Rambling Creek iron deposit to determine the amount of iron that could potentially be mined under reasonable assumptions. The Whittle shell is defined using optimistic economic parameters and reflects the material with which SRK considers has the potential for eventual economic extraction and is not intended to be an indication of mineral reserves. The Whittle shell is limited by the property boundary to the west on the Rambling Creek portion of the property.

The Mineral Resource Statement for the Clear Hills iron deposit is presented in Table 1 below.

Table 1: Mineral resource statement* Rambling Creek-North Whitemud River iron deposit Clear Hills, Alberta, SRK Consulting (Canada) Inc., July, 2012

Classification	Density	Tonnes (000)	Fe (%)	SiO_2 (%)	V_2O_5 (%)	Al_2O_3 (%)	P_2O_5 (%)	[1]P%
Indicated	2.24	557,738	33.30	24.37	0.20	4.98	1.37	0.60
Inferred	2.23	94,664	34.11	26.19				

* Reported at a cut-off grade of 25% Fe within a Whittle pit shell optimized using Fe price of $317/dry metric tonnes Fe, metallurgical recovery of 82%, and overall mining cost of $2.63 per tonne and processing costs of C$51. All numbers are rounded to reflect relative accuracy of the estimates. P% is calculated by dividing P2O5 % by 2.2914

The development of the iron beneficiation process to date has established the design criteria for the comminution, calcining and drying, and reduction parts of the process. The planned work is expected to establish the design criteria for the remainder of the commercial process. However, chloride segregation has never been applied for iron before on a commercial scale and direct heating during chloride segregation has never been attempted at a pilot plant scale.

Attaining success in the remainder of the pilot plant work to develop a commercially viable GE process, consistent with the favourable outcome of the work to date, would indicate that the iron deposit of the Clear Hills would constitute a mineral resource as defined under NI43-101.

SRK recommends that Ironstone continue to investigate the potential of Clear Hills iron deposit. To further evaluate the potential of the deposit, SRK recommends that Ironstone continues to process the bulk sample collected during the 2011 field season to develop a more robust process flow-sheet. Based on positive results of the additional metallurgical testing, SRK recommends that Ironstone carry a scoping level study to determine the economics of extracting iron from Clear Hills. SRK estimates that the additional sampling and metallurgical testing will cost about $360,000 and a scoping level study would cost approximately $280,000.

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (Canada) Inc. ("SRK") by Ironstone Resources Ltd. ("Ironstone"). These opinions are provided in response to a specific request from Ironstone to do so, and are subject to the contractual terms between SRK and Ironstone. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report.

Copyright

1 Introduction

1.1 Background of the Project

Ironstone Resources Ltd. ("Ironstone") owns twenty six Metallic and Industrial Mineral permits and four Mineral Leases comprising 190,868 hectares ("ha") in the Clear Hills area of northern Alberta. The Company carried out a drilling program targeting the Rambling Creek portion of the property in 2008, followed up with a second drilling program in 2011 targeting the North Whitemud River portion of the property and a third drilling program in 2012 targeting the South Whitemud River portion of the iron deposit.

Ironstone has retained SRK Consulting Canada ("SRK") to prepare a National Instrument 43-101 ("NI43-101") compliant report for their oolitic iron deposit situated near Clear Hills Alberta. The purpose of this Report is to compile the 2008 and 2011 drilling information and to provide an independent technical assessment for inclusion in a prospectus to be issued by Ironstone to support a proposed listing on the Toronto Stock Exchange.

This technical report provides the first NI43-101 resource estimate for the North Whitemud River portion of the deposit. This report replaces the report prepared by SRK on the Rambling Creek portion of the deposit released on October 28, 2010 (Arseneau et al, 2010). The information for this technical report was mostly sourced from the assessment files of the Alberta Government Ministry of Energy, technical reports prepared for General Properties Ltd. in 2006 and 2007 (Sneddon, 2006, 2007) and from data provided by Ironstone.

David Keller, P. Geol., of SRK visited the property on April 6 and 7, 2010 to gather additional information regarding drill site location, access, physiography and property geology. A total of nine drill holes were also re-logged during the site visit by David Keller. Michael Johnson, P. Geo., visited from February 2 to 4th 2011.

1.2 Project Team

The mineral resources presented in this report were prepared by Dr. Gilles Arseneau, P. Geo., Associate Consultant and verified by Marek Nowak, P. Eng. Michael Johnson, P. Geo., and Dave Keller, P. Geol., carried out the site visit and verified the data as well as the quality control measured.

1.3 Statement of SRK Independence

Neither SRK nor any of the authors of this Report have 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 SRK.

SRK has no prior association with Ironstone in regard to the mineral assets that are the subject of this Report. SRK has no beneficial interest in the outcome of the technical assessment being capable of affecting its independence.

SRK's fee for completing this Report is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report.

2 Reliance on other Experts

SRK did not carry out a detailed title search as part of this study. Instead, SRK have relied on information provided by Ironstone and information obtained from the Alberta Government Ministry of Energy web site on Mineral Titles for metallic and Industrial Minerals http://www.energy.alberta.ca/.

3 Property Description and Location

The Clear Hills property encompasses four main project areas, Rambling Creek, North Whitemud River, South Whitemud River and Worsley. The Rambling Creek-North Whitemud River portion of the property underlies most of the Clear Hills in northwestern Alberta, which are about 80 kilometres ("km") northwest of the town of Peace River, Alberta, and about 480 km by air northwest of Edmonton (Figure 3.1). The oolitic ironstone deposit is primarily within National Topographic System ("NTS") map-areas 84D and 84E. Ironstone's permits are located between townships 87 and 93, ranges 3 through 8 west of the sixth meridian (Figure 3.2). The property consists of twenty six Metallic and Industrial Mineral permits and four Mineral Leases comprising 190,868 ha (Table 3.1). Mineral resources presented in this report are derived from the Rambling Creek and North Whitemud River Project areas only and are contained within Lease Number 094 9405040583 and Permit numbers 093 9306040750, 093 9306050832, 093 9308050888 and 093 9310080616. Ironstone owns 100% interest in the property subject to a 2% royalty in addition to the standard royalties due to the Alberta Government on production.

Ironstone is obliged to carry out expenditures to maintain the permits in good standing. The expenditures associated with the 2008 drilling program were sufficient to keep all the permits in good standing until early 2014. The expenditures associated with the 2011 drilling have not been applied yet but should be sufficient to extend all the Clear Hills permits to 2020.

Table 3.1: Clear Hills permits and leases

Title Type	Number	Acquisition Date	Area (Ha)	Property
Permit	093 9306040749	Apr 05, 2006	8996	South Whitemud River
Permit	093 9306040750	Apr 05, 2006	5576	North Whitemud River
Permit	093 9306040751	Apr 05, 2006	9000	Notikewin River
Permit	093 9306050831	May 15, 2006	4884	Notikewin River
Permit	093 9306050832	May 15, 2006	3972	North Whitemud River
Permit	093 9306080769	Aug 01, 2006	9216	South Whitemud River
Permit	093 9306080770	Aug 01, 2006	9168	South Whitemud River
Permit	093 9306080798	Aug 22, 2006	9216	South Whitemud River
Permit	093 9306090859	Sep 25, 2006	9216	Notikewin River
Permit	093 9308050888	May 26, 2008	704	Rambling Creek
Permit	093 9310080616	Aug 18, 2010	256	Rambling Creek
Permit	093 9310120508	Dec 02, 2010	8200	South Whitemud River
Permit	093 9311120656	Dec 19, 2011	9216	Eureka River
Permit	093 9311120657	Dec 19, 2011	9216	Eureka River
Permit	093 9311120658	Dec 19, 2011	8580	Worsley
Permit	093 9311120659	Dec 19, 2011	8512	Worsley
Permit	093 9311120660	Dec 19, 2011	8320	Worsley
Permit	093 9311120661	Dec 19, 2011	8604	South Whitemud River
Permit	093 9311120662	Dec 19, 2011	9076	Worsley
Permit	093 9312060404	Jun 28, 2012	2048	Eureka River
Permit	093 9312060405	Jun 28, 2012	7424	South Whitemud River
Permit	093 9312060406	Jun 28, 2012	6908	Worsley

Permit	093 9312060407	Jun 28, 2012	9216	West Rambling Creek
Permit	093 9312060408	Jun 28, 2012	6568	West Rambling Creek
Permit	093 9312060409	Jun 28, 2012	4160	West Rambling Creek
Permit	093 9312060410	Jun 28, 2012	9216	West Rambling Creek
Lease	094 9405040583	April 12, 2005	1152	Rambling Creek
Lease	094 9406011262	January 23, 2006	2060	Worsley
Lease	094 9406011263	January 23, 2006	456	Worsley
Lease	094 9406011264	January 23, 2006	1732	Worsley

In Alberta, Mineral Permits are acquired by application to the Ministry of Energy, essentially map staking. The permit boundaries follow surveyed township and Range lines. Some of the permits in the South Whitemud River area fall within the designated “Caribou Zone” and require a submission of a “Caribou Plan” to the Department of Sustainable Resource Development (“SRD”) of Alberta for fall and summer work. There are no other known environmental liabilities associated with the Clear Hills property but the area is closely monitored by Alberta Sustainable Resources and its forestry officers, to ensure access is limited to the public in order to protect its eco-systems. Permits are required for drilling and easily obtainable from the Alberta Government.

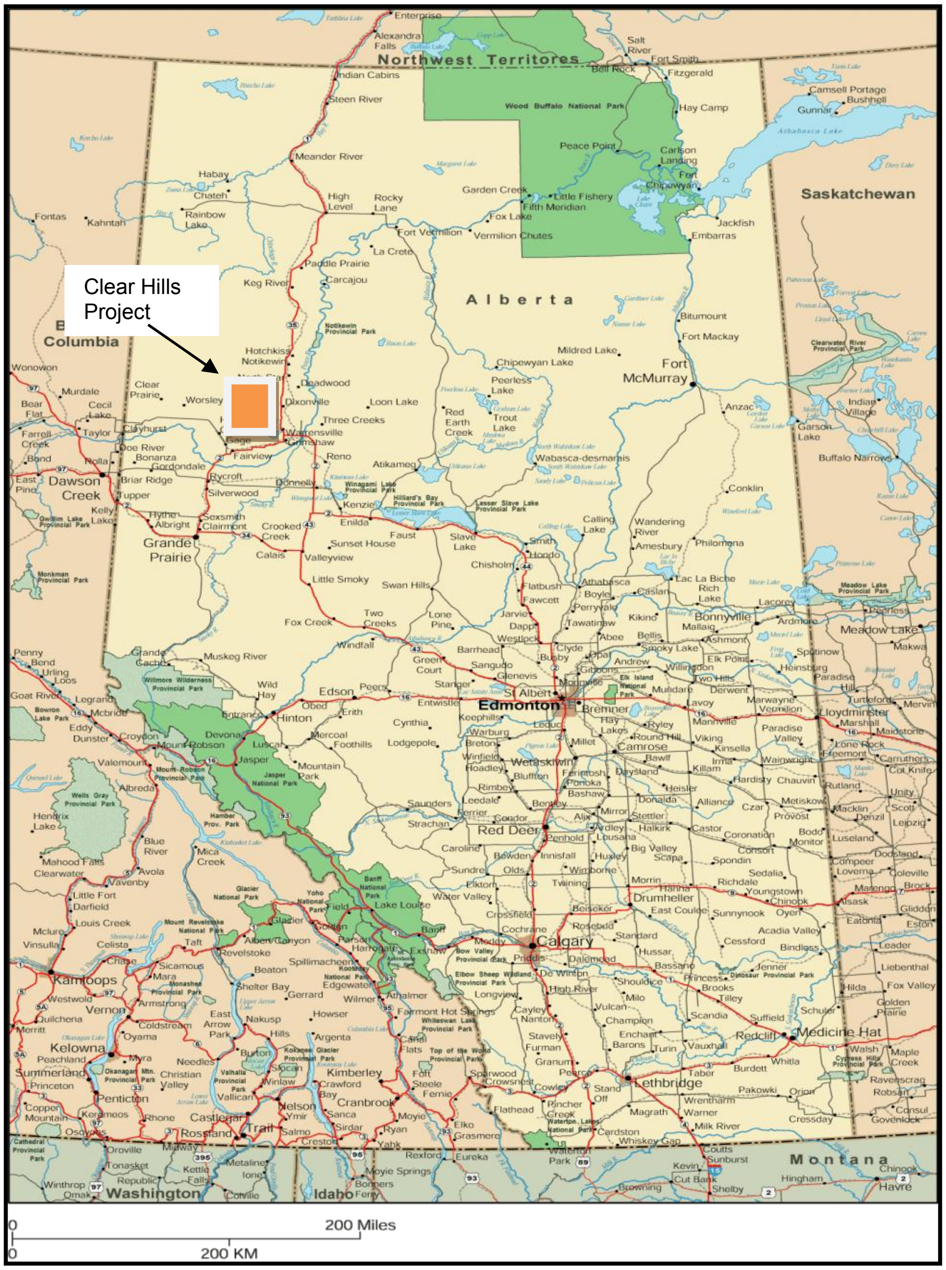


Figure 3.1: Clear Hills Property location

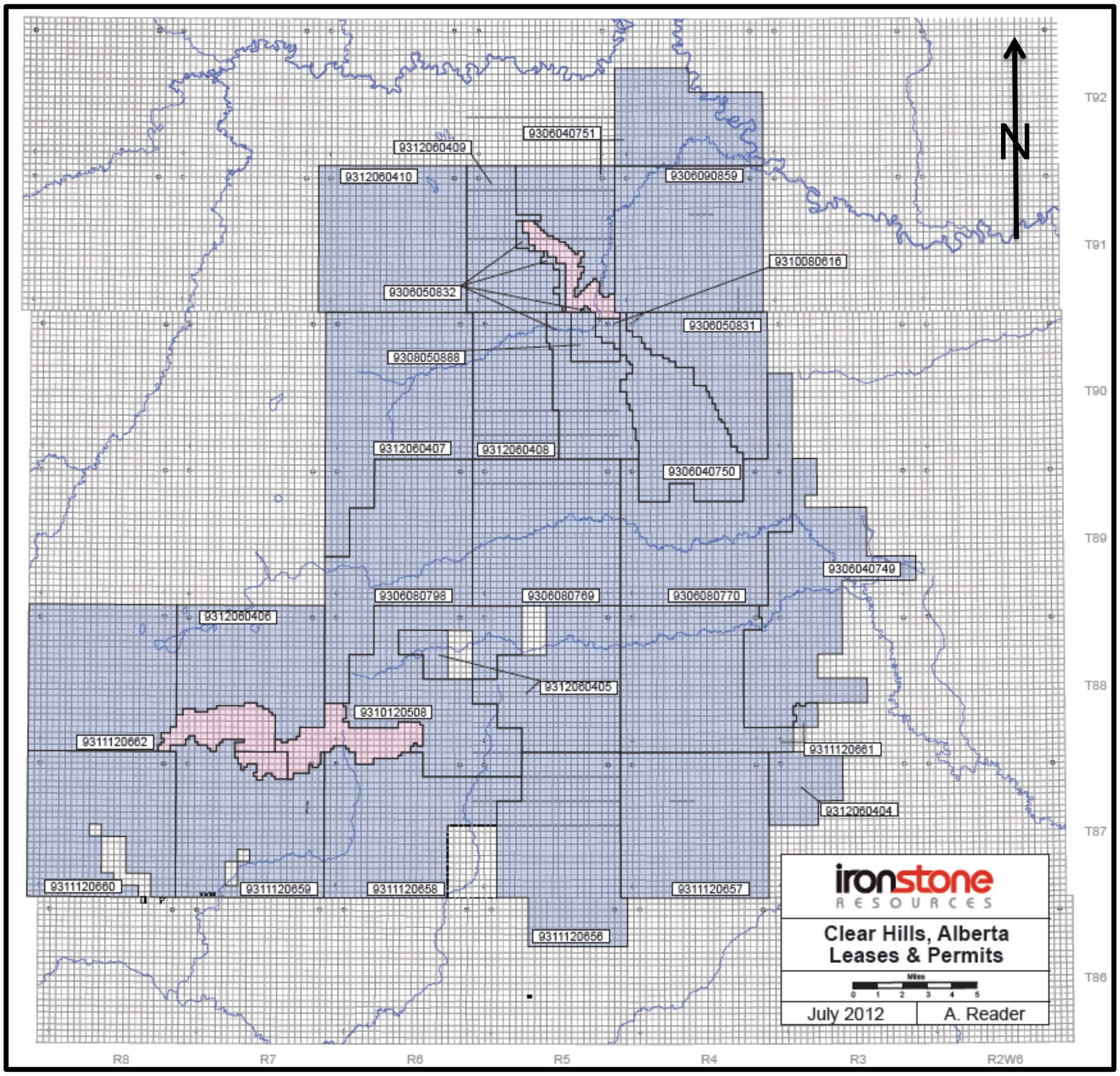


Figure 3.2: Ironstone Clear Hills property

Note: Grid lines indicate Alberta Township boundaries

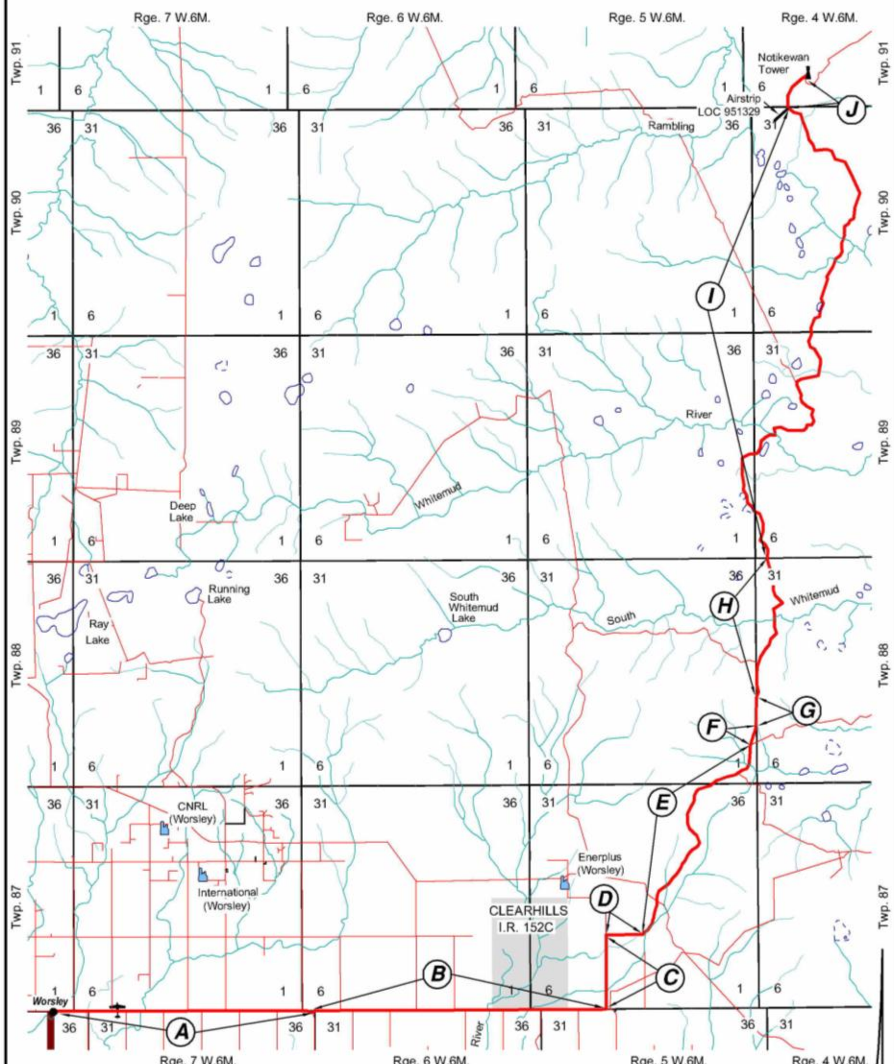
4 Accessibility, Climate, Local Resources, Infrastructure and Physiography

The southern parts of the Clear Hills iron deposits are accessible by gravel road extending northerly from the small community of Worsley. Farther north, the deposits, which outcrop along Rambling Creek (formerly called Swift Creek), are accessible by vehicle from a recently constructed all weather, graded gravel road that extends to the Notikewin forestry tower and airstrip. In general, other than these locales, access to other places in the Clear Hills is best done by helicopter or in winter by skidoo along the numerous seismic lines which transect this area.

The property can be accessed year round on the all-weather road. Two forestry companies (Canadian Forest Products and Diashowa) and several oil and gas companies currently operate in the area. The property can be accessed by the well-maintained Notikewin Fire Tower Road, north of Eureka River, all year as culverts have been installed at all the necessary creek crossings (Figure 4.1). Ironstone also has access to Rambling Creek area via a well-maintained company-owned airstrip.

The rolling prairie topography in the vicinity of the Clear Hills has an average elevation of about 700 m. The Clear Hills form a gently sloping upland that rises from east to west, reaching elevations that locally reach up to almost 1,100 m near their southwestern margin and to the north along Halverson Ridge. Local relief is about 300 m along the southern margins of the Clear Hills, but to the north and east the hills slope gradually into the wide glaciated valleys of the the Notikewan and Whitemud Rivers and their tributaries. The terrain within the Clear Hills is rolling and thickly wooded, with the dominant species being spruce on the uplands, poplar on the slopes, and willow along the rivers and creeks; muskeg only covers small areas of the upland (Kidd, 1959). The Clear Hills originated as post-Cretaceous monadnocks, which subsequently were modified by Pleistocene glaciation. Exploration work can be carried year round with some work such as drilling being done easiest in winter because of the muddy swampy conditions in some areas of the property.

The property has a northern continental climate typical of northwestern Alberta and northeastern British Columbia. Winters are generally cold with some mild spells. Summers are often fairly cool to pleasantly warm in the daytime, but nights can be cool despite the long summer days typical for its latitude. Hot days, over 30°C are rare, occurring on average only one to two days a year. Winter conditions can vary tremendously from year to year. The average January temperature is −15°C and the average July temperature is 16°C. However, temperatures as low as −52°C and as high as 35° C have been recorded. The total annual precipitation is 446 millimetres (“mm”) which includes both rain and snow. Snowfall amounts, however, vary greatly from year to year. Summers can bring thunderstorms, although they are not as frequent or as severe as further south in Central Alberta.



Road	Owner	LOC	Length
A	Public Road	--	±11.2km
B	Public Road	--	±12.7km
C	Public Road	--	±3.2km
D	Public Road	--	±1.6km
E	Clear Hills County	FRD 570009	±10.8km
F	Clear Hills County Bonovista	FRD 570009 LOC 973265	±1.8km
G	Public Road	--	±1.3km
H	Clear Hills County Bonovista	FRD 570009 LOC 973265	±6.7km
I	Clear Hills County Bonovista	FRD 570009 LOC 981082	±26.3km
J	Clear Hills County Bonovista	FRD 570009 LOC 981082	±1.8km

ACCESS SKETCH
SCALE 1 : 200 000

McElhanney

IRONSTONE RESOURCES LTD.	Plan ID : G06364AR1	Job No. : 351106364	Revision: 0	Page: 1 of 1

Figure 4.1: Notikewin Access Road

5 History

The iron deposit in the Clear Hills was initially discovered in 1924, and attracted considerable development interest during the late 1950s and the early 1960s.

In 1953 geologists for the Phillips Petroleum Company of the Oil and Gas Conservation Board noted the presence of iron during the examination of drill cuttings from a Phillips Petroleum well (Phil C No. 1). Subsequently, the iron-bearing material was identified in three other Phillips wells.

In 1954, D. B. McDougall obtained an iron prospecting permit covering 100,000 acres in the Clear Hills area. He drilled 11 holes in the Swift Creek deposit (Rambling Creek area). A bulk sample was collected and sent to Alberta Mines Branch for analysis.

Lenz (1956) made the first detailed petrographic and fossil dating studies on the iron formation, as a term paper project at the University of Alberta. The following year Colborne examined outcrops in the Swift Creek area for the Cleveland Cliffs Iron Company and submitted his result as a M.Sc. thesis, also at the University of Alberta (Colborne, 1958). In 1956 and 1958, the Alberta Research Council mapped all the iron formation outcrops in the Clear Hills area (Kidd, 1959). In this work, Kidd made a preliminary reserves estimate of about 1.5 billion tonnes grading 29% to 35% iron. This estimate was prepared before the implementation of National Instrument 43-101 and no information is available regarding the method utilized to prepare the estimate. The estimate should not be relied upon; it is only quoted here for historical completeness.

In 1957, Premier Steel Mills Ltd. (Premier) acquired an interest in the deposit and, in cooperation with the Alberta Research Council, began metallurgical studies on a bulk sample collected from the Worsley outcrop. Mineralogical analysis of the ore was performed by the Federal Mines branch (Nickel, et al., 1960). Tests results indicated that the iron ore from Clear Hills was not suitable as a blast furnace feed (Samis and Gregory, 1962).

A joint research program was then undertaken in 1959 by the Governments of Alberta and Canada to reassess the potential of the Clear Hills Iron deposit in light of advanced ore dressing technology. The program included a general assessment of the deposit by Krupp Industries Ltd. of Germany, ore dressing research by the Alberta Research Council and CANMET, and mineralogy studies by CANMET. Initial samples sent to Germany seem to indicate that the iron ore could be concentrated to 54% to 56% and could be used as blast furnace charge material. Results of the work completed by CANMET and Krupp Industries indicated that physical beneficiation of the iron to grades above blast furnace charge grade would be difficult if not impossible (Bertram and Kay, 1978).

Additional testing by the Mines Branch in Ottawa seemed to indicate that the Clear Hills iron ore would respond well to a process developed by R-N Corporation. To further evaluate the R-N process, a 5,286 ton bulk sample was excavated from beneath 15 m of overburden in the Swift Creek (Rambling Creek) segment of the deposit and shipped to the R-N pilot plant in Birmingham, Alabama (Samis and Gregory, 1962) (Figure 5.1). The pilot plant produced 1,000 tons of hot briquette iron (“HBI”). The estimated cost of the pilot plant operation was about $300,000.

Very little work was carried out until 1974, when proposals for an integrated steel industry in Alberta prompted a review of the deposit. The Alberta Research Council established a research project to identify a possible extraction or beneficiation processes that would render the Clear Hills economical. The study (Bertram and Kay, 1978) proposed to produce metallic iron concentrate by a process named the Grain Enlargement Process. The process is essentially a direct reduction iron beneficiation ("DRI") that reduces the iron minerals to metallic iron with coal in the presence of a small quantity of chloride salt. The process consists of blending together the iron with dried coal with ferrous chloride or calcium chloride (Bertram and Kay, 1978). The process has shown to be successful at lab-scale testing and additional small pilot tests were carried out in 1984 (Bertram, 1984). The project did not advance beyond the bench-top pilot testing.

A total of 349 drill holes were cored to test the Clear Hills iron formation between 1950 and 2006 (Table 5.1). The historical drilling effectively covers the Rambling Creek deposit on a 400 m square grid pattern.

Table 5.1: Summary of drilling in Clear Hills area

Year	No holes	Metres
1950	11	244.85
1953	2	2,482.00
1959	1	837
1960	70	1,375.46
1961	113	3,673.05
1962	37	1,204.49
1963	52	1,260.77
1965	5	184.08
1966	4	314.84
1995	17	758.28
1997	1	63
1998	10	337.70
1999	7	619.39
2000	3	9.12
2006	9	583
2008 Ironstone	51	2,055.44
2011 Ironstone	148	12,085.7
2012 Ironstone	31	1,403
Unknown	7	454
Total Data	579	29,945

Figure 5.1: Rambling Creek 1962 bulk sample site

6 Geological Setting and Mineralization

The Clear Hills region lies at the eastern margin of the foothills of the Rocky Mountains of Alberta. The area is about 80 km northwest of Peace River and about 480 km northwest of Edmonton. The Alberta-BC border is about 80 km west of the Clear Hills and Fort St John is approximately 140 km to the west-southwest.

The Clear Hills area lies with the sedimentary basin covering northern Alberta, bounded by the Rocky Mountains to the west. The regional geology consists of flat-lying or near flat-lying sedimentary rocks formed throughout the existence the Western Interior Seaway which waxed and waned between the Rocky Mountains and the Canadian Shield throughout the Cretaceous (Massop and Shetsen, 1994). A regional geology map for northern Alberta is shown in Figure 6.1 (Alberta Geological Survey) while the extent of the Western Interior Seaway (~94 million years) is shown in Figure 6.2.

