Chevron Canada Resources
Snake River Iron Ore

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Distribution List

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1. Conditions and Limitations of Use

The Client, Chevron Canada Limited, commissioned this Review in an Agreement dated 06 December 2005, and signed 23 December 2005 (by Hatch Ltd) and 12 January 2006 (by Chevron Canada Limited). The agreement was based on a proposal submitted 07 November 2005. These Conditions and Limitations of Use apply to this Report.

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The information contained herein has been prepared based upon information and data obtained by the Consultant from the Client's management and staff, their contract staff and advisors, or from other public sources the Consultant deemed reliable.

Any environmental commentary does not constitute a legal opinion. The disclosure of any information contained in this Report is the sole responsibility of the Client. The principles, procedures and standards applied in conducting an environmental investigation are neither regulated nor universally the same. An environmental review has been excluded from Hatch's scope.

The Consultant has conducted this investigation in accordance with the methodology outlined in the proposal document. It is important to note that the methods of evaluation employed, while aimed at minimizing the risk of unidentified problems, cannot guarantee their absence. Even though the information provided by the Client was reviewed, we were required to rely on this information with out being able to independently verify its accuracy.

2. Executive Summary

Chevron Canada Limited (Chevron) has asked Hatch Consulting to review an iron ore deposit in the Yukon Territory for which Chevron holds the leases, to assess the attractiveness of developing the property. The deposit, known as the Snake River iron ore deposit or the Crest deposit (both names are used in this document), is reported to have in the order of 20 to 30 billion tonnes of iron ore. This would make it the largest undeveloped deposit within a developed country and the second largest in the world.

Key Findings

The following are Hatch's key findings with respect to the Crest iron ore deposit:

- The Crest iron ore deposit is believed to be the second largest iron ore deposit in the world with an estimated 20 to 30 billion tonne "resource", of which 50% is reportedly suitable for open-pit mining. It is believed that only the El Mutun iron ore deposit in Bolivia is larger than Crest. It is understood that the El Mutun deposit is soon to be developed by the Jindal Iron and Steel Co. of India.
- The Iron Creek area of the Crest deposit is believed to be the most attractive in terms of reportedly contains more than 11 billion tonnes of iron ore. This area was evaluated in 1964 to contain between 41% and 45% Fe, six billion tonnes of which can be processed with a stripping ratio of 0.2:1 and 1:1 waste ratios (both measures are considered excellent by industry standards). Past reports show promise of an iron ore deposit with capacity for 400 years of production.
- Issues of concern raised in 1962-65 testing period (ie: high phosphorus and silica content) are issues more readily overcome through modern milling and processing technologies. Additional testing is required to confirm that Crest iron ore could be viably processed into iron ore pellets suitable for blast furnace feed.
- The global iron ore industry is highly concentrated with three producers accounting for 71% of total sea-borne production. Large, high quality iron ore deposits are of significant strategic importance to major global producers and national governments alike. Growing demand for iron ore and related steel products is unlikely to be matched by existing and imminent supply.
- Exploration of Crest was initiated in 1962, however, the remoteness of the mine and substantial distance to tidewater (approx. 920 km) limited interest in developing the mine site. Consideration of rail development in Yukon, northern BC and Alaska improves the potential viability of mining the Crest deposit. Competitive iron ore mining operations are railed (or transported via pipeline) to port similar distances. Rail transit or pipeline is key to competitive iron ore production and export.

Conclusions

- The Snake River/Crest deposit is one of the largest undeveloped iron ore deposits in the world with 20 to 30 billion tonnes of resource reported.
- Iron ore demand is increasing and traditional known large deposits are depleting their reserves quickly. As supply decreases, prices continue to increase.

Recommendation

- Given the current circumstances, Hatch believes the Crest deposit is worthy of further development to define the resources, processing and infrastructure.

The Snake River iron ore deposits are located approximately 360 airline miles north of Whitehorse, Yukon Territory. This deposit is on the boundary between the Yukon and Northwest Territories, as shown in the following map. Logical transportation routes would be through Anchorage/Haines/Port MacKenzie, Ft St John/Prince Rupert or a new Alaska Canada rail link that is now being studied. Figure 2.1 shows a map of the area, and Figure 2.2 is a photograph of the airstrip that was built in the 1960's, looking southeast across Iron Creek.

Figure 2.1: Map of area surrounding Crest

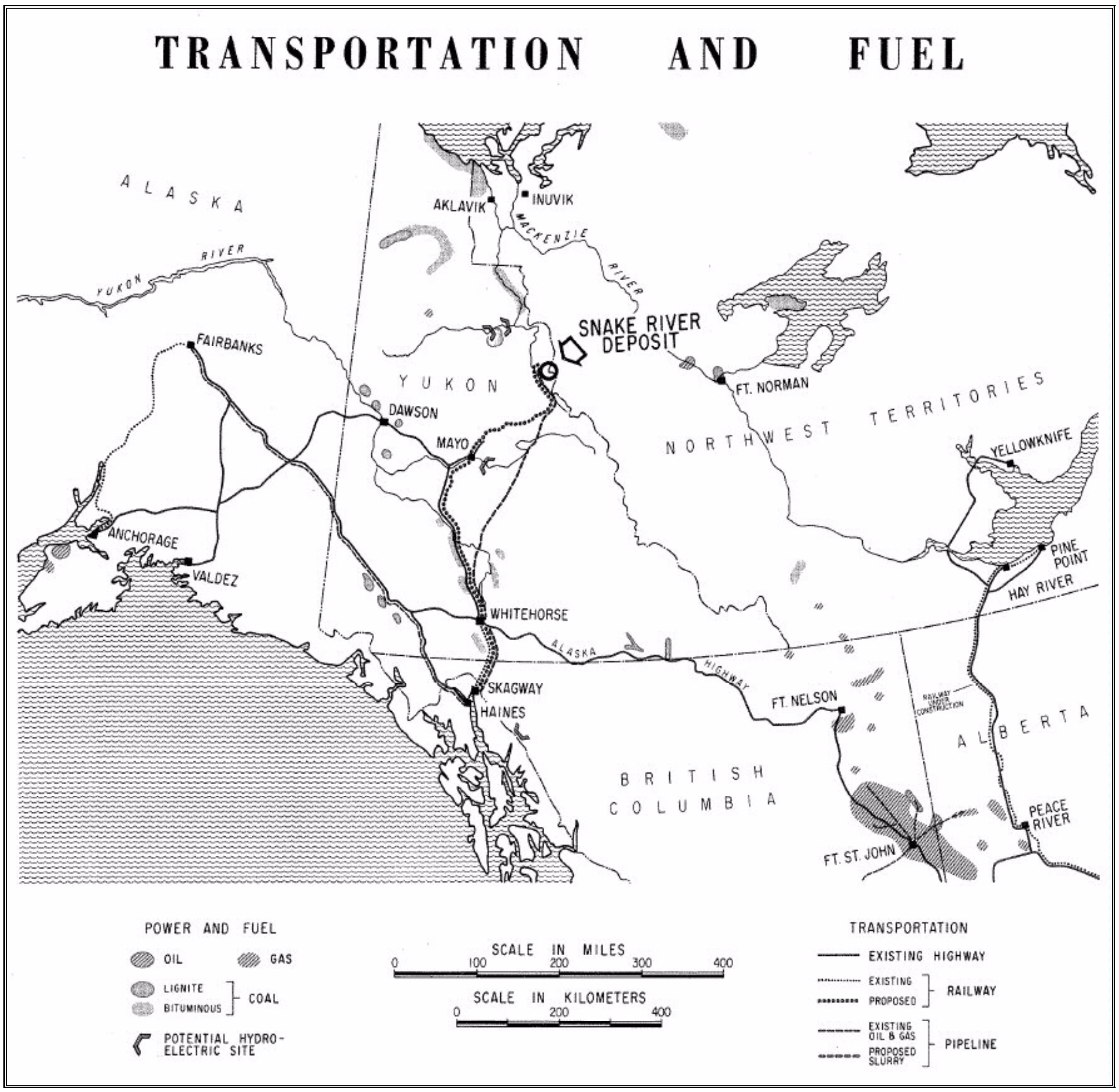


Figure 2.2: Snake River Airstrip

The project was originally explored in the early 1960's and then development stopped due to falling iron ore prices.

2.1 Previous Studies

Several studies/reports were reviewed by Hatch in developing this document, including:

- Preliminary Evaluation by Canadian Bechtel Limited (1963)
- Snake River Iron Deposit Summary Report by Crest Exploration (1965)
- Update Evaluation of Capital and Operating Costs by Kaiser Engineers (1976, and updated in 1991 and again in 1998)

For a complete list of documents available, see Appendix A.

Hatch's objective was to review the existing material and to determine if there have been changes in the market, in technology, or in circumstances since the original work was completed that would have an influence on the attractiveness of developing the Snake River property.

Hatch's work focused on the geology of the deposit reported in previous studies, beneficiation and processing and technology improvements in these areas that may have an impact on Snake River iron ore, the current market situation for iron ore and general developments (such as the Mackenzie Valley Pipeline Project).

2.1.1 *Geology of the Iron Formation*

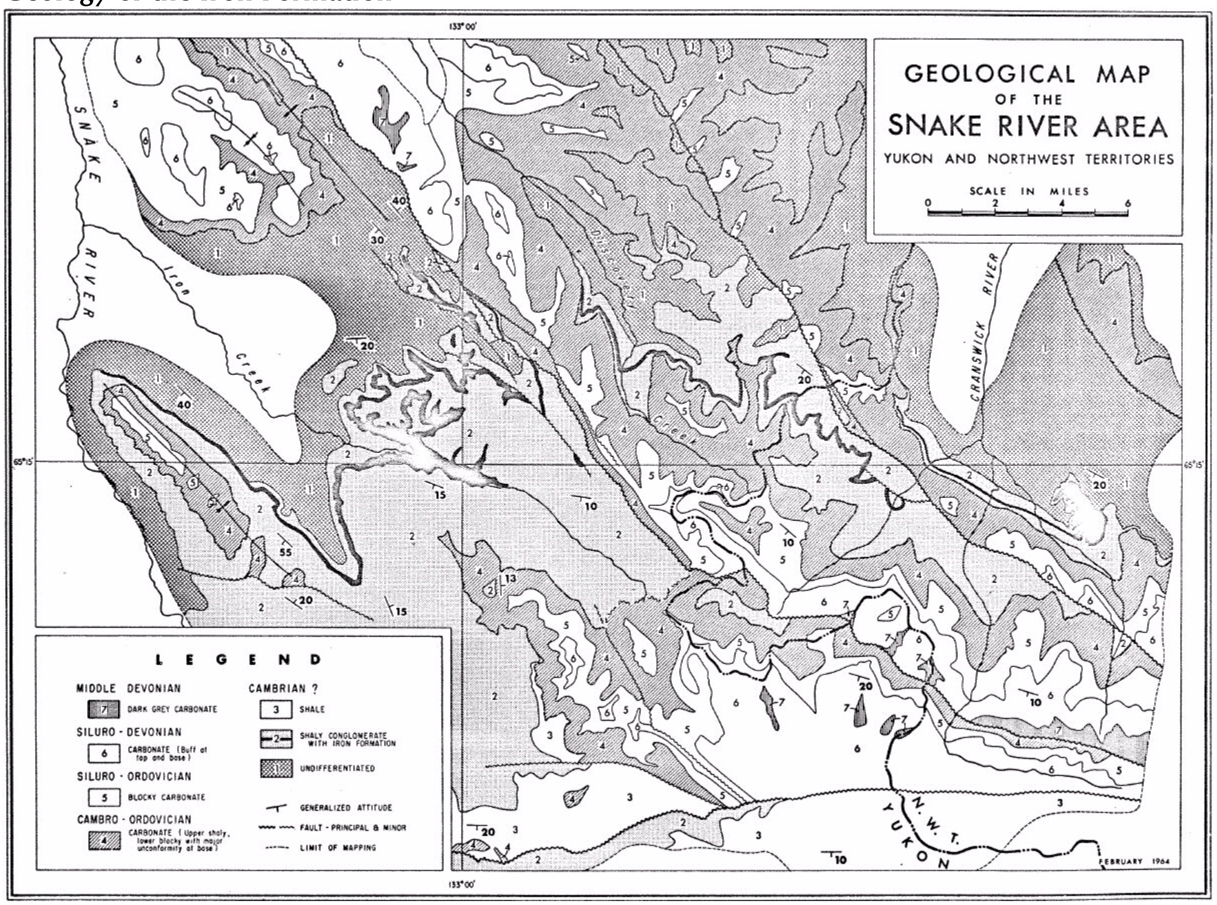


Figure 2.3: Geological map of the Snake River area

This section comprises a summary of the Snake River iron ore deposit geology, sampling and resource estimation, which were carried out by Crest Exploration Limited between 1961 and 1964, and described in a number of reports prepared at that time. This summary is a compilation of data and assessment by others in these existing reports.

The Snake River iron ore is a fairly simple sedimentary deposit. Mineralogically it consists of fine grained specular hematite with silica distributed as bands or nodules of red jasper. The sedimentary iron ore had been traced over a distance of 51.5 km.

The jasper-hematite type of iron formation constitutes a significant proportion of the lower 305 metres of the hematitic conglomerate of Cambrian age. The greater part of the iron formation occurs in a restricted zone between 152 and 305 metres above the unconformity at the base of the conglomerate. The zone attains its maximum thickness of 152 metres in the area immediately north of Iron Creek, and generally thins out toward both east and the west.

Thirteen cross sections were constructed to establish correlations in the iron-rich zone throughout the Snake River area. Eight of these cross sections form a grid (4 east-west and 4 north-south) covering the main Iron Creek block. The lithologies were standardized to facilitate correlation into five lithology types: hematite, shale, sand, shaly conglomerate (less than 30% to 40% clasts) and conglomerate (more than 30% to 40% clasts). The arbitrary ore cut off of 35% soluble iron was used to differentiate between hematite and shale. (The analytical method for determination of soluble iron is described in the Section 5.5.1.6 of this report.) During the correlation work, the iron formation was divided into nine natural units (Figure 5.6), the boundaries of which were established as follows:

- Zone 1: Top of main iron to bottom of upper marker sandstone,
- Zone 2: Bottom of upper marker sandstone to top of first continuous clastic unit,
- Zone 3: Top of first continuous clastic unit to bottom of second clastic unit,
- Zone 4: Top of second continuous clastic unit to bottom of main marker sandstone,
- Zone 5: Bottom of main marker sandstone to top of next major clastic unit,
- Zone 6: Major clastic unit predominantly shaly conglomerate,
- Zone 7: Major hematite unit,
- Zone 8: Major clastic unit predominantly shaly conglomerate,
- Zone 9: Basal major hematite unit.

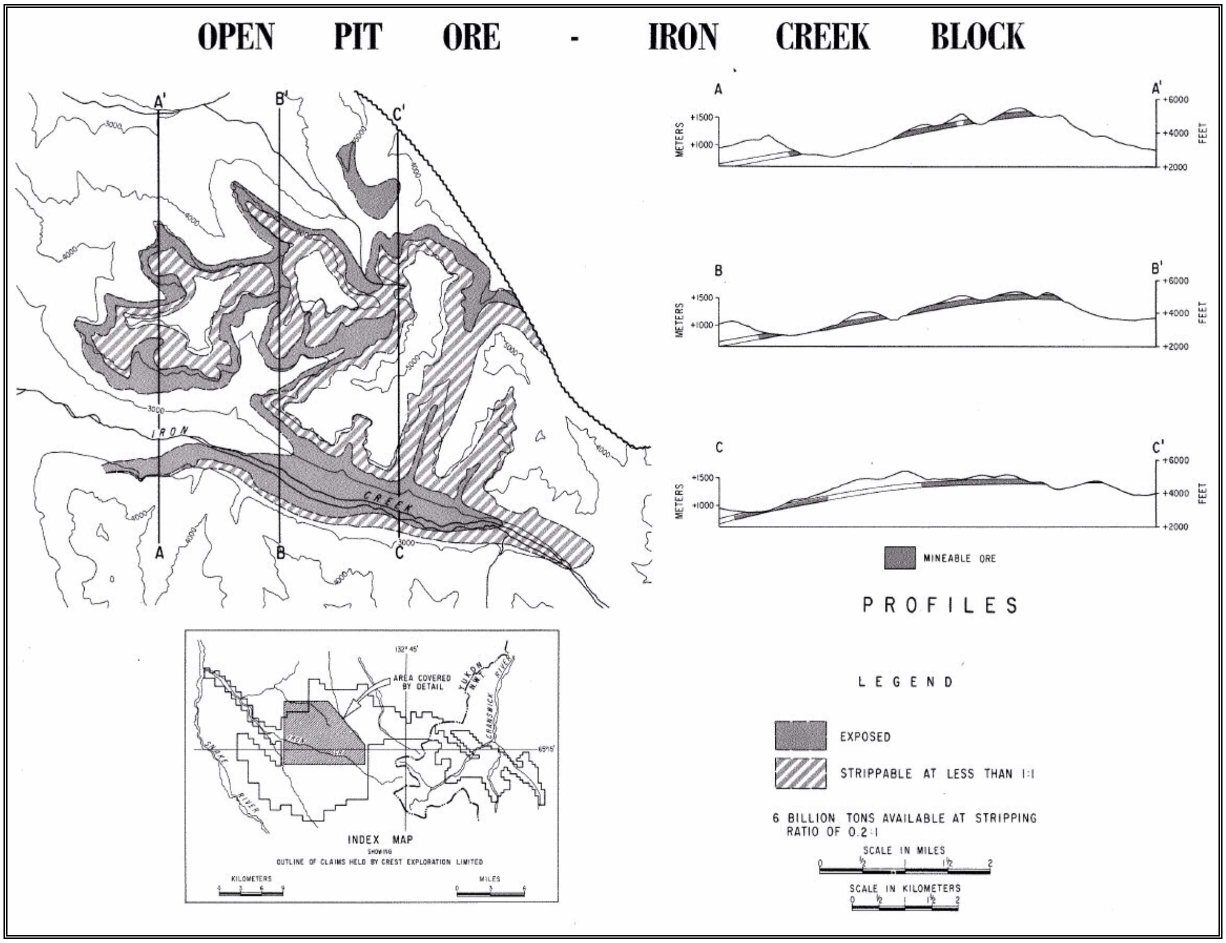


Figure 2.4: Iron Creek block

Sandstone is not a particularly abundant constituent of the iron-rich zone, but is notable chiefly for the persistence of its beds. Shale and siltstone are not volumetrically important in the iron-rich zone and usually form beds 0.6 m or less thick and very limited area. Shaly conglomerate is by far the most abundant sedimentary type and forms beds within the iron-rich zone ranging in thickness from a few centimetres to 20 m or more (Zones 6 and 8).