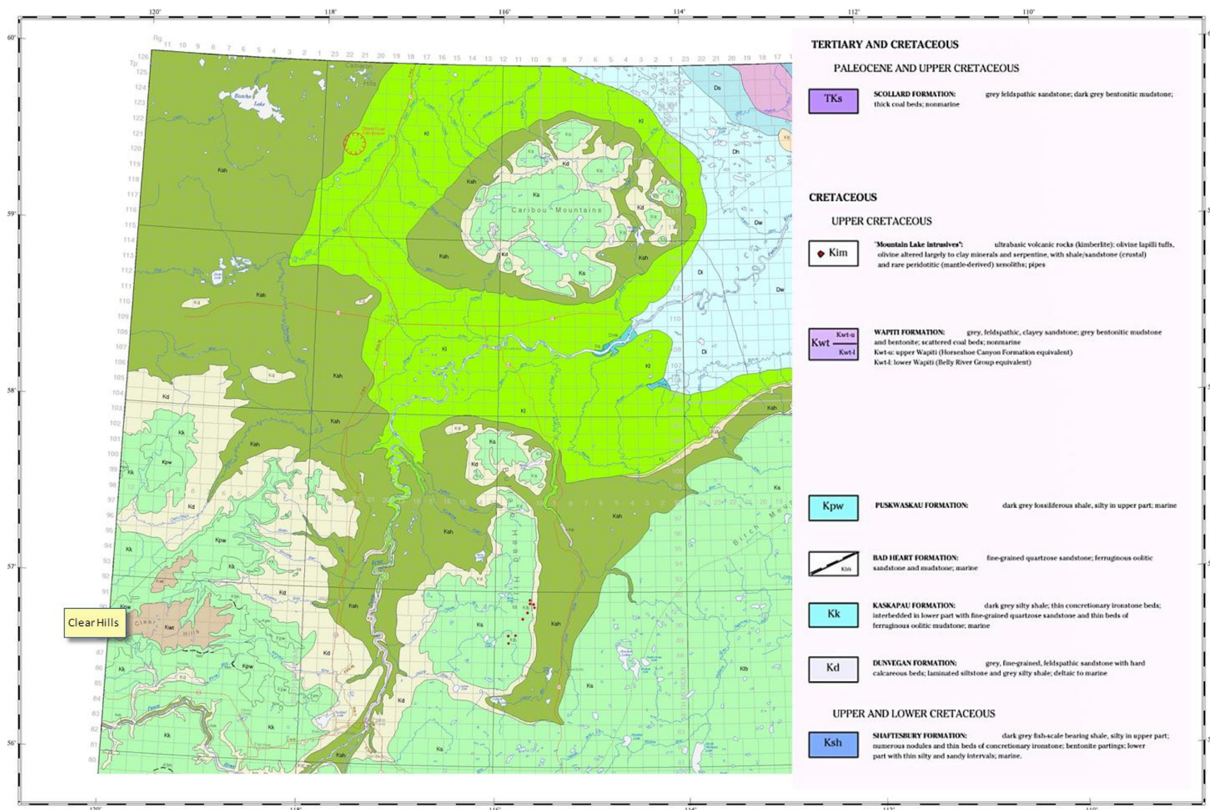


Figure 6.1: Regional geology map of north-western Alberta

Source: Bhattacharya J.P., (2008)

During the Cretaceous, sea levels were highly variable and this resulted in repeated events of transgression and regression within the Interior Seaway. The transgression was intermittent and resulted in a sequence of shallow subaqueous (dominant) and sub-aerial sediments which were deposited during a significant portion of the Cretaceous Era.

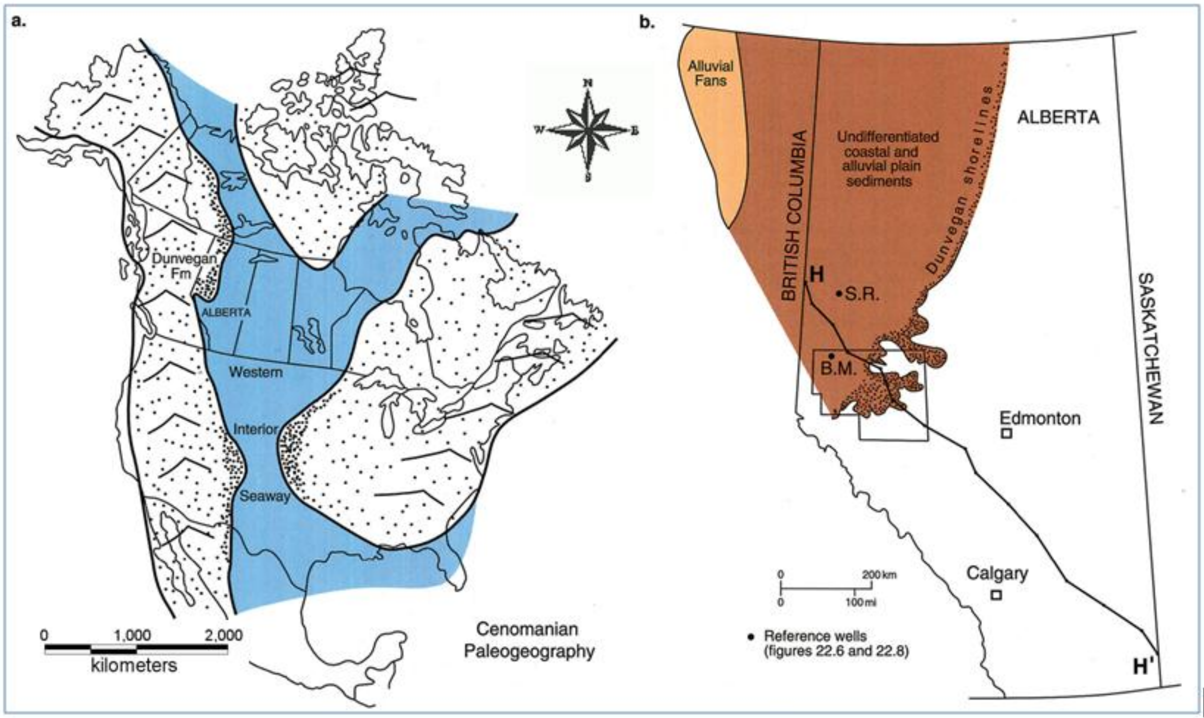


Figure 6.2: (a) General paleogeography of Western Interior Seaway and (b) Dunvegan Sedimentary Deposition Basin

Source: (Williams and Stelck, 1975)

The sediments have deeply buried the basement rocks which do not outcrop in the region but have been intersected by deep wells (Burwash et al., 2008). Basement rocks in the Clear Hills area are approximately 1.8 Ga continental magmatic arc derived rocks and accreted terrains.

Regional structure consists of gently undulating homoclinal terrain which dips less than 10° to the west, although some recent elevation measurements of the Bad Heart Formation at Worsley and Rambling River indicate a gentle northerly dip (Olson and Kafle 2005). Figure 6.3 shows the generalized Phanerozoic tectonic features of Alberta.

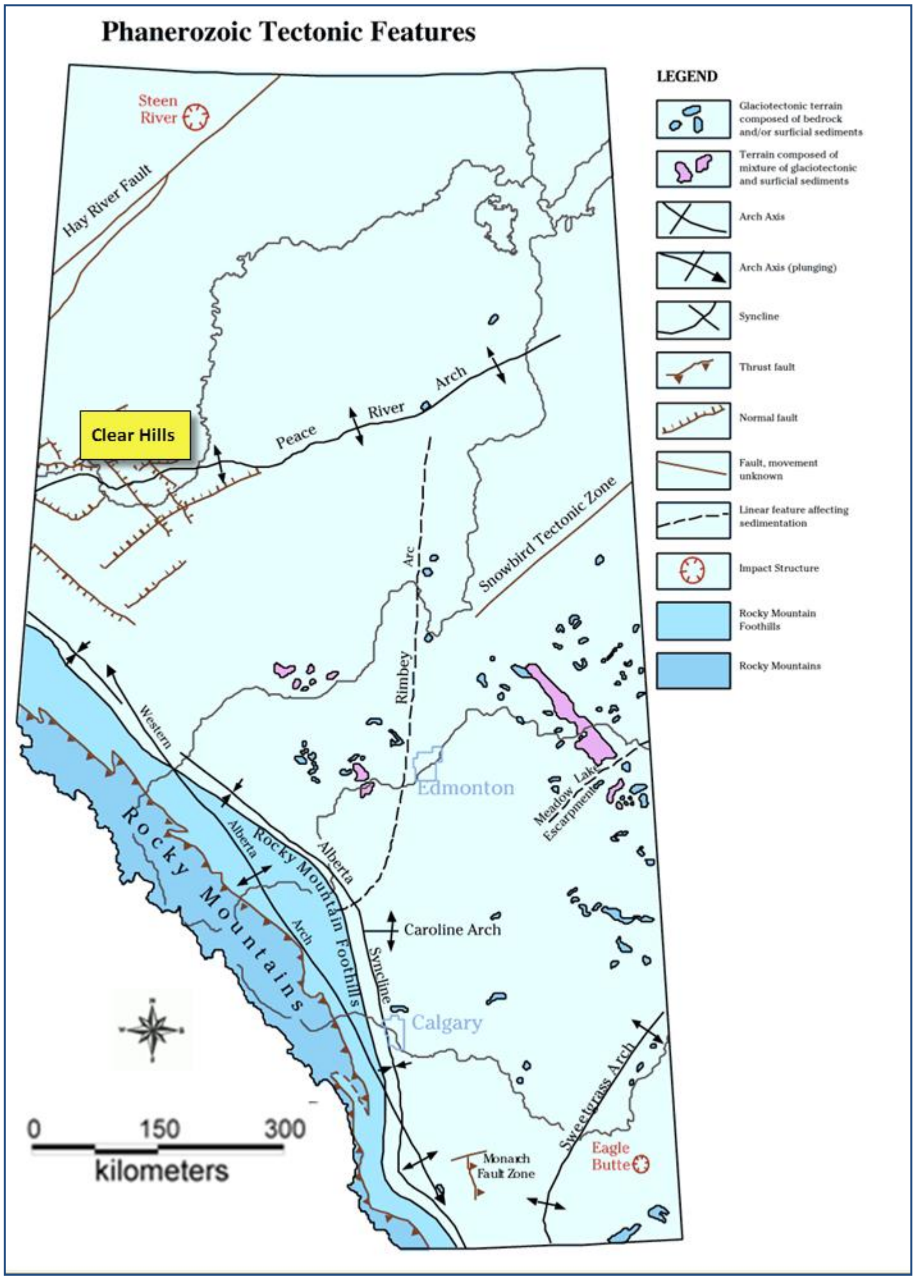


Figure 6.3: Generalized Alberta Phanerozoic tectonic features

(AGS, geology.about.com)

The Clear Hills region lies just north of the Peace River Arch. It is underlain by a sequence of flat-lying to gently folded Cretaceous sedimentary units of the Smoky and/or Colorado Groups.

Figure 6.4 shows the stratigraphic section for the northwest and northeast plains of Alberta. Two sedimentary groups dominate the sequence; the Colorado Group and the Smoky Group which overlap somewhat in definition, both including the Puskwaskau Formation. The Smoky Group is younger and includes the Wapiti, Puskwaskau and iron-bearing Bad Heart Formation. It overlies the Colorado Group which includes the Kaskapau and Dunvegan Formations.

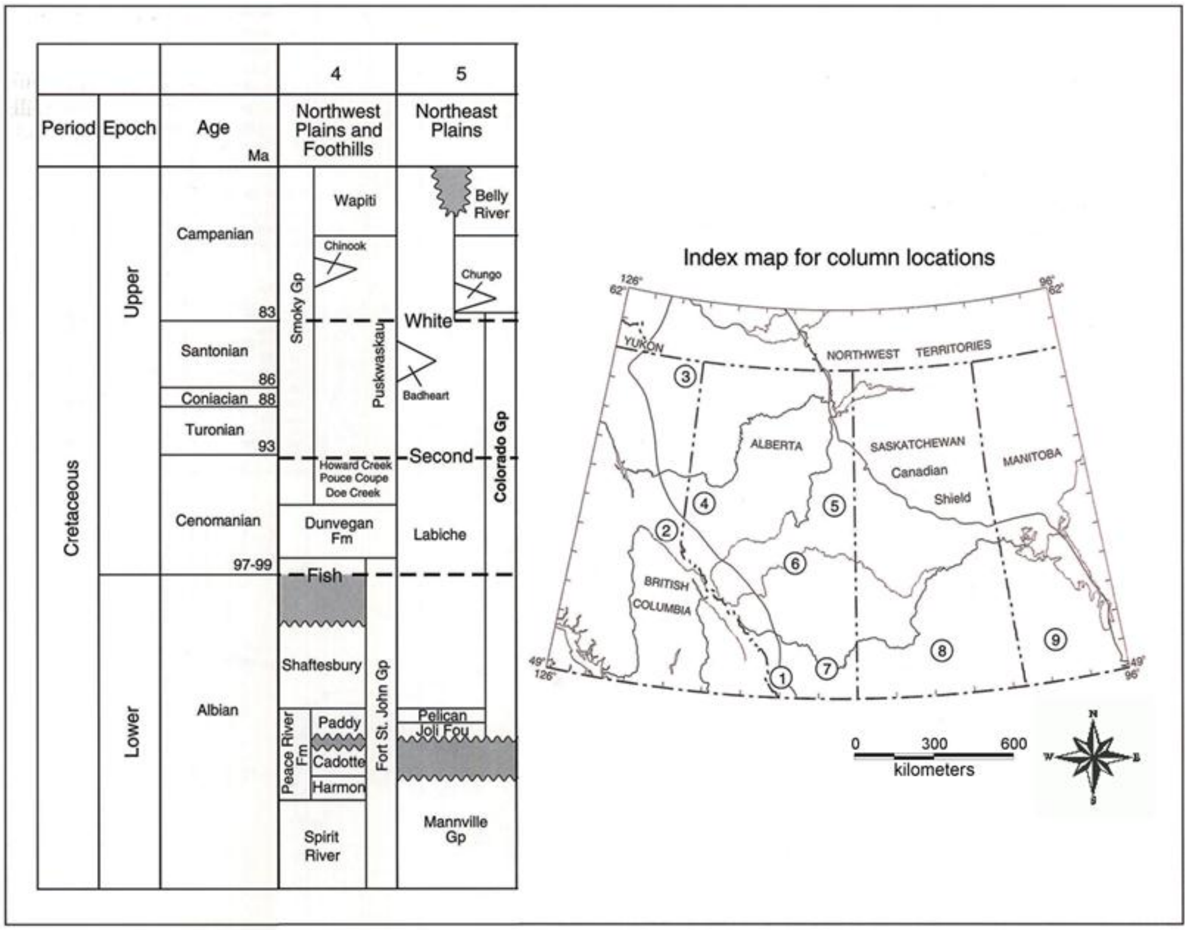


Figure 6.4: Stratigraphic terminology of the Colorado & Smoky Groups
(Modified from Alberta Geological Survey, 2008)

The iron bearing Bad Heart Formation is bounded by unconformities, being overlain by the Wapiti and Puskwaskau Formations and underlain by the Kaskapau and Dunvegan Formations. The Bad Heart forms the boundary between the Puskwaskau and the Kaskapau. As expected, the Wapiti and Puskwaskau Formations occur at higher elevations and in the west of the region, while the underlying Kaskapau and Dunvegan Formations occur to the east and at lower elevations along erosional valleys such as the Eureka and Peace Rivers as shown in cross section on Figure 6.5 and plan view on Figure 6.6.

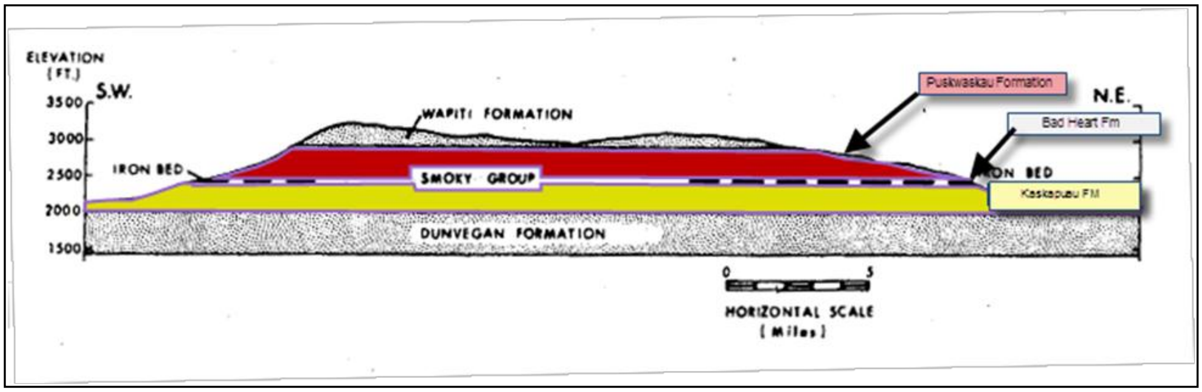


Figure 6.5: Schematic cross section through Clear Hills showing stratigraphic sequence formation

(Modified after Bertram and Mellon 1975)

Generally, the rock formations of this region are dominated by marine fine sedimentary rocks (shale and mudstone) with volumetrically less significant sequences of shoreline and alluvial fan sandstone.

The Wapiti Formation is a 67 to 79 million year old ("Ma") continental unit comprising sandstone and shale with interbeds of coal and bentonite that ranges from 10 to 120 m in thickness (Petruk, 1977). Immediately underlying the Wapiti Formation, the Puskwaskau Formation (80 to 85 Ma) is made up of shale with wedges of marine sandstones. The Bad Heart Formation (85 Ma) underlies the Puskwaskau Formation and ranges from 10 to 20 m in thickness and consists of sandstones, shales, and ooidal ironstones. Ooidal ironstones are moderately well consolidated, brown to black in colour with thin lenses and interbeds of sideritic clays and greenish mudstone (Bertram and Mellon, 1975). The Kaskapau Formation (89 to 94 Ma) directly underlies the Bad Heart Formation and is dominated by shale with less common shallow marine sandstones. It ranges from 170 to 900 m in thickness. The Dunvegan Formation which underlies the Kaskapau Formation is a south-eastward thinning and fining, fluviodeltaic wedge and attains a thickness of about 350 m. It includes interbeds of mudstone, sandstone, and conglomerate (Bhattacharya, 2008).

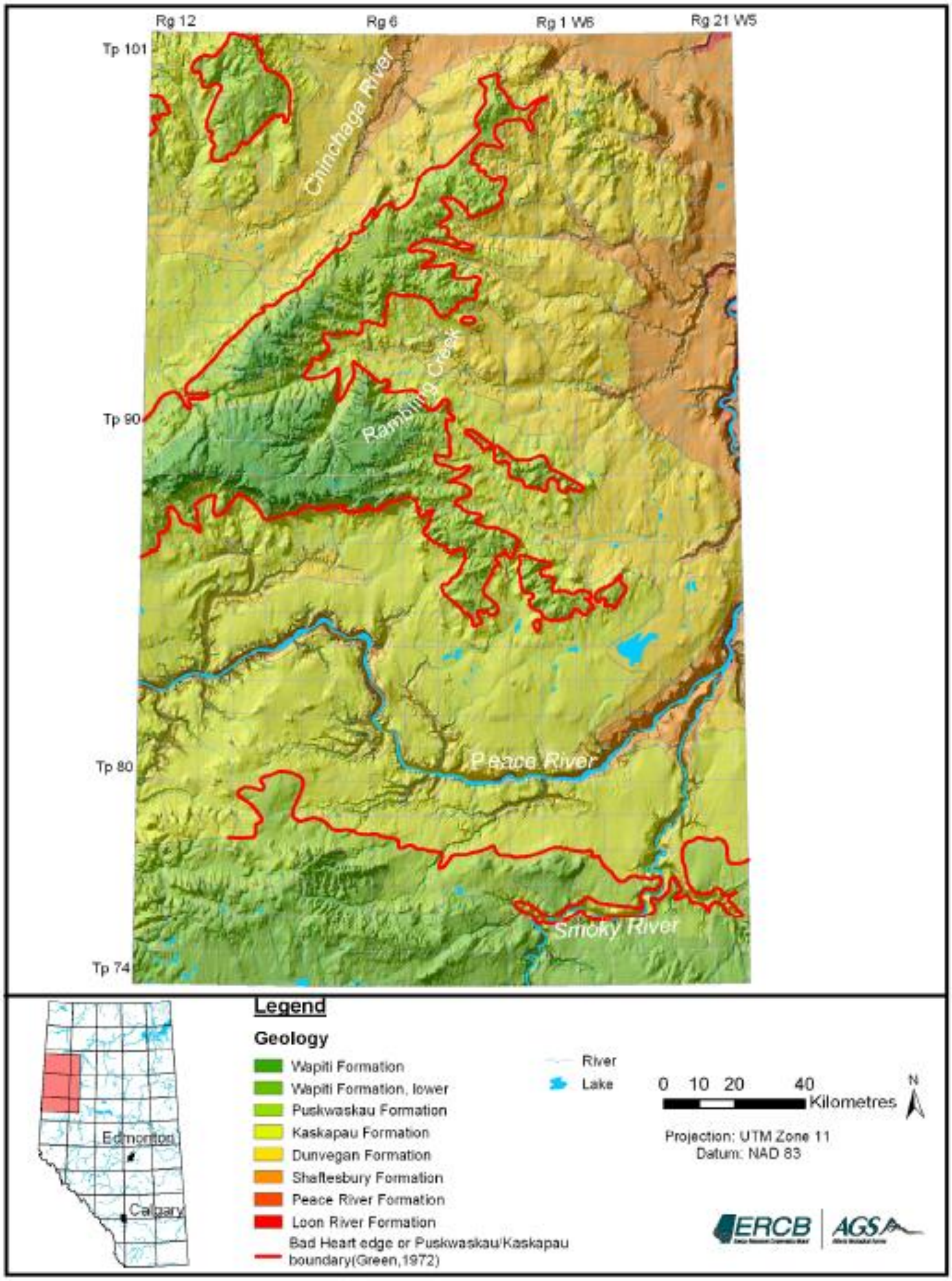


Figure 6.6: Geology of the Clear Hills and Smoky River regions, showing the Bad Heart Formation edge or Puskwaskau/Kaskapau boundary (Kafle 2008)

6.1 Rambling Creek-North Whitemud River Oolitic Iron deposit

The Rambling Creek-North Whitemud River portions of the Clear Hills Property physiography consists of hills in the south and west dropping to plains in the north and east. The hills are cut by a steep sided but shallow valley containing Rambling Creek and the North Whitemud River which drains toward the north. A sequence of lone hills in the central area of the property is separated from the main SW hills by a broad NS trending valley (Figure 6.7 and Figure 6.8).

The topography consists of gently sloping hills and valleys with elevations averaging 700 m and locally reaching 1,100 m. Local relief of up to 300 m occurs along the southern margin of the Clear Hills (Bertram and Mellon, 1975). Modern drainage valleys occur as shallow and broad cuts. Unconsolidated glacial overburden covers the area and locally range up to 35 m thick. Bedrock exposure is scarce and dominantly located along eroded stream banks.

Figure 6.7: Topography of Rambling Creek area

Figure 6.8: Exposure of Bad Heart Formation along Rambling Creek

Within the Rambling Creek-North Whitemud River portions of the property, the geological units found are typical of the region. Glacial overburden consists of 1 to 72 m of glacial till, clay and gravel units although typical thickness is approximately 30 m. The glacial overburden in the Clear Hills is underlain in places by the Wapiti, Puskwaskau and Bad Heart Formations. In the west of the property, total overburden is higher, as it is made up of glacial overburden, Puskwaskau, and Wapiti Formations as elevation increases. Towards the east, total overburden decreases, as the erosional level is lower into the Puskwaskau or Bad Heart Formation. To the east of the zero-edge of the Bad Heart Formation, the glacial overburden directly overlies the Kaskapau Formation shale.

The 2008 drill program consisted of short drill holes completed over areas of lower elevation near the Rambling Creek. The drill holes typically intersected overburden and then penetrated directly into oolitic sandstone or had short upper shale intercepts. Figure 6.9 shows the drill hole collars in relation to Rambling Creek and the local hills and highlights the approximate boundary of the Puskwaskau and Bad Heart Formations and Figure 6.10 show the 2011 North Whitemud River drilling.

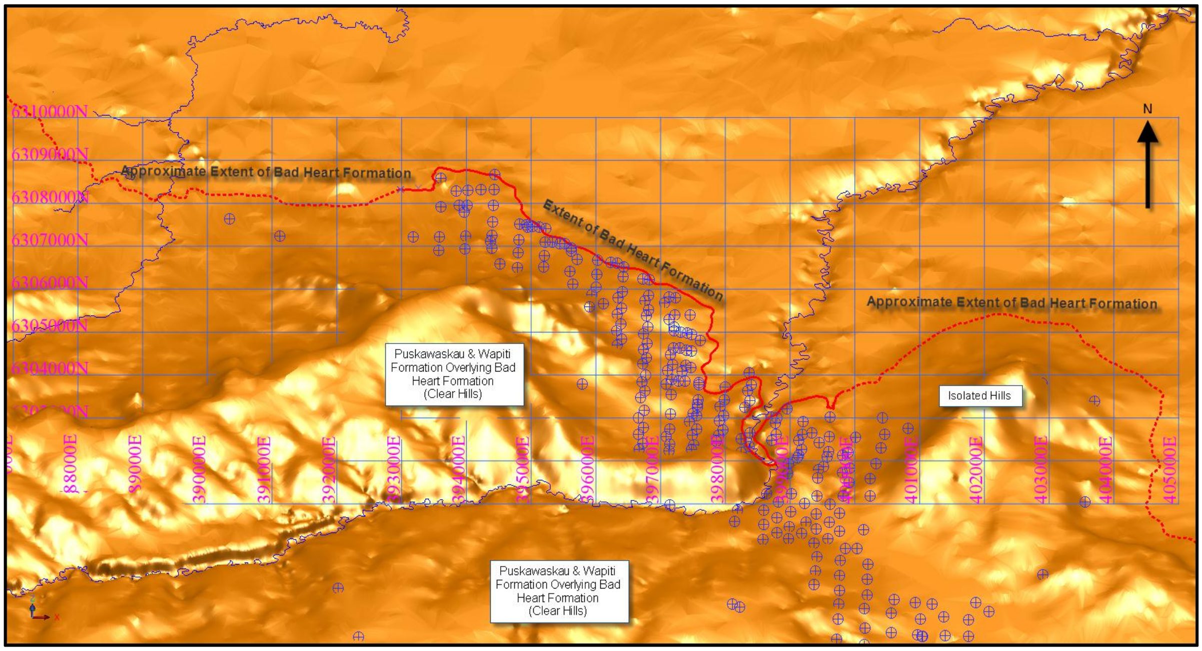


Figure 6.9: Rambling Creek drilling and local physiography looking north, vertical exaggeration 6:1

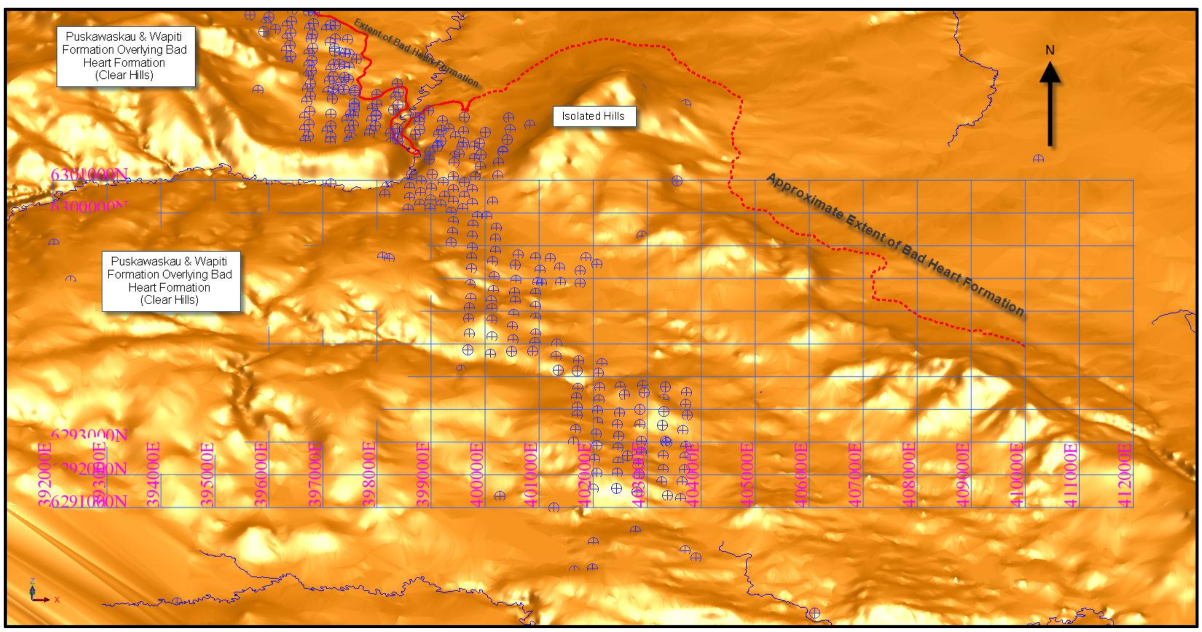


Figure 6.10: North Whitemud River area 2011 drilling and local physiography looking north, vertical exaggeration 6:1

Drilling in 2011 tested the southern extension of the oolitic ironstone deposit south of Rambling Creek towards the North Whitemud River.

Drill holes and associated logs did not preserve information about the glacial overburden and some of the 2008 drilling did not recover either the upper or lower contact of the Bad Heart sandstone and the shale. However, till, clay and gravel intersections were generally reported.

The upper contact of the Bad Heart Formation, where preserved, is a sharp contact between the overlying Puskwaskau shales and underlying ironstones. The OIS intervals can be generally broken into two groups; densely oolitic ironstone ("DOIS") and moderately oolitic ironstone ("MOIS"). The contact between the moderately oolitic ironstone and the basal shale is gradational over about one or two metres. Oolitic components of the rock may variably continue as part of the lower sequences, but decreases gradually until the level of oolitic material fall well below 10% of the rock volume. The decrease in oolitic material is associated with an increase in silicate minerals and clay contents near the bottom of the ironstone unit.

The division between the densely oolitic ironstone and the moderately oolitic ironstone is somewhat arbitrary and may not have been consistently applied between the pre-2008 and Ironstone logs. The iron (and oolite) content is highest in the top of the iron bearing bed and grades to lower content toward the bottom.

6.2 Mineralization

The deposit is bedded, flat lying, and has an average thickness of 8.3 m and a maximum thickness of 15 m. The deposit is exposed on the banks of Rambling Creek and extends northwest and southeast of Rambling Creek for several kilometres. The deposit has been modelled for a strike length of 21 km and 4 km across strike. The ironstone consists of ooliths, siderite, and clastic material embedded in a clastic matrix and ferruginous cement. The ooliths consist of concentric layers of intimately intergrown goethite, nontronite, and amorphous phosphate around centres which are generally quartz. The goethite contains 46 to 56 wt % Fe and about 1.6 wt % P_2O_5, the nontronite contains about 36.7 wt % Fe and 0.8 wt % P_2O_5, and the amorphous phosphate contains 4.4 to 22.9 wt % Fe and 15.4 to 35.0 wt % P_2O_5. The cement is largely a ferruginous opal that contains 24 wt % Fe. About 44% of the Fe in the ironstone beds occurs as goethite, 35% as nontronite, 13% as ferruginous opal, and 8% as siderite (Petruk 1977).