The iron-rich zone consists of varying proportions of three basic constituents: hematite, chert, and clastic sedimentary rocks. Crest distinguished the following types of iron formation on the basis of the hematite jasper inter-relationship:

1) Nodular iron formation

   This consists of 60% to 90% of dense very fine grained, steel-grey to maroon-tinted hematite containing small rounded or ovoid nodules of orange-red jasper.

2) Banded Iron Formation

This consists of interbanded hematite and jasper. The bands may range from a fraction of a centimetre to a metre in thickness, they may be structureless or laminated, and they may be interbedded in any relative proportions.

3) Irregular Iron Formation

This type of iron formation is characterized by irregular masses and intergrowths of hematite and jasper.

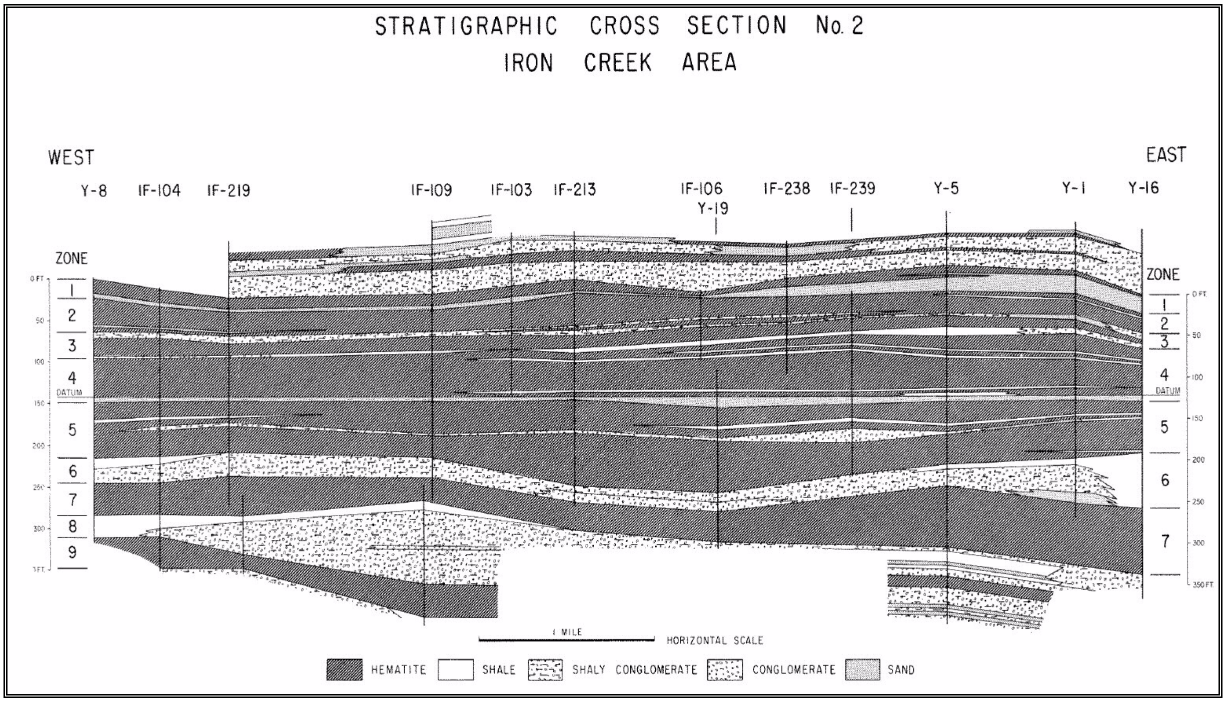


Figure 2.5: Example of the stratigraphic cross section

2.1.2 *Exploration History*

Crest Exploration has reported that the Snake River area was virtually unknown geologically until the mid-1950's when petroleum exploration companies became active in the Mackenzie Mountains.

The Snake River iron ore deposit was discovered by a geological party of the Standard Oil Company of California in 1961 during an extensive program of regional structural and stratigraphic geological mapping. The deposit was acquired by Crest Exploration Limited, a subsidiary of the Standard Oil Company of California, in May-June 1962.

A geological mapping program in 1962 was designed to determine the constitution of the iron formation and to map the distribution and structure of the iron ore. The constitution of the ore was measured and described at 40 localities and 18 channel samples were taken. One vertical test hole was drilled to the depth of 106 m. Fifty metres of core was recovered from the iron formation, which was reported to corresponded with a core recovery of 79.7%.

In 1963 an exploration program comprising diamond drilling and surface sampling was carried out for the initial evaluation of the deposit. Bulk samples were also taken for beneficiation tests. The 1963 mapping was concerned with improving the accuracy of the geological mapping in a restricted part of the area near Iron Creek. The geological sequence was measured and described at 46 new localities. The drilling program was continued and 25 additional holes were drilled with a total length of 3,111 metres. Twelve of those holes were drilled in the Iron Creek valley, seven in the Northwest Territories, four at the mountaintops north of the main valley, and two at the heads of two north trending valleys. A total of 2,904 m of core was recovered, including 1,162 m from the iron formation with the average core recovery of 80%.

This brought the total of stratigraphic sections through the area to 86 which, coupled with 26 drill holes, provided good stratigraphic control, particularly in the Iron Creek block.

2.1.3 Resource Statement

Crest Exploration Limited estimated the overall tonnage of the Snake River deposit to be in the order of 20 to 30 billion tons. The Snake River iron ore is a fairly simple sedimentary deposit. Mineralogically it consists of fine grained specular hematite with silica distributed as bands or nodules of red jasper. The sedimentary iron ore had been traced over a distance of 51.5 km.

The Iron Creek area of Snake River is thought to be the most attractive in terms of development, and much of the focus of exploration done in the 1960's was concentrated in this area. This area alone reportedly contains more than 11 billion tonnes of iron ore, with an average grade of almost 44% Fe, as can be seen in the table below.

Table 2.1: Iron Creek Area Resource Statement

Zone	Fe %	Insoluble %	Volume m^3	Tonnes Mt	Density t/m^3
1	41.36	31.7	122.3	457.1	3.74
2	44.27	27.9	275.5	1051.7	3.82
3	41.43	31.0	220.7	825.0	3.74
4	44.86	25.2	625.2	2412.2	3.86
5	43.54	26.3	769.4	2936.7	3.82
7	44.99	24.5	554.7	2140.1	3.86
9	42.70	27.8	363.6	1373.4	3.78
Total:	**43.82**	**26.6**	**2931.4**	**11196.3**	**3.82**

[NB Crest reported the volume and tonnage in imperial units, and Hatch has converted these data to metric units. The values are soluble iron, total phosphorus and insoluble contents as described in Section 5.5.1.6, and density as described in Section 5.6.2 of this report. Hatch has not reviewed the reasonableness of these estimates.]

Some quantitative spectrographic chemical analyses for titanium were done from five surface transects and four drill holes. The iron ore (at 35% cut off grade) contains between 0.02% and 0.11% titanium.

In addition to the Iron Creek block, Crest reported several outcrop areas of iron formation not included in the Iron Creek block.

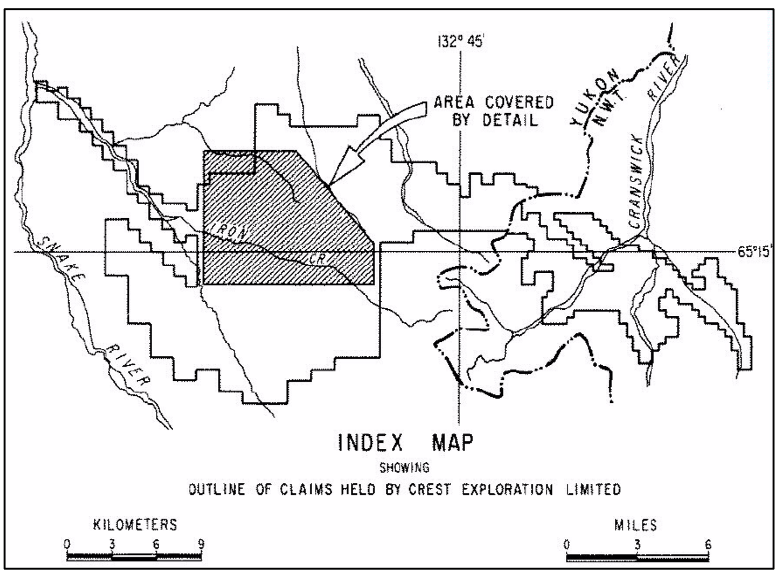
From the tests, Crest concluded that the laboratories agreed as well as could be expected on the iron and silica contents. Crest also concluded that the Warnock Hersey Company's assay procedure for phosphorus was at fault. This was not followed up with further testing.

A conceptual pit was also designed in June 1964, using a stripping ratio of 2 m^3 of waste to 1 m^3 of ore, cut off grade of 35% soluble iron and 1.52 m minimum ore thickness. The pit walls were assumed to be 60 degrees in ore and 45 degrees in waste. The estimated resources within the pit design were in order of 15% from the total tonnage of the Iron Creek area (*Snake River Iron Deposit, Summary Report, Volume F Reserves and Grades*).

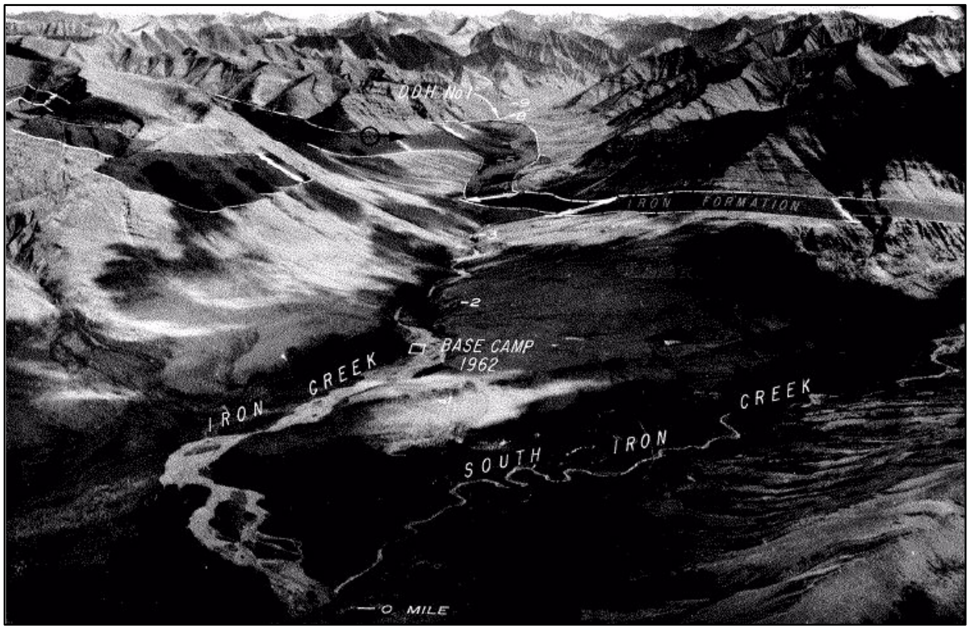
Given todays and expected future market conditions, it is quite likely that a lower cut-off grade could be used, giving this very large deposit even more potential.

2.1.4 *"Resources" and Concentration Ratio*

The Snake River iron ore deposit in the Yukon Territory reports (Bechtel 1963 study) preliminary estimates of total reserves from 20 to 30 billion tonnes of ore. Approximately 50% can reportedly be mined by open pit methods; the remaining 50% might be mined by underground technology. The most favourable segment is shown below:



Iron Creek (photo below) is the most suitable area for open pit operations where it is reported that six (6) billion tonnes can be processed with a stripping ratio of 0.2:1.0 and maximum 1:1 (over-burden: ore)



Past reports indicate that one pit alone has one (1) billion tonnes with virtually no overburden. Metallurgical studies promise encouraging potential with "resources" for 400 years operation.

The pits considered of interest (Bechtel, Jan 1963) were D and E in the Iron Creek valley (photo above), at elevations 823 to 1130m with moderate overburden, and favourable conditions for development of benches and hauling of ore. Potential pits are A, B, C, F, G and H at 1219 to 1555m elevation (difficult access). A summary of these potential pits is shown below:

SUMMARY OF RESERVES

AREA	ORE Millions Long Tons	WASTE Millions Cubic Yards	WASTE : ORE RATIO Cubic Yards:Long Tons
A	230	15	0.065
B	50		0.000
C	800	98	0.123
D	730	42	0.058
E	115	9	0.078
F	230	23	0.100
G	120	17	0.142
TOTAL	**2,275**	**204**	**0.090**

(*) Referenced to Canadian Bechtel Limited, 1963 and Kaiser Eng 1976

The specific gravity for hematite has been calculated by the geologists to be 4.3, and for calculation purposes, 4.1 has been used.

Comment

New exploration is required. The data available and considered in all studies corresponds to the original information generated in the Geology study and used by Bechtel in generating the 1963 report.

It is highly desirable to obtain new defined drilling and sampling under international procedures to analyze the data in digital format, applying mathematical models to accurately predict the size and quality of the deposit.

The concentration ratio must be clearly defined due to its influence in engineering calculations and capital and operating cost estimates.

The concentration ratio given in the 1998 Kaiser report is the one which Hatch considers is probably more appropriate "A concentration ratio of 3.5:1 is anticipated for conventional ore dressing/pelletizing and a 2.5:1 ratio for direct reduction of the iron".

Iron Ore Mineralogy

The Snake River iron ore body is reported to be a hematite deposit, and the Iron Creek formation shows bands with varied proportions of iron and silica. The petrology of the ore indicates a uniform sedimentary deposit of fine grained blue specular hematite with jasper disseminated throughout the hematite.

The microscopic evaluation reports Silica mixed within the Hematite. The gangue distribution was as follows:

- Coarse particles from 1mm to 2cm, that could liberate by coarse grinding at -10mesh (2.85mm)
- Fine gangue quartz ranging from 10-15microns. Some fine impurities (2 microns) were found with solid hematite bands

Mineral Components:

The bulk of the ore consists of: Micro-crystalline Hematite (Fe_2O_3) Chalcedonic Quartz (SiO_2) Calcite ($CaCO_3$), Dolomite $Ca(MgCO_3)_2$, Apatite [$Ca_4(CaF)(PO_4)_3$], Goethite ($Fe_2O_3.H_2O$).

Trace components include chlorite, ferroan dolomite, siderite, collophane or konnickite, wavellite, barite, muscovite, pyrite and chalcopyrite. The ore also contains scattered grains and occasional lenses of clastic material which consists of quartz, finely crystalline carbonate and altered volcanic rocks

- Hematite. The hematite is most commonly in the form of irregular bounded, interlocking crystals ranging in size from 5 to 200 microns, averaging 30 microns.
- Jasper Gangue. Hematite also occurs in the jasper gangue in the form of tabular crystals from less than 1 micron to 25 microns in diameter
- Chalcedonic quartz comprises most of the gangue
- Calcite and Dolomite are common primary and secondary constituents in the ore
- Apatite is abundant in the chalcedonic quartz and is also present in carbonates. The bulk of the apatite is in the form of scattered stubby hexagonal prisms ranging in length from 2 to 35 microns, averaging 10 microns
- The ore contains occasional crystalline grains of chalcopyrite and pyrite

Snake River Ore Types:

The ore has been classified as: Banded, Nodular and Complex

Banded Ore. Consists of beds from 0.25 to 1.5 inch thick, of red or maroon jasper and hematite in about equal amounts. The hematite crystals are up to 0.2mm (the average is lower).