The DOIS unit is described as a brown to black sandstone unit with 40% to 70% silicate nucleus iron oolite clasts and minor finer hydrated iron-silicate matrix. Oolites are 0.2 to 1 mm in diameter and densely packed with other clasts of nodular rock fragments and angular quartz grains. Examples of DOIS oolite and matrix relationships are shown in Figure 6.11, Figure 6.12 and Figure 6.13 (Sliwinski 2009).

Figure 6.11: Photograph of DOIS core sawed in half

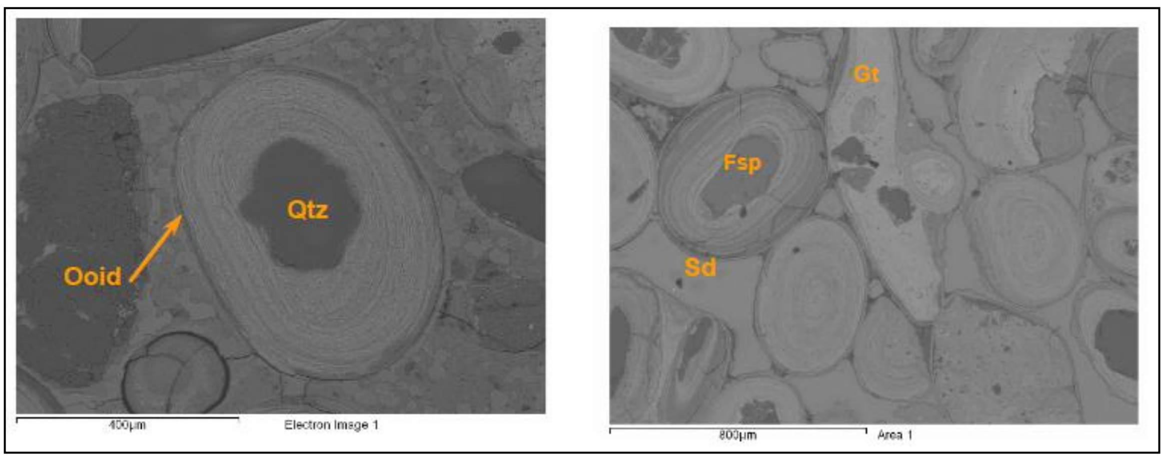


Figure 6.12: Examples of oolites and oolite formation

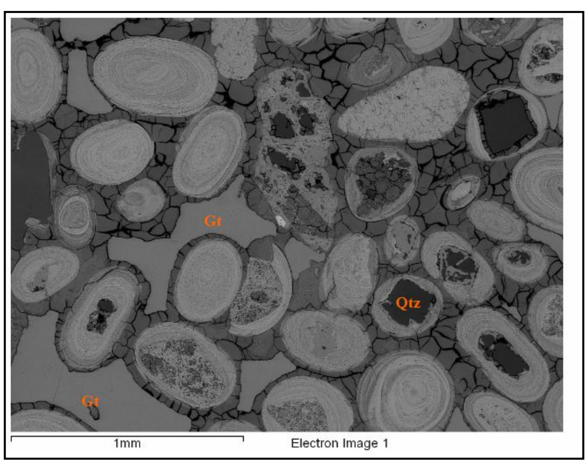


Figure 6.13: Densely packed oolite clasts with "cracked" texture of ferruginous opal and siderite matrix

The MOIS unit is similar but with lower (25% to 50%) amounts of iron oolite clasts, finer oolite clasts and an increase in fine grained iron silicates and clay matrix. The bottom of the unit grades into finer grained sandstone and eventually shale (Bertram and Mellon 1975).

Major iron bearing minerals include goethite and siderite with minor amounts of pyrite and glauconite. QEM scans shown in Figure 6.14 and Figure 6.15 highlight the differences in mineralogical components between the upper and lower sandstone units. The DOIS has a much higher proportion of coarse (oolitic) goethite (grey / black) and a lower proportion of coarse quartz (pink). In Figure 6.15, the lower proportion of coarse oolitic goethite is evident, but a finer component of high Si-Al goethite is still evident. A higher proportion of coarse quartz clasts are prevalent as well in the MOIS unit.

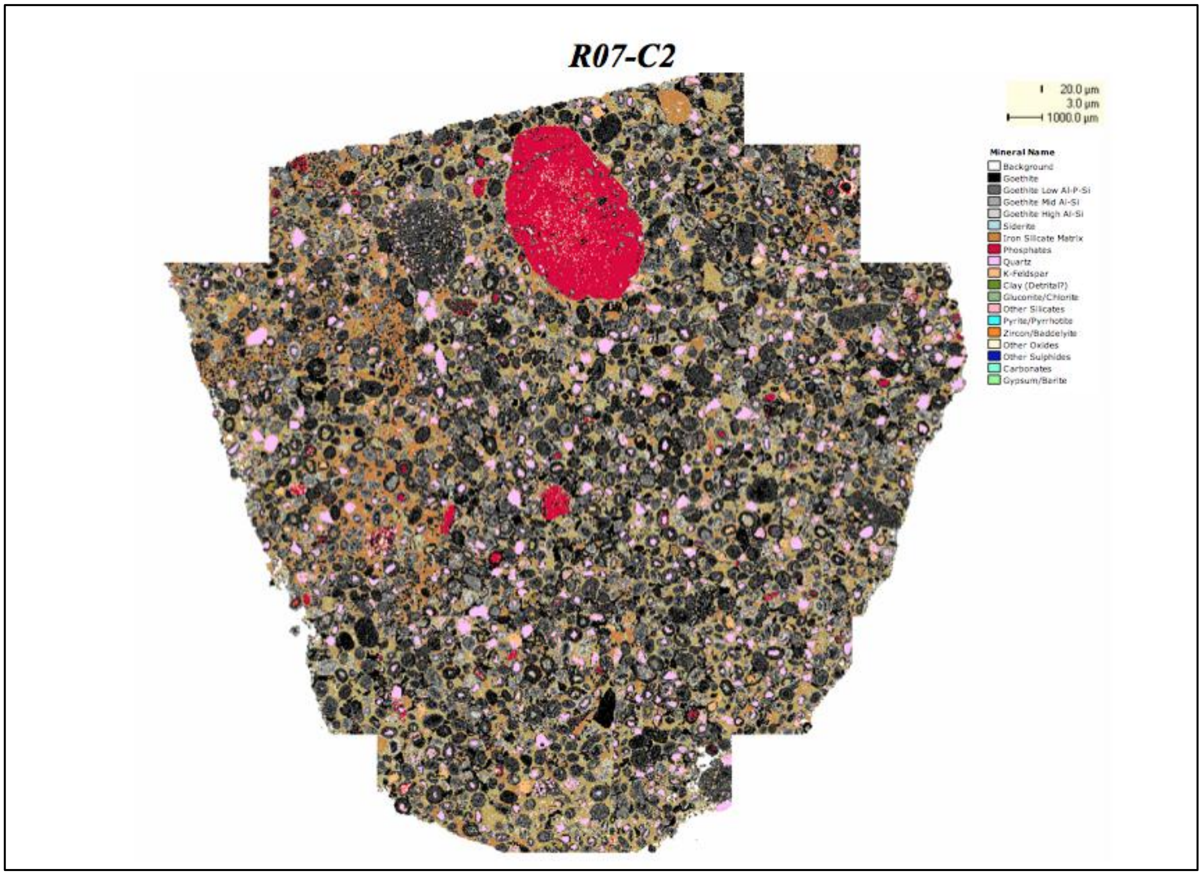


Figure 6.14: QEM scan (false color) of DOIS

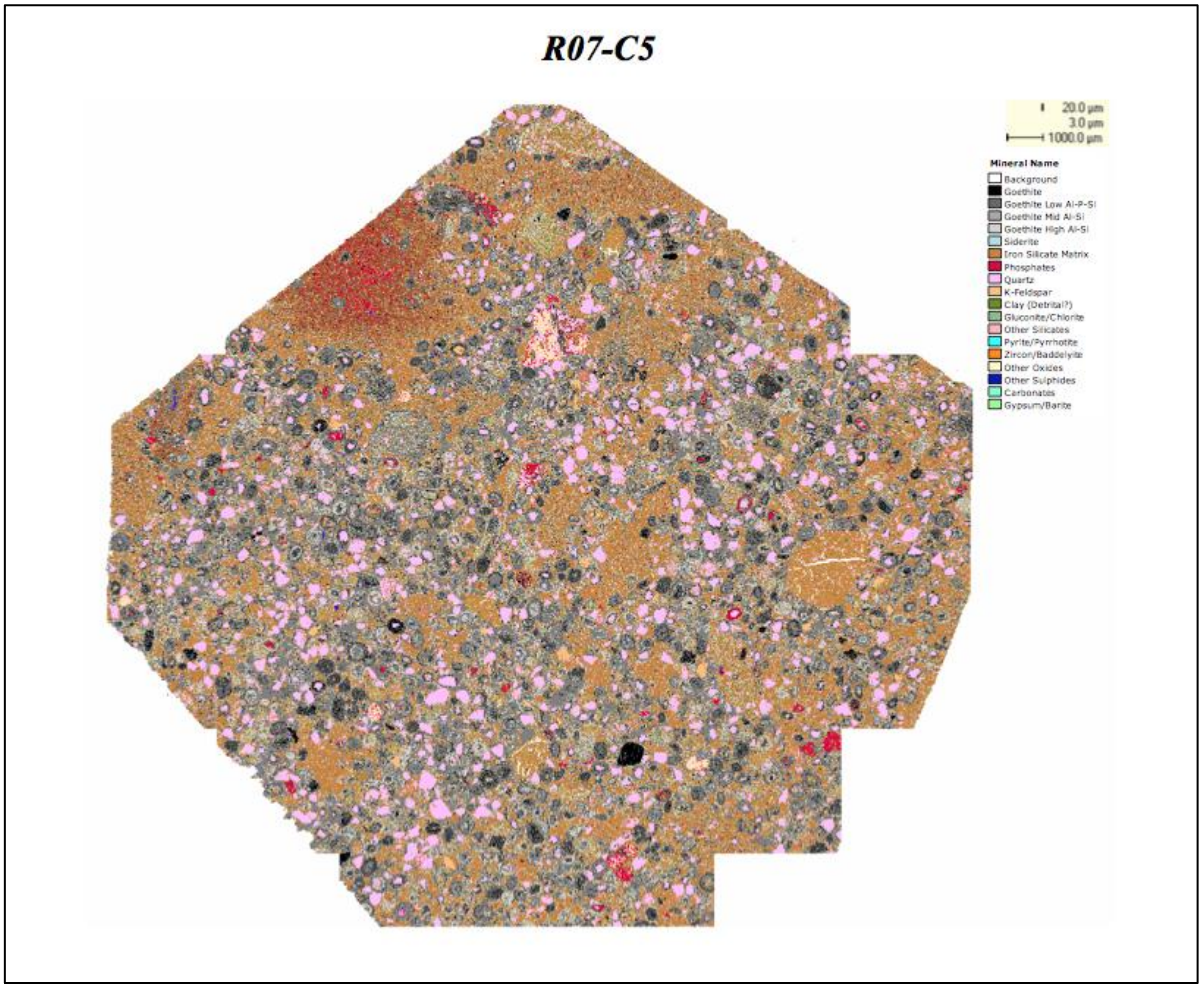


Figure 6.15: QEM scan (false colour) of MOIS

7 Deposit Types

The Clear Hills Deposit is an oolitic ironstone deposit that is best classified as Minette type iron formation. The most prominent feature of these oolitic ironstones is the presence and abundance of oolites and pisolites composed of goethite and nontronite that were deposited in shallow water environments, close to shorelines or abandoned deltas.

The ironstone deposit consists of ooliths, siderite and phosphate clasts, in a clastic matrix with silica cement. The ooids are composed of fine concentric laminae of goethite, nontronite (an iron rich smectite) and amorphous phosphate phase in variable amounts. The cores of the ooids are variable as well and consist of quartz, feldspar, phosphate, magnetite/hematite, broken pieces of older ooids and other clastic fragments. The ooids are set in a fine- grained iron-rich clastic matrix primarily composed of an amorphous silica cement described as “ferruginous opal” that contains 24 weight percent (“wt%”) Fe. Goethite containing 46 to 56 wt% Fe is the primary iron mineral of interest in this deposit.

Oolitic ironstones typically contain between 30 and 50 wt % Fe. Oolitic iron formations are, however, much more aluminous and contain high concentrations of phosphorus P (an average of 0.5 to 1 wt %) than banded non-oolitic iron formations. The SiO_2 content is usually greater than 20 wt %.

8 Exploration

Several reconnaissance trips have been made to the Clear Hills property by Ironstone staff and by its prime contractor. In 2007/2008, it was noted that several culverts had been removed from stream crossings in the area which restricted access in to the permit areas. During the 2008 drilling program, snow bridges were required to allow for transport into the drilling area.

Since 2008, Ironstone has invested in installing new culverts over the creek crossings to allow for year-round access to the permit areas, airstrip, and camp area.

A drilling and service camp was established at the northeast end of the airstrip to accommodate all onsite personnel (Figure 8.1). The crossing of Rambling Creek was facilitated through the construction of an ice-bridge where the Iron Haul Road meets Rambling Creek.

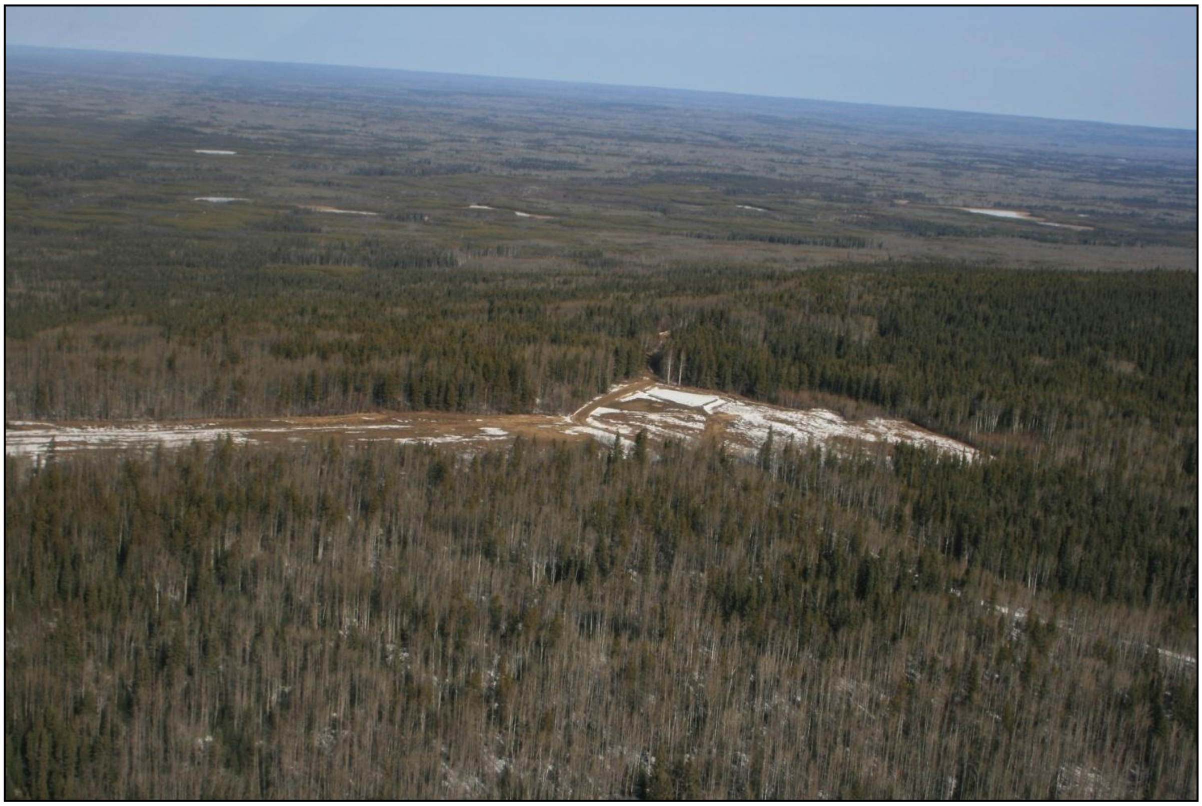


Figure 8.1: Ironstone Clear Hills campsite and airstrip

8.1 2011 Bulk Sample

During March 2011, concurrent with Ironstone's winter drilling program on the North Whitemud River block, the company opened a bulk sample pit at the south end of its Rambling Creek block. A 9 ha area was permitted for up to 45,000 tonnes of material to be extracted per annum.

Ironstone extracted 11,000 tonnes of oolitic ironstone for process development, pilot plant tests and future use. 7,500 tonnes of material is stockpiled 60 km south of Rambling Creek near the town of Hines Creek on Ironstone's 48 ha property (Figure 8.2) and 3,500 tonnes of material was stored at the airstrip.

The 2011 Ironstone bulk sample pit is located at 398812m E 6303573m N 11V (Figure 8.3 and Figure 8.4). Ironstone's property in Hines Creek is situated at 404267m E 6238770m N 11V. The stockpile on Ironstone's private airstrip is located at 401536m E 6302509m N 11V.

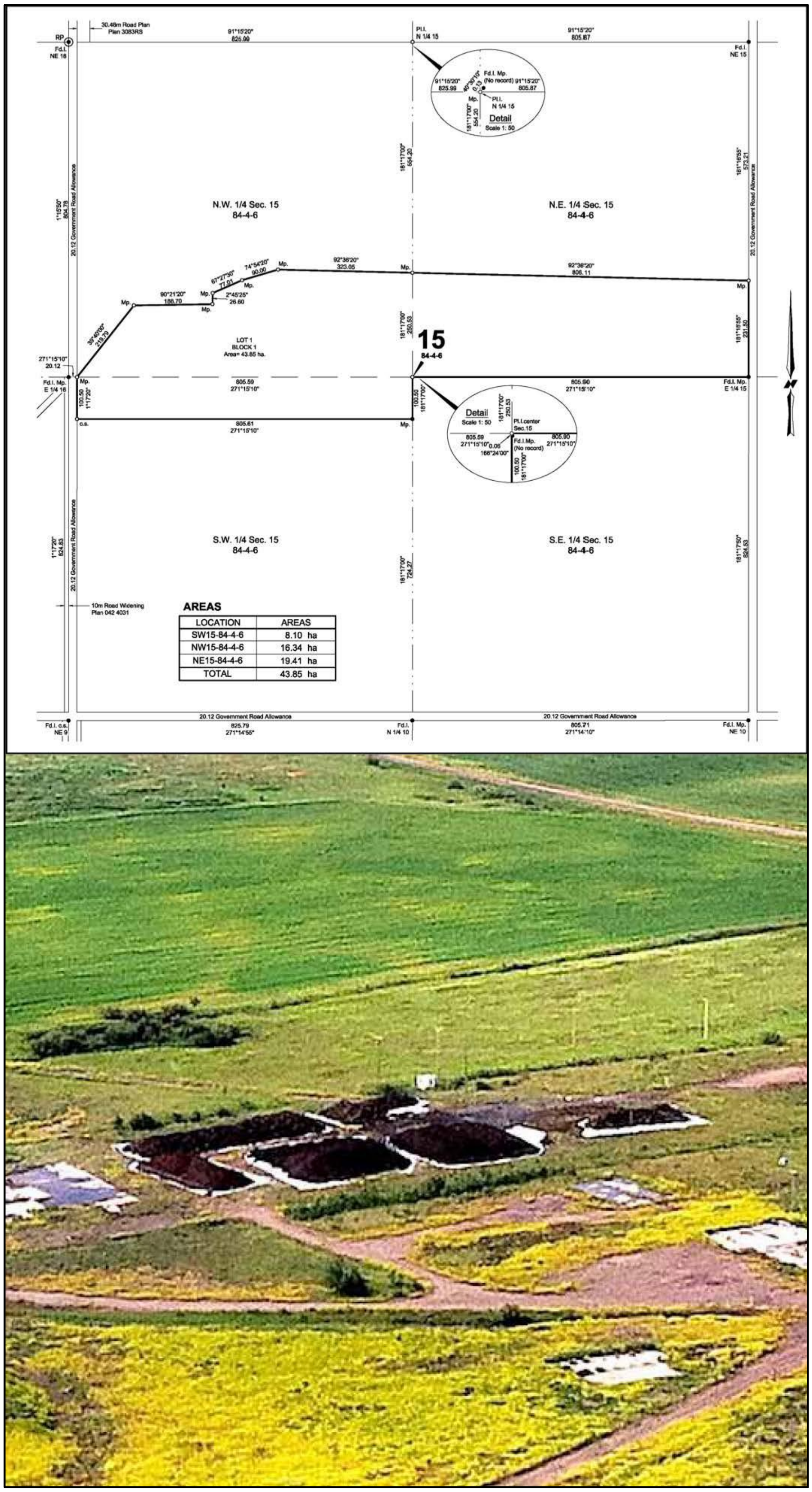


Figure 8.2: Location of 44 ha property and 7,500 tonnes bulk sample

Figure 8.3: Bulk sample pit at south end of Rambling Creek block

A Slope Stability Assessment was conducted by Harder Associates in Q1 2011 and evaluations are ongoing for the design of an open pit mine.

Figure 8.4: Aerial view of bulk sample pit

9 Drilling

Ironstone has carried out two drilling campaigns on the Rambling Creek-North Whitemud River deposit. The first campaign was carried out in 2008 and focused mainly on the Rambling Creek portion of the deposit while the 2011 campaign extended the Rambling Creek deposit to include the North Whitemud River portion of the deposit. Ironstone completed a third drilling campaign in 2012, targeting the extension of the iron deposit in the South Whitemud River area, drilling 31 holes and recovering 1,403 m of core. The South Whitemud River drilling was not incorporated as part of the resource estimate presented in this report.

9.1 Rambling Creek 2008 Drilling

Through the month of February and ending on March 5, 2008, Ironstone conducted its first drilling program on the Rambling Creek area of the Clear Hills Property. The company successfully drilled 2,055 m and recovered 385 m of oolitic iron ore from 47 out of 51 holes. The purpose of the 2008 Ironstone drilling was to collect samples of the oolitic iron deposit for assaying and to validate the historical drilling results. The intent of the drilling program was to twin the historical drill holes; however, the Ironstone drilling grid was offset slightly to the southwest from the historical drilling pattern (Figure 9.1). The new drilling resulted in the deposit being drilled on a 400 by 200 m grid in the Ironstone drilling area.

Geotech Drilling Ltd. of Prince George, BC was contracted by Ironstone to carry out the 2008 drilling program. The company supplied two Fraste Track Rigs mounted on tracks and a five ton service vehicle. The Fraste drilling rig is capable of augering and coring HQ core. Pond water was supplied during the drilling, and no additives were used to avoid environmental contamination. Most pilot holes were cased with steel liners to mitigate the swelling glacial clays. Geotech operated twenty four hours a day with two crews working on a twelve hour rotation. Demobilization from the area in early March was necessitated due to softening ground conditions and the desire to minimize ground disturbance. The company successfully drilled and recovered 385 m of HQ core during the four week period. The Clear Hills are notorious for being difficult to drill due to the presence of expanding clays in overlying glacial sediments. Drilling during the winter helps to minimize the swelling clay problem.

McElhanney Land Surveys (Alberta) Ltd. (“McElhanney”) conducted all surveying work for Ironstone. Drill sites were positioned and marked initially by handheld GPS, with final, highly accurate, drill collar surveys done on all boreholes after drilling. As per regulation, all drilling locations were permanently marked with metal identification tags bearing the MME number, hole number, and DLS location. The tags were affixed to a tree at the southwest corner of each location. At the completion of the drilling program, all of the drilling leases were reclaimed to SRD specification, leaving the area as close to original condition as possible. Ironstone’s onsite Geology and Drilling Program was supervised by its exploration personnel during the entire drilling program. All drill holes were vertical and most penetrated the ironstone but only 17 holes were drilled through to the lower contact of the ironstone. Several difficulties were encountered during drilling, including swelling clays which slowed drilling progress on many holes and high water usage which increased the drilling costs. During cold spells, drilling equipment and water lines experienced freeze-ups.

Figure 9.1 indicates the location of the Ironstone 2008 drill holes in red in relation to the historical drill holes in green. As can be seen, the Ironstone drill holes overlap and essentially act as check of the historical drill data.

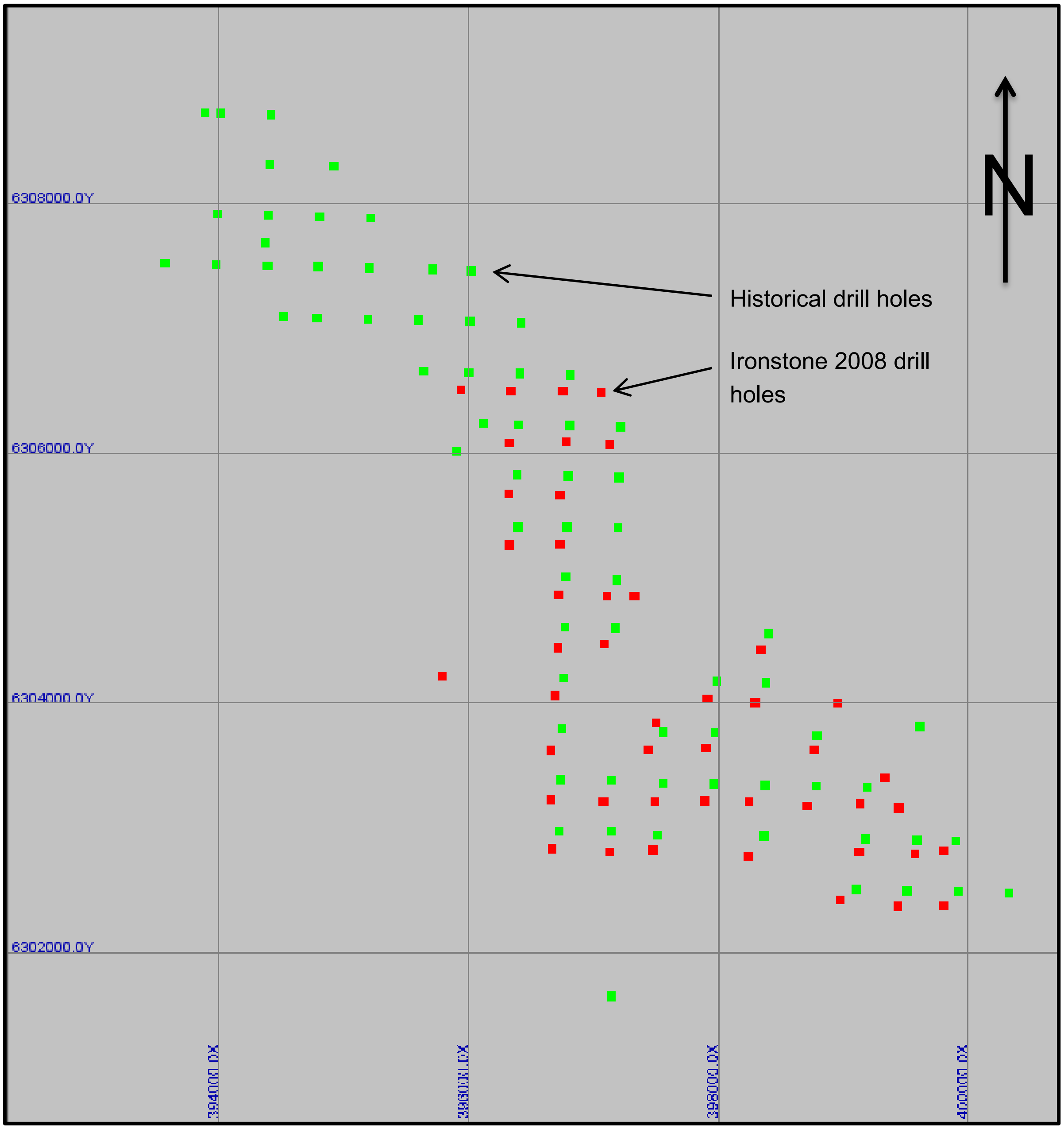


Figure 9.1: Rambling Creek 2008 drilling

Note: Ironstone drill holes in red, historical drill holes in green. Grid is 2,000 m by 2,000 m

9.2 North Whitemud River 2011 Drilling

Drilling in 2011 focused on extending the ironstone deposit south of Rambling Creek in the North Whitemud River project area. A total of 148 holes were drilled and 12,086 m of core was recovered. Drill hole locations were set up at a nominal 400 m spacing with some holes drilled at a 250 m spacing to better define grade continuity within the ironstone. All drill core was HQ3 in size (61.1mm) and 5 foot (1.52 m) acrylic liners were used to prevent oxidation and improve core handling. The 2011 drilling was completed by Radius Drilling, of Prince George, BC working two shifts per day.

All drill sites were initially located with hand-held Global Positioning System ("GPS") devices and later surveyed by McElhanney. Figure 9.2 shows the location of the North Whitemud River drilling with respect to the Rambling Creek drilling and Figure 9.3 shows a typical drill section.