Nodular Ore consists of massive hematite (15 microns average) with little evidence of bedding and containing 0.25 to 2.5 inch oval or lenticular concretions of gangue. Nodules of red jasper are the most common, followed in abundance by red spherulitic nodules (silica and calcite). Nodules of finely crystalline dolomite are occasional.

Complex Ore. Complexes ores are composed of hematite and gangue arranged in intricate patterns. The complex texture appears to be due to successive partial replacement by the various gangue minerals and finally hematite. An example is the conversion of laminated dolomite hematite ore into a complex ore.

(Detailed description in the Crest Summary Report, Section E Geology, and this report section 5)

2.2 Current Regional Development and Infrastructure

Yukon Development

Development in the area is being encouraged, and several projects are currently being reviewed.

Yukon Economic Development:

There has been a significant increase in mining and mineral exploration and development in the Yukon over the last three years or so. Last year $50 million was spent on exploration and in 2006 the figure will be $150 million, including development. Two projects are close to construction.

All the projects are listed on the weblink and the key ones are as follows:

- The Minto Project by Sherwood Copper (small open pit copper mine has all the permits in place)
- Yukon Zinc's Wolverine deposit - zinc and silver underground mine. The permitting will be complete this year and the concentrate will be trucked to Stewart, BC and shipped from the port there. This port is approximately 1,600 km from Dawson has been recently refurbished and handles other ore shipments.
- Alaska Rail Link- described further below. Phase One a US$6 million 'opportunity study' has been completed. There is a strong will in Alaska to connect with the North American rail system.

There is new legislation in the Yukon - YESA- Yukon Environmental and Social Economic Assessment Act which clearly defines the requirements to obtain permits for projects. The Yukon Government clearly supports the environmental and socially sound development of projects and can offer assistance to prospective developers of the Crest deposit.

Alaska Canada Rail Link:

Alaska Canada Rail Link is conducting a study into the feasibility of a rail link connecting the Alaska Railroad to the North American rail system in Canada. A primary purpose of a rail link would be to improve the economics of developing the extensive resource deposits in Alaska, Yukon, and British Columbia.

A rail line with a linking point at Carmacks, Yukon is being investigated. Carmacks is approximately 400 km southwest of the Snake River site (see Figure 2.1 for a map of the area), and would become a potential site for a pelletizing plant if a rail link was there.

The study is being managed jointly by the State of Alaska and the Yukon Territory. A project office has been established in Whitehorse, Yukon and a project manager is working out of that office.

The completed study will provide long-range transportation planning data aimed at better integrating Alaska, Yukon and British Columbia with emerging international markets and supply chains.

Chevron has been approached to supply some background information on the Crest deposit for this study.

Coal Deposits:

The rail link would not only influence the economics of developing Crest directly, but also have the potential to encourage development of nearby coal deposits, which would also be beneficial to the Snake River development in terms of a local fuel source.

The Bonnet Plume Basin is located in the Northern Yukon approximately 100 km to the east of the Dempster Highway. It contains the Yukon's largest reserves of coal, 660 million tones of high volatile bituminous C, in seams of mineable thickness. The coal is of low sulphur content and is potentially clean-burning. The quantities identified are suitable for power generation to support plants up to 2,000 MW in size. The coal is potentially suitable for conversion to clean gaseous or liquid fuels. This coal deposit is located approximately 100 km from Crest, and could be considered as a potential source of electricity generation for mine and milling operations at Crest.

Mackenzie Valley Pipeline:

Positive discussions continue on the Mackenzie Valley Pipeline project. Hatch completed a high level evaluation in 2002 of a plan for a mining-steel manufacturing operation, using iron ore from the Snake River deposit as one of the inputs to manufacture line pipe steel for a potential gas pipeline. If the Mackenzie Valley Pipeline were to proceed, this study could be revisited and updated with more detail to provide an assessment of its potential.

2.3 Legal:

The following information on the legal status of the land claims was provided by Chevron's legal department:

- There are 525 Yukon leases (27,827 gross hectares, no annual rentals) and 1 NWT lease (31,752 gross hectares, annual rental $19,576.86).
- They are held 100% by CCL, and are not encumbered by any agreements with third parties.
- 213 Yukon leases expire in 2013 and 312 expire in 2014. The NWT lease expires in 2014.
- Upon expiry each lease can be renewed for another 21 years by paying fees as set out in the applicable regulations. The Yukon legislation (s.103 Yukon Quartz Mining Act) provides that the lease shall be renewed for another 21 year period if the Minister is satisfied that the terms of the lease have been complied with, and the Commissioner in Executive Council may impose additional terms and conditions on the lease upon renewal.
- There are no outstanding work commitments.
- There are no restrictions on transfer for the Yukon leases. In the case of the NWT lease, both the transferor and transferee are required to hold a valid prospector's licence at the time of transfer, and no transfer may be made if rent or royalties are outstanding.

- Royalties are prescribed in the applicable regulations.
- An airstrip and campsite are located on the claims. Exact location, physical (and environmental) condition, and regulatory status are not determined.

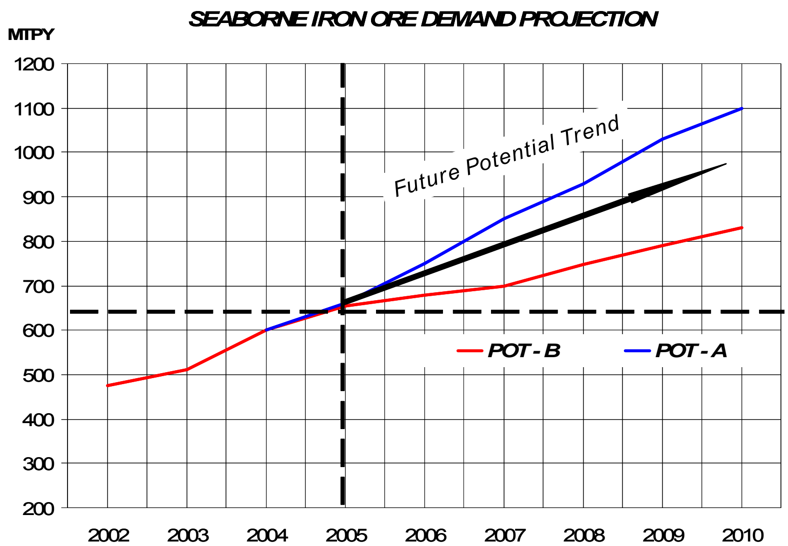
A legal description of the permits can be provided.

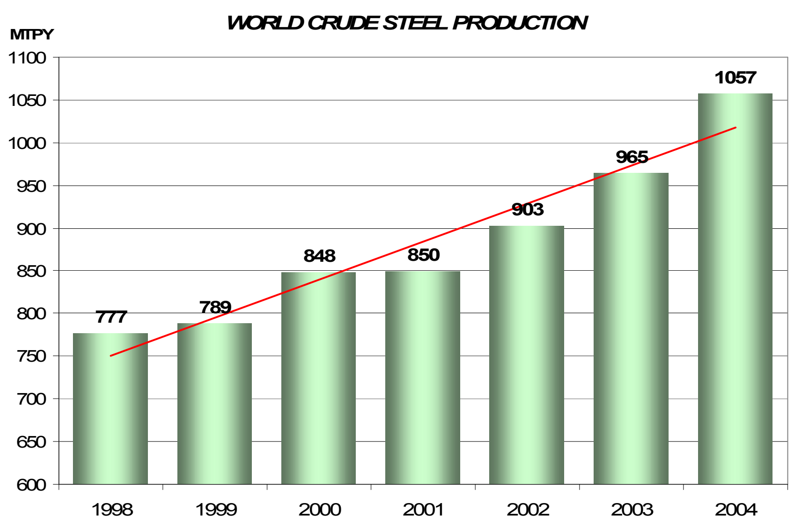
2.4 Iron Ore Market

The globalization of the steel industry and iron ore suppliers in recent years plays an important and strategic role in the economics of the steel industry. The power of the market in China has had an enormous influence in the development of the steel business, which in turn influences the demand for iron ore.

In contrast to when Kaiser's reports of 1976, 1991 and 1998 were completed, the current demand for iron ore and pellets is extraordinary and the trend is expected to continue; numerous efforts, both through expansions and green-field projects, are being made to bring more iron to the market to feed steelmaking furnaces and should eventually produce enough pellets to bring supply in line with demand.

The following figures show the trend of iron ore demand, which follows the trend of crude steel production:

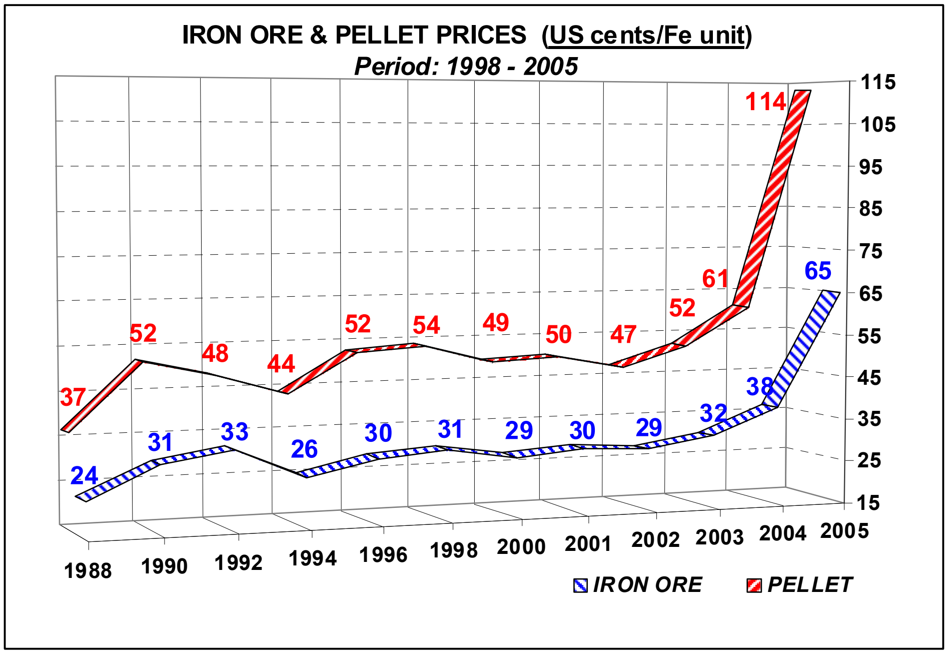




Chinese imports were responsible for more than half of the increase in the seaborne iron ore demand during the last decade. The substitution of Chinese domestic low-grade iron ores with imported ores will continue to lead the growth of the seaborne iron ore market.

The demand from China and Japan leads the iron ore market, where there currently exists an imbalance in global iron ore supply and demand levels, which continues despite this year's increase in iron ore and pellet prices.

The strong demand in 2004 also caused shortages, driving prices to higher levels. From 2003 to 2004, iron ore prices increased by approximately 53%, while pellet prices increased by 70%. The dramatic increases are illustrated in the Figure below.



The expectation is that the strong demand for iron combined with high capacity utilization (operating time) of the plants in the steel sector will keep prices high in 2006. The increased supply in response to high prices will cause prices to fall back somewhat, but they are expected to remain higher than pre-2003-2004 levels. May 2006 settlements have seen iron ore prices increase by 19%.

The strong demand has not only influenced the price of iron ore, but also the quality available on the market. Recent years have witnessed a significant decline in the quality of iron ore available on world markets, and increasing scarcity in the form of lump ore. High quality lump ore is simply not available in sufficient amounts and this trend is likely to continue.

2.5 Processing Overview

Over the past 40 years, globally, steel plants have modified their operating practices to accommodate iron ore with higher impurities. Ores can be blended to reduce impurities, processes can be modified in steel making and/or (lower grade) standard carbon steel can be produced.

For instance, most of the iron ore supply today is from hematite ores in Australia and Brazil. As an example Australian and Brazilian ores have much higher phosphorus content than the ores generally available in the 1960's. Iron ores being developed in India also have high phosphorus content. Seventy to seventy five percent of seaborne traded iron ore now comes from Australia and Brazil, with these deposits being developed in the last 30 years.

As a consequence, for instance, Japanese steelmakers have all installed very expensive phosphorus processes and mills globally can generally handle higher phosphorus.

2.6 Beneficiation and Processing CREST

Hatch has reviewed the iron ore characteristics reported in previous studies, done benchmarking of some current iron ore and pellet projects and completed theoretical calculations to determine a potential pellet produced with Snake River iron ore using current technologies. The results are encouraging for the potential production of pellets.

Hatch considers that, although low chemical quality was obtained during the testing program in 1962-1965 on Snake River iron ore, today it is potentially feasible to increase the total iron by reducing phosphorus and silica through modern processing techniques.

Hatch benchmarked Crest with a similar deposit (chemically) in North America. Hatch found an integrated steel complex with an operating mine, concentration, slurry pipeline transportation, pellet plant, blast furnace, BOF, continuous casting, rolling and finishing plant, using iron ore with some very similar characteristics to those reported for Snake River. The following table provides a simple comparison:

HEAD CHEMICAL ANALYSIS OF IRON ORE COMPOSITE

PLANT	SNAKE RIVER (*)	REFERENCE PLANT		
		PAST	CURRENT (2000 - 2006)	
IRON ORE TYPE	SPECULAR HEMATITE	SPECULAR HEMATITE	MAGNETITE	HEMATITE (**)
Total Iron (%Fe)	46.67	43.00	50.00	57.00
Silica (%SiO2)	24.55	16.80	15.00	5.00
Phosphorus (%P)	**0.37**	**0.30**	**0.30**	**0.70**
Sulphur (%S)	0.01			

*Referenced to Canadian Bechtel Limited, 1963

** The reference plant was initially mining specular hematite, and the ore body has changed to a magnetite/hematite mix

Based on the results of the table above, Hatch considers that the possibility of increasing the total iron content of the Snake River iron ore in beneficiation (through silica and phosphorus reduction) should be evaluated. Modern and standardised metallurgical laboratory procedures, advances in chemical products for flotation and new operating practices for liberation applied industrially give enormous opportunity to improve the final concentrate quality.

Hatch considers that there may be an opportunity today to produce blast furnace grade pellets with the Snake River iron ore. New technologies, including the verti-mill, in primary processing that allow optimization of the conventional beneficiation process are being used successfully in some concentration plants, reducing the particle size and improving liberation and metallurgical properties of the pellets (improving reducibility).

Hatch considers, subject to further study, that the Crest iron ore is marketable given a range of techniques that could be used to manage the impurities levels:

- Beneficiation to increase the iron content and decrease impurities
- Pellet making
- Use HiSmelt technology to make pig iron

- Blending
- Provide feed to steel mills that can manage the impurity content

Additional drilling and testing is required to define the reserves and resources to international code (NI 43-101), and to determine the metallurgical characteristics and define the optimum process design.

One potential process route is given in Section 8.8, including mining and concentration at the Snake River site, transportation of the concentrate via slurry pipeline to Carmacks (pellet plant location, approximately 400 km from the Snake River site) for pelletizing and final transportation of the pellets from Carmacks to the port located at Haines/Anchorage or to Ft St John and Prince Rupert. This route is one of several potential routes, and next steps of development would include analyzing the different options available.

2.7 Transportation and Infrastructure

Previous studies analyzed both slurry pipeline and rail as potential transportation options. In Hatch's review, a potential process route includes both slurry pipeline for transporting concentrate to Carmacks where a pellet plant complex would be located, and rail to transport pellets to the Port. The economics of transporting pellets from Carmacks to the Haines, Anchorage or MacKenzie Port will be influenced heavily by the decisions made on the Alaska Canada Rail Link. Other potential locations for a pellet plant complex would be at the mine site, at Dawson or at a port location.

Transportation route alternatives would have to be analyzed after decisions are made with regard to the Alaska Canada Rail Link (see section 2.2) and further testing of the ore is completed to define a process basis design.

Highways

There is an all-weather road terminating at the settlement of Elsa, 193 km southwest of the deposit. Whitehorse, an additional 483 km to the south, is the northern terminus of the nearest railroad, and Skagway, 161 km farther south is the nearest seaport. Haines, the most likely port alternative, is 520 km from Carmacks, or Prince Rupert is 1600 km. Other settlements in the vicinity of the deposit include Mayo Landing, 241 km southwest, Dawson City, 338 km west-southwest, Norman Wells, 290 km east, and Inuvik, 338 km north. Refer to map of the area in Figure 2.1.

Port

There is an existing port facility at Haines, Alaska (approximately 920 km from Carmacks). It has been estimated that Haines could have a capacity of 30 million tons per year, with something of the order of $1.5 billion development costs required to bring the port to operating condition at this capacity.

Port MacKenzie, Alaska (approximately 1400 km from Carmacks) is further from Crest than Haines, but it is reported that minimal capital would be required.

A decision on which Port to use will depend on further study regarding capital and operating costs, as well as what role the government plays in developing the infrastructure.

2.8 Conclusions

Hatch has reviewed previous studies on Snake River and analysed changes in technology and the iron ore market that could have an impact on the project. The Snake River/Crest deposit is one of the largest undeveloped iron ore deposits in the world with 20 to 30 billion tonnes of resources reported. Iron ore demand is increasing and traditional known large deposits are depleting their Reserves quickly. By far the largest challenge will be infrastructure, although the Yukon has a history of mining and the port facilities are already in place in several optional locations.

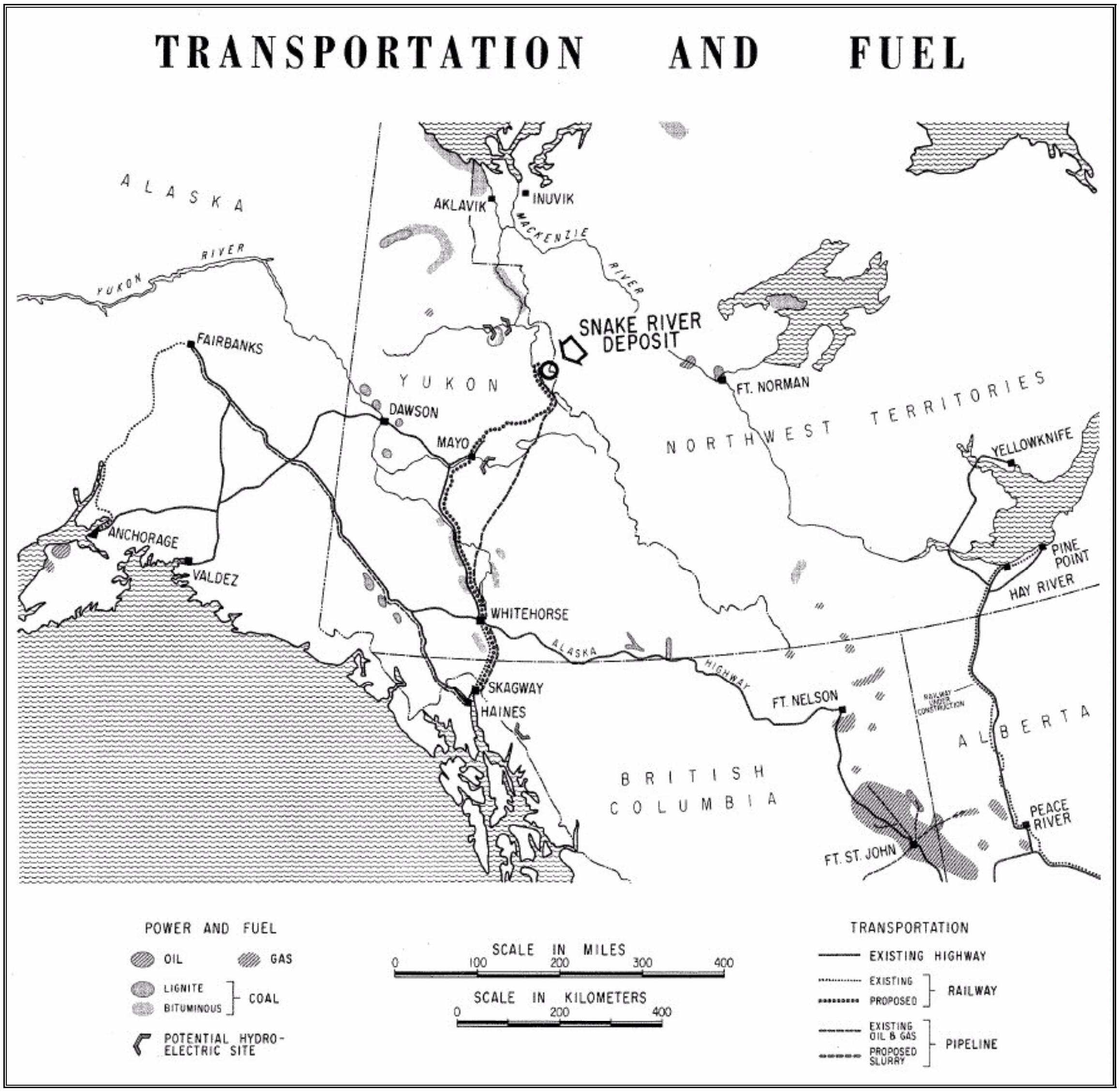
Given the current circumstances, Hatch believes this deposit is worthy of further development to define the Resources and processing and infrastructure options.

3. Introduction

Chevron Canada Resources (Chevron) has asked Hatch to review an iron ore deposit in the Yukon Territory for which Chevron holds the leases. The deposit, known as the Snake River iron ore deposit or the Crest deposit (both names are used in this document), is reported to have in the order of 20 to 30 billion tonnes of iron ore. This would make it possibly the largest known deposit within a developed country (there is one larger deposits in the developing country, Bolivia).

As iron ore mining is not something that Chevron wants to focus on at this time, their objective is to assess whether the Snake River deposit has value, given the current market situation for iron ore. If there is potential value, Chevron is looking to market the property to some party that will have the ability and focus to bring the project to the next stages of development (whether that be further exploration and testing, feasibility study, etc).

The Snake River iron ore deposits are located approximately 360 airline miles north of Whitehorse, Yukon Territory. This deposit is on the boundary between the Yukon and Northwest Territories, as shown in the following map:



Exploration work was carried out in the early 1960's, and Hatch has reviewed several reports that were completed at that time, as well as updates. Most notably were the following:

- Preliminary Evaluation by Canadian Bechtel Limited (1963)
- Snake River Iron Deposit Summary Report (1965)
- Update Evaluation of Capital and Operating Costs by Kaiser Engineers (1976, and updated in 1991 and again in 1998)

For a complete list of documents available, see Appendix A.

Hatch's objective was to review the existing material and to determine if there have been changes in the market, in technology, or in circumstances since the original work was completed that would have an influence on the attractiveness of developing the Snake River property.

Hatch's work focused on the geology of the deposit reported in previous studies, beneficiation and processing and technology improvements in these areas that may have an impact on Snake River iron ore, the current market situation for iron ore and general developments (such as the Mackenzie Valley Pipeline Project).

4. History of the Snake River Iron Ore Deposit

Discovery and Exploration (1961 to 1965)

The Snake River iron ore deposits are located approximately 360 airline miles north of Whitehorse, Yukon Territory. This remotely situated deposit is on the boundary between the Yukon and Northwest Territories.

The iron ore deposit was discovered in 1961 by a California Standard Company geological crew doing stratigraphic work in the area. During the course of their normal work, the crew measured a section of conglomerate, which was found to contain 30 feet of jasper hematite iron formation. Another section of conglomerate was measured which contained 100 feet of iron formation. The two occurrences were several miles apart, and at this point the possibility of an extensive deposit was apparent.

Five samples of iron ore were sent to the Provincial Analyst, and the assay results were:

	First Sample	Second Group of Samples			
Iron (Fe)	56.00	50.8	25.47	42.19	50.67
Silicon (Si)	6.59	11.74	20.61	14.49	9.99
Sulphur (S)	Tr.	0.05	0.09	0.07	0.05
Phosphorus (P)	0.03	0.09	0.11	0.03	0.17
Hematite	80.00	72.67	36.38	60.28	72.39

The low phosphorus assays were subsequently found to be non-representative but the analyst had discarded the sample pulps so it was never possible to determine whether the error was in the analyses or in sampling.

Following the early results, a reconnaissance of the iron formation was undertaken in September 1961. At the end of the reconnaissance it was evident that about 25 square miles at least were underlain by a minimum of 15 billion tons of iron ore. As winter was approaching, further action would be delayed until the following spring.

A staking program was developed over the winter, and was carried out beginning May 4, 1962. The exploration program began later that summer and continued through the following summer.

Crest had been studying the Japanese market for some time in an effort to anticipate future prices. Once the magnitude of the Australian deposits became known, it was apparent that prices would decline seriously. The offers of high grade blast furnace feeds to Japan by potential Australian producers confirmed the price decrease and it was found that the price slump was going to be more drastic than originally anticipated, particularly in sinter feed. A new economic evaluation based on improved operating costs and the lower iron prices showed that Snake River sinter feed could not compete with the Australian ore.

Under conditions at that time, the evaluation showed Crest was not competitive, although it might become so if pellet costs were reduced or if cheap gas for direct reduction became available in the vicinity of Snake River. Consequently, at the budget review it was recommended that the Crest operation should be reduced in scope. It was decided to organize the available data into a summary report, to complete the work required to bring the claims to lease and then to reduce the staff to two and a half technical people who would keep abreast of current developments and continue the beneficiation studies on developing a marketable product.

Kaiser Engineers Report (1976)

Subsequently, no new work was undertaken until 1976, when Kaiser Engineers was commissioned by Crest Exploration Limited to undertake an update of the early reports, a preliminary study of direct reduced iron and pipeline transportation technology as it could be applied in exploiting this Northern Canadian iron ore deposit.

Some new information related to the metallurgical processing was available during the study period. Kaiser Engineers supervised a minimum program of sample testing using bench scale wet high-intensity magnetic separation equipment at Colorado School of Mines Research Institute, Golden, Colorado.

Results of the physical concentration test work confirmed the previous metallurgical test work with respect to hematite concentrate yield and grade. Preliminary results on the use of wet high intensity magnetic separation in a primary concentration were encouraging in that improved weight and iron yields were obtained. However, a secondary stage of concentration such as flotation would be required to achieve a marketable concentrate grade.

In the opinion of the project team assigned to the Crest Project, these iron ore deposits were not economically feasible at that time.

IFC Kaiser Engineers Update Reports (1991 and 1998)

In 1991 IFC Kaiser Engineers was commissioned to review previous studies and prepare an update evaluation of the Snake River Iron Ore Deposit. The objective was to briefly evaluate any new developments in beneficiation and direct reduction of Iron Ores, which could establish the Chevron Canada project as a competitive supplier of iron ore products at that time or in the foreseeable future.

The conclusion at that time was that the deposits could not be developed economically in the foreseeable future due to an abundance of many operating, high-grade mines, which could expand their production at very little investment. The availability of a gas field, located approximately 200 km west of the mine site was said to not significantly improve the overall economics.

In 1998, IFC Kaiser Engineers was commissioned by Chevron Canada Resources to once again update its evaluation of the Snake River Iron Ore deposit. The study was an update of the 1991 study with reference to the 1976 study.

In summary, this 1998 update concluded that the Snake River deposit is a relatively large iron ore deposit in an extremely remote location. The ore within the deposit contains certain characteristics which made it, at best, marginally acceptable in the market at that time. Hence, it was concluded that there was no change in the marketability of the iron in the deposit since 1965.

However, the 1998 update also looked at several new technologies such as HIsmelt. As these concepts were not fully developed commercially at that time, additional investigation was said to be required before a compelling argument could be made in favour of pursuing even a reduced level of development.

Other studies

In 2002, Hatch carried out a high level evaluation of a plan for a mining-steel manufacturing operation in northeastern Yukon. The plan involved developing the Crest Iron deposit and the Wind River Coal Field for the purpose of producing high-pressure natural gas line-pipe.

This review raised a number of uncertainties and issues, which was reflective of the dated and/or otherwise incomplete documentation available. Accordingly, it was recommended that a Pre Feasibility Study be carried out, managed by an internationally credible Iron and Steel consulting engineering concern, supported by a knowledgeable environmental consultancy with public hearings expertise. To date, no Pre Feasibility Study has been completed.

There have also been several studies completed on developing a rail link. The first was completed in 1965 for the government of Canada. And just last year, in February 2005 a study on the review of potential benefits of a proposed Alaska-Canada was prepared for the Yukon Economic Development.

Current Status

Gartner Lee is currently carrying out a study to assess the potential outbound freight from mineral properties in Yukon and Northern BC as part of a rail link study funded by the governments of the Yukon and Alaska. Chevron has been approached to supply some background information on the Crest deposit for this study.

In November 2005, Hatch Consulting was engaged to complete a review of previous studies as a first step towards creating a document to be used by Chevron Canada Resources in marketing the Snake River Iron Ore property.

5. Iron Ore Deposit

This section comprises a summary of the Snake River iron ore deposit geology, sampling and resource estimation, which were carried out by Crest Exploration Limited between 1961 and 1964, and described in a number of reports prepared at that time.

This summary is a compilation of data and assessment by others in these existing reports. Hatch has not visited the site or verified any of the data or assessments. The authors of this summary are not in a position to, and do not, verify the accuracy of, or adopt as their own, the information and data supplied by others.

Imperial units were used throughout the reports on which this summary is based. Where possible, values were converted into metric units in this summary. All images in this section were copied from the existing reports.

5.1 Location and Access

The deposit is located in the vicinity of Snake River, Yukon Territory, Canada. The iron formation crops out in the northern Mackenzie Mountains in the area bounded by Latitudes 65^0 10′ N and 65^0 20′ N and Longitudes 132^0 15′ W and 133^0 20′ W.

According the to 1963 report (*Stuart R.A., July 1963: Geology of the Snake River Iron Deposit, Crest Exploration Limited*), the nearest all-weather road terminates at the settlement of Elsa, 193 km southwest of the deposit. Whitehorse, an additional 483 km to the south, is the northern terminus of the nearest railroad, and Skagway, 161 km farther south is the nearest seaport. Other settlements in the vicinity of the deposit include Mayo Landing, 241 km southwest, Dawson City, 338 km west-southwest, Norman Wells, 290 km east, and Inuvik, 338 km north.

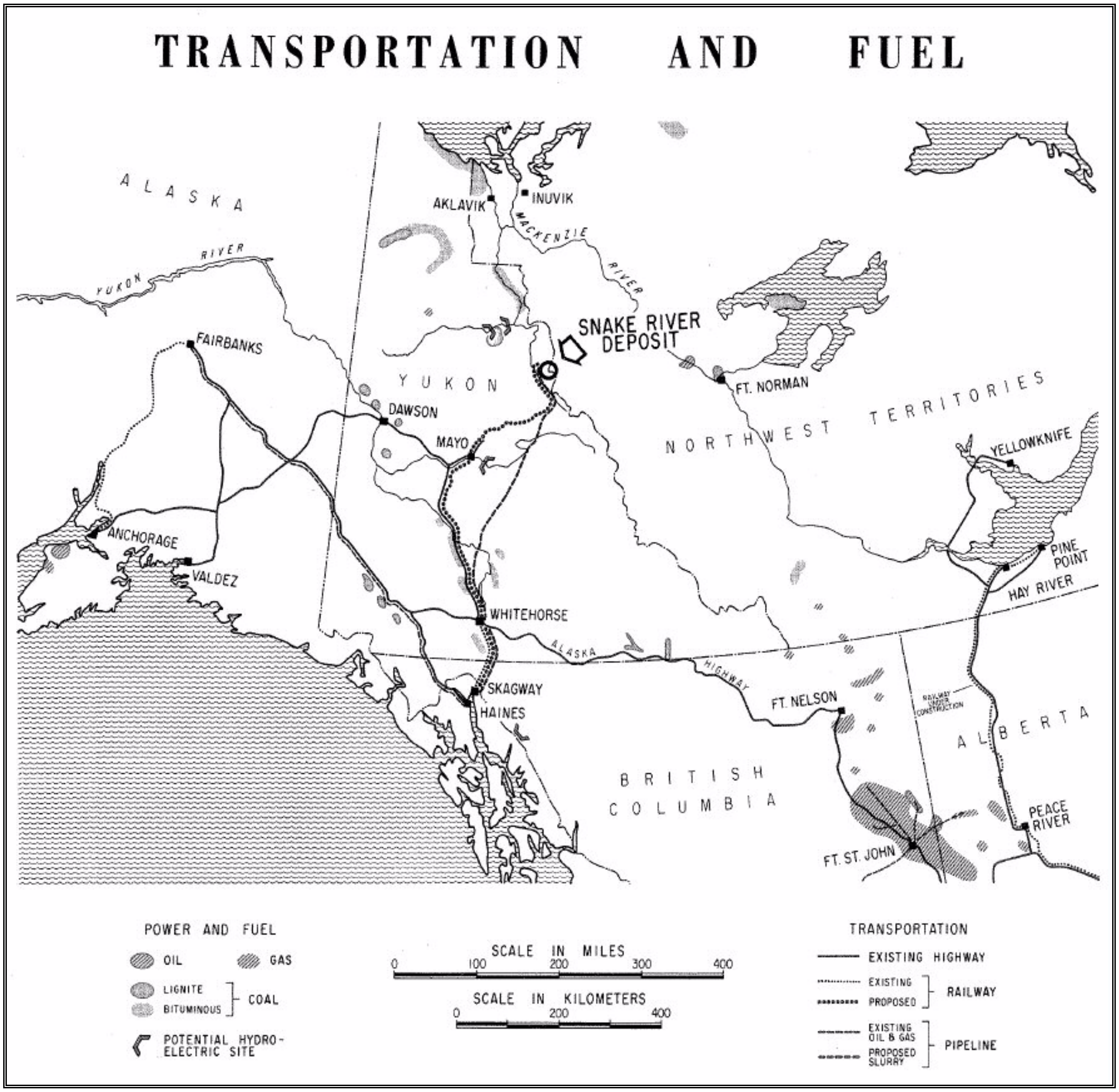


Figure 5.1: Snake River deposit location plan

5.2 Topography

The maximum topographic elevations are nearly 2130 m and the mountains rise to 1000 metres above the valley floors.

The area is drained by the Snake and Cranswick Rivers and has been dissected by many tributaries to these rivers. The major tributaries flow in steep-walled valleys up to 1.6 or 3.2 km wide with floors comprising alluvium, but the minor tributaries occupy narrow valleys cut into bedrock over much of their length.