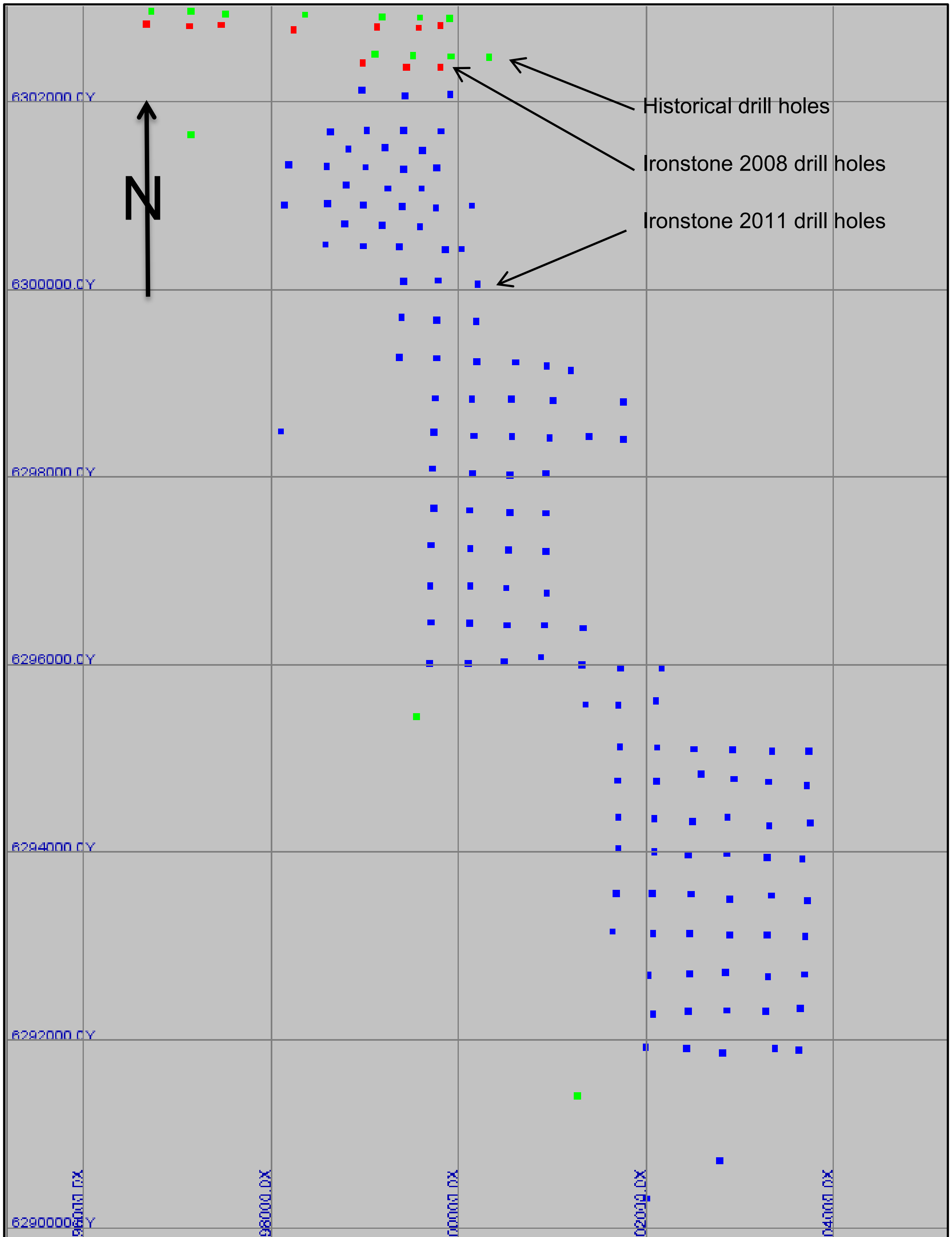


Figure 9.2: 2011 drilling over North Whitemud River area
Note Grid is 2,000 m by 2000 m

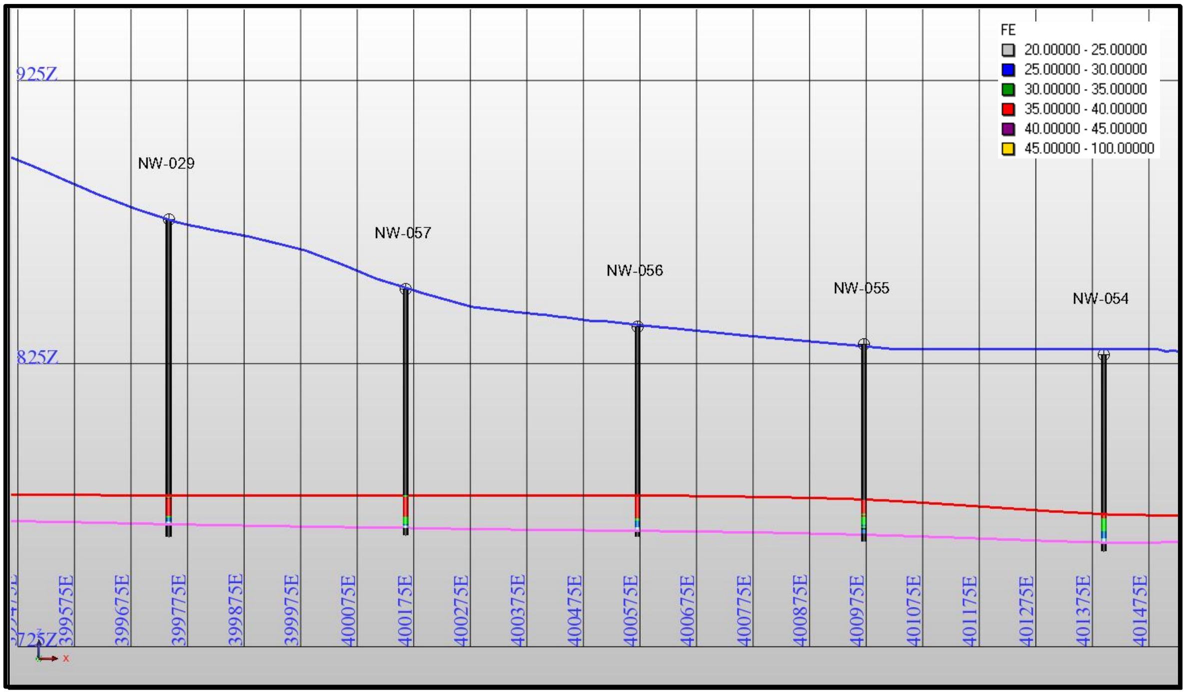


Figure 9.3: Typical cross section showing iron grade and ironstone limits

Note Section is at 6,298,500N looking north. Grid is 50 m by 50 m with a 5 to 1 vertical exaggeration.

9.3 South Whitemud River 2012 Drilling

Drilling in 2012 focused on extending the ironstone deposit south from the North Whitemud River project area. A total of 31 holes were drilled and 1,403 m of core was recovered. Drill hole locations were set up at a nominal 400 m spacing. All drill core was HQ3 in size (61.1mm) and 5 foot (1.52 m) acrylic liners were used to prevent oxidation and improve core handling. The 2012 drilling was completed by Radius Drilling, of Prince George, BC working two shifts per day.

All drill sites were initially located with hand-held Global Positioning System (“GPS”) devices and later surveyed by McElhanney. Figure 9.4 shows the location of the South Whitemud River drilling with respect to the North Whitemud River drilling. The South Whitemud River drilling was not incorporated in the resource estimate presented in this report.

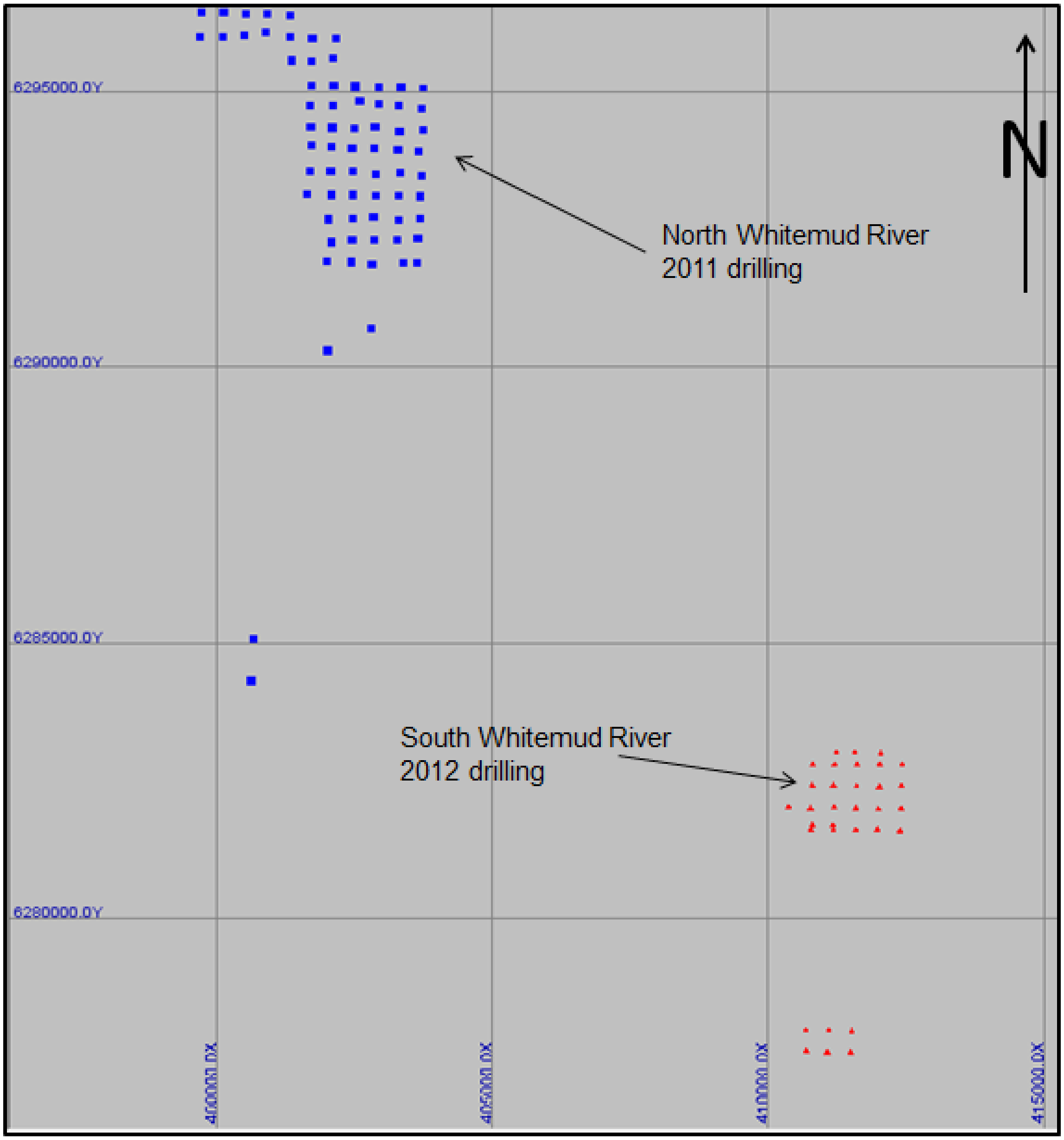


Figure 9.4 Location of 2012 South Whitemud River drilling in relation to 2011 North Whitemud River drilling

10 Sampling Preparation, Analyses and Security

Sampling methods for the historical drilling are not known. Ironstone used similar sampling procedures for both the 2008, 2011 and 2012 drilling campaigns.

All cores were cut to fit inside 5-foot (1.52 m) acrylic liners to avoid oxidation of the iron and maximize recoveries. To ensure all core would remain in its most pristine form, the core was subsequently sealed in poly-tubing before the core boxes were sealed. Each core tube was marked to identify the intervals, including tops and bottoms, and the core boxes were marked with the Hole ID and a bar-code label affixed for easy identification. The 2008 core boxes were secured in a Sea-Can after the program concluded. The core was transported in the locked Sea-Can to a secure facility near Ft. St. John, BC. Ironstone Resources hired an independent, qualified geologist to review the program and provide guidance during the core sampling program which was completed in June 2008. The 2011 and 2012 core was logged at the site by Ironstone staff geologists.

The core sampling program included taking 0.5 m samples for elemental and whole rock analysis. The core was sawn length wise with a diamond saw (Figure 10.1). A total of 752 samples were collected form the 2008 drilling. For the 2011 drill program, 3,888 samples were collected for XRF analysis, 423 samples were collected for wax bulk density and 1,280 samples were collected for metallurgical characterization. Only 185 of the 1,280 metallurgical samples have been sent for testing as of the date of this report. A total of 471 samples were collected from the 2012 drilling and sent for assays.

The 0.5 m samples are representative of the ironstone as intersected in drill core. Some of the upper contacts of the ironstone could not be sampled from the 2008 drilling because the drillers triconed into the ironstone when pre-collaring the drill holes. This problem was corrected for the 2011 drilling and sampling of the upper contact was achieved in all the holes. Coring was also stopped in some cases before the ironstone had been completely drilled so the lower contact of the deposit is not fully documented, however, the lower part of the ironstone tends to be lower grade and of lesser economic importance.

In addition to 0.5 m samples collected across the ironstone deposit, in 2008, the company collected 50 “cookie” samples taken every 2 m for mineralogical and metallurgical analysis over the 385 m of recovered ironstone core. All samples were shipped to SGS Lakefield (“SGS”) for processing and analyses.

SRK is of the opinion that the sampling protocols and sample intervals were adequate for determination of major element concentration of the ironstone. SRK recommends that for future drilling campaigns, the drill holes be extended to intersect the footwall of the oolitic iron deposit so that the entire ironstone can be sampled and analyzed, that characterization of the footwall can be determined, and that special care be taken when drilling the overburden to avoid penetrating the top of the iron deposit with the tricone bit.

The driller was responsible to ensure that the core was properly stored and labeled in the core boxes. The core boxes were picked up from the drill site by Ironstone personnel and taken to the core storage facility at the base camp. At the camp, the core boxes were laid out on tables and checked to make sure that the core was continuous and in the right order in each box. Core boxes were cleaned to remove excess debris and measurements of core were taken to determine drill core recovery. Core recovery was generally very good with only minor intervals missing due to excessive grinding by the drill. All core boxes and lids were clearly labeled with the "from" and "to" lengths in metres.

The core was inspected and photographed at the core storage facility, and the end caps on the acrylic liners were fastened with tape to ensure oxidation was avoided. The 2008 core boxes were re-sealed, and the core box labels were verified for accuracy. A company truck transported the core boxes in the sea-cans to a secured location near Fort St. John. The 2011 core was logged at base camp set up on-site.

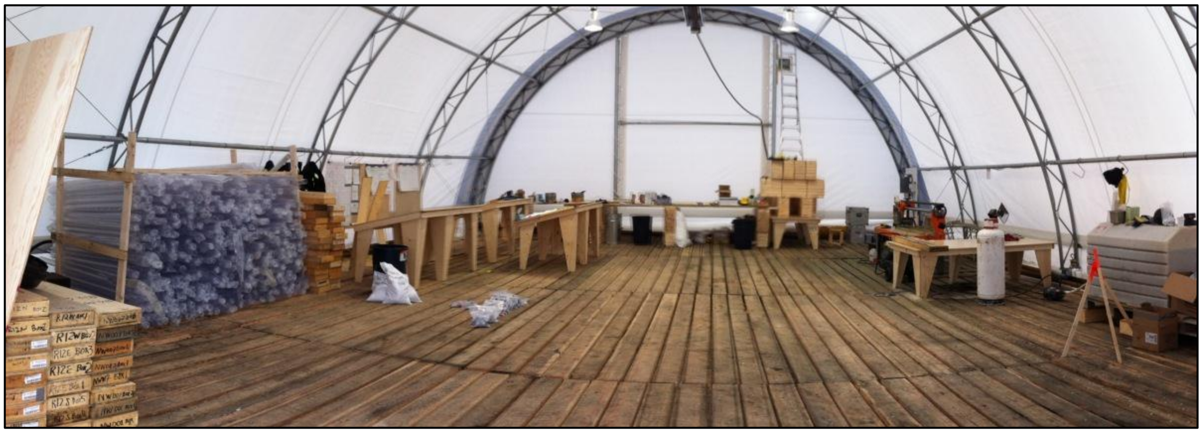


Figure 10.1: Core cutting facility used in 2011

10.1 Rambling Creek 2008 Analyses

All of the core intervals for the 2008 drilling campaign were submitted to SGS for chemical assay (Strong Acid Digest with Fusion of Residue ICP-OES Analysis & Borate Fusion WRA by XRF). SGS is a world recognized laboratory and is ISO 9001:2008 certified. The remaining material was preserved to make composites for metallurgical study. In addition to 50 core intervals chosen by the client, "cookie samples", for QEMSCAN™ analyses, 33 pulverized samples obtained from the chemical assay reject material were also analyzed by QEMSCAN. Each cookie was cut to fit a 30 mm size mold and then impregnated with epoxy resin and polished to give a polished section suitable for QEMSCAN™ analysis. Each section was carbon coated and analyzed using the Field Scan ("FS") mode of QEMSCAN™ operation. The samples were mapped at a 20 micron ("µm") resolution. Each of the 33 pulverized samples was micro-riffled and prepared into graphite-impregnated polished epoxy grain mounts. Each polished section of each sample was submitted for analysis using the Bulk Mineral Analysis (BMA) mode of QEMSCAN™ operation. The samples were analyzed at a 5 µm resolution. Results of the chemical assays were used for the resource estimate.

The QEMSCAN analyses revealed that the primary minerals of interest are the goethite found in the ooids and siderite generally located in the matrix. Some iron is present in the clay minerals and this iron may be recoverable during the iron reduction process. The ooids are ellipsoidal to spherical in shape and on average range in size from 200 to 1000 µm. The ooids consist of concentric layers of goethite, nontronite and amorphous phosphate phase in variable amounts. The cores of the ooids are variable as well and consist of quartz, feldspar, phosphate, magnetite/hematite, broken pieces of older ooids and other clastic fragments. Some ooids are almost entirely goethite whereas others are almost entirely nontronite, but most are a layered combination of the two.

The Ironstone samples shipped to SGS did not include any standards or blanks. SGS did carry out 27 duplicate assays as part of their routine internal quality control system. These internal check assays returned excellent correlation (Figure 10.2 and Figure 10.3).

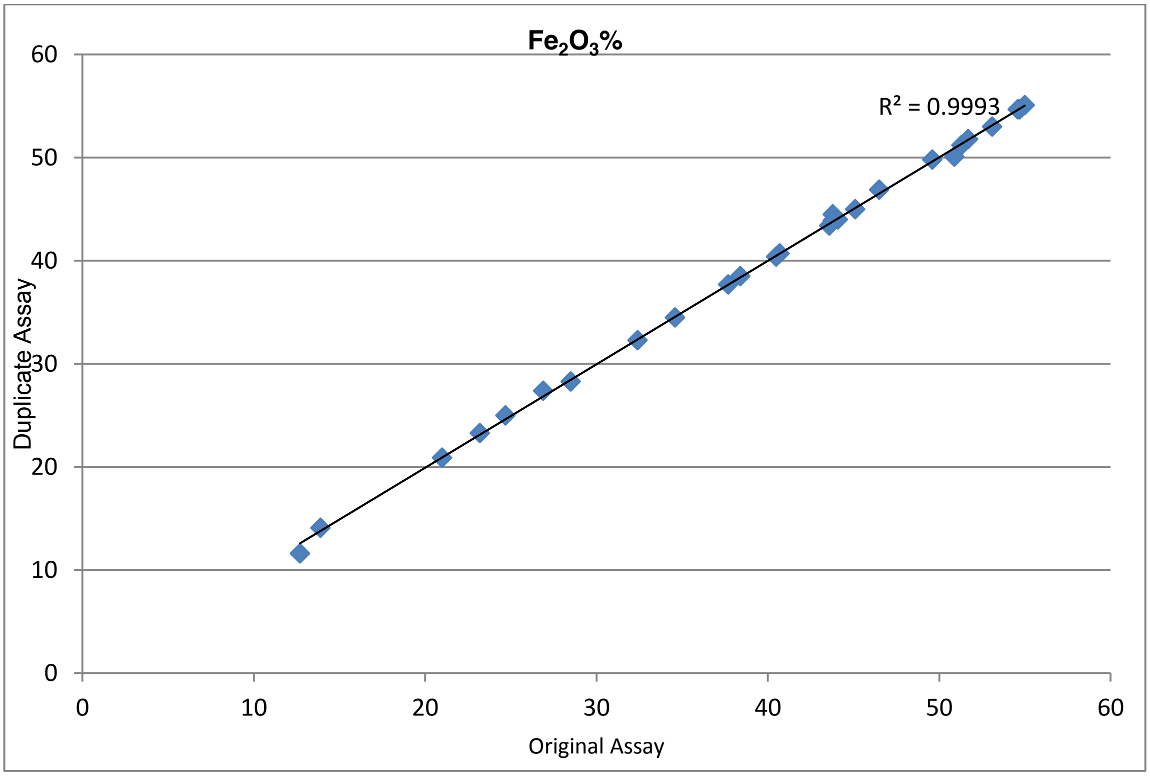


Figure 10.2: Internal SGS check assay results for Fe_2O_3

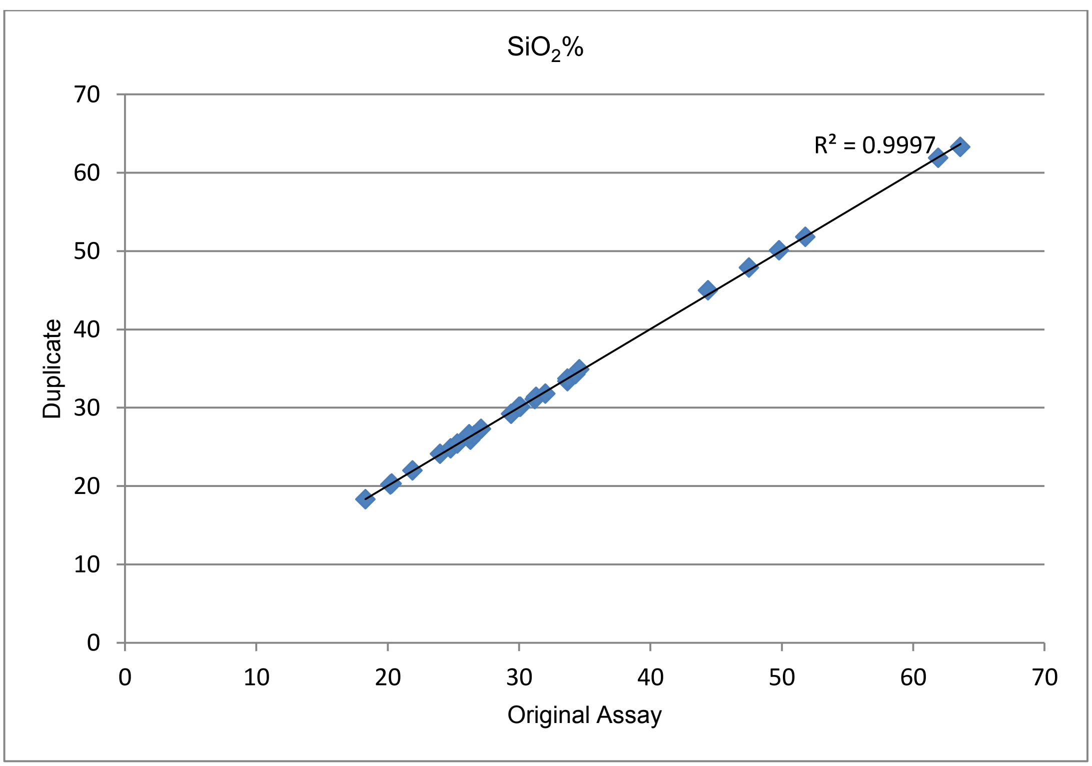


Figure 10.3: Internal SGS check assay results for SiO_2

Because of the lack of reference material (“RM”) and blanks and the overall low level of duplicate assays collected during the 2008 drilling, SRK recommended that 99 pulp samples be collected from SGS and forwarded to ALS Chemex for re-assay. Included with the 99 samples were 10 samples of known concentration, Standard Samples.

The check assay program was carried out under the supervision of Linda Bloom of Analytical Solutions Ltd.

Check assays were conducted on the same pulp that was originally assayed by SGS. Standard procedures are to submit check assays to a secondary laboratory for the same analytical procedures primarily to augment the assessment of bias based on the reference material (RM) and in-house control samples submitted to the original laboratory. Reference materials are also inserted with samples submitted to the secondary laboratory to measure whether the secondary laboratory is potentially biased. For the purpose of this check assay program, reference materials were purchased from CANMET (Natural Resources Canada) and NIST (U.S. National Institute of Standards and Technology).

Table 10.1 lists the analytical methods used at both laboratories. Only selected samples were analyzed at SGS by ICP-MS and these data were not used for check assay purposes.

Table 10.1: Analytical methods used by SGS and ALS Chemex

Method Codes	SGS	ALS-Chemex
Borate Fusion XRF	XRF76C	ME-XRF06 (whole rock XRF)
4-acid ICP-OES/MS	9-4-40 (4 acid ICP-OES)	ME-MS61 (48 element 4-acid ICP-MS)

A total of 10 RMs were inserted with the samples for check assays sent to ALS-Chemex. The results for the 10 RMs were plotted in Table 10.2 and are shown in Figure 10.4 below. There were no quality control failures or mislabels.

Table 10.2: Assay results for reference materials

RM	Number	Criteria	Expected Assay (%)	Observed Assay (%)	% of Expected
CANMET FER-1	3	Fe_2O_3 (%)	75.88	73.78	97.2
CANMET FER-3	4	Fe_2O_3 (%)	44.55	45.32	101.7
NIST 692	3	Fe (%)	41.67	43.83	105.2
Total	10	* - Weighted Average			101.41*

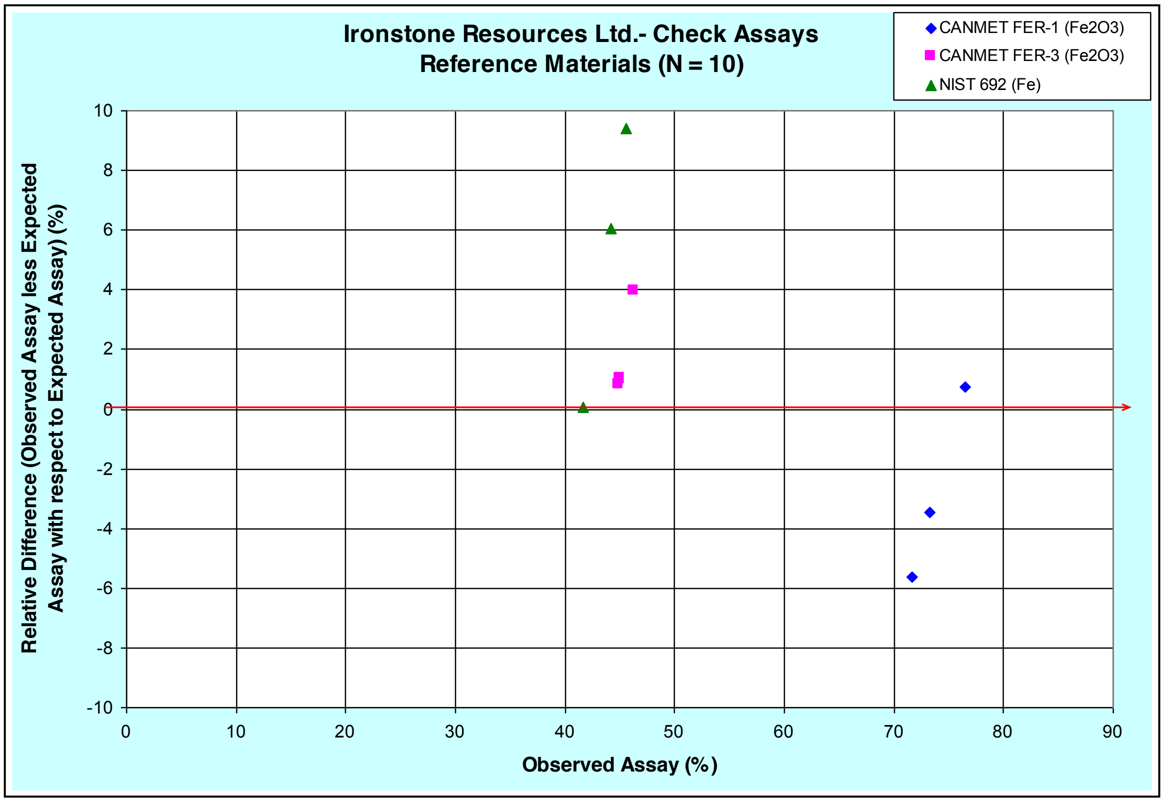


Figure 10.4: Percent error for reference material assayed at ALS Chemex

ALS-Chemex iron assays are within ±10% relative to expected values for the three RMs.

SGS assays versus ALS-Chemex assays are plotted in the Figures 10-5 through 10-10 and summarized in Table 10-3. In most cases, assays by similar methods were compared. If data were not available, conversion factors were used to calculate the corresponding value. ALS Chemex ICP Fe% values were converted to Fe_2O_3 % by multiplying by 1.42973 and SGS V_2O_5 (XRF) values were converted to V% by multiplying by 0.56017.