5.3 Climate

The 1963 report (*Stuart R.A., July 1963: Geology of the Snake River Iron Deposit, Crest Exploration Limited*) advises that climate conditions for the deposit area are assumed to be similar to those recorded at Elsa, Yukon Territory. At Elsa records kept over seven years in 1950s and 1960s show mean maximum temperatures and daily mean temperatures of 19^{o} C and 15^{o} C respectively for July, and mean minimum and daily mean temperatures of 27^{o} C and 23^{o} C respectively for January. Annual rainfall at Elsa is approximately 380 mm.

5.4 Geology

5.4.1.1 Tectonics

Regionally the Snake River area is located on the east-west trending portion of the Mackenzie Mountain System. It is bounded on the north by a belt of Upper Cambrian to Upper Devonian strata deformed into east-west trending folds. Bounding the area to the south is a broad zone of Lower Palaeozoic and possibly Precambrian strata that strike east-west and predominantly dip south. Within the deposit area, both folds and faults trend northwest at an oblique angle to the regional trend.

The major structural features of the area are three major north-west trending westerly dipping reverse faults that divide the area into three blocks.

The westernmost or "Iron Creek" block is from 16 to 24 km wide and extends west of the area to its boundary fault west of the Snake River. This block is folded along north-west trending axes into several anticlines and synclines. The eastern part of the block is bounded to the south by an east-west trending high angle reverse fault. A second east-west trending reverse fault forms the southern boundary of the western part of the block.

The central or "Discovery Creek" fault block ranges in width from 11 km at the north to eight kilometres at the south. It consists of a block of relatively undeformed, predominantly west-dipping strata with gentle plunges to the north-west and south-west.

The eastern or "Cranswick River" fault block resembles the central block both in dimensions and in structure. It is 8 to 11 kilometres in width, wider in the north than the south, and constitutes a south-west dipping monocline locally deformed adjacent to the boundary faults.

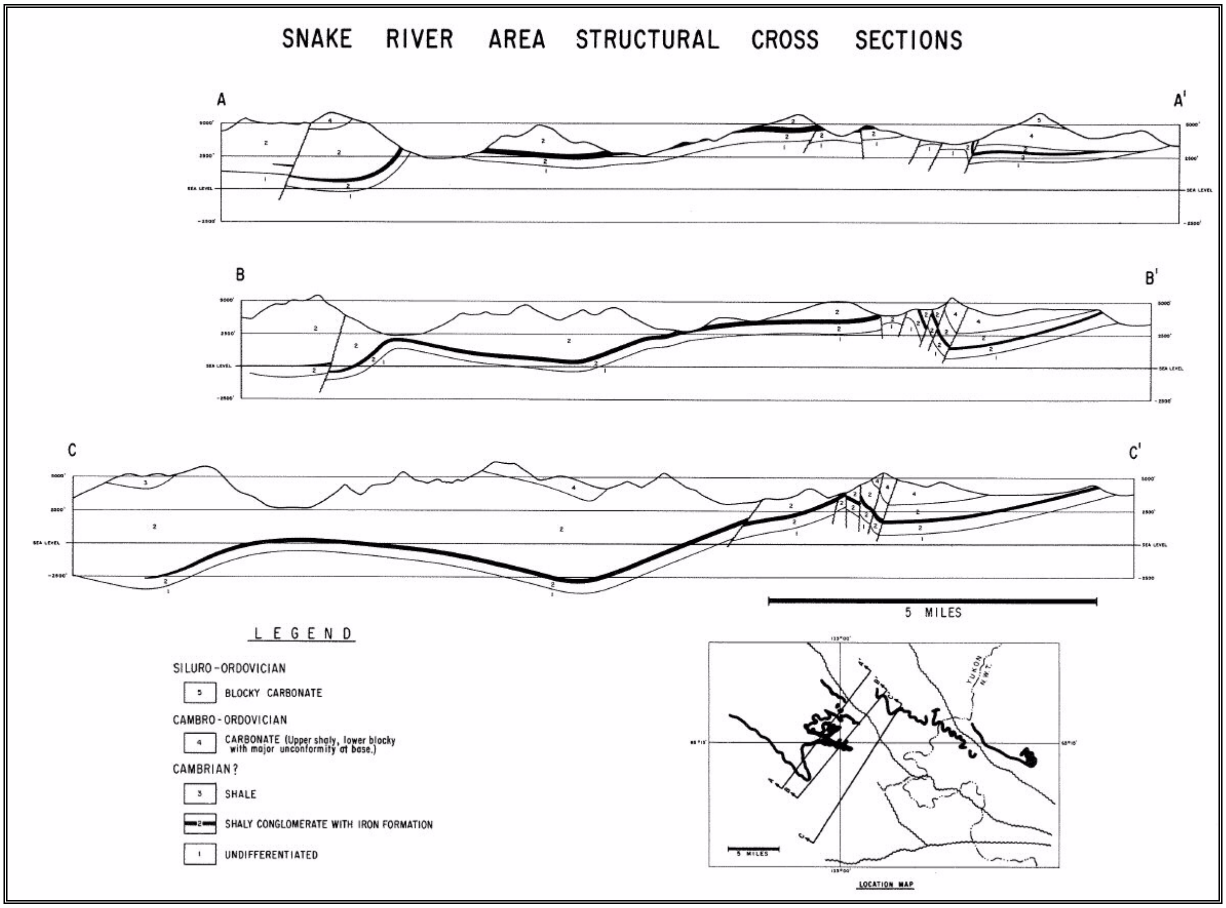


Figure 5.2: Snake River deposit structural cross sections

5.4.1.2 Stratigraphy

Table 5.1: Table of Geological Formations

Period	Lithology	Approximate Thickness, m
Middle Devonian	Dark grey carbonate	305
Siluro Devonian	Upper buff carbonate Light grey carbonate Lower buff carbonate	610
Siluro Ordovician	Medium grey blocky carbonate	305
Cambro Ordovician	Shaly carbonate Light grey blocky carbonate	152 305
Cambrian (?) (with angular unconformities above and below)	Silty dolomite Shale with carbonate and quartzite Dark shale	457 610 305
	Green & red conglomerate with iron formation	2135
Cambrian (?)	Recessive buff-weathering carbonate with occasional zones of shale and resistant carbonate	760
	Gypsum and shale	152
	Buff-weathering shaly carbonate and conglomerate	152
	Grey resistant limestone	305
	Black shale	152
	Quartzite, conglomerate, carbonate and shale	915

Rocks exposed in the area range in age from probably Early Cambrian to Middle Devonian (Table 5.1). The stratigraphic sequence at Snake River is broken into three gross units by two major unconformities.

The oldest rocks exposed within the area comprise a thick sequence of variably resistant quartzite, conglomerate, carbonate and minor black shale. This sequence is overlain by a relatively thin black shale unit followed by a very massive light grey cliff-forming limestone and a thick sequence of recessive buff-weathering carbonates and shaly carbonates.

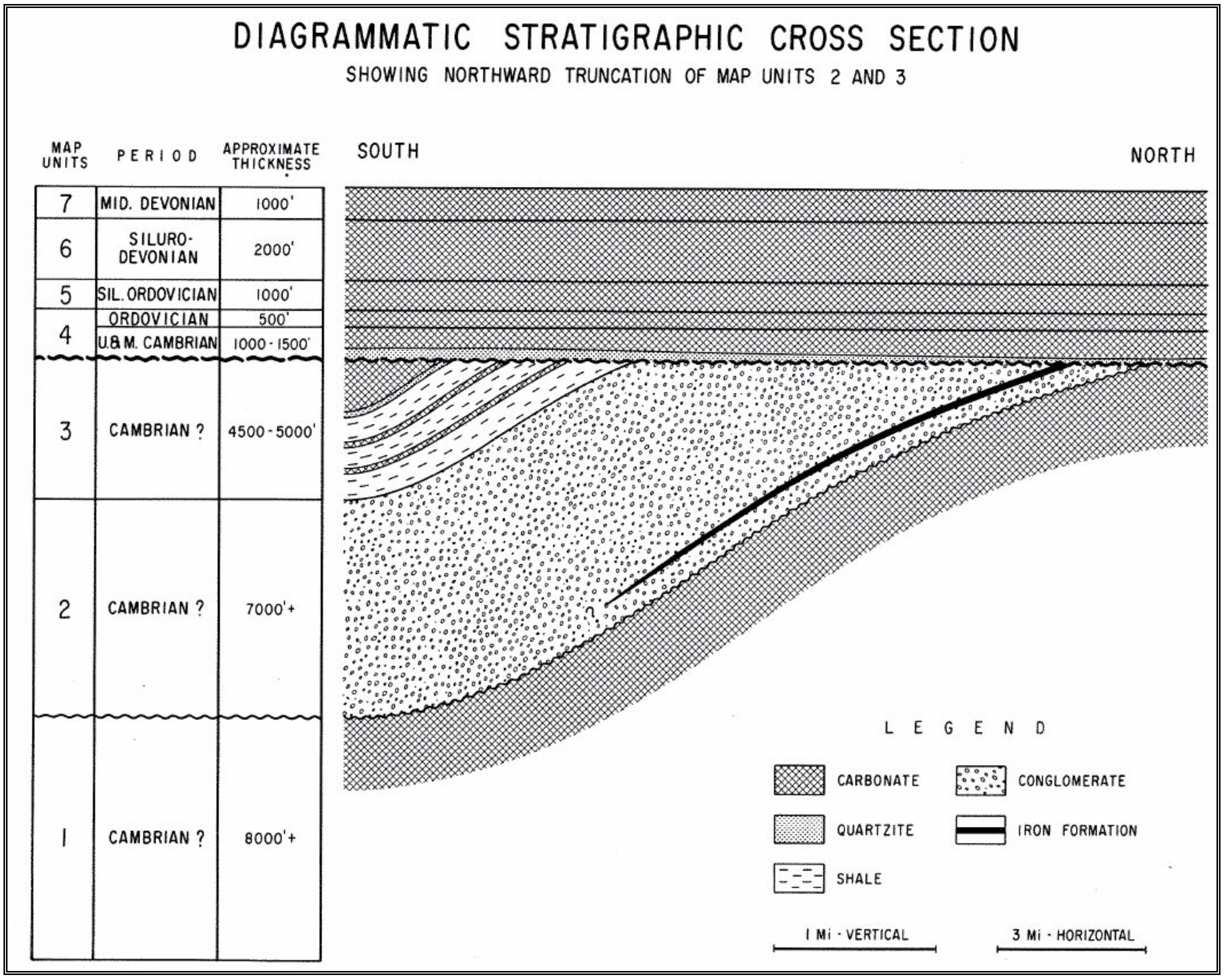


Figure 5.3: Diagrammatic stratigraphic cross section

These oldest rocks are truncated by a marked angular unconformity, and as much as 1070 metres of stratigraphic truncation can be recognised within the area. The unconformity is overlain by 1500 metres or more of silty conglomerate and conglomeratic shale and siltstone, which pass upwards into 305 metres or more of grey silty shale. The lower 610 to 915 metres of the conglomerate and siltstone are typically highly ferruginous, are dark maroon in colour, and contain iron formation at several horizons within the lower 305 metres. The upper part of the sequence is dominantly grey-green in colour, though some tightly ferruginous maroon beds are present. The shale that overlies the conglomeratic rocks occurs only in the southeast part of the deposit area and has not been examined in detail.

The conglomeratic beds are truncated by a major angular unconformity. At least 1830 m, and possibly as much as 3050 metres of stratigraphic section are missing from the sequence within the area. The regional dip of the strata below the unconformity is to the south and successively older beds are present at the unconformity from south to north.

The unconformity is overlain by a conformable sequence of carbonate and shaly carbonate ranging in age from Late Cambrian to Middle Devonian.

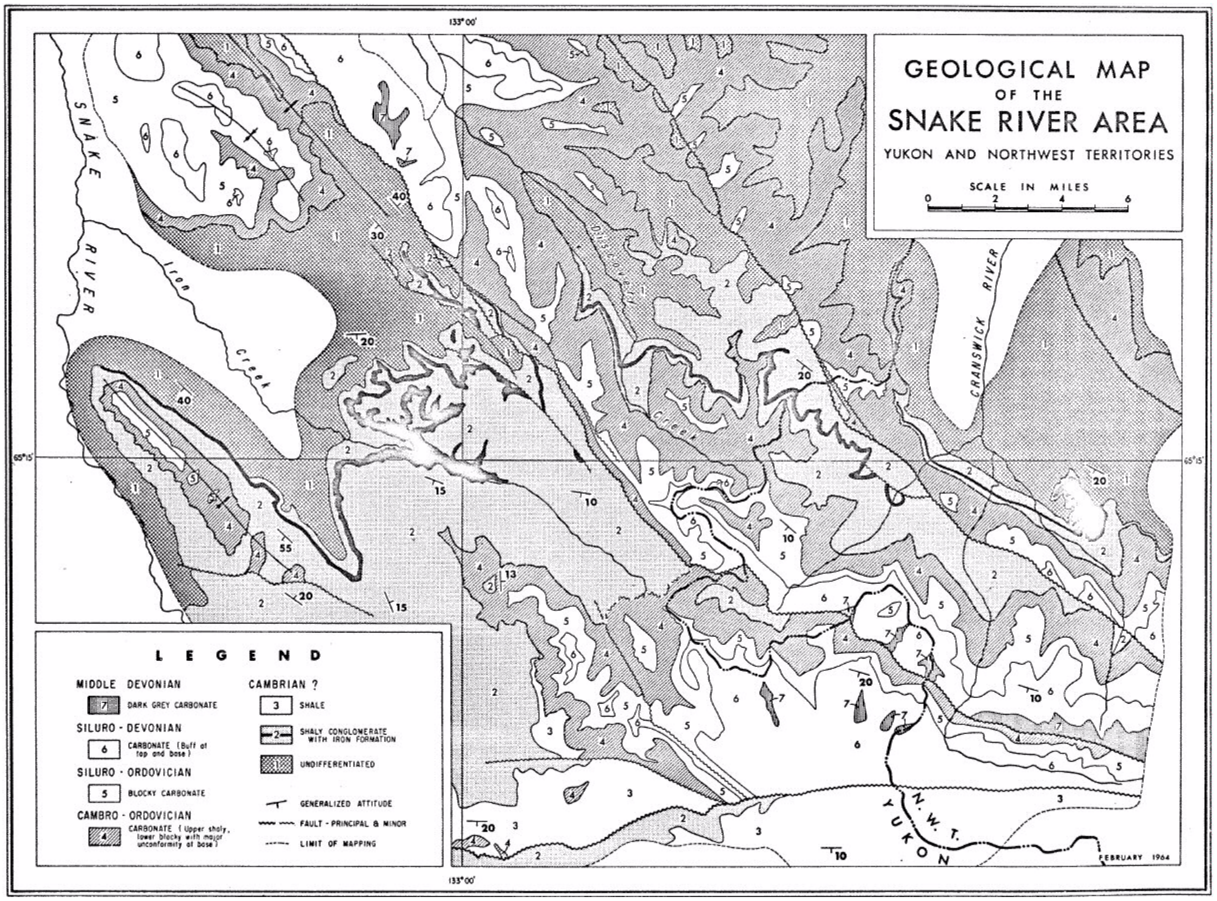


Figure 5.4: Geological map of the Snake River area

5.4.2 *Geology of the Iron Formation*

The Snake River iron ore is a fairly simple sedimentary deposit. Mineralogically it consists of fine-grained specular hematite with silica distributed as bands or nodules of red jasper. The sedimentary iron ore had been traced over a distance of 51.5 km.

The jasper-hematite type of iron formation constitutes a significant proportion of the lower 305 metres of the hematitic conglomerate of Cambrian age. The greater part of the iron formation occurs in a restricted zone between 152 and 305 metres above the unconformity at the base of the conglomerate. The zone attains its maximum thickness of 152 metres in the area immediately north of Iron Creek, and generally thins out toward both east and the west.

Thirteen cross sections were constructed to establish correlations in the iron-rich zone throughout the Snake River area. Eight of these cross sections form a grid (4 east-west and 4 north-south) covering the main Iron Creek block. The lithologies were standardized to facilitate correlation into five lithology types: hematite, shale, sand, shaly conglomerate (less than 30% to 40% clasts) and conglomerate (more than 30% to 40% clasts). The arbitrary ore cut off of 35% soluble iron was used to differentiate between hematite and shale. (The analytical method for determination of soluble iron is described in the Section

5.5.1.6 of this report.) During the correlation work, the iron formation was divided into nine natural units (Figure 5.6), the boundaries of which were established as follows:

- Zone 1: Top of main iron to bottom of upper marker sandstone,
- Zone 2: Bottom of upper marker sandstone to top of first continuous clastic unit,
- Zone 3: Top of first continuous clastic unit to bottom of second clastic unit,
- Zone 4: Top of second continuous clastic unit to bottom of main marker sandstone,
- Zone 5: Bottom of main marker sandstone to top of next major clastic unit,
- Zone 6: Major clastic unit predominantly shaly conglomerate,
- Zone 7: Major hematite unit,
- Zone 8: Major clastic unit predominantly shaly conglomerate,
- Zone 9: Basal major hematite unit.

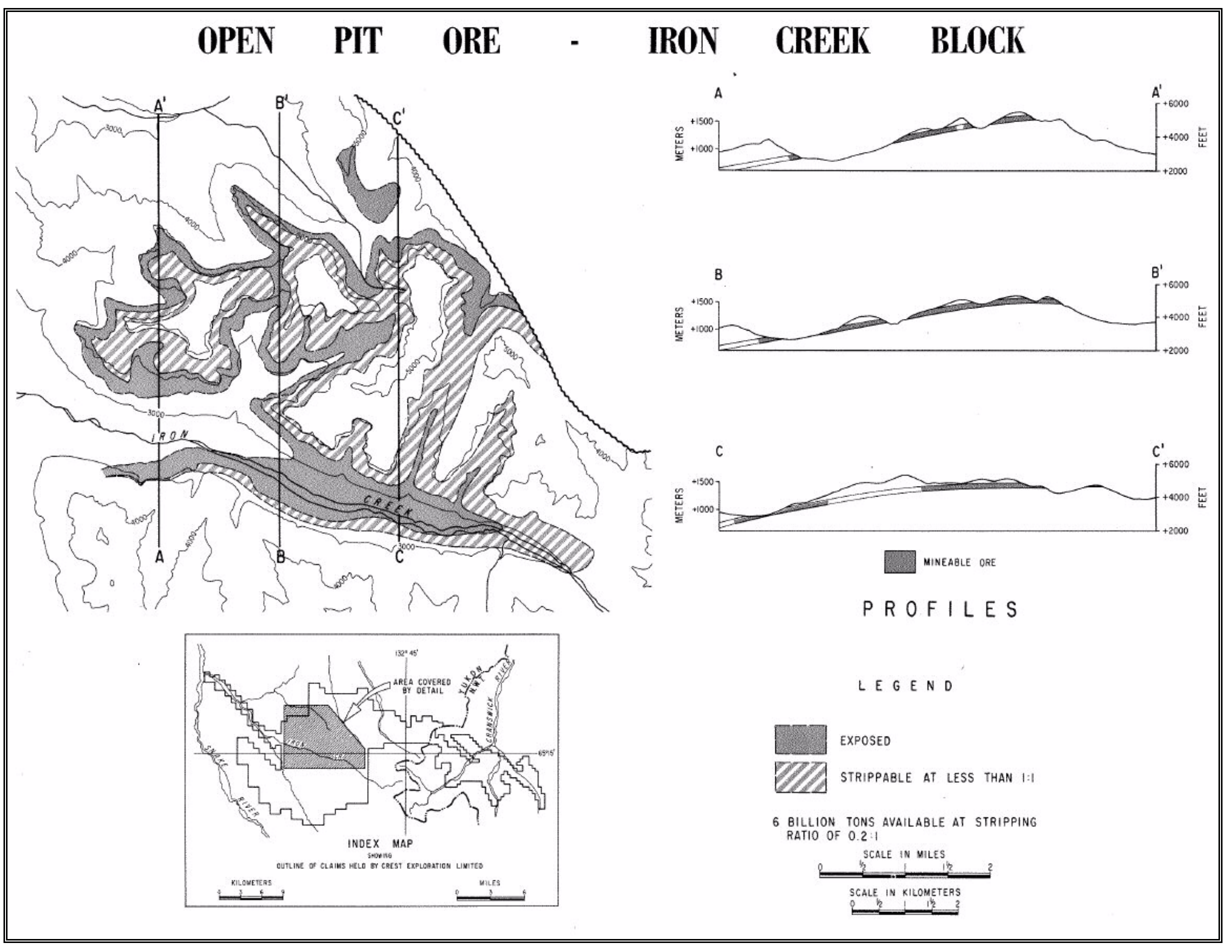


Figure 5.5: Iron Creek block

Sandstone is not a particularly abundant constituent of the iron-rich zone, but is notable chiefly for the persistence of its beds. Shale and siltstone are not volumetrically important in the iron-rich zone and usually form beds 0.6 m or less thick and very limited area. Shaly conglomerate is by far the most abundant sedimentary type and forms beds within the iron-rich zone ranging in thickness from a few centimetres to 20 m or more (Zones 6 and 8).

The iron-rich zone consists of varying proportions of three basic constituents: hematite, chert, and clastic sedimentary rocks. Crest distinguished the following types of iron formation on the basis of the hematite jasper inter-relationship:

4) Nodular iron formation

This consists of 60% to 90% of dense very fine grained, steel-grey to maroon-tinted hematite containing small rounded or ovoid nodules of orange-red jasper.

5) Banded Iron Formation

This consists of interbanded hematite and jasper. The bands may range from a fraction of a centimetre to a metre in thickness, they may be structureless or laminated, and they may be interbedded in any relative proportions.

6) Irregular Iron Formation

This type of iron formation is characterized by irregular masses and intergrowths of hematite and jasper.

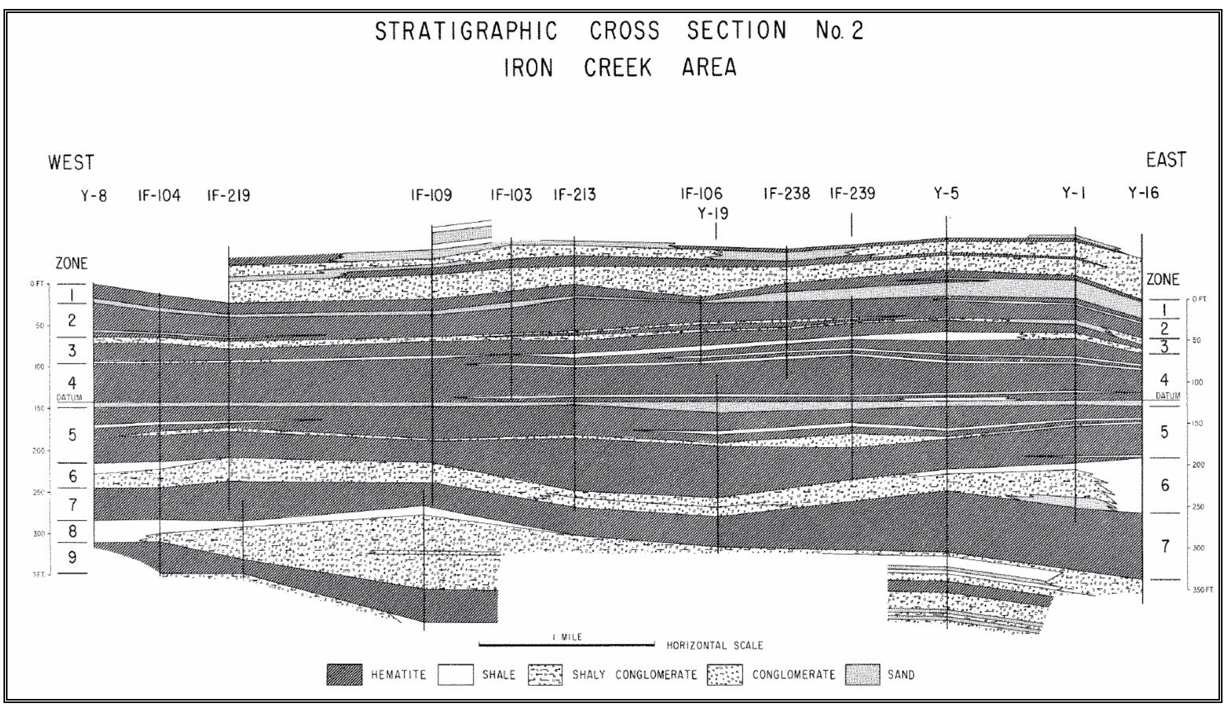


Figure 5.6: Example of the stratigraphic cross section

5.5 Exploration History

The Snake River area was virtually unknown geologically until the mid-1950's when petroleum exploration companies became active in the Mackenzie Mountains.

The Snake River iron ore deposit was discovered by a geological party of the Standard Oil Company of California in 1961 during an extensive program of regional structural and stratigraphic geological mapping. The deposit was acquired by Crest Exploration Limited, a subsidiary of the Standard Oil Company of California, in May-June 1962.

A geological mapping program in 1962 was designed to determine the constitution of the iron formation and to map the distribution and structure of the iron ore. The constitution of the ore was measured and described at 40 localities and 18 channel samples were taken. One vertical test hole was drilled to the depth of 106 m. Fifty metres of core was recovered from the iron formation, which was reported to corresponded with a core recovery of 79.7%.

In 1963 an exploration program comprising diamond drilling and surface sampling was carried out for the initial evaluation of the deposit. Bulk samples were also taken for beneficiation tests. The 1963 mapping was concerned with improving the accuracy of the geological mapping in a restricted part of the area near Iron Creek. The geological sequence was measured and described at 46 new localities. The drilling program was continued and 25 additional holes were drilled with a total length of 3,111 metres. Twelve of those holes were drilled in the Iron Creek valley, seven in the Northwest Territories, four at the mountaintops north of the main valley, and two at the heads of two north trending valleys. A total of 2,904 m of core was recovered, including 1,162 m from the iron formation with the average core recovery of 80%.

This brought the total of stratigraphic sections through the area to 86 which, coupled with 26 drill holes, provided good stratigraphic control, particularly in the Iron Creek block.

5.5.1 Sampling and QA/QC

5.5.1.1 Channel sampling

The 1962 exploration program included sampling of well exposed transects of the iron formation. The iron ore had been sampled at intervals over the full length of the mineralised beds. Channel samples were cut across the exposed mineralised intervals at 18 localities. The samples were collected from channels about 10 cm wide and 1.3 cm deep yielding approximately 1.8 kilograms of sample per 30 cm of channel and were bagged at 90 cm intervals. Shorter samples were taken when there was an obvious break in lithology or grade. The length weighted average of all the assays representing 732 m of mineralisation was 46.24 % Fe, 0.35 % P and 24.85 % SiO_2.

Waste bands up to 30 cm in thickness were included within samples, and the thicker waste bands were not sampled.

Several sampled transects were submitted for complete chemical and spectrographic analysis of the 0.9 m samples. If subsequent review of these results indicated that a larger sample interval would be satisfactory, the remaining samples from adjacent transectss were submitted as composited samples each representing a 2.7 to 3.6 m interval.

During the 1963 field season 3,191 m of transects were sampled, 391 m were waste or covered zones belonging to the 18 transects which had been sampled in 1962. The remaining 2,800 m of sampled transects came from 68 transects measured and described in 1963. The sample intervals within consistent lithology were 3 m, and new samples commenced at lithologic boundaries. All other sampling techniques were similar to the 1962 program.

5.5.1.2 Bulk sampling

Two bulk samples of approximately 363 kg each were taken from transect IF-13-62 in 1962. The samples were collected as a series of "grab" samples selected at intervals throughout the vertical thickness to represent the complete mineralised stratigraphic section. These samples were used for beneficiation tests at the Ontario Research Foundation in Toronto.

A 45 ton sample of iron formation was taken for beneficiation tests carried out by the Department of Mines in 1963. This sample was representative of the complete section in the central part of the deposit. After this sample was completed, a second sample was taken in anticipation of further testing work.

In 1964, five 1.8 ton channel samples were taken from the 1963 bulk sample section and subjected to various bench scale beneficiation tests. The total sampled thickness was 82 m, including 71 m of mineralisation and 11 m of waste.

5.5.1.3 Special sampling

A sample of each of five mineralisation types was collected for preliminary investigation at the Department of Mines at Ottawa in 1962. The five types were differentiated by five different textures; ovoids, continuous bands, discontinuous lenses, irregular patches and maroon hematite. About 27 kg of each type was collected.

A special channel sample was taken in 1963 for Mitsui and Company Ltd, Japan. The size of the channel was scaled so that the final sample would weigh approximately 0.9 ton. Upon completion the sample was shipped to Mitsui and Co., Ltd. in Vancouver.

Eighteen 20 cm cubes of iron formation, six from each of three separate transects were taken in 1964 to investigate the apparent difference in assays obtained from channel and core samples.

5.5.1.4 Core sampling

All of the diamond core from 26 drill holes was logged in the field. The core was notched lengthwise with the diamond saw and then split in the splitter. Core was sampled before shipment to storage in the core laboratory in Calgary.

A total of 1459 m of core were split and sampled. Initially 1049 m were completed at Iron Creek and 410 m were subsequently cut in the Calgary core laboratory.

For every hole, the complete interval, between the top of the main iron ore and the bottom of the last iron-bearing unit, was split and sampled. The sample interval was 3 m except where an obvious break in grade or lithology occurred, and then the sample was broken. Intervals of waste 0.3 m thick or less were included with the iron formation and vice versa. Half the core was bagged for assay and the other half was retained in the core boxes.

5.5.1.5 Core recovery

The iron formation was drilled mainly with AXT (32.5 mm core diameter) and EXT (23 mm core diameter) equipment. The average core recovery was slightly more than 80% and the recovery for EXT core (core diameter 23mm) was approximately 75%. Core loss was mainly caused by grinding and caving at the lithology boundaries. In the holes where there was little caving, average recovery was 90 to 95% but in zones with thinly interbedded shale and iron formation the recovery was exceptionally low.

5.5.1.6 Analytical methods

The samples were all submitted for chemical analyses of the iron, silica, phosphorus and sulphur grades, though the analytical methods changed during the project.

In 1962 all samples were routinely analysed for total iron, total phosphorus, silica, and sulphur. At the beginning of 1963, Crest changed to analysing for soluble iron, soluble phosphorus and insolubles.

The soluble iron content was determined volumetrically by oxidation using the Zimmerman-Reinhardt method. In this method iron is dissolved in concentrated hydrochloric acid, then determined by reduction through addition of stannous chloride.

For grade estimation and reporting, Crest estimated the soluble iron content in samples obtained before 1963 that had been determined for total iron. This adjustment was estimated using a linear regression developed from a simple scattegram of acid soluble iron versus total iron. The scattegram showed that virtually all of the total iron is soluble iron (i.e. hematite) with less than half of one percent of insoluble iron (ie iron within silicates).

After further checks, Crest concluded that the soluble phosphorus analyses were not consistently accurate. Thereafter all of the assays reported total phosphorus.

The insoluble material was reported as hydrochloric acid insolubles, i.e. the weight percent of material remaining after dissolving the sample in hydrochloric acid. The difference between the silica analyses and the insoluble analyses reflects silica occurring in alumino- silicates.

The resource statements in 1965 report (*April 1965: Snake River Iron Deposit Summary Report)* are based on soluble iron, total phosphorus and insolubles.

Several samples underwent further chemical and spectrographic analyses, which gave a more comprehensive composition of the iron ore formation. The accuracy of the semi-quantitative spectrographic method was reported to be plus or minus 35 to 50% of the actual grade. Some samples were assayed for alumina, magnesia, calcium, manganese, CO_2 and titanium. Crest concluded that these elements or oxides were not critical components of the mineralisation and no further analyses were required.

There is a detailed description of the analytical methods in the Volume F of the Snake River Iron Deposit Summary Report.

All analyses for grade calculations were done by Coast Eldridge, Engineers and Chemists Ltd., Vancouver. The check analyses were sent to the Warnock Hersey Company of Winnipeg, and Lerch Brothers of Hibbing, Minnesota.

5.5.1.7 *Check Assays*

The sample precision was checked at Coast Eldridge laboratory using 206 repeat analyses. Compared with the original assay, there was a difference reported by Crest in average iron of +0.4% (relative difference of 0.31%); silica +0.28% (relative difference of 1.21%); phosphorus 0.01% (relative difference of -3.03%). Original Coast Eldridge analyses were used as a basis for comparison. (Note: Hatch recognises that some of these values are inconsistent but cannot resolve the discrepancy, so has reported the values as reported by Crest).

The assay bias was checked using 19 repeat samples, which were sent to Warnock Hersey Co. The assays for iron and silica compared closely with the results of the Coast Eldridge laboratory, but there was a considerable difference in the phosphorus analyses with Warnock Hersey being consistently lower. Compared with the original assay reported by Coast Eldridge, there was a difference in average iron of +0.63% (relative difference of 1.27%); silica -0.66% (relative difference of -2.65%); phosphorus 0.10% (relative difference of -28.5%).

The same 19 samples were sent to Lerch Brothers. Compared with the original assay reported by Coast Eldridge, there was a difference in average iron of -0.80% (relative difference of -1.74%); silica +0.99% (relative difference of +3.97%); phosphorus 0.03% (relative difference of -8.6%).

From these tests, Crest concluded that the laboratories agreed as well as could be expected on the iron and silica contents. Crest also concluded that the Warnock Hersey Company's assay procedure for phosphorus was at fault for the different phosphorus results.

5.5.1.8 *Minor elements*

The following minor constituents were studied somewhat more than the other minor elements:

Sulphur

Quantitative chemical analyses for sulphur were carried out on samples from six surface transects. The sulphur grade of the mineralisation typically varied from 0.01% to 0.02%, and several samples from the waste intervals contained more sulphur, with the highest grade sample being 0.08% sulphur.

Titanium

Some quantitative spectrographic chemical analyses for titanium were done from five surface transects and four drill holes. The iron ore (at 35% cut off grade) contains between 0.02% and 0.11% titanium.