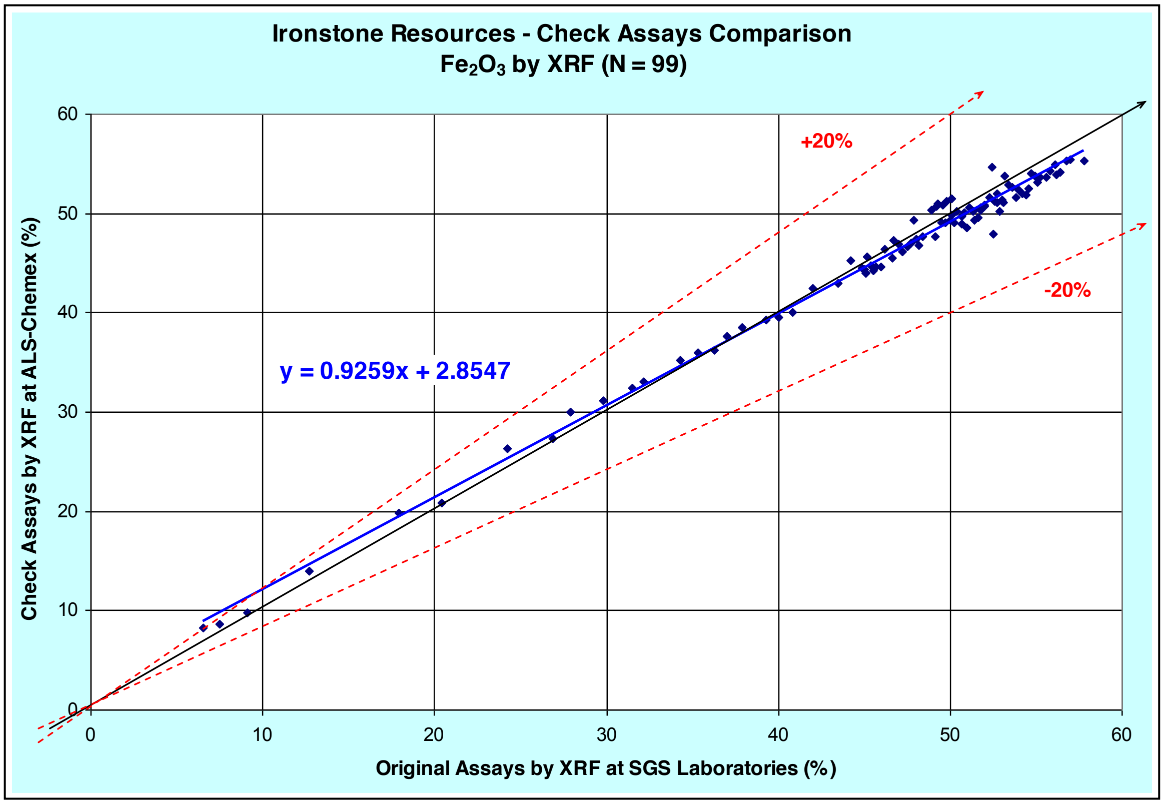


Figure 10.5: Comparison of ALS and SGS SRF assay values

As can be seen in Figure 10.5 the iron assays by XRF agree reasonably well between SGS and ALS-Chemex. There is a small bias (approximately +2% of the Fe_2O_3 assay) for Fe_2O_3 SGS assays greater than 40%. The bias is not significant.

Figure 10.6 compares Fe_2O_3 by 4-acid digest (ICP-MS finish) at ALS-Chemex and Fe_2O_3 determinations by XRF at SGS. As expected, the XRF determinations are generally higher than the 4-acid digest analyses. The difference of some 15% can be explained by the fact that 4-acid digests rarely completely dissolve rocks whereas the XRF determination is done on a fused glass disk and dissolution is not a factor.

The tendency for XRF data to be higher than 4-acid digest data is also apparent in vanadium analyses, which was plotted in Figure 10.7 as an example of an element with a similar discrepancy between XRF and ICP as iron.

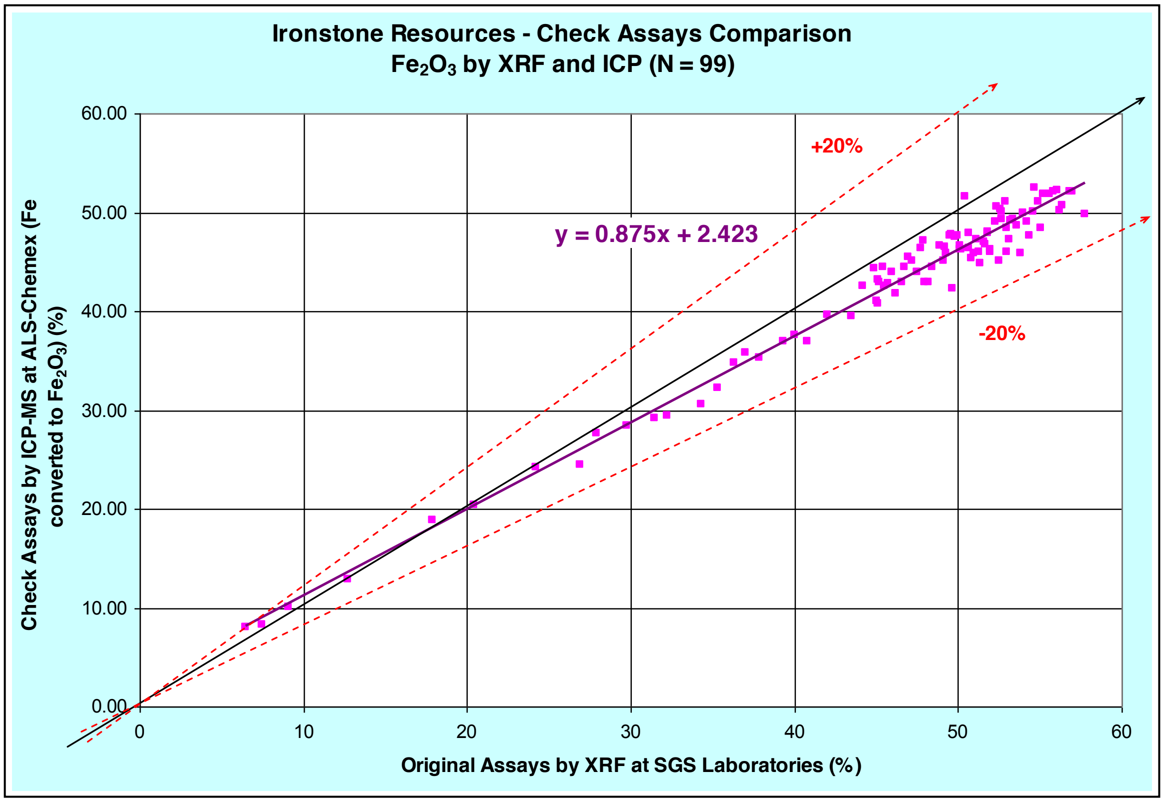


Figure 10.6: Comparison of ALS ICP and SGS XRF Fe_2O_3 assays

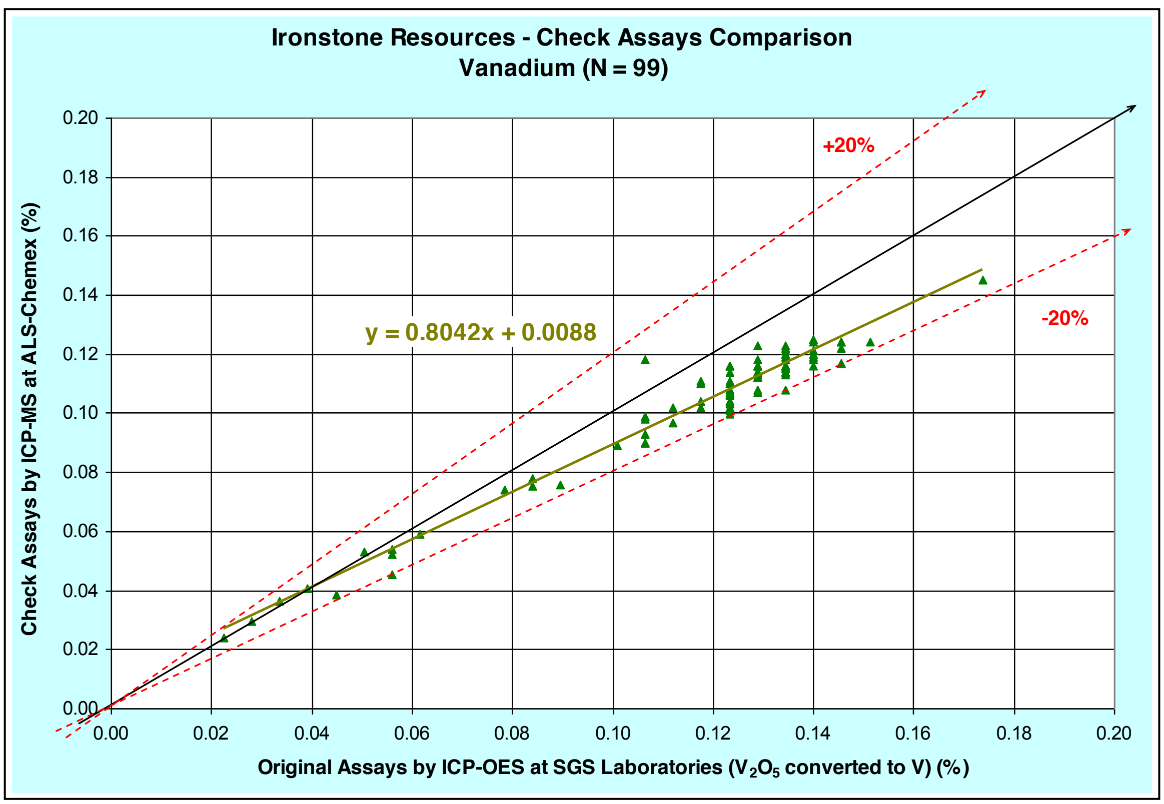


Figure 10.7: Comparison of ALS ICP and SGS XRF V2O5 assays

Other elements such as SiO_2 plotted in Figure 10.8 and TiO_2 plotted in Figure 10.9 analyzed by XRF at both laboratories agree very well.

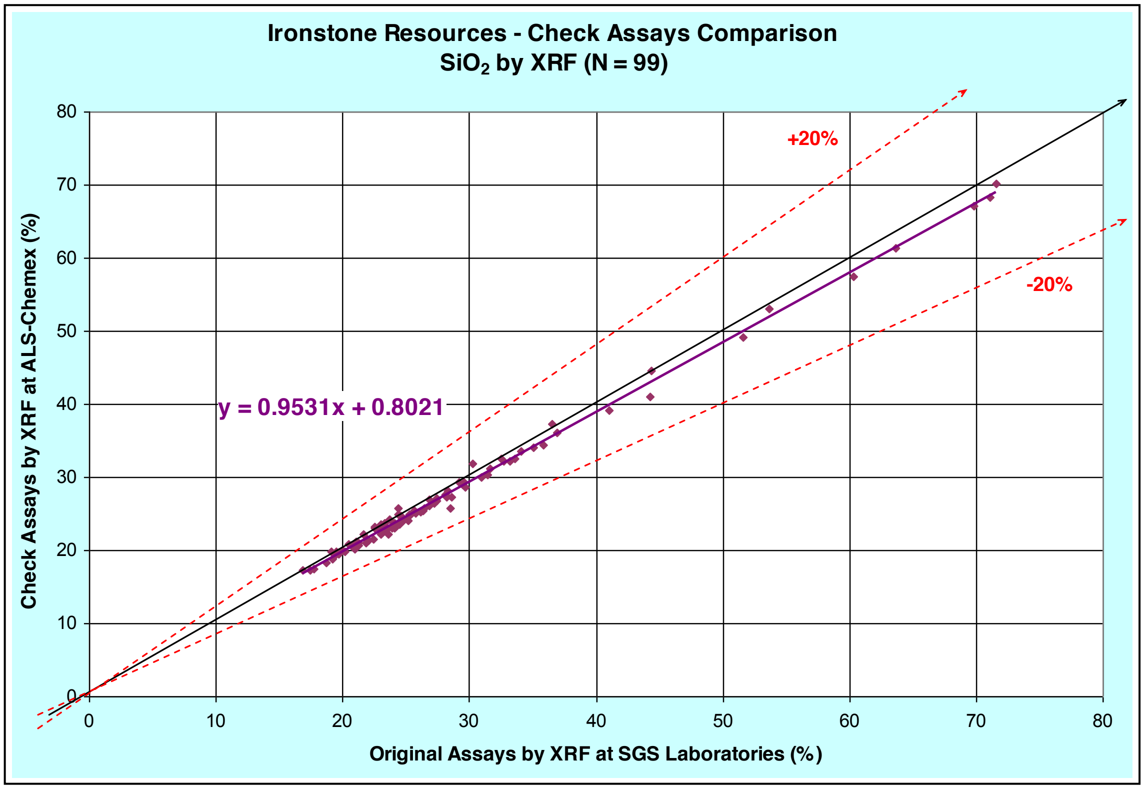


Figure 10.8: Comparison of ALS and SGS XRF SiO_2 assays

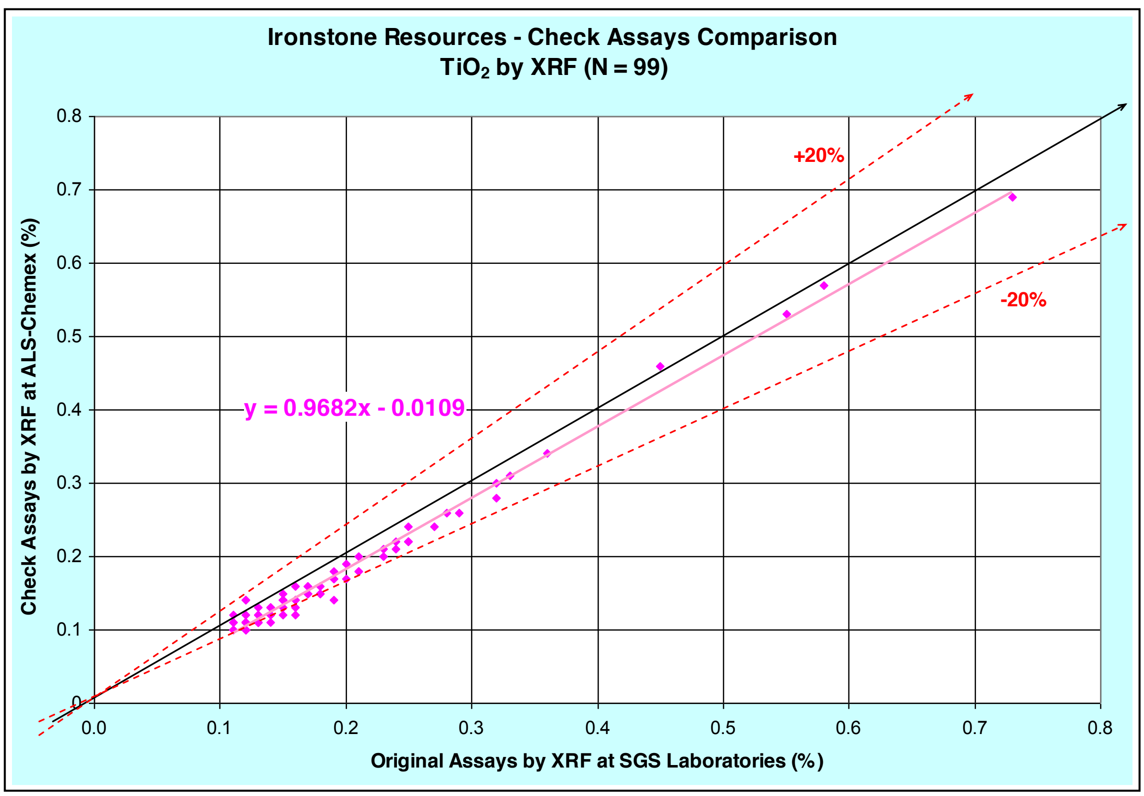


Figure 10.9: comparison of ALS and SGS SRF TiO_2 assays

Loss on Ignition (LOI) is determined by weighing the sample before and after drying. Laboratories can use different temperatures when drying samples which may account for the generally 20% shift in results between laboratories (Figure 10.10).

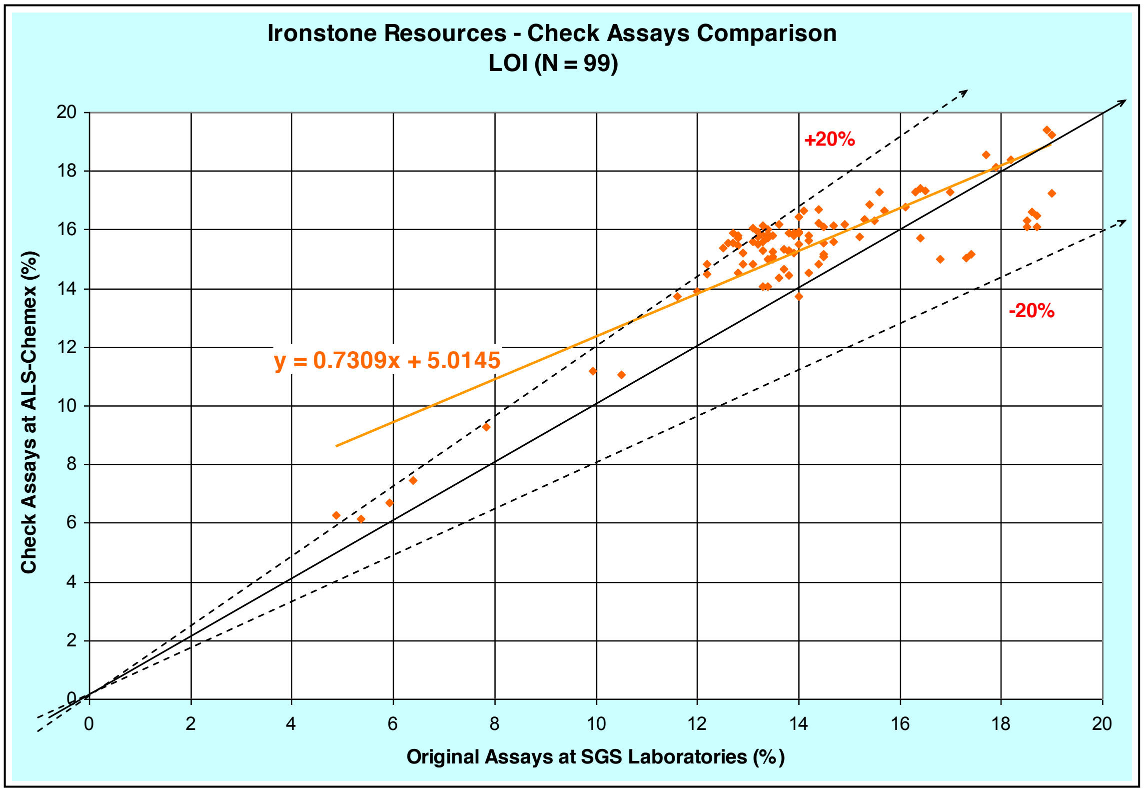


Figure 10.10: Comparison of LOI between SGS and ALS Chemex

The differences discussed above are summarized in Table 10.3 as average (and median) Relative Percent Differences (RPD) and the equation of the linear regression line that compares analyses.

Table 10.3: Summary of relative percent differences between SGS and ALS Chemex

Criteria	SGS Method	ALS-C Method	N	Average RPD	Median RPD	Trend Line Equation
Fe_2O_3	XRF	XRF	99	0.39	1.50	y = 0.9259x + 2.8547
Fe_2O_3*	XRF	ICP*	99	6.68	7.28	y = 0.875x + 2.423
V**	XRF**	ICP	99	12.06	13.18	y = 0.8042x + 0.0088
SiO_2	XRF	XRF	99	1.61	1.72	y = 0.9531x + 0.8021
TiO_2	XRF	XRF	99	10.56	9.52	y = 0.9682x - 0.0109
LOI	Furnace	Furnace	99	-9.13	-10.67	y = 0.7309x + 5.0145

* ALS-Chemex Fe (ICP) was converted to Fe_2O_3 (x 1.42973)
** SGS V_2O_5 (XRF) was converted to V (x 0.56017)

Table 10.4 below summarizes the number of cases with SGS assays greater than ALS-Chemex assays, and vice versa.

Table 10.4: Comparison of SGS and ALS Chemex Fe assay results

Criteria	Average Assay	N	SGS > ALS-Chemex	SGS < ALS-Chemex	Average RPD
Fe_2O_3 (both XRF)	<40% Fe_2O_3	19	2	17	-5.36
			11%	89%	
	>40% Fe_2O_3	80	66	14	1.75
			83%	18%	
Fe_2O_3 (SGS XRF vs. ALS-Chemex ICP)	<20% Fe_2O_3	5		5	-9.66
				100%	
	>20% Fe_2O_3	94	92	2	7.55
			98%	2%	

ALS-Chemex Fe_2O_3 assays confirm original Fe_2O_3 assays reported by SGS Lakefield. As expected, 4-acid digest Fe_2O_3 determinations are generally lower than XRF assays due to the inability of the acids to completely dissolve samples prior to analysis by ICP-OES or ICP-MS.

SRK is of the opinion that the level of sample security and analytical procedures for the 2008 drilling were adequate for this type of deposit.

10.2 2011 North Whitemud River Analyses

For the 2011 drilling campaign, Ironstone sent all of their samples to Activation Laboratories Ltd. ("Act Labs") of Ancaster Ontario. Act Labs is a leading provider of assaying and analytical testing services for mining and exploration companies. The laboratory is accredited to international quality standards through the International Organization for Standardization /International Electrotechnical Commission (ISO/IEC) 17025 (ISO/IEC 17025 includes ISO 9001 and ISO 9002 specifications) with CAN-P-1579 (Mineral Analysis) and CAN-P-1585 (Environmental) for specific registered tests by the SCC. The accreditation program includes ongoing audits which verify the QA system and all applicable registered test methods. They are also accredited by the National Environmental Laboratory Accreditation Conference (NELAC) program and Health Canada ISO 9001:2000 and ISO/IEC 1702S:2005 certified.

All samples shipped to Act Labs were crushed to a nominal minus 10 mesh (1.7 mm), mechanically split by riffle splitter to obtain a representative sample and then pulverized in steel mills to at least 95% minus 150 mesh (105 microns). Samples were analysed by X-ray fluorescence ("XRF") analysis by fusing the sample with lithium metaborate/tetraborate in platinum crucibles with the molten glass cast into a glass disc in platinum crucibles. These glass disks are analyzed on a Panalytical Axios Advanced wavelength dispersive XRF.

The 2011 Ironstone samples shipped to Act Labs did not include any blanks; however, the samples included duplicates and RMs. Table 10.5 below summarizes the insertion rate for sample duplicates and standards.

Table 10.5: Summary of Analytical QAQC data: North Whitemud River 2011 drilling

	Core Samples	Percent of Samples Collected
Total Samples Collected	3,760	
Certified Reference Material - GIOP-32	139	3.7%
Field Duplicates	129	3.4%
Total QC Samples	**269**	**7.2%**

Analytical sample blanks were deemed unnecessary for this type of deposit. The insertion rate for duplicates and RM is slightly lower than industry standard of 5% of samples collected. The assays for each drill hole were generally processed as a laboratory batch. Most holes had one duplicate and one standard included but 14 drill holes did not have a duplicate and 4 drill holes did not have a RM within the sample batches.

Although SRK recommends 5% insertion rate for duplicates and RM, SRK considers the 2011 QA/QC sample insertions to be sufficient for this stage of the project.

10.2.1 QA/QC Duplicates

Ironstone collected and processed 129 field duplicates. The samples were collected by splitting a normal assay sample into two ¼ core duplicate samples. Each were sent to Act Labs. SRK compared the original assay results to the duplicate sample results for Fe, SiO_2 and P for each duplicate pair.

Original Fe values were derived from Fe_2O_3 analysis by mathematical conversion. The original values matched the duplicate values very well, with no significant bias and relatively few pairs which deviated by 10%. Figure 10.11 is a scatter plot of the original vs. the duplicate Fe % assay. The graph shows little bias and relatively little variation between the values, with 99% of the duplicate results having Fe values within 10% of the original assay.

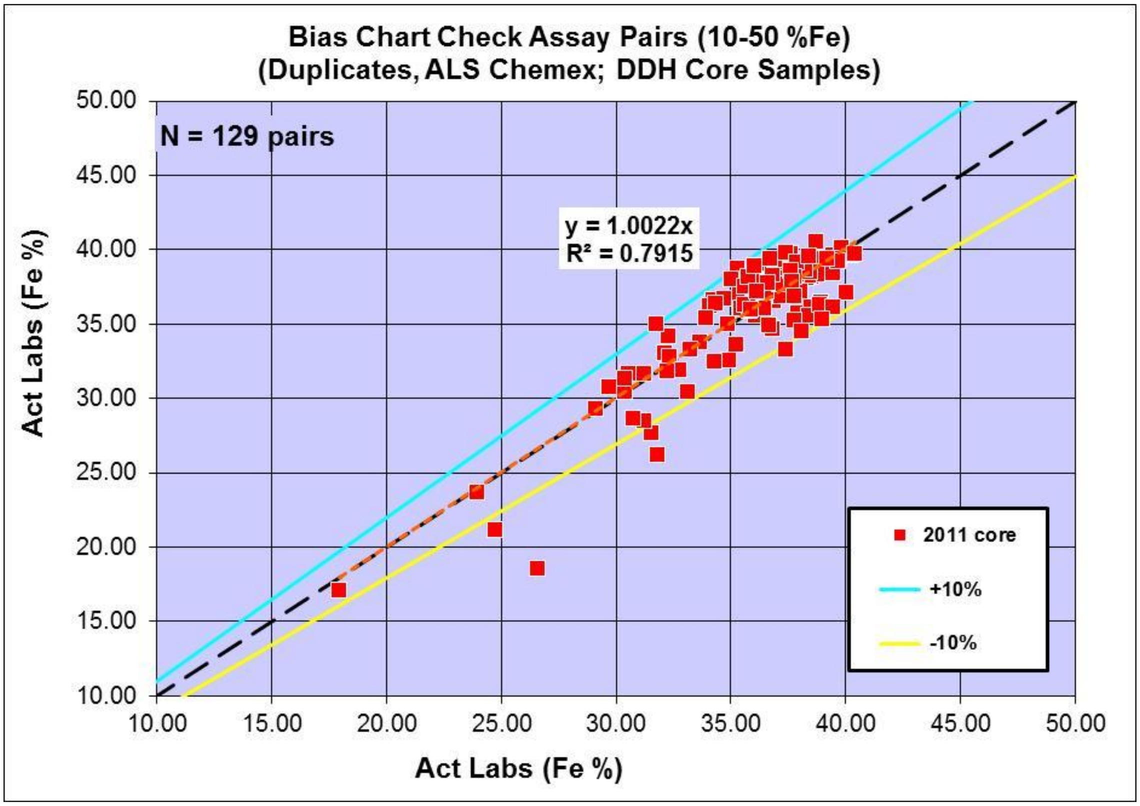


Figure 10.11: Fe% duplicate pair bias check

P and SiO_2 % follow similar trends with no significant bias between original and duplicate assays and relatively little variation between the original and duplicate values. SiO2 duplicates were within 10% of the original values in 98% of the cases. P duplicates were within 10% of the original value in 91% of the cases.

Overall, SRK found that the 2011 North Whitemud River field duplicate results indicated highly repeatable assay results

10.2.2 Standard Reference Material

A single reference standard, GIOP-32, was utilized by Ironstone during the 2011 program. GIOP-32 is a certified reference standard from Geostats Pty Ltd in Western Australia. The material is designed to be an iron ore standard and is sourced from Pilbara, Western Australia.

The standard was inserted 139 times during the program. SRK reviewed the standard's analytical results for the elements Fe (calculated from Fe_2O_3), SiO_2 and P (calculated from P_2O_5). The RM was not certified for vanadium so V analyses were not reviewed. Overall, the results of the assays were found to match the expected values relatively well; however, there were a few deviations worth noting.

There were five standard RMs which resulted in Fe, P and SiO_2 values which were significantly different form the expected values. In all cases the cause of the error was resolved either through re-processing of the batch or though discovery of a sample number issue which resulted in a RM assay result within tolerances. Figure 10.12 shows the deviation of the RM results compared to expectations. Aside from the five obvious errors, 16 (11%) of the RM sample results lie outside of two standard deviations of the expected standard value. In most cases, the absolute value of the deviation was less than 0.5% and in all cases it was less than 1%. There was no apparent bias in the Fe reference standard results and SRK believes that the results are acceptable.

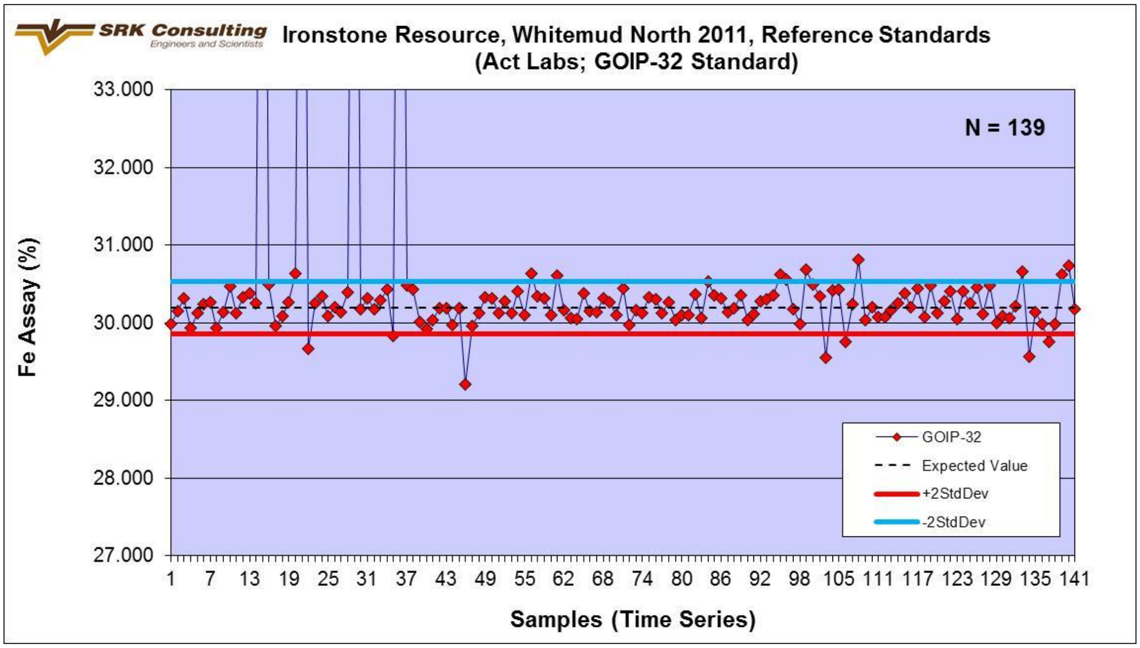


Figure 10.12: Fe% analytical reference material results for 2011 drilling

The reference standard results for SiO_2 are shown in Figure 10.13. The SiO_2 results show a slight low bias (3% low). Aside from the RM errors, 53 RM sample results (38%) deviated from expectation by more than two standard deviations. When the deviations are viewed as absolute values, all of the results were within 1% of the expected SiO_2 values. SRK believes that the level of accuracy indicate by this data is sufficient for the current analysis.