Manganese

Semi-quantitative spectrographic analyses for manganese were carried out on samples from four surface transects and three drill holes. The manganese content ranges from 0.02% and 0.80% with an average of 0.25%.

Alumina

Both quantitative and semi-quantitative spectrographic analyses for alumina were made on samples from several surface transects and drill holes. The alumina content varies from 0.20% to a high of 5.00% with an average of 0.90% within the iron formation.

5.6 Resource Estimates

5.6.1 Statistical Analysis

The channel samples in the iron formation demonstrate that significant chemical variations correspond with physical and lithological variations.

No major systematic trend in the iron content of the iron formation was observed by Crest from top to bottom of a stratigrahic section, or between different transects. Also Crest observed only minor variation in iron content from sample to sample within zones.

The phosphorus content of the iron formation typically increases from the base of the iron-rich zone to the top.

5.6.2 Density

Preliminary grades and tonnages were estimated using a constant density value of 3.99 t/m^3. Subsequent examination by Crest of the average iron content of the individual zones showed that this figure was high. Crest subsequently revised tonnage estimates using a density value for each zone calculated as follows:

$$Density(t/m3) = \frac{(\%Fe * 6.435 + \%Inso * 2.6 + \%Sol * 2.8) * 22.426}{2240}$$

The average density value for all mineralised zones was 3.82 t/m^3.

The input parameters in the formula were not defined within Crest reports. Hatch considers that *%Fe* is the soluble iron content, *%Inso* total percentage of insolubles, and *%Sol* total percentage of acid soluble material excluding soluble iron.

5.6.3 Resource Estimation Methodology

Crest Exploration Limited estimated “resources” and “reserves” in June 1963.

The grade and tonnage was estimated for all the iron formation in the area of principal interest around Iron Creek. Crest considered that approximately half of this total tonnage may be amenable to mining by conventional open pit methods, while the remaining tonnage may be amenable to mining by underground methods, although Crest recognised that it would not be economic at the time.

An arbitrary cut off grade of 35% soluble iron was selected for the resource estimation. A minimum mining thickness of 1.52 m was applied to constrain the estimate. Intervals of iron ore less than 1.52 m thick were considered as waste and similarly waste horizons less than 1.52 m thick within the ore were included and considered to be ore.

The total tonnage and grade of the Iron Creek area was estimated using the polygonal method. Polygons were designed around each drill hole and surface transect in an area bounded on the south by the North Iron Creek valley and on the north by the Gypsum Creek valley. The polygons which had open sides facing the valleys were closed using the outcrop pattern of the various zones. Open polygons on the southern boundary were arbitrarily closed by a line drawn approximately parallel to the strike south of the upper contact between the iron formation and the conglomerate. The eastern limit was set along the fault marking the west edge of the Iron Creek block.

The iron formation had been divided into nine stratigraphic zones, two consisting predominately of waste and seven of ore. Each zone was divided into ore and waste intervals, according to thickness and iron assay criteria, and separate polygons were designed for each zone.

The area of each zone was estimated using a planimeter. The volumes for each zone were estimated by multiplying these areas by the average depth of the zone, and tonnage was estimated using the estimated density value.

5.6.4 *Resource Statement*

Crest Exploration Limited estimated the overall tonnage of the Snake River deposit to be in the order of 20,000 to 30,000 Mt. The Snake River iron ore is a fairly simple sedimentary deposit. Mineralogically it consists of fine grained specular hematite with silica distributed as bands or nodules of red jasper. The sedimentary iron ore had been traced over a distance of 51.5 km.

The following table shows the average grade and tonnage for the Iron Creek area estimated in June 1964.

Table 5.2: Iron Creek area Resource Statement

Zone	Fe %	P %	Insoluble %	Volume m^3	Tonnes Mt	Density t/m^3
1	41.36	0.68	31.7	122.3	457.1	3.74
2	44.27	0.52	27.9	275.5	1051.7	3.82
3	41.43	0.40	31.0	220.7	825.0	3.74
4	44.86	0.37	25.2	625.2	2412.2	3.86
5	43.54	0.32	26.3	769.4	2936.7	3.82
7	44.99	0.25	24.5	554.7	2140.1	3.86
9	42.70	0.22	27.8	363.6	1373.4	3.78
Total:	**43.82**	**0.34**	**26.6**	**2931.4**	**11196.3**	**3.82**

[NB Crest reported the volume and tonnage in imperial units, and Hatch has converted these data to metric units. The values are soluble iron, total phosphorus and insoluble contents as described in Section 5.5.1.6, and density as described in Section 5.6.2 of this report. Hatch has not reviewed the reasonableness of these estimates.].

A conceptual pit was also designed in June 1964, using an arbitrary stripping ratio of 2 m^3 of waste to 1 m^3 of ore, cut off grade of 35% soluble iron and 1.52 m minimum ore thickness. The pit walls were assumed to be 60 degrees in ore and 45 degrees in waste. The estimated resources within the pit design were in order of 15% from the total tonnage of the Iron Creek area (*Snake River Iron Deposit, Summary Report, Volume F Reserves and Grades*.).

5.7 Geology - Concluding Comments

The Snake River deposit was discovered and explored in 1960s. Resource estimation was based on surface trench and drill hole samples. The applied estimation methodology was polygonal and mainly manual which was the common practice at that time.

Future updates to the resource estimates should involve the following:

- Transformation of all available analytical information into digital format,
- Some check drilling and sampling to verify existing analytical data,
- Additional drilling and sampling, including implementation of QA/QC procedures,
- Block model development and grade interpolation using modern computerised techniques,
- Pit optimisation and design using the block model.

Please note that Hatch does not consider that ANY of the estimates have been established with sufficient confidence to be classified as Mineral Resources according to NI 43-101, JORC or corresponding codes.

6. Land and Legal Status

The following information on the legal status of the land claims was provided by Chevron's legal department:

- There are 525 Yukon leases (27,827 gross hectares, no annual rentals) and 1 NWT lease (31,752 gross hectares, annual rental $19,576.86).
- They are held 100% by CCL, and are not encumbered by any agreements with third parties.
- 213 Yukon leases expire in 2013 and 312 expire in 2014. The NWT lease expires in 2014.
- Upon expiry each lease can be renewed for another 21 years by paying fees as set out in the applicable regulations. The Yukon legislation (s.103 Yukon Quartz Mining Act) provides that the lease shall be renewed for another 21 year period if the Minister is satisfied that the terms of the lease have been complied with, and the Commissioner in Executive Council may impose additional terms and conditions on the lease upon renewal.
- There are no outstanding work commitments.
- There are no restrictions on transfer for the Yukon leases. In the case of the NWT lease, both the transferor and transferee are required to hold a valid prospector's licence at the time of transfer, and no transfer may be made if rent or royalties are outstanding.
- Royalties are prescribed in the applicable regulations.
- An airstrip and campsite are located on the claims. Exact location, physical (and environmental) condition, and regulatory status are not determined.

A legal description of the permits can be provided.

7. Current Iron Ore Market Conditions

The globalization of the steel industry and iron ore suppliers in recent years plays an important and strategic role in the economics of the steel industry. The power of the market in China has had an enormous influence in the development of the steel business

The following announcement by a CVRD representative in 2004 (which is valid today) gives an indication of the current market conditions for iron ore and pellets:

"In four years CVRD will grow by 50 percent as much as it grew in its previous 62 years of history," Silva told delegates at Metal Bulletin's 13th International Iron Ore Symposium in Rotterdam at a presentation designed to establish CVRD's commitment to meeting iron ore demand growth.

The demand for iron ore and pellets to feed the world's steel plants is tremendous. Several expansion projects are ongoing around the world, particularly in South America, the Middle East, Asia and Europe; all of these projects are currently in progress to produce more iron ore pellets to satisfy the steel plants' requirements.

In addition, aggressive modern managers are operating with and/or investigating methods to optimize the metallurgical units, maximize plant productivity, improve product quality, reduce process variability, increase the yearly operating time (plant availability), reduce energy consumption (electrical and thermal), and thus reduce operating costs.

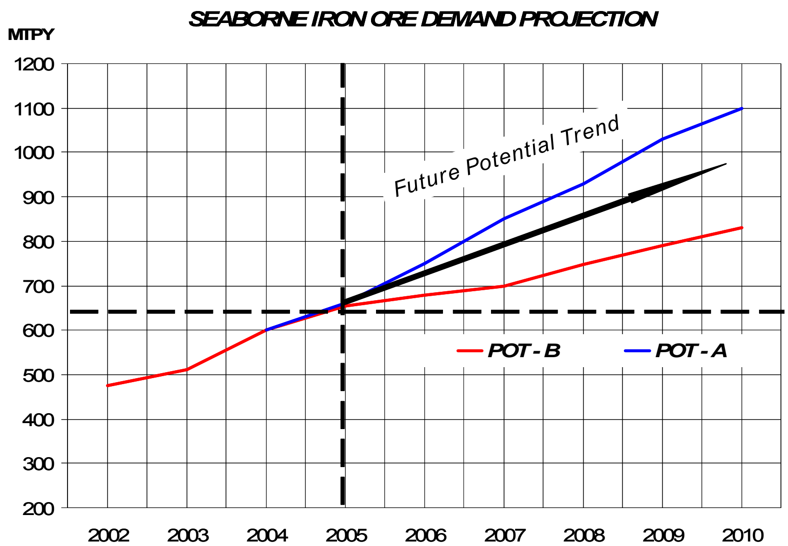
The automation level has also been improved; the plant operators and process engineers are operating with the support of expert systems, automatic process control or mathematical models on line to predict the process performance and product quality.

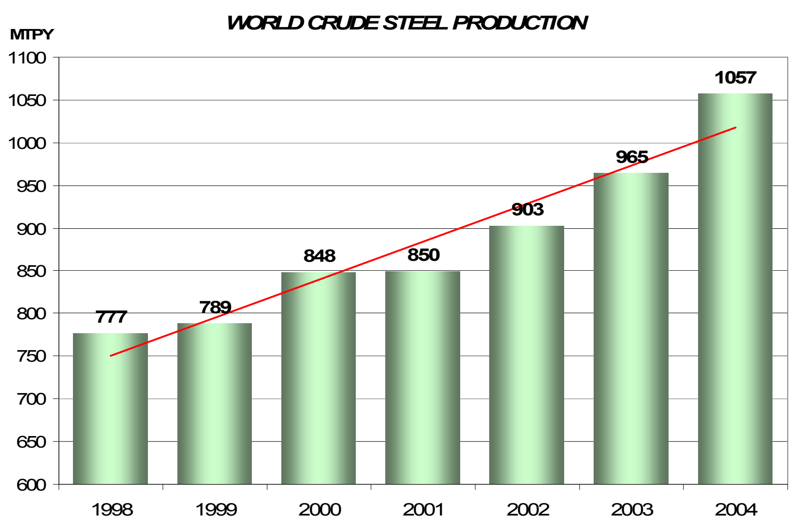
The situation outlined above highlights the need for an investigation of the potential to upgrade the Snake River iron ore to a quality sufficient to meet current market requirements.

7.1 Iron Ore Demand

In contrast to when Kaiser's reports of 1976, 1991 and 1998 were completed, the current demand for iron ore and pellets is extraordinary and the trend is expected to continue; numerous efforts, both through expansions and green-field projects, are being made to bring more iron to the market to feed steelmaking furnaces and should eventually produce enough pellets to bring supply in line with demand.

The following figures show the trend of iron ore demand, which follows the trend of crude steel production:





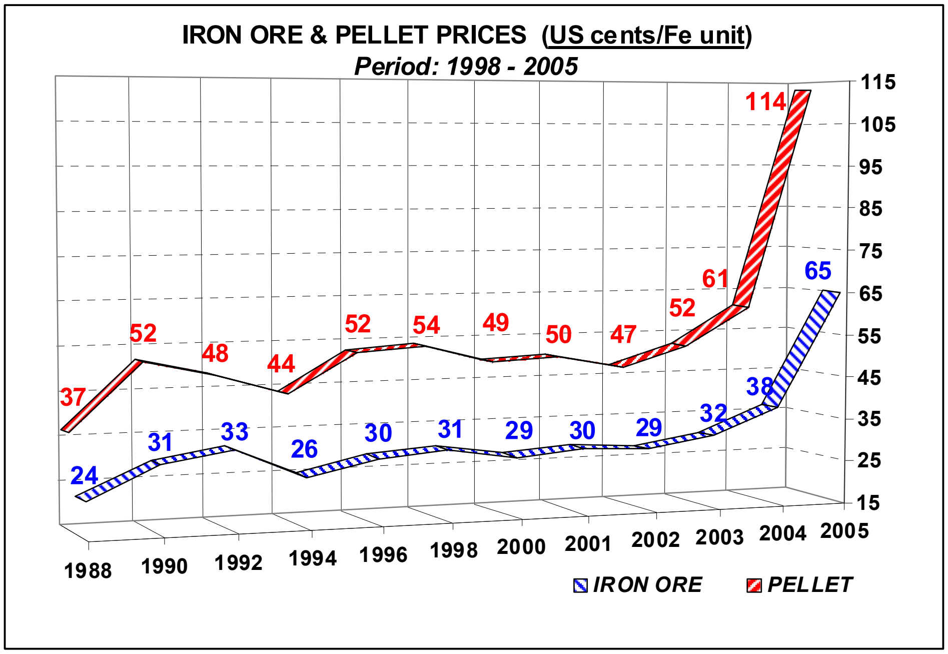
7.2 China's Influence

Chinese imports were responsible for more than half of the increase in the seaborne iron ore demand during the last decade. The substitution of Chinese domestic low grade iron ores with imported ores will continue to lead the growth of the seaborne iron ore market

The demand from China and Japan leads the iron ore market, where there currently exists an imbalance in global iron ore supply and demand levels, which continues despite this year's increase in iron ore and pellet prices. The prices follow the trend of industry demand.

Pellets are agglomerated iron ore and are used for a variety of reasons, including improving furnace productivity.

The strong demand in 2004 also caused shortages, driving prices to higher levels. From 2003 to 2004, iron ore prices increased by approximately 53%, while pellet prices increased by 70%. The dramatic increases are illustrated in the Figure below.



The expectation is that the strong demand for iron combined with high capacity utilization (operating time) of the plants in the steel sector will keep prices high in 2006. The increased supply in response to high prices will cause prices to fall back somewhat, but they are expected to remain higher than pre-2003-2004 levels.

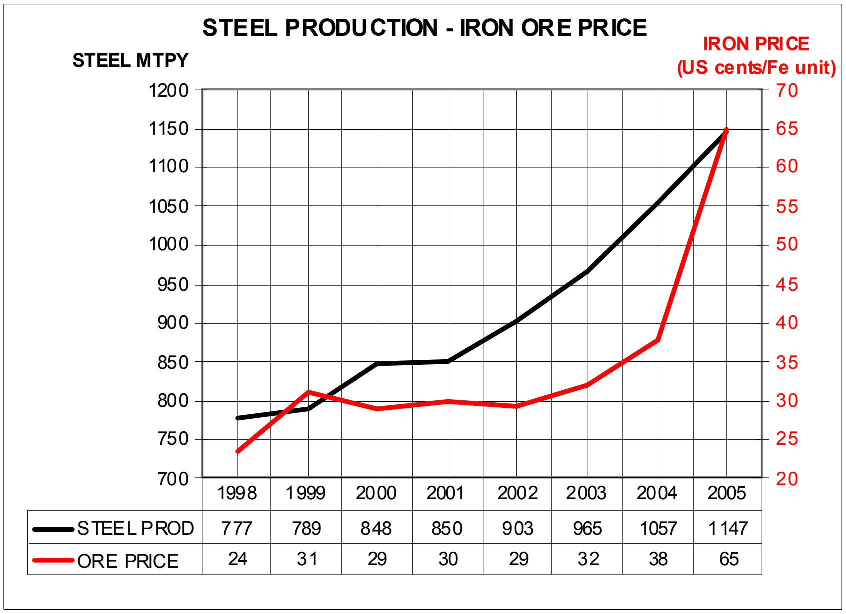
7.3 Iron Ore Prices

Iron ore is priced in US dollars on both the domestic and export markets. The reason is that buyers demand comparability, mainly between the Japanese and European markets.

Prices in the sellers' and buyers' currencies vary therefore, according to fluctuations in the exchange rate.

Price negotiations each year

Generally, prices are set on a yearly basis, even for contracts longer than one year, and are most often negotiated directly between buyer and seller. The benchmark level in price negotiations is usually set by the major market players; either between Australian iron ore producers and the Japanese steel industry, or between Brazilian producers and German steelmakers.



	1998	1999	2000	2001	2002	2003	2004	2005
STEEL PROD	777	789	848	850	903	965	1057	1147
ORE PRICE	24	31	29	30	29	32	38	65

How iron ore is priced:

The price of iron ore is quoted in the unit c/u, US cents per iron unit and tonne, which is synonymous with dollars per tonne pure iron (Fe).

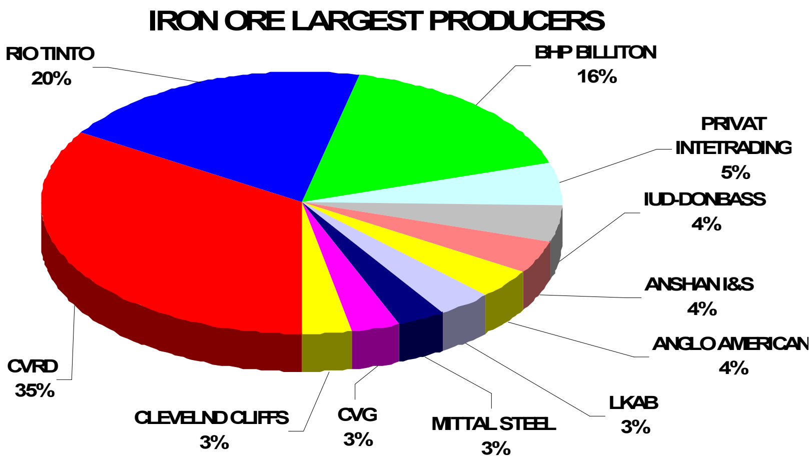
In recent decades, sinter fines prices on the European market, quoted cfr*) Rotterdam, have served as a point of comparison for pricing on other markets. With the exception of ore from Australia and Venezuela, priced cfr (...name port of destination), prices are generally set fob*) (...name port of shipping) with deductions for an agreed calculated freight rate.

Compared to the Brazilian benchmark price for sinter fines in Rotterdam, the individual cfr prices vary according to quality. Deductions are made for defects in chemical composition and grain size distribution.

8. Beneficiation and Processing

8.1 Iron Ore Benchmarking

Subsequent to globalization processes, the raw materials market for the steel industry is currently distributed as follows:



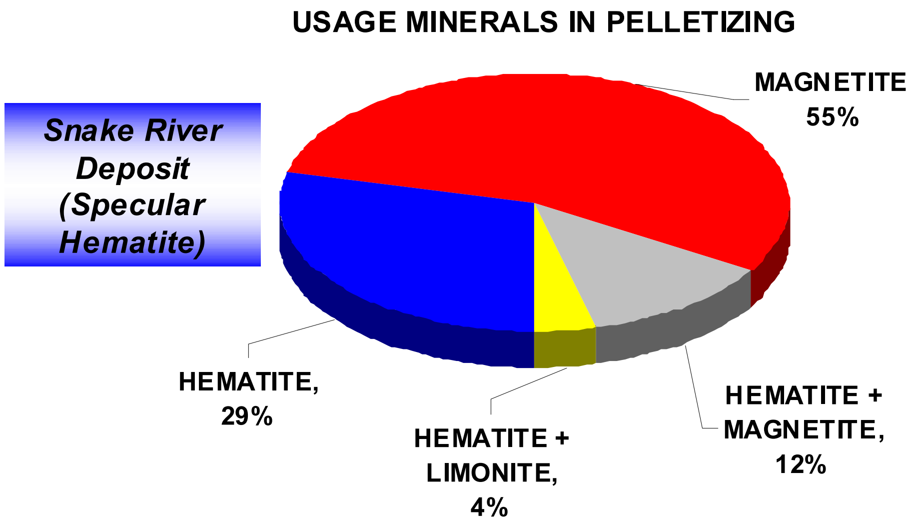
The iron ore in the market is dominated traditionally by Australia and Brazil with 65-70% of the worldwide production in 2005. Both countries have large iron ore resources with sophisticated transportation systems and state-of-the-art port facilities; the next largest exporters are India, Canada and South Africa.

The Snake River iron ore deposit, when the reserves are confirmed, could play an important role in the selected group of iron ore producers.

Raw Materials for Pelletizing

The steel industry is currently having difficulty obtaining raw materials for the production of Direct Reduction (DR) and Blast Furnace (BF) grade pellets. DR pellets are used for making direct reduced iron for mainly Electric Arc Furnaces (EAF) and are of high quality. BF pellets can be fed into blast furnaces in integrated steel complexes that can tolerate a wider quality range. Both the short-term and long-term availability of raw materials will influence the operating strategy of the steel complexes.

Magnetite iron ore is generally desirable, however the figure below shows that hematite makes up almost 30% of ores used in pelletizing.



A conservative estimate of tonnage increase from existing mines or projects under development in the next 5 years is approximately 55 65 MTPY of pellets. It is expected that the market will require even more than this estimated increase provided by existing sources, and new sources could be evaluated to fill the gap.

8.2 Iron Ore Quality

The following table shows the chemical quality of concentrates produced by some of the most important iron ore suppliers in the world, and the mineral used by internationally recognized pellet producers. These are compared with Snake River's reported characteristics without beneficiation, shown in the bottom row of the table.

IRON ORE TYPE	COUNTRY	CHEMISTRY (%)						PELLET	CONSUMP
		Fe tot	Fe++	SiO2	Gangue	S	P	TYPE	TION
MAG	PERU	69.90	17.34	1.42	1.72	0.140	0.010	DR	MARKET
	MEXICO 2	68.05		2.32	4.49	0.270	0.028	DR	INTERNAL
	RUSSIA	68.30	27.70	4.50	5.15	0.013		DR	INTERNAL
HEM - MAG	IRAN 1	68.29	16.49	1.20	3.23	0.118	0.050	DR	INTERNAL
	IRAN 2	68.45	10.88	1.52	2.67	0.031	0.063	DR	INTERNAL
HEMATITE	BRAZIL 1	68.40	0.16	1.10	1.39	0.003	0.018	BF - DR	MARKET
	BRAZIL 2	67.80	0.16	1.37	2.04	0.003	0.034	DR	MARKET
	VENEZUELA	66.71	5.00	1.05	1.81	0.015	0.050	DR	NTER - MAR
	BRAZIL 3	66.60	1.06	1.40	1.78	0.002	0.043	BF - DR	MARKET
	BRAZIL 4	66.60	0.21	0.73	2.44	0.001	0.038	BF - DR	MARKET
	CANADA 1	66.00		4.90	5.35	0.005	0.015	BF	MARKET
	CANADA 2	66.00	7.00	4.50	5.44	0.003	0.008	BF	MARKET
	M_2005	65.67	2.11	2.85	5.03	0.098	0.125	BF	INTERNAL
	M_2000	63.36	3.20	4.25	6.49	0.135	0.147	BF	INTERNAL
	SNAKE (*)	**62.00**		**5 to 10**			**0.160**	**BF**	**MARKET**

(*) Hatch believes that Snake River's reported iron ore chemistry can potentially be improved.

The Gangue content of the iron ores is expressed as the sum of the acid and basic components, which are the main components of the slag in the subsequent processes: Gangue = (%SiO2 + %Al2O3 + CaO + MgO).

Ores often contain impurities, undesirable chemical components such as phosphorus, sulphur, sodium and potassium (the latter two oxides are called alkalis). Other components such as calcium and manganese may be considered desirable, depending on the composition of other raw materials used in the individual iron or steel producer's process. All of these factors are considered and will have an impact on the selling price of the final product. (see: Review of Snake River iron ore characteristics)

Iron Oxide Pellets

The table below compares the iron ore and the pellets produced in the same countries (Snake River potential at bottom). Detailed discussion and comments on pellet quality are included in Section 8.3.

PELLET	COUNTRY	CHEMICAL QUALITY									
TYPE		Fe tot	Fe ++	SiO2	Al2O3	CaO	MgO	P	S	B2	Gangue
DR	PERU	68.00		1.56	0.32	0.29	0.63	0.01	0.006	0.19	2.80
	MEXICO 2	66.65	0.42	2.22	0.90	0.69	0.45	0.03	0.004	0.31	4.26
	RUSSIA	66.75	2.35	2.92	0.19	1.06	0.20			0.36	4.36
	IRAN 1	67.12	0.30	2.17	0.37	0.75	0.43	0.05	0.003	0.35	3.72
	IRAN 2	67.04	0.18	2.15	0.53	1.18	0.56	0.03	0.002	0.55	4.42
	VENEZUELA	67.70		1.65	0.88	0.30	0.20	0.06	0.002	0.18	3.03
BF	BRAZIL 1	65.71		2.46	0.63	2.56	0.06	0.02	0.002	1.04	5.71
	BRAZIL 3	67.31	0.16	2.02	0.45	0.88	0.12	0.05	0.001	0.44	3.47
	BRAZIL 4	65.86		1.83	1.17	1.83	0.12	0.03	0.005	1.00	4.95
	CANADA 1	64.95		2.58	0.46	2.32	1.52	0.01	0.004	0.90	6.88
	CANADA 2	65.60	0.13	4.75	0.27	0.50	0.30	0.01	0.002	0.11	5.82
	MEX 1_ 2005	62.49	2.11	3.63	1.02	4.05	1.40	0.13	0.018	1.11	10.10
	MEX 1_2000	61.31	1.20	4.37	0.89	4.86	1.41	0.14	0.032	1.11	11.53
	SNAKE ACID	**63.49**		**4.35**	**1.09**	**2.36**	**1.24**	**0.15**	**0.003**	**0.54**	**9.04**

8.3 Current Iron Ore and Pellet Projects

Full capacity and strong demand have generated numerous efforts both expansion and green-field projects--to bring more iron to the market to feed steelmaking furnaces, which should eventually produce enough pellets to bring supply in line with demand.

Pellet Plant and Mine Expansions/New Projects

Several new projects are planned to increase pellet production in different areas of the world, including South America, the Middle East, Asia and Europe.

"There is currently no spare capacity in the iron ore pellets market and the strong demand is seen continuing for the next three to four years," added CVRD president Roger Agnelli. (Metal Bulletin PLC Jan. 2005)

Gol E Gohar, Iran

Iran's Gol-e-Gohar Iron Ore Co is to go ahead with construction of a new 4 MTPY pellet plant to produce DR pellet from magnetite concentrate. The machine will be a traveling grate designed by Outokumpu Technology

Samarco Pellet Plant, Slurry-pipeline and Mine expansions

CVRD is a 50 percent partner with BHP Billiton in Samarco, which is expected to proceed with a third 7.0 MTPY pellet plant (straight grate), boosting total pelletizing capacity at Samarco to 21.0 MTPY.

Carajas and New Mines Operations

Expansion plan to increase production from 78 to 100 MTPY of sinter and pellet feed at Carajás. CVRD is looking at the feasibility of 100 MTPY at Carajás by 2009-10

Iron Ore Reserves

By the end of the decade it is expected that CVRD will begin exploiting a new area of deposits with 11 billion tonnes of reserves. This investment would require the construction of a 100km rail spur and could take Carajas up to a 200 million tpy operation in the period 2010-2020.

MBR Pellet Plant

A 7.0 MTP pelletizer at MBR (Minerações Brasileiras Reunidas) in Minas Gerais (CVRD project in progress): Outokumpu Technology, formerly Lurgi-Mettalurgie, will construct the machine.

Asia Iron Nanjing Iron & Steel

This joint venture has a project in progress to construct two (2) grate kiln machines to produce five (5) MTPY of blast furnace pellets. The iron ore to produce the pellets is magnetite from Australia

CVRD No 8 at Tubarao

In late 2004 CVRD announced it would add a new 7.0 MTPY pellet plant at Tubarão in Espirito Santo state (straight grate). The project is being considered for 2007.

LKAB - Sweden

Western Europe's iron ore miner, LKAB, wants build two more pellet plants.
The major investment would be at the company's Kiruna mine for a 5.0 MTPY pellet plant. At the Malmberget mine LKAB is considering a 3.5 MTPY capacity plant. Pellet and sinter plant supplier Outokumpu Technology is already working on a project related to the new pelletizing plants.

Ferteco (Fabrica)

CVRD looked at the possibility of a second pelletizer of around 6.0 MTPY at Fabrica, in Minas Gerais, a project inherited from Ferteco, to produce BF and DR pellets (straight grate)

GIIC - Bahrain

CVRD may participate in a possible doubling of the 4.0 MTPY GIIC pellet plant in Bahrain, in which it has a 50 percent stake (Grate Kiln Process)

Essar Steel Hy-Grade No 2

Hy-Grade Pellets, which has capacity of 3.5 MTPY, is expanding to 7.0 MTPY via the construction of a second plant at the same site in the Visakhapatnam

Panzhihua Iron & Steel Group

The construction of a pellet plant is being considered with 1.2MTPY capacity in the south-western Chinese province of Sichuan as part of its Baima iron ore project.

Increased Capacity of Existing Pellet Plants

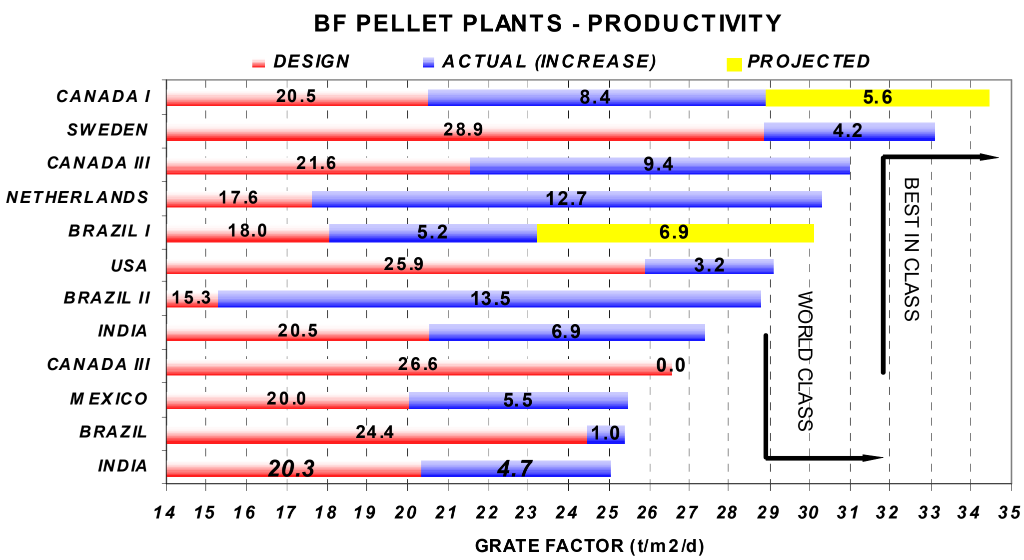
In addition to new pellet plant projects, existing plants are working to maximize pellet output through implementation of modern technologies.

A public example is CVRD's investment in 2003 to upgrade their Espirito Santo integrated pelletizing complex with the addition of seven (7) straight grate machines (CVRD 1 & 2, Itabrasco, Hispanobras, Nibrasco 5 & 6 and Kobrasco) in an attempt to increase production by 12 percent to 28 MTPY.

Iran (Mobarakeh and Ahwas), Canada (QCM and IOC) and Mexico (Peña, Mittal LZC and AHMSA) have been working on their pellet plants to maximize pellet production, consequently more iron ore is required to match the pellet production increases.

In order to be competitive in the market, efficient operations are required to reduce operating cost. Pellet plants around the world are working to increase pellet production while maintaining pellet quality. The figures below show some advances that have been made in pellet plant productivity, both for blast furnace pellets and direct reduction pellets.

Blast Furnace Pellet Plant Producers

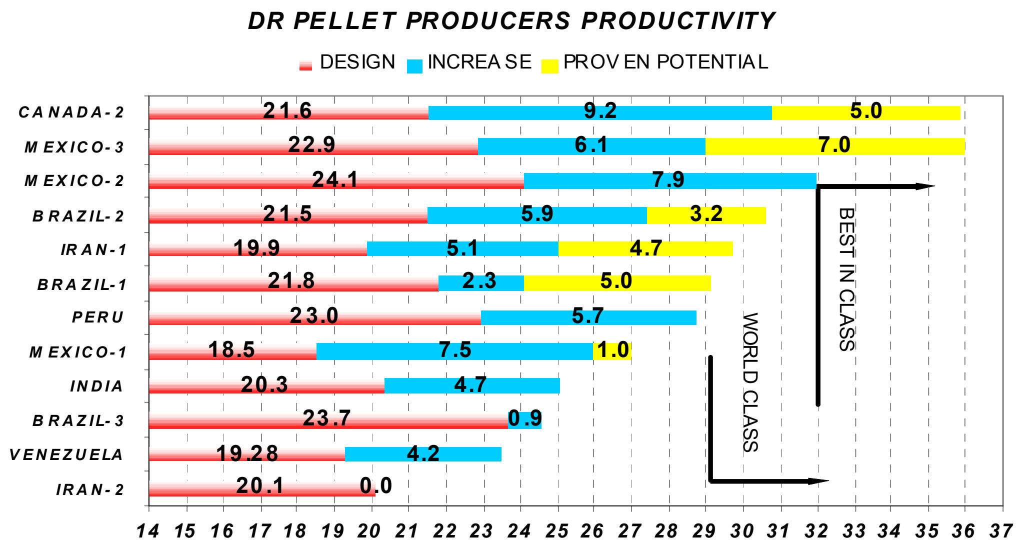


Essentially all of the plants in the world are operating over their design capacity. The productivity levels achieved depend on the following:

- Raw materials quality (hematite or magnetite)
- Type of pellet produced (low, medium or high flux)
- Process Control (measurements on line)
- Operating practices   plant philosophy
- Operating time (plant availability)
- Automation level (expert system, automatic process control, mathematical models)

Direct Reduction