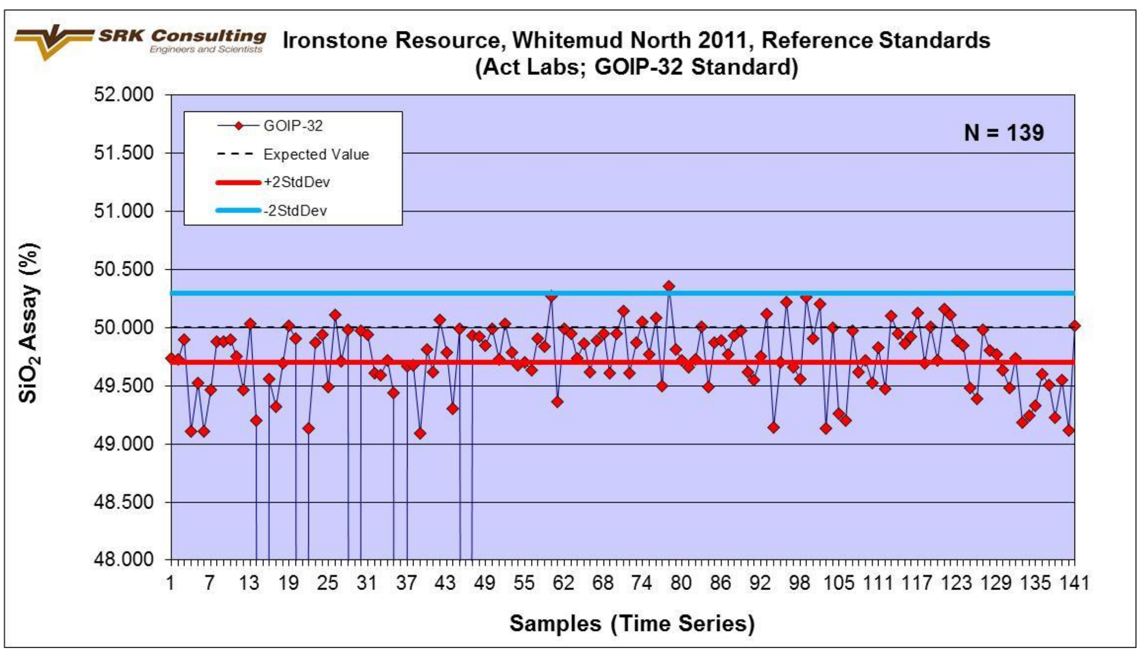


Figure 10.13: SiO2% analytical reference material results 2011 drilling

P standard values (not shown) reveal relatively little bias and only six samples outside of 2 standard deviations from expected values. However the RM P values are relatively close to the detection limit.

Overall, SRK believes that the duplicate and standard RM results match the expected data sufficiently to support the Act Labs assay results and the use of these results for a mineral resource estimate.

11 Data Verification

G. David Keller, P. Geol. of SRK carried out a site visit in 2010 to verify the Rambling Creek drilling and Michael Johnson, P. Geo. carried out a site visit in February 2011 to verify the North Whitemud River drilling. During the site visits, drill hole locations, drill core, logging procedures and accuracy, sampling recovery and documentation were verified by SRK. SRK checked drill hole locations using hand held GPS and found that the field locations agreed well with the surveyed locations provided by Ironstone. SRK re-logged nine of the Ironstone drill holes and found that the geological descriptions provided were generally good and acceptable for the estimation of mineral resources of a bulk iron deposit such as Clear Hills. In addition, SRK verified the assay data by checking the digital database against original assay certificates provided by SGS. In all, SRK checked 221 assay records, 30% of the assay data, and identified no errors. SRK verified all of the 2011 assays against files provided directly from ActLabs.

Because of the lack of standards and blanks and the overall low level of duplicate assays in the 2008 Ironstone drilling, SRK recommended that 99 pulp samples be collected from SGS and forwarded to ALS Chemex for re-assay. The results of the pulp re-checks are described in Section 11.1 of this report.

SRK was unable to verify the historical drill data as most of the original information no longer exists, for this reason the historical data has been used to estimate an inferred resource only. SRK did carry out a study of the historical data to see if any significant differences existed between the historical assay data and the data collected by Ironstone and found no significant un-explainable differences between the two data sets.

Michael Johnson, P. Geo, of SRK Vancouver visited the project during the 2011 and 2012 drilling campaigns to verify core logging and sampling procedures and assure that QA/QC protocols were in-place and being followed.

SRK verified and monitored the QA/QC samples and received all assay data directly from the assay laboratory.

12 Adjacent Properties

There are no significant adjacent properties as defined in NI 43-101.

13 Mineral Processing and Metallurgical Testing

In 2011, Ironstone commenced a program to commercialize a process developed by the Alberta Research Council in the 1970s and early 80s. This process is known as the grain enlargement process ("GE process"). This process was successful in liberating the iron from the ore at a laboratory scale. The process, in addition, separates the iron from deleterious materials, such as phosphorus, and causes the iron grains to enlarge making the iron more readily amenable to separation by mechanical means, such as magnetic separation. For these reasons Ironstone decided to undertake a program to commercialize the process.

In addition, Ironstone in 2008 to 2010 contracted with laboratories to conduct beneficiation tests through conventional means to determine the viability of conventional processes. None of these processes were amenable to the beneficiation of the ore.

13.1 2011 Metallurgical Testwork

Ironstone recognized, from the laboratory work that had been done, that the GE process was most likely to result in the best economics for the project. As a result Ironstone has embarked on a process to develop a commercial application of the GE process.

This program encompasses the establishment of a block flow diagram, process flow diagrams, computer simulation of the process, testing of the process in batch laboratory sized equipment, testing of the process with continuous laboratory sized equipment, and finally with pilot plant sized equipment to simulate the process. After each test program, the computer simulation of the process is adjusted to match the results from the testing.

The process is separated into specific sequential elements and each step is developed and tested before moving to the subsequent steps. The 2011 program encompassed the preparation of the ore by crushing and sizing, drying and calcining to remove free and entrained water and reduction of the iron to a metallic iron.

The 2011 program was considered very successful in providing Ironstone with the process design criteria required to specify the equipment and operating conditions for the next step in the process development and subsequently in the equipment selection and process design criteria for a commercial plant.

The laboratory test work has made considerable progress to date in understanding the process fundamentals and has identified several opportunities including the following opportunities and challenges.

<u>Opportunities</u>:

- It will be relatively easy to prepare the ore for processing due to its low crushing strength. Test work shows that the energy requirements for ore preparation would be relatively low based on crushing tests performed at a qualified laboratory.
- Equipment configurations available at the laboratory and available commercially indicated the possibility of significant capital and energy savings by the close coupling of the crushing, drying, calcination and reduction processes.

- Pilot plant test work indicated that the fines produced in the process will be significant (20% by weight of the ore); however, Ironstone was able to pelletize the fines using commercially available equipment and a binder from material available from the Ironstone deposit. This eliminates a major concern in the process.
- The computer model of the process indicates that the majority of the energy requirements may be supplied by the reductant, most likely coal, with minimum net energy requirements for calcining and drying, due to the use of kiln off-gas energy.

Challenges:

- Pilot plant testing resulted in lower than expected reduction (49%) but did indicate design considerations that will be applied to a reactor built for the purpose.
- The pilot test program indicated the operating conditions such as temperature to achieve the reduction required and anticipated from the small-scale testing. For example, the testing established an upper limit of 1050°C sintering occurs and a practical lower limit of 800°C below which the rate of reduction is reduced.
- Designing the chloride segregation process for the ore is the most important challenge; this process has never been applied for iron before on a commercial scale and direct heating during chloride segregation has never been attempted at a pilot plant scale.
- Designing of the off-gas cleaning system, including handling of chloride containing gases and removal of chlorides will also be a challenge.
- The process flowsheet is intricate and the design and implementation stages will be demanding.
- Environmental issues need careful consideration and resolution. Satisfying process water requirements and effluent treatment will be some of the other challenges.
- Designing a marketable product also remains to be developed in the future.
- Test results show that vanadium tends to concentrate in the tailings; however, characterization of the tails is yet to be done and extraction of vanadium from the tails is yet to be tackled.

13.2 2012 Metallurgical Testwork Program

The 2012 program will address issues arising from the 2011 program plus the development and testing of the chloride segregation and iron separation elements of the process. The 2012 program will also prepare a plan for the development and testing of the vanadium recovery process from the tailings after the iron separation, leading to testing programs in 2013.

The 2013 program will address the remainder of the segregation segment of the process as well as completion of the iron separation and product development. The development of off-gas treatment facilities and the design for environmental issues will be addressed in 2013 as well.

14 Mineral Resource Estimates

Mineral resources for the Rambling Creek and North Whitemud River Ironstone deposit were estimated by SRK using 3-dimensional block modelling software provided by Gemcom Software International Inc. of Vancouver, GEM version 6.3. Resources were estimated and classified by Dr. Gilles Arseneau (P. Geo.), Principal Consultant, Geology at SRK in Vancouver.

14.1 Exploratory Data Analysis

The Ironstone drill data were provided to SRK digitally in the form of an EXCEL spreadsheet containing drill hole locations in UTM coordinates, assay data, and abbreviated geological logs. Historical drill holes information was obtained from the Alberta Government assessment files which was in ACCESS database format. Drill holes were located in UTM grid coordinates (NAD83) which had been converted by the Alberta Government from NAD27. SRK verified the coordinate conversion by measuring and comparing the relative drill hole spacing in both UTM systems and is satisfied that the coordinate transformation between NAD27 and NAD83 has been performed correctly.

14.1.1 Assay Data

There are 579 drill holes in the Ironstone database; 347 are drilled in the Rambling Creek-North Whitemud River area representing 21,365 m of drilling. A large proportion of the drilling, 148 holes, were drilled thirty to forty years ago and by operators other than Ironstone and, as a result, most of the original assay records have been misplaced, lost or destroyed. However, assay records are available for 72 of the historical drill holes through the Alberta Government assessment records. The historical data contains only Fe and SiO_2 assay values. A total of 437 historical Fe and SiO_2 assay records representing 489 m of drilling have been used as part of this estimate. SRK is of the opinion that while there are some differences between the new and old assay data, the historical data are acceptable for the estimation of an inferred resource.

Table 14.1 summarizes the basic statistical data for the historical drill holes and Figure 14.1 shows a histogram of Fe values for the historical drilling in the Rambling Creek area.

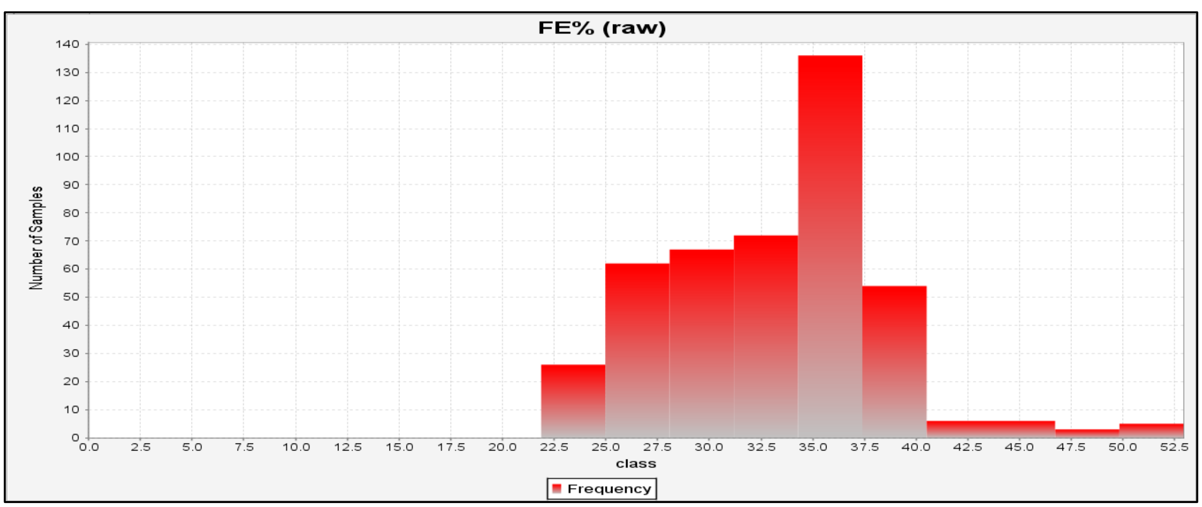


Figure 14.1: Histogram of Fe for historical drilling in Rambling Creek and North Whitemud River area

Table 14.1: Descriptive statistics of all assay data for the historical drilling

Historical Drilling	Fe%	SiO_2%	Length
Valid cases	437	437	437
Mean	33.22	28.50	1.12
Std. error of mean	0.26	0.27	0.02
Variance	28.85	31.09	0.22
Std. Deviation	5.37	5.58	0.47
Variation Coefficient	0.16	0.20	0.42
rel. V. coefficient (%)	0.77	0.94	2.00
Skew	0.38	0.56	-0.54
Kurtosis	0.77	-0.26	-1.13
Minimum	21.87	14.90	0.09
Maximum	52.93	48.46	2.13
Range	31.06	33.56	2.04
1st percentile	22.59	18.65	0.15
5th percentile	24.75	20.81	0.31
10th percentile	25.88	22.39	0.37
25th percentile	28.91	24.35	0.67
Median	33.84	27.23	1.37
75th percentile	36.72	32.65	1.52
90th percentile	38.88	36.75	1.53
95th percentile	40.42	38.48	1.53
99th percentile	50.39	42.76	1.80

Table 14.2 summarizes the same information for the 2008 and 2011 Ironstone drilling and Figure 14.2 is a histogram of Fe for the Ironstone drilling within the oolitic ironstone unit.

Table 14.2: Descriptive statistics of all assay data for 2008 Rambling Creek and 2011 North Whitemud River drilling

New Drilling	Fe %	SiO_2%	Length	V_2O_5%	Al_2O_3%	P_2O_5%
Valid cases	3320	3320	3320	3320	3320	3320
Mean	32.30	25.39	0.50	0.20	5.18	1.38
Std. error of mean	0.11	0.13	0.00	0.00	0.01	0.01
Variance	36.67	55.69	0.00	0.00	0.74	0.12
Std. Deviation	6.06	7.46	0.06	0.04	0.86	0.35
Variation Coefficient	0.19	0.29	0.12	0.21	0.17	0.25
rel. V. coefficient (%)	0.33	0.51	0.21	0.37	0.29	0.44
Skew	-1.06	1.64	0.04	-1.14	3.16	1.63
Kurtosis	0.84	4.07	49.60	0.90	21.62	16.68
Minimum	3.74	14.36	0.02	0.02	3.26	0.13
Maximum	41.29	69.63	1.50	0.31	14.97	5.53
Range	37.55	55.27	1.48	0.29	11.71	5.40
1st percentile	15.66	15.85	0.20	0.07	4.06	0.55
5th percentile	20.18	17.23	0.45	0.11	4.35	0.83
10th percentile	23.57	18.09	0.50	0.14	4.44	0.99
25th percentile	28.44	19.93	0.50	0.18	4.61	1.22
Median	34.22	23.59	0.50	0.21	4.97	1.39
75th percentile	37.00	28.93	0.50	0.23	5.51	1.53
90th percentile	38.46	34.63	0.50	0.24	6.17	1.71
95th percentile	39.08	39.37	0.50	0.24	6.59	1.87
99th percentile	39.97	50.89	0.65	0.25	8.05	2.40

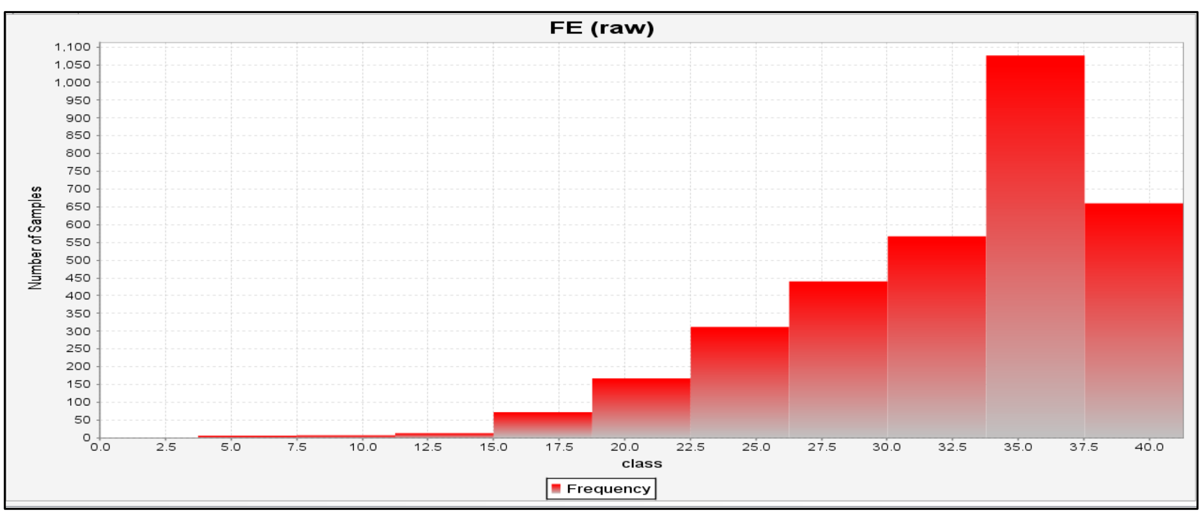


Figure 14.2: Histogram of Fe values for Ironstone drilling in Rambling Creek-North Whitemud River area

Differences between the two data sets are attributed to different sampling intervals. Most of the historical drilling was focused on the densely oolitic material and therefore preferentially sampled the higher grade portion of the ironstone. The more recent drilling carried out by Ironstone intersected and sampled most of the ironstone interval (DOIS and MOIS) while most of the historical drilling sampled only the upper portions (DOIS) of the ironstone deposit where iron contents tends to be elevated. As can be seen from the two histograms (Figure 14.1and Figure 14.2), the Ironstone drilling sampled a more complete section of the ironstone unit than had been sampled by the historical drilling.

14.1.2 Composite Data

Assay values were composited to a fixed length of 1 m to assure that all data were evenly weighted before block modelling interpolation. Composites were generated starting from the collar of the drill hole downwards and incorporated only the assays contained within the interpreted mineralized zones. Two mineralized zones were modelled; a densely oolitic (DOIS) and a moderately oolitic (MOIS) zone. Data that fell outside of the interpreted mineralized zone were not composited and were not used in the estimation process.

Composite lengths that were less than 0.5 m were deleted from the composite database prior to estimation. A total of 2,358 Fe and SiO_2 composites were generated and used for block model estimation. These include data for both the historical and Ironstone drilling. Table 14.3 summarizes the statistical information for all drill holes that intersected oolitic ironstone in the Rambling Creek – North Whitemud River area only.

Table 14.3: Summary statistics for all composites inside Rambling Creek-North Whitemud River

Total Composites	Fe%	SiO_2%	Length
Valid cases	2358	2358	2358
Mean	32.36	25.56	0.95
Std. error of mean	0.13	0.15	0.00
Variance	37.87	49.58	0.02
Std. Deviation	6.15	7.04	0.13
Variation Coefficient	0.19	0.28	0.14
rel. V. coefficient (%)	0.39	0.57	0.29
Skew	-1.06	1.12	-2.63
Kurtosis	2.34	3.29	5.46
Minimum	0.00	0.00	0.50
Maximum	52.93	67.25	1.00
Range	52.93	67.25	0.50
1st percentile	15.08	12.21	0.50
5th percentile	20.61	17.62	0.51
10th percentile	23.70	18.48	0.80
25th percentile	28.80	20.63	1.00
Median	34.06	24.36	1.00
75th percentile	36.75	28.92	1.00
90th percentile	38.35	34.58	1.00
95th percentile	39.09	38.40	1.00
99th percentile	41.38	47.73	1.00

Table 14.4 and Table 14.5 summarise and compare the basic statistical data for the composited assay data, of both the historical and Ironstone drilling, for DOIS and MOIS rock types, for the area where the two drillings overlap: mainly the Rambling Creek portion of the resource area. As can be seen in the table, the two data sets are similar when separated by rock types and weighted by the same assay length. SRK is of the opinion that the historical assay data is of adequate quality and reliability for the estimation of an inferred resources for iron.

Table 14.4: Composited data for DOIS, Comparison between new (Ironstone) and historical drill holes

Densely Oolitic	Fe%	SiO_2%	Fe%	SiO_2%
Drilling	New	New	Old	Old
Valid cases	1107	1107	442	442
Mean	35.49	21.31	36.13	24.67
Std. error of mean	0.10	0.11	0.19	0.22
Variance	11.20	13.33	16.41	20.79
Std. Deviation	3.35	3.65	4.05	4.56
Variation Coefficient	0.09	0.17	0.11	0.18
rel. V. coefficient (%)	0.28	0.51	0.53	0.88
Skew	-2.93	2.63	0.24	2.35
Kurtosis	15.69	26.32	8.38	23.39
Minimum	3.90	8.10	11.85	5.71
Maximum	40.65	67.25	52.93	65.07
Range	36.74	59.15	41.08	59.36
1st percentile	19.30	13.95	23.66	9.17
5th percentile	31.48	17.04	32.02	19.50
10th percentile	32.41	17.74	32.72	20.82
25th percentile	34.06	18.93	34.23	22.66
Median	36.08	20.81	36.01	24.70
75th percentile	37.60	23.25	37.53	26.59
90th percentile	38.64	25.49	39.27	28.19
95th percentile	39.14	26.91	41.50	29.29
99th percentile	39.93	30.38	51.20	41.47

Table 14.5: Composited data for MOIS, comparison between new (Ironstone) and historical drill holes

Moderately Oolitic	Fe%	SiO_2%	Fe%	SiO_2%
Drilling	New	New	Old	Old
Valid cases	606	606	197	197
Mean	25.42	32.26	28.62	31.57
Std. error of mean	0.18	0.27	0.25	0.43
Variance	19.53	44.93	12.38	36.54
Std. Deviation	4.42	6.70	3.52	6.04
Variation Coefficient	0.17	0.21	0.12	0.19
rel. V. coefficient (%)	0.71	0.84	0.88	1.36
Skew	-0.79	1.19	0.78	-0.82
Kurtosis	0.70	2.50	12.08	4.14
Minimum	5.02	13.62	10.46	0.00
Maximum	34.69	62.10	51.75	48.70
Range	29.67	48.48	41.29	48.70
1st percentile	12.72	19.98	19.21	10.71
5th percentile	18.01	24.15	23.53	22.71
10th percentile	19.41	25.88	24.83	24.20
25th percentile	22.46	28.07	26.97	28.39
Median	26.19	30.87	28.77	32.12
75th percentile	29.01	35.16	30.52	35.48
90th percentile	30.58	41.79	31.68	37.37
95th percentile	31.20	44.97	33.23	40.25
99th percentile	31.95	57.94	39.36	48.46

Assay data for P2O5, Al2O3 and V2O5 are only available for the Ironstone drilling; as such only 4,511 assay records were available for compositing as opposed to 4,948 assays for Fe and SiO2. A total of 1,719 composites were generated from the Ironstone drill data when compositing to a 1 m length. The composited assay data for P2O5, Al2O3 and V2O5 are summarized in Table 14.6 below.

Table 14.6: Summary statistical data for 1m composite for the Ironstone drilling

	P_2O_5%	Al_2O_3%	V_2O_5%
Valid cases	1719	1719	1719
Mean	1.36	5.10	0.20
Std. error of mean	0.01	0.02	0.00
Variance	0.10	0.75	0.00
Std. Deviation	0.31	0.87	0.04
Variation Coefficient	0.23	0.17	0.21
rel. V. coefficient (%)	0.56	0.41	0.52
Skew	1.09	1.19	-1.20
Kurtosis	20.00	17.27	1.57
Minimum	0.00	0.00	0.00
Maximum	5.47	14.61	0.28
Range	5.47	14.61	0.28
1st percentile	0.50	2.76	0.08
5th percentile	0.82	4.28	0.11
10th percentile	0.98	4.43	0.14
25th percentile	1.22	4.61	0.17
Median	1.39	4.95	0.21
75th percentile	1.51	5.47	0.23
90th percentile	1.64	6.07	0.24
95th percentile	1.76	6.49	0.24
99th percentile	2.17	7.48	0.25

14.1.3 Capping

Capping of high grade values to restrict their influence on the estimated block model resource was evaluated using decile analysis as defined by Parrish (1997). Because of the varying lengths between the 1970s and the Ironstone drilling campaigns, SRK decided to composite the assay values to a fixed length of 1 m prior to carrying out the capping analysis. Based on the results from the decile analysis, and because of the lack of significant outliers, SRK decided that capping of assays was not required.

14.2 Bulk Density

No record has been found of bulk density data collected during the historical drilling but information from small bulk sampling of the ironstone in 1961 found that the ironstone had an in-situ bulk density ranging between 2.5 and 2.82 t/m^3. Ironstone collected 50 representative samples from ten drill holes in 2008 and shipped them to SGS for dry bulk density determination. Ironstone collected an additional 423 samples for bulk density ("BD") determination from their 2011 drilling program and shipped them to Act Labs in Ancaster, Ontario for processing. Because of the high porosity of the ironstone, the samples were coated with wax prior to BD determinations based on water displacement method.

The average of all BD determinations is 2.22 t/m^3. SRK noted that the BD data was variable and increased slightly as expected with increasing Fe content (Figure 14.3). Bulk density is an important component of the resource estimation process as the bulk density is applied to the interpreted volume of the mineralized body to calculate the in-situ tonnes.

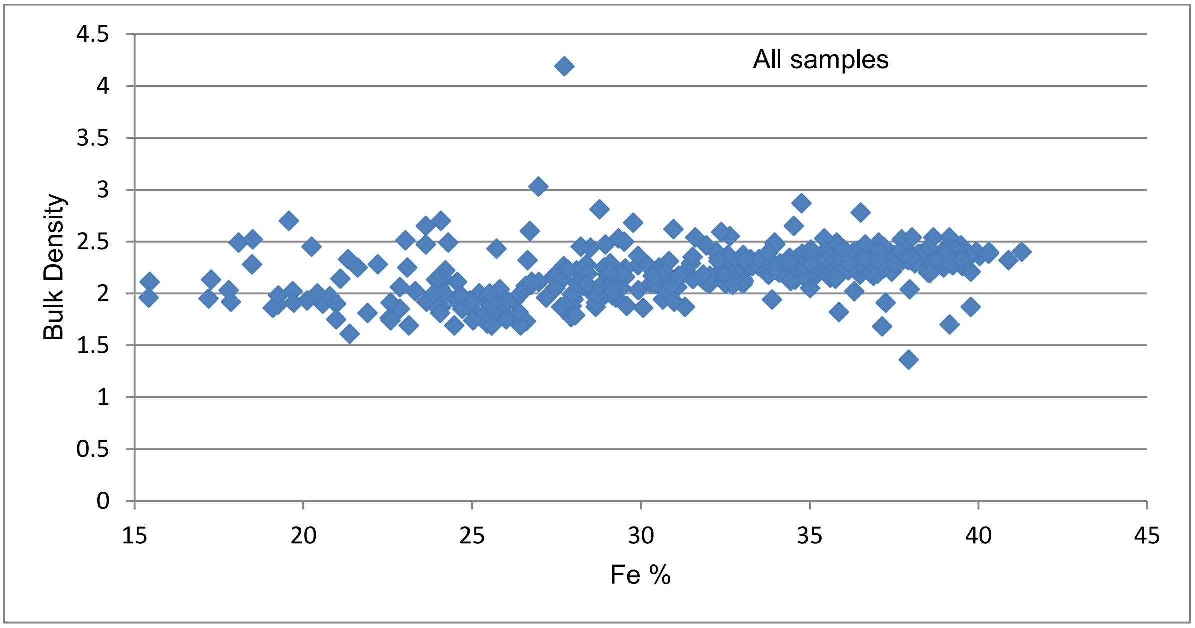


Figure 14.3: Plot of Bulk Density versus total Fe content

Because of the high number of BD data within the ironstone, SRK decided to interpolate the BD in the model as opposed to simply using an averaged BD value.

14.3 Geological Interpretation

The Clear Hills iron deposit is a bedded oolitic ironstone that is relatively flat lying and comprises of two main units, a densely and a moderately oolitic unit. The deposit can be easily modelled by constructing surfaces at the top and bottom of each unit of the ironstone. The upper and bottom surface are then linked to create a three dimensional solid of the iron deposit. Based on lithological logs, SRK extracted the coordinates of the top and base of both the densely and moderately oolitic ironstone units. Once the elevation of all top and bottom surfaces were extracted and separated in individual files, a surface was constructed using the Laplace interpolation method to link all the points in a common surface. The top and bottom surface of each unit were then linked together to generate three dimensional solids of each unit. Figure 14.4 is a two dimensional view of the Rambling Creek and North Whitemud River ironstone deposit.

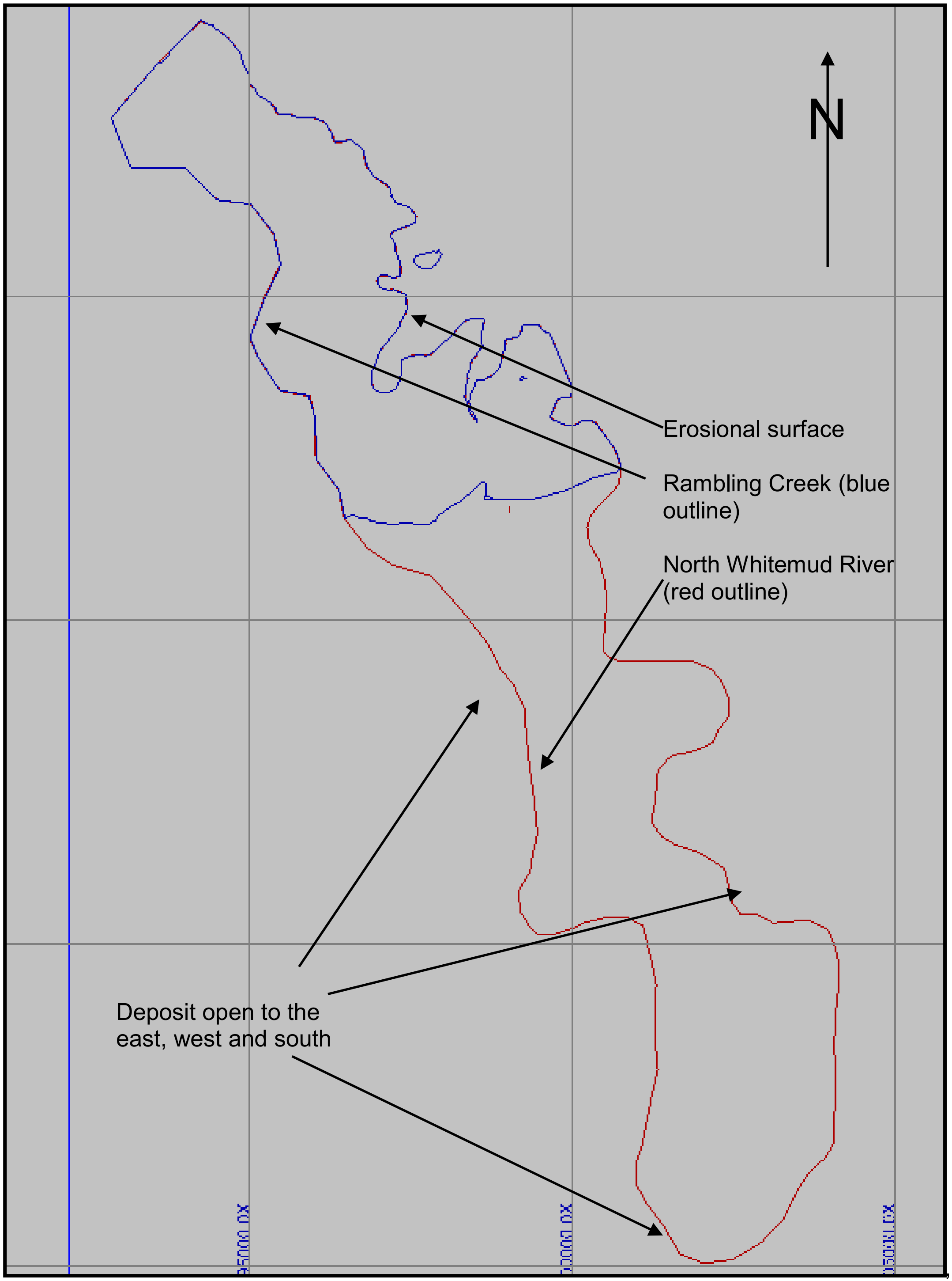


Figure 14.4: Top view of Rambling Creek-North Whitemud River oolitic ironstone deposit
Note: Grid is 5,000 m by 5,000 m

14.4 Spatial Data Analysis

Using Sage 2001 software, SRK evaluated the continuity of Fe and SiO_2 composites for the deposit. A two-dimensional flat variogram with major and semi-major axes being aligned east-west and north-south was the best fit for the Fe data (Figure 14.5). A similar variogram was developed for SiO_2. The two-dimensional variogram structure appears to suggest that a range of influence of 600 m may be supportable. For this reason, SRK decided to estimate the mineral resource using the ordinary kriging weighting interpolation method and validated the data using inverse distance interpolation methods.

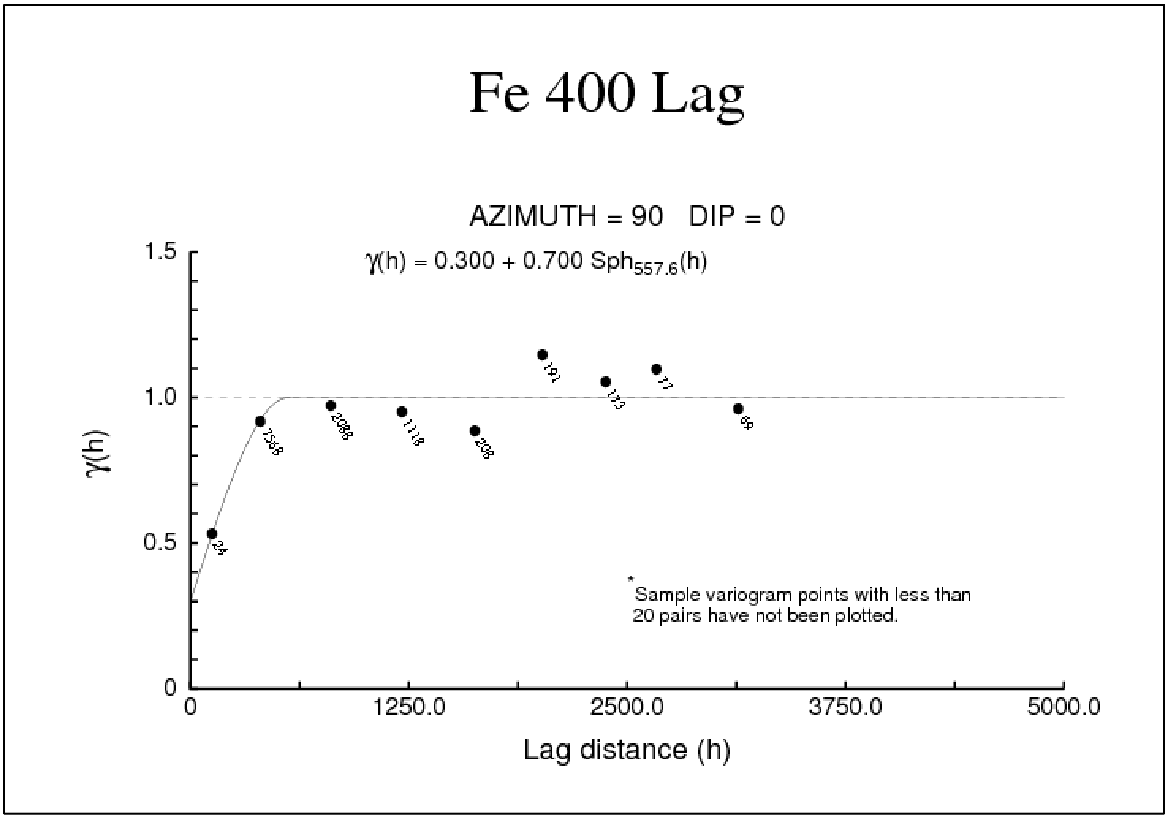


Figure 14.5: Two-dimensional variogram for Fe

14.5 Block Model Data

Mineral resources were estimated using block model methods with values interpolated into 50 m by 50 m by 2 m blocks to reflect drill spacing, which is about 200 m by 400 m in the area of the Ironstone drilling and 400 m by 400 m for the remainder of the deposit. The block model was defined based on parameters outlined in Table 14.7. The block origin in GEMS™ is defined at the minimum easting and northing and the maximum elevation.

Table 14.7: Block model parameters in UTM coordinates

Model	Origin	No of Blocks	Block Size (m)
Easting	392,200	256	50
Northing	6,288,300	434	50
Elevation	970	135	2

Block models are comprised of multiple components including rock code, grade, bulk density and percent models. Each model or attribute is coded independently of each other and combined in the final process of resource tabulation. The subsections below describe how each model attribute was constructed. Two separate models were constructed; one for the densely oolitic and a second one for the moderately oolitic unit. The two models were then combined in a single model after interpolation.

14.5.1 Rock Type Model

The rock type model contains information regarding the geology of the deposit and block model. The model was constructed by assigning an integer code to each block in the model as outlined in Table 14.8. All blocks were initially assigned an air rock code and all blocks being at least 50% by volume below the surface topography were assigned a waste rock code. All waste blocks that intersected the wireframes representing the mineralized zones were re-coded as “ore block” if more than 0.001% of the block volume was contained within the wireframe defining the mineralized envelope. Separate models were prepared for the DOIS and MOIS and then combined into a final rock model for the ironstone deposit. Final rock code was assigned based on the highest proportion of material within the block either DOIS or MOIS. Figure 14.6 shows block model rock codes for Level 100 (771 m above mean sea level (“amsl”)) compared with drill hole composited rock codes.

Table 14.8: Block model rock codes

Rock type	Block Model Code
Air	0
Overburden	9
Waste (Shale)	99
Ironstone combined (IOS)	100
Densely oolitic (DOIS)	101
Moderately oolitic (MOIS)	102

14.5.2 Percent Model

The Percent model is used to store the proportion of each block contained within the wireframes representing the mineralized envelopes. Because blocks were assigned “ore” rock codes if only 0.001% of their volumes were encapsulated within the mineralized envelop, the total volume of all “ore” block is far greater than the volume of the wireframe representing the mineralized envelopes.

To assure that the volume of the block model result corresponds to the volume of the wireframe, the volume of each block is weighted with the percent of the block found within the wireframe (from 0.001% to 100%).

14.5.3 Density Model

The density model contains information about the bulk density of each block. The data is used to convert the block model volumes into tonnes during the resource tabulation. Ironstone collected a total of 473 representative ironstone samples for bulk density determination. The average of all BD determinations is 2.20 t/m^3. SRK is of the opinion that the bulk density data collected is sufficient for block model interpolation and decided to estimate the BD in the block model using the inverse distance weighting interpolation method instead of using a simple weighted average for BD. All blocks that had and Fe content less than 5% were assigned a nominal BD of 2.34 t/m^3. All air blocks were assigned a value of zero, all waste blocks were assigned 2.3 t/m^3 and all overburden blocks were assigned an average BD of 1.9 t/m^3.

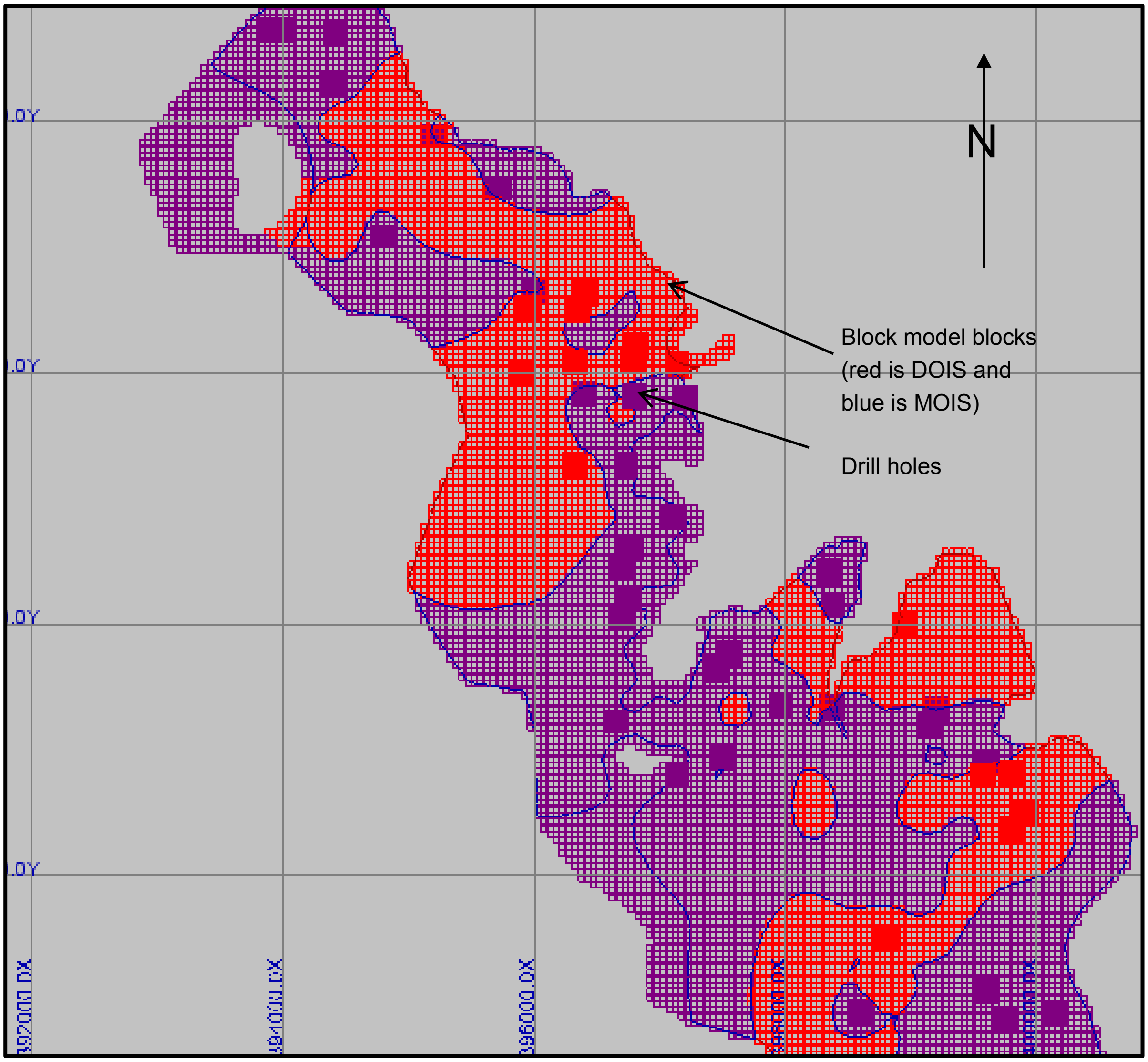


Figure 14.6: Comparison of block model rock codes with drillhole data for level 100 (771 m amsl)

Note: Red Blocks are DOIS and blue blocks are MOIS, grid is 2,000 m by 2,000 m

14.5.4 Grade Interpolation

Grade values were interpolated into the block model for Fe, SiO_2, V_2O_5, P_2O_5 and Al_2O_3 using ordinary kriging ("OK") weighting based on the two dimensional variogram developed from SAGE2001 software. Unique fields were recorded for the number of composites used to estimate each block and the pass from which the block was interpolated.

The grade interpolation was carried out in two successive passes using flat search ellipses. The first pass search ellipse was set to 350 m, about one-half the maximum range obtained from the variogram. No anisotropy was assigned to the search ellipse as the variogram did not indicate any anisotropy.

The second pass search ellipse encompasses a larger search neighbourhood and extended to the full range determined by the variogram 600 m by 600 m. Blocks were only interpolated in the second pass if they had not been interpolated during pass one interpolation. Similar search radii were used for all elements outlined in Table 14.9.

Grades were interpolated into a block if at least two drill holes and four composites were found within each of the search ellipsoid. No more than 12 composites, and four holes, were used to interpolate any block grades. During the first pass interpolation, only DOIS composites were used to interpolate blocks coded as DOIS and only MOIS composites were used to interpolate MOIS coded blocks. Composites from both rock types were used to interpolate all rock types for the second pass interpolation.

Table 14.9: Search ellipse parameters

		Rotation Angle			Range (m)		
Element	**Pass**	**Z**	**Y**	**Z**	**X**	**Y**	**Z**
Fe	1	-14	89	90	350	10	350
Fe	2	-14	89	90	604	10	600
SiO_2	1	-14	89	90	350	10	350
SiO_2	2	-14	89	90	604	10	600
Al_2O_3	1	-14	89	90	350	10	350
Al_2O_3	2	-14	89	90	604	10	600
P_2O_5	1	-14	89	90	350	10	350
P_2O_5	2	-14	89	90	604	10	600
V_2O_5	1	-14	89	90	350	10	350
V_2O_5	2	-14	89	90	604	10	600

14.6 Mineral Resource Classification

Mineral resources were estimated in conformity with generally accepted CIM “Estimation of Mineral Resource and Mineral Reserve Best Practices” Guidelines. The Mineral Resources may be affected by further infill and exploration drilling that may result in increases or decreases in subsequent resource estimates. The Mineral Resources may also be affected by subsequent assessments of mining, environmental, processing, permitting, taxation, socio-economic and other factors.

Mineral reserves can only be estimated based on the results of an economic evaluation as part of a preliminary feasibility study or feasibility study. As such, no mineral reserves have been estimated by SRK as part of the present assignment. There is no certainty that all or any part of the Mineral Resources will be converted into a mineral reserve.

Mineral resources were classified in accordance with definitions provided by the Canadian Institute of Mining ("CIM") as stipulated in NI43-101 by Dr. Gilles Arseneau. P. Geo. Michael Johnson, P. Geo. of SRK, designed the Whittle shell considered for resource reporting.

The Rambling Creek-North Whitemud River iron deposit has been drilled on a grid that is roughly 400 m by 200 m in the area of the Ironstone 2008 drilling and about 400 m by 400 m for the remainder of the deposit. Efforts to construct a variogram for iron suggested a general range of influence for the 1 m composited data of approximately 600 m based on an omni-variogram structure. The first pass search ellipse was set to a maximum of 350 m in a horizontal plane.

Grades were interpolated into a block if at least two drill holes and four composites were found within the search ellipsoid. No more than 12 composites, and four holes, were used to interpolate any block grades. Only DOIS composites were used to interpolate blocks coded as DOIS and only MOIS composites were used to interpolate MOIS coded blocks.

In order to classify mineralization as Indicated, the nature, quality, quantity and distribution of data must be such as to allow confident interpretation of the geological framework and to reasonably assume the continuity of mineralization.

Blocks were classified as Indicated Mineral Resource based on:

- Confidence in interpretation of the ironstone deposit geology;
- Continuity of grades as defined by the two-dimensional variogram; and
- Number of data found within a restricted search radius.

Any blocks that satisfied the criteria of the first pass search ellipse were classified as Indicated Mineral Resources. All other interpolated blocks were classified as Inferred Mineral resources.

On the northern portion of the Rambling Creek permit, only Fe and SiO_2 were estimated because of the lack of assay data for the other elements in the historical database. However, SRK is of the opinion that this area has similar V_2O_5, P_2O_5 and Al_2O_3 contents to those estimated in the region with new drill holes.

14.7 Mineral Resource Statement

A Mineral Resource as defined by CIM is "*a concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge*."

The identification of a reasonable prospect for economic extraction of a mineral resource implies that some basic level of economic analysis be carried out in order to determine if mineralization pass the '*reasonable prospect of economic extraction"* test**.** This is usually achieved by applying a reasonable cut-off and minimum mining thickness to the modeled mineral resource. In order to validate the reasonable prospect test, SRK applied a Whittle shell to the Clear Hills Iron deposit to determine the amount of iron that could potentially be mined under reasonable assumptions. The Whittle shell is defined using optimistic economic parameters and reflects the material with which SRK considers has the potential for eventual economic extraction and is not intended to be an indication of mineral reserves.

The mineral resources are reported at a 25% Fe cut-off based on information gathered for the Whittle economic analysis that incorporates assumed mining costs and value of product extracted. Table 14.10 and Table 14.11 illustrate the sensitivity of the indicated and inferred mineral resources to various cut-off grades. The Mineral Resource Statement for the Rambling Creek iron deposit is presented in Table 14.12.

Table 14.10: Indicated mineral resource estimate for Rambling Creek-North Whitemud River iron deposit

Cut-Off Fe (%)	Density	Tonnes (000)	Fe (%)	SiO_2 (%)	V_2O_5 (%)	Al_2O_3 (%)	P_2O_5 (%)	[1]P%
35	2.30	250,968	36.53	20.99	0.22	4.75	1.46	0.64
30	2.28	424,975	35.12	22.37	0.21	4.84	1.42	0.62
25	**2.24**	**557,738**	**33.30**	**24.37**	**0.20**	**4.98**	**1.37**	**0.60**
20	2.24	585,865	32.84	24.87	0.20	5.01	1.36	0.59

Note[1]: P% is calculated by dividing P_2O_5 **%** by 2.2914

Table 14.11: Inferred mineral resources Rambling Creek-North Whitemud iron deposit

Cut-Off Fe (%)	Density	Tonnes (000)	Fe (%)	SiO_2 (%)
35	2.26	39,107	37.34	24.57
30	2.24	82,195	35.07	25.37
25	**2.23**	**94,664**	**34.11**	**26.19**
20	2.23	95,763	34.00	26.27

Table 14.12: Mineral resource statement* Rambling Creek-North Whitemud River iron deposit Clear Hills, Alberta, SRK Consulting (Canada) Inc., July, 2012

Classification	Density	Tonnes (000)	Fe (%)	SiO_2 (%)	V_2O_5 (%)	Al_2O_3 (%)	P_2O_5 (%)	[1]P%
Indicated	2.24	557,738	33.30	24.37	0.20	4.98	1.37	0.60
Inferred	2.23	94,664	34.11	26.19				

* Reported at a cut-off grade of 25% Fe within a Whittle pit shell optimized using Fe price of $317/dry metric tonnes Fe, metallurgical recovery of 82%, and overall mining cost of $2.63 per tonne and processing costs of C$51. All numbers are rounded to reflect relative accuracy of the estimates. P% is calculated by dividing P2O5 % by 2.2914

Figure 14.7 is a graphical representation of the physical distribution of resource blocks by classification; note that the indicated mineral resource is restricted to the area of the Ironstone drilling and Figure 14.8 displays the distribution of resource blocks by class for blocks that are above the nominal cut-off of 25% Fe.

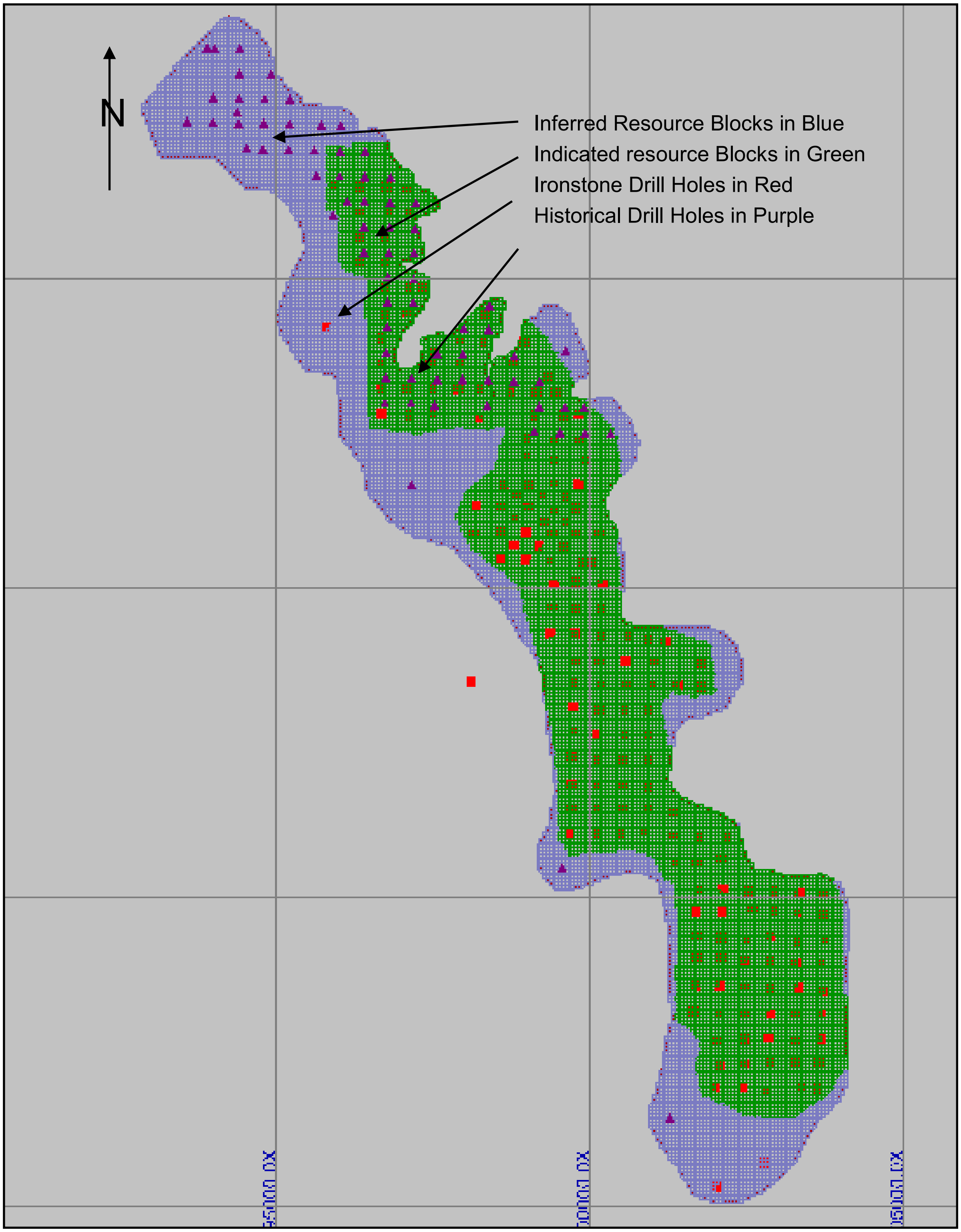


Figure 14.7: Plan view of resource classification

Note: Grid is 5,000 m by 5,000 m

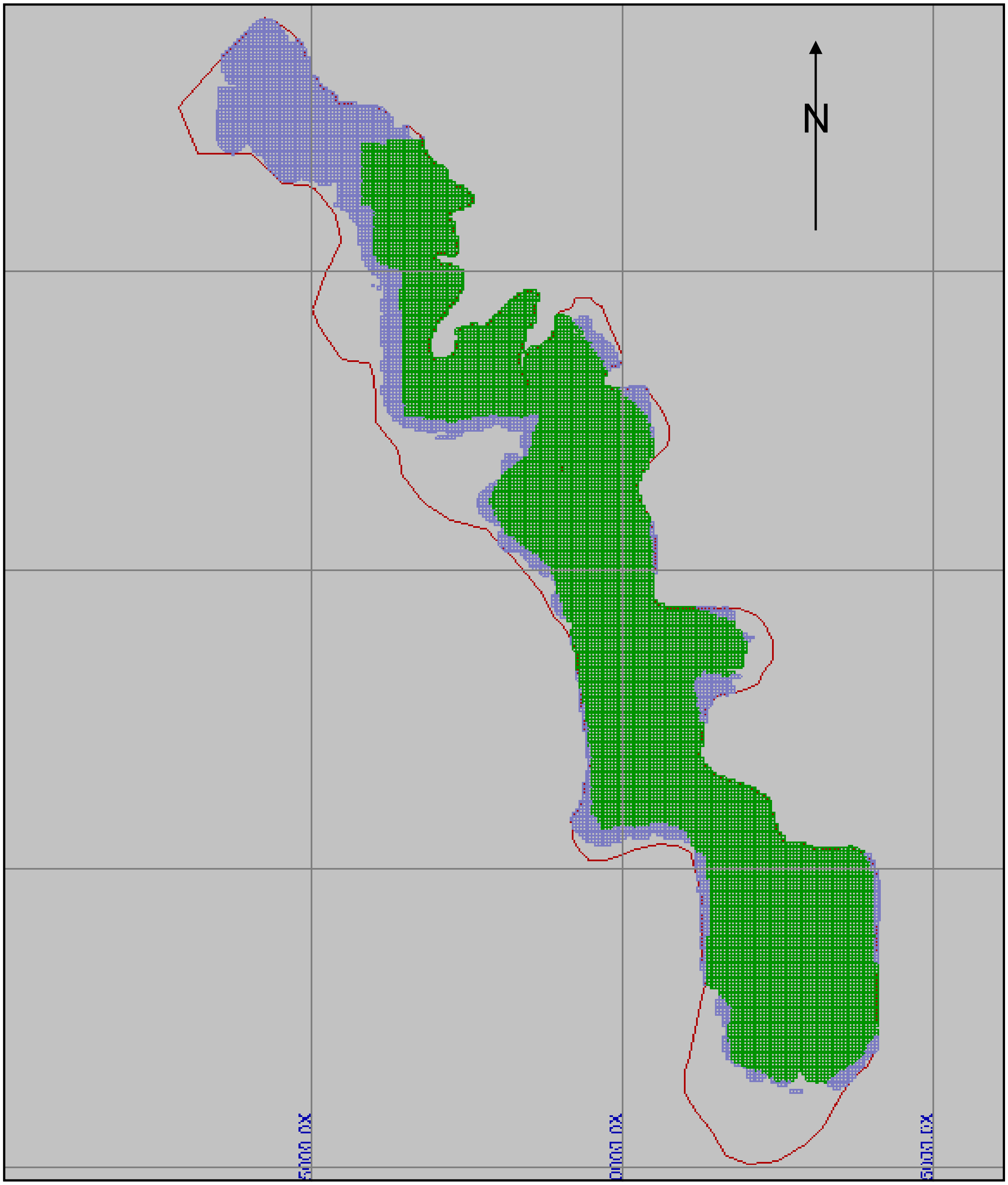


Figure 14.8: Mineral resources by class above 25% Fe cut-off
Note: Grid is 5,000 m by 5,000 m

14.8 Block Model Validation

The block model was validated by inspecting the interpolated grades on sections and plans and carrying out a visual comparison of interpolated grades against the drill hole composite grades (Figure 14.10). No interpolation errors or discrepancies were noted as part of the visual inspection.

In order to check for global bias or errors, a duplicate model was generated from using the same geological outline but block grades were estimated using Inverse Distance square ("ID2") interpolation method. Assay data were re-imported and geology wireframes were checked against the newly imported data to confirm that the geological interpretation was still corresponding to the drill hole. Mineral resources were re-estimated using the ID2 estimation method. Table 14.13 summarises the OK indicated mineral resources for the ID2 interpolation and Table 14.14 summarises the inferred mineral resources. The results of the ID2 interpolations are very similar to the OK method which indicates that no significant global bias exists in the OK estimate.

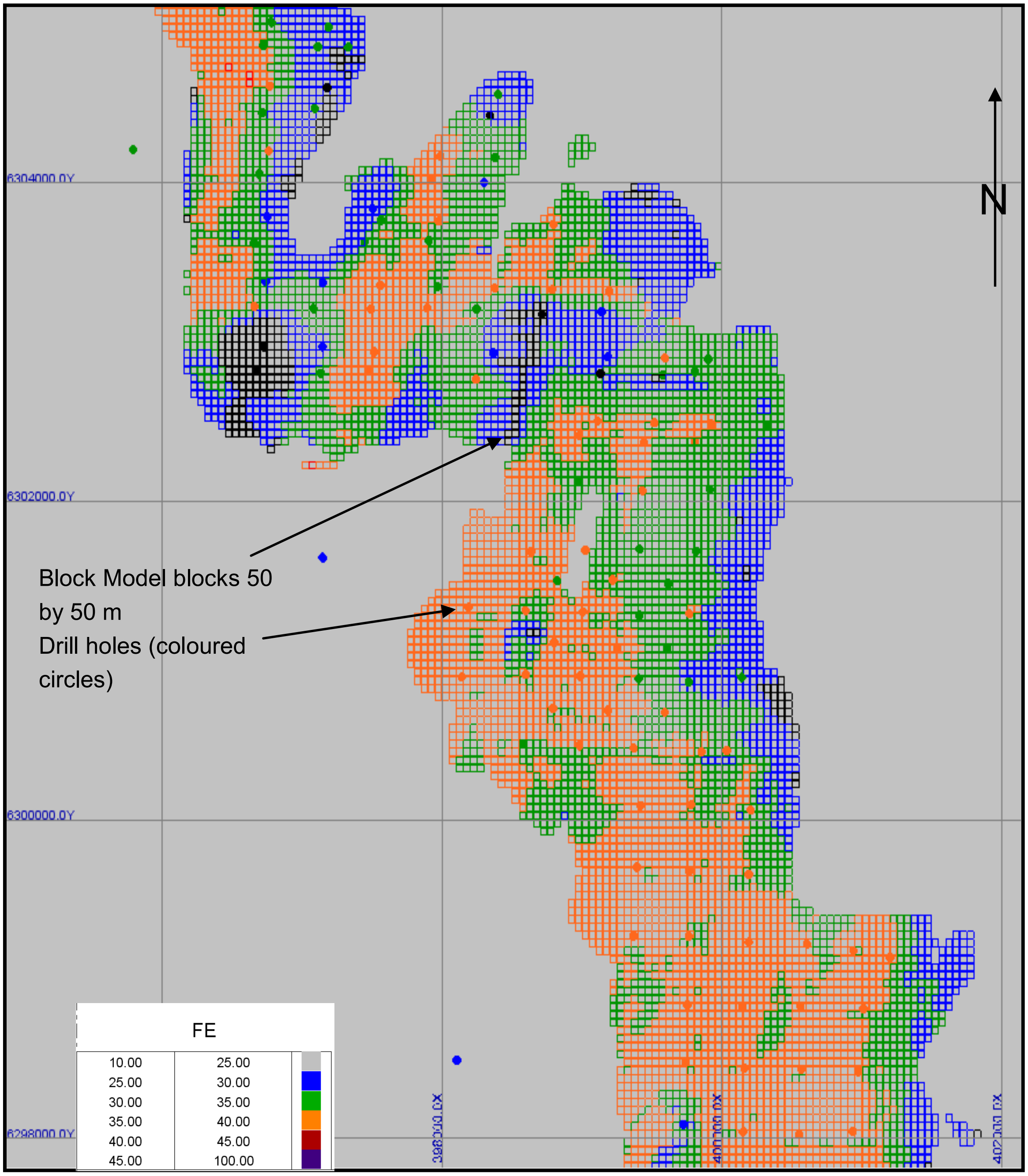


Figure 14.9: Block model Level 99 (773 m amsl), comparison of Fe block grades with drillhole composited values

Note Grid is 2,000 m by 2,000 m

Table 14.13: Inverse distance square model indicated mineral resources

Cut Off	S.G.	Tonnes (000)	Fe%	SiO_2%	V_2O_5%	Al_2O_3%	P_2O_5%	[1]P%
>35%Fe	2.29	285,500	36.66	20.96	0.20	4.24	1.30	0.57
>30%Fe	2.28	419,799	35.60	21.92	0.19	4.24	1.27	0.55
>25%Fe	2.24	546,367	33.66	23.99	0.18	4.35	1.21	0.53
>20%Fe	2.24	585,835	32.98	24.71	0.18	4.41	1.20	0.52

Note[1]: P% is calculated by dividing P_2O_5**%** by 2.2914

Table 14.14: Inverse distance square model inferred mineral resources

Cut-Off	S.G.	Tonnes (000)	Fe%	SiO_2%
>35%Fe	2.27	41,883	37.64	24.10
>30%Fe	2.24	79,894	35.51	25.18
>25%Fe	2.23	94,603	34.35	26.15
>20%Fe	2.23	95,735	34.22	26.23

14.9 Sensitivity of mineral Resource to Cut-off Grade Selection

Mineral resources are sensitive to the selection of cut-off grade. Figure 14.10 shows tonnage and grade for the blocks classified as indicated mineral resources and Figure 14.11 shows the blocks classified as inferred mineral resources. The reported quantities and grades are only presented as a sensitivity of the resource model to the selection of cut-off grade and contain both open pit and underground mineral resource. As can be seen from the figures, tonnage and grade don't vary much below 25% Fe cut-off. The deposit appears to have a natural cut-off of 25% Fe above which tonnage decreases rapidly without an appreciable corresponding increase in grade.

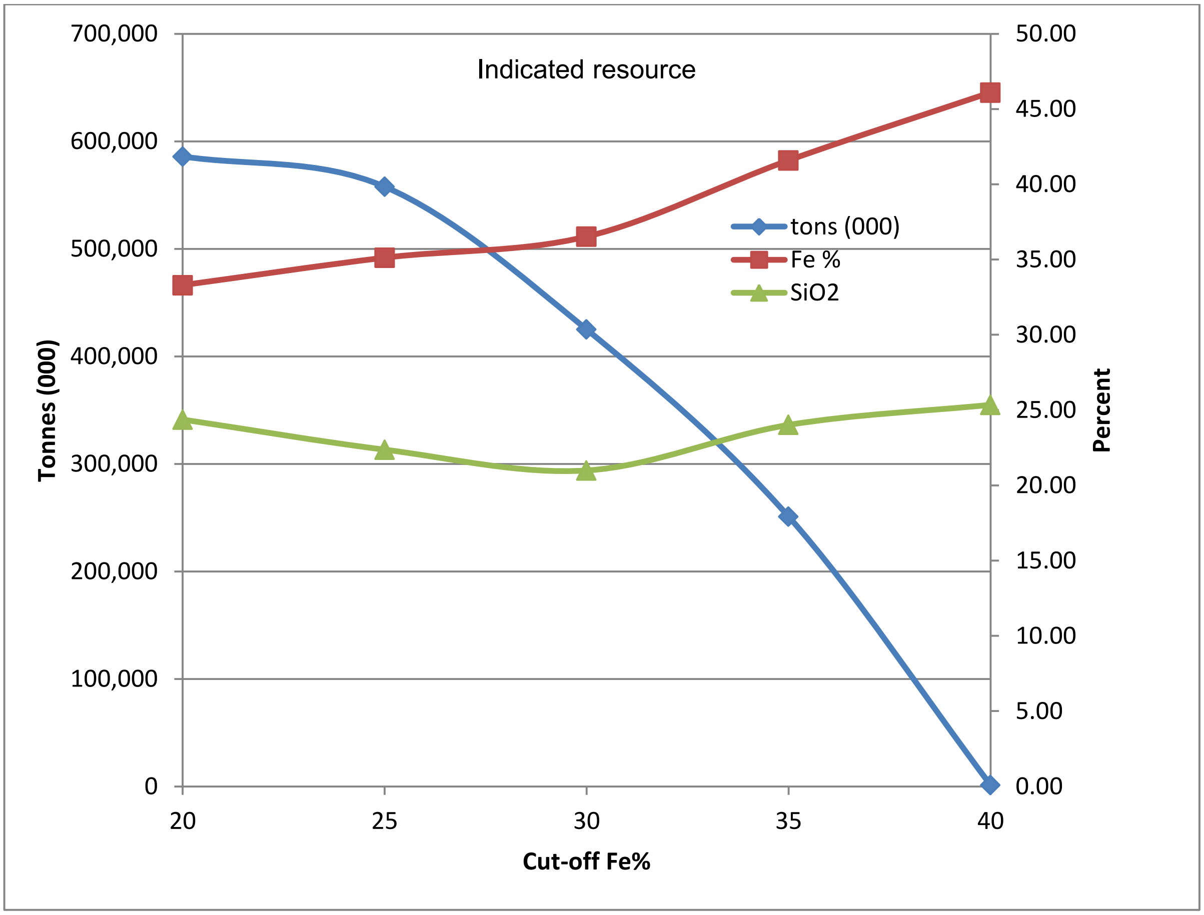


Figure 14.10: Grade tonnage curve for indicated mineral resource

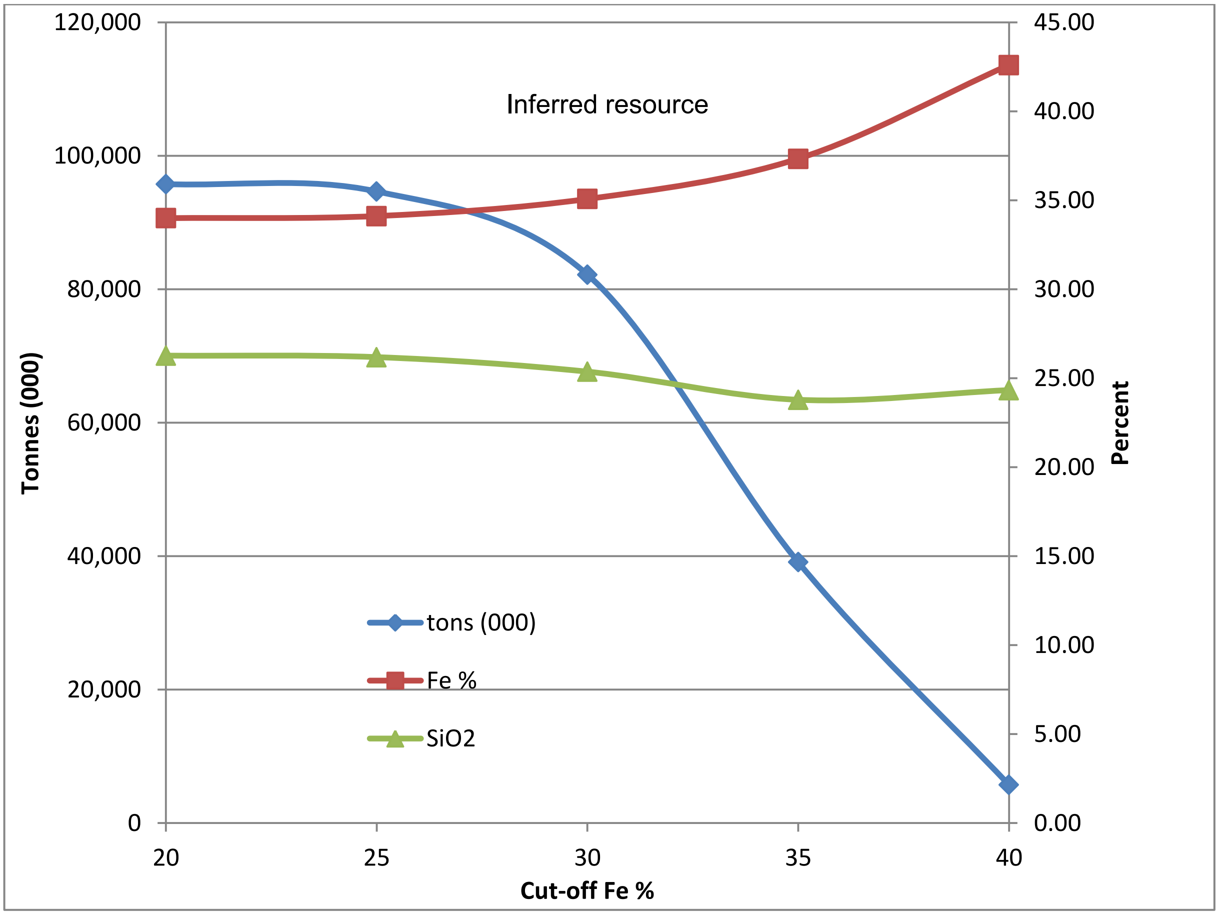


Figure 14.11: Grade tonnage curve for inferred mineral resource

15 Other Relevant Data and Information

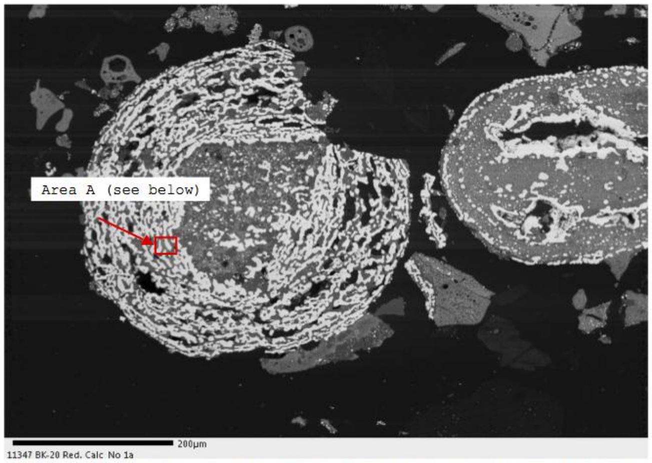
SRK notes that the oolitic ironstone at Rambling Creek and North Whitemud River is laterally very extensive and that the mineral resources presented in this report only represent a small portion of the overall iron deposit. The deposit is open to the east, west and has been encountered in the South Whitemud River drilling 11 km south of the resource area. The deposit appears to be of consistent thickness and grade and it is reasonable to assume that additional drilling will identify additional resources.

SRK notes that the Clear Hills Iron deposit is associated with appreciable concentration of vanadium pentoxide. Early work by SGS indicates that the vanadium may be recoverable during the DRI process and additional laboratory work indicates that the vanadium is concentrated in the material interstitial to the iron (Figure 15.1). SRK has not included the vanadium in the economic parameters while estimating the viability of the Whittle shell. Should vanadium be recoverable, the economics of the project will be positively affected. Further work is required to determine the economics of recovering vanadium from the deposit. Similarly, gold has been identified in some of the core samples collected from the 2008 drilling. Insufficient sampling has been carried out to determine if gold does exist in any significant concentration to be recoverable.

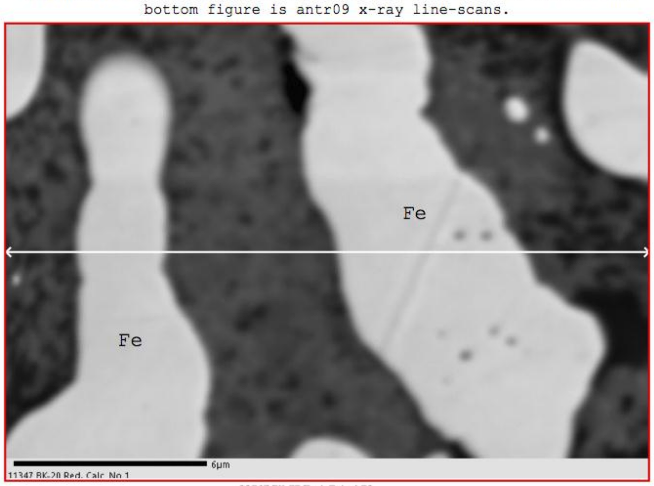
SRK notes that there has been a significant amount of work undertaken to beneficiate the Clear Hills ore over the last 50 years. Work done by Krupp Industries in the early 1960s, utilizing the SL/RN process, indicated that the iron can be beneficiated. The GE process developed by the Alberta Research Council in the early 1980s resolved the concerns with the SL/RN process at a laboratory scale. Current work underway by Ironstone is focussed on development of the GE process on a commercial scale.

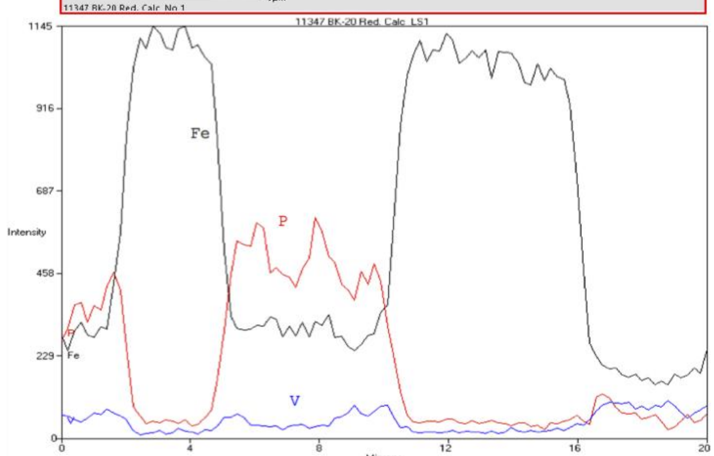
The development of the process to date has established the design criteria for the comminution, calcining and drying, and reduction parts of the process. The planned work is expected to establish the design criteria for the remainder of the commercial process. However, chloride segregation has never been applied for iron before on a commercial scale and direct heating during chloride segregation has never been attempted at a pilot plant scale.

Attaining success in the remainder of the pilot plant work to develop the GE process commercially, consistent with the favourable outcome of the work to date, would indicate that the iron deposit of the Clear Hills would constitute a mineral resource as defined under NI43-101.



Backscattered electron (BSE) image showing oolites with metallic iron (bright areas). Figure directly below shows the enclosed area A and bottom figure is antr09 x-ray line-scans.





X-ray line-scan along the white line (above) showing the increased concentrations of vanadium and phosphorus at the surfaces of the metallic iron particles and in the silicate phase between the metallic iron particles.

Figure 15.1: Electron photomicrograph of oolith and x-ray line scatter of grains.

16 Interpretation and Conclusions

The Rambling Creek-North Whitemud River iron deposit underlies most of the Clear Hills in north-western Alberta, which are about 80 km northwest of the town of Peace River, Alberta, and about 480 km by air northwest of Edmonton. The deposit is best classified as Minette type iron formation. The most prominent feature of these oolitic ironstones is the presence and abundance of oolites and pisolites composed of goethite and nontronite that were deposited in shallow water environments, close to shorelines or abandoned deltas.

The deposit is bedded, flat lying and has a maximum thickness of 15 m. The deposit is exposed on the banks of Rambling Creek and extends northwest and southeast of Rambling Creek for several kilometres. The ironstone consists of ooliths, siderite, and clastic material embedded in a clastic matrix and ferruginous cement.

There are 579 drill holes in the Ironstone database; 347 are drilled in the Rambling Creek-North Whitemud River area representing 21,365 m of drilling. A large proportion of the drilling, 148 holes, were drilled thirty to forty years ago and by operators other than Ironstone and, as a result, most of the original assay records have been misplaced, lost or destroyed. However, assay records are available for 72 of the historical drill holes through the Alberta Government assessment records. The historical data contains only Fe and SiO_2 assay values. A total of 437 historical Fe and SiO_2 assay records representing 489 m of drilling have been used as part of this estimate. SRK is of the opinion that while there are some differences between the new and old assay data, the historical data are acceptable for the estimation of an inferred resource. Indicated mineral resources have only been defined where Ironstone has completed drilling in 2008 or 2011

Through the month of February and ending on March 5, 2008, Ironstone conducted its first drilling program on the Rambling Creek area of the Clear Hills Property. The company successfully drilled 2,055 m and recovered 385 m of oolitic iron ore from 47 out of 51 holes. The Company carried out a second drilling campaign in January of 2011, drilling an additional 148 holes over the North Whitemud River portion of the deposit. Ironstone carried out a third drilling campaign in 2012 targeting the extension of the iron deposit in the South Whitemud River area drilling 31 holes and recovering 1,403 m of core. The South Whitemud River drilling was not incorporated as part of the resource area presented in this report. SRK is of the opinion that the sampling protocols and sample intervals were adequate for determination of major element concentration of the ironstone.

The proposed flow sheet for the Clear Hills ironstone consists of an initial drying or dehydration using a calciner, particularly to dehydrate and decompose the nontronite clay fraction cementing the higher grade ooids. The iron fraction is treated by direct reduction, producing metallic iron using coal or gas in a kiln, followed by a chloridizing step to promote iron grain growth, dry grinding of the kiln product, magnetic separation of the metallic iron and finally hot briquetting to produce the final HBI product.

Mineral resources for the Clear Hills Ironstone deposit were estimated by SRK using 3-dimensional block modelling software provided by Gemcom Software International Inc. of Vancouver, GEM version 6.3.

Mineral resources were estimated using block model methods with values interpolated into 50 m by 50 m by 2 m blocks to reflect drill spacing and the laterally extensive nature of the deposit compared to its average 8 m thickness. A percent model was used to store the proportion of each block contained within the wireframes representing the mineralized envelopes. Assay values were composited to a fixed length of 1 m to assure that all data were evenly weighted before block modelling interpolation. Composites were generated starting from the collar of the drill hole downwards and incorporated only the assays contained within the interpreted mineralized zones. Two mineralized zones were modelled; a densely oolitic and a moderately oolitic zone. Data that fell outside of the interpreted mineralized zone were not composited and were not used in the estimation process. The grade interpolation was carried out in two successive passes using flat search ellipses. The second pass represents a larger search neighbourhood and only blocks that had insufficient data for interpolation during the first pass were interpolated.

SRK applied a Whittle shell to the Rambling Creek-North Whitemud River iron deposit to determine the amount of iron that could potentially be mined under reasonable assumptions. The Whittle shell is defined using reasonable economic parameters and reflects the material with which SRK considers has the potential for eventual economic extraction and is not intended to be an indication of mineral reserves. Blocks were classified as Indicated Mineral Resource if they were interpolated as part of the first interpolation. All other blocks within the oolitic ironstone were classified as Inferred Mineral Resource.

Based on the above parameters, SRK estimated that the Rambling Creek and North Whitemud River portions of the Clear Hills iron deposit contained 557,738,000 tonnes grading 33.30% Fe classified as Indicated Mineral Resources and 94,664,000 tonnes grading 34.11% Fe classified as Inferred Mineral resources at a 25% Fe cut-off.

SRK notes that there has been a significant amount of work undertaken to beneficiate the Clear Hills ore over the last 50 years. Work done by Krupp Industries in the early 1960s, utilizing the SL/RN process, indicated that the iron can be beneficiated. The GE process developed by the Alberta Research Council in the early 1980s resolved the concerns with the SL/RN process at a laboratory scale. Current work underway by Ironstone is focussed on development of the GE process on a commercial scale.

The development of the process to date has established the design criteria for the comminution, calcining and drying, and reduction parts of the process. The planned work is expected to establish the design criteria for the remainder of the commercial process. However, chloride segregation has never been applied for iron before on a commercial scale and direct heating during chloride segregation has never been attempted at a pilot plant scale.

Attaining success in the remainder of the pilot plant work to develop the GE process commercially, consistent with the favourable outcome of the work to date, would indicate that the iron deposit of the Clear Hills would constitute a mineral resource as defined under NI43-101.

SRK noted that the Clear Hills iron deposit is associated with appreciable concentration of vanadium pentoxide. Early work by SGS indicates that the vanadium may be recoverable during the DRI process. SRK did not include the vanadium in the economic parameters while estimating the viability of the Whittle shell.

17 Recommendations

SRK recommends that Ironstone continue to investigate the potential of the Clear Hills iron deposit. To further evaluate the potential of the deposit, SRK recommends that Ironstone continues to process the bulk sample collected during the 2011 field season to develop a more robust process flow-sheet. Based on positive results of the additional metallurgical testing, SRK recommends that Ironstone carry a scoping level study to determine the economics of extracting iron from Clear Hills. SRK estimates that the additional sampling and metallurgical testing will cost about $360,000 and a scoping level study would cost approximately $280,000. A preliminary budget is outlined in Table 17.1.

SRK recommends that if additional drilling is carried out in the future that the drill holes be extended to intersect the footwall of the oolitic iron deposit so that the entire ironstone can be sampled and analyzed and that characterization of the footwall can be determined.

Table 17.1: Preliminary budget of phase 1 and phase 2 work programs

Item	Cost
Phase 1	
Pilot Test Analyses	$350,000
Reporting	$10,000
Total Phase 1 Work	**$360,000**
Phase 2 (contingent on positive results from Phase 1 work Program)	
Scoping Level Study	$280,000
Total Phase 2	**$280,000**
Total Phase 1 and Phase 2	**$640,000**

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

18 References

Arseneau, G. J., Keller, G.D., and Willis, J. (2010): SRK report on Rambling Creek Iron Project, Clear Hills Alberta, October 28, 2010, 85 p.

Bertram, E.F., Harris, P. and Myroniuk, D.W., (1981): Beneficiation Process for Oxidised Iron Ore. US Patent 4246025.

Bertram, E.F. and Kay, W.C., (1978): *Clear Hills Iron Ore Project Part XI – Grain Enlargement Project Summary Report*; Product Research and Development Alberta Research Council, 90p.

Bertram, E.F. and Mellon, G.B., (1975): Peace River iron deposits; Alberta Research Council, Alberta Geological Survey, Information Series 75, 53 p.

Bhattacharya J.P., (2008): Cretaceous Dunvegan Formation of the Western Sedimentary Basin; *in* Geological Atlas of the Western Canada Sedimentary Basin, G.D. Mossop and I. Shetsen (comp.), Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4, URL http://www.ags.gov.ab.ca/publications/wcsb_atlas/atlas.html , May 31, 2010

Burwash, R.A., McGregor, C.R. and Wilson, J., (2008): Precambrian Basement beneath the Western Canada Sedimentary Basin; *in* Geological Atlas of the Western Canada Sedimentary Basin, G.D.

Caplan, B.R., (2008): *Assessment Work, Clear Hills Project*, Ironstone Resource Ltd.; 198 p.

Colborne, G.L. (1958): *Sedimentary Iron in the Cretaceous of the Clear Hills area, Alberta*; Unpublished M. Sc. Dissertation, University of Alberta, 85p.

Dam, O., Whipp, R., and Osborne, C., (1998): *Venezuela's Role in the Merchant DRI Market*. Metal Bulletin's Latin American Steel and Iron Ore Conference, March 22-24

Edgar, N. S., (1961): *Iron Prospecting Permit 16: Report on Clear Hills iron deposit of Alberta; Unpublished Assessment Report.* Alberta Research Council Economic Minerals File FE-AF-017 (01)

Edgar, N.S., (1964): *Assessment Report on Clear Hills Iron Deposit of Alberta, Peace River Mining and Smelting Ltd.*; Alberta Energy and Utilities Board, EUG/AGS Assessment File 19620001, 8 p.

Green, R. and Mellon, G.B., (1962): *Geology of the Chinchaga River and Clear Hills (north half) map-area, Alberta*: Alberta Research Council Earth Science Report 62-8, 18p.

Hamilton, W.N., (1980): *Clear Hills Iron Deposit, Geology Mineralogy and ore Reserves*. Open File Report 1982-13 Alberta Geological Survey 51p.

Hatch, (2012): Work Order #2 Final Report for Engineering Services – Clear Hills Iron Ore Project, February 13, 2012, 104p.

Kafle, B., (2008): Geochemistry and preliminary stratigraphy of oidal ironstone of the Bad Heart Formation, Clear Hills and Smoky River regions, northwestern Alberta; Energy Resources Conservation Board, ERCB/AGS Open File Report 2009-01, 97p.

Kidd, D.J. (1959): *Iron Occurrences in the Peace River Region, Alberta:* Alberta Research Council Earth Sciences Report 59-3, 38p.

Kingston Process Metallurgy Inc, (2010): Thermal Analysis and Treatment of Rambling Creek Iron Ore Deposit. Final Report

Lenz, A.C., (1956): *Oolitic Iron Ore, Clear Hills Alberta*; Unpublished term paper, University of Alberta, 37p.

Ministry of Environment & Forests of India, (2007): Central Pollution Control Board, Sponge Iron Industry.

Mossop, G.D. and Shetsen, I., (1994): Geological atlas of the Western Canada Sedimentary Basin; Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4, URL http://www.ags.gov.ab.ca/publications/wcsb_atlas/atlas.html, May 31, 2010.

Nickel, E.H., Bright, N.F.H., Lepine, E.E., (1960): *A Mineralogical Analysis oftwo Samples of Oolitic Iron Ore from the Clear Hills area of Alberta*; Canada Mines Branch Investigation Report IR 60-39, 41p.

Olson, R.A. and Kafle, B., (2005): Bad Heart Fomration Ooidal Ironstones: Where to Explore and Where not, Alberta Energy & Utilities Boards, Alberta Geolgoical Survey, University of Alberta; poster, 1 p.

Parrish, I.S., (1997): *Geologist's Gordian Knot: To cut or not to cut.* Mining Engineering Magazine, April 1997, pp 45-49

Petruck, W., (1977): Mineralogical Characteristics of an Oolitic Iron Deposit, Canada Centre for Mienral and Energy Technology, Deptartment of Energy and Mines, Canadian Mineralogist, Vol. 15, pp. 3-13

Samis, C. S., and Gregory, J., (1962): *The Reduction of Clear Hills Iron Ore by the R-N Process,* Alberta Research Council Information Series 40, 35p.

SGS Canada Inc, 2010. An Investigation into Phase 2: Metallurgical Testwork Clear Hills Iron Ore Deposit, Project 11946-002 Final Report

Sliwinski, J. And Gunning, C., (2009): A High Definition Mineralogical Examination of Ten Drill Cores from the Clear Hills Iron Deposit; SGS Minerals, 155 p.

Sneddon, D. T., (2006): Technical Report and Recommendations Resource Potential of the Clear Hills Iron Deposit Alberta 70p.

Sneddon, D. T., (2007): Technical Report and Recommendations Resource Potential of the Clear Hills Iron Deposit Alberta, 2006 Filed Program 65p.

Williams, G.D. and Stelck, C.R. (1975): Speculations on the Cretaceous Palaeogeography of North America. In: The Cretaceous System in the Western Interior of North America. W.G.E. Caldwell (ed.). Geological Association of Canada, Special Paper 13, p. 1-20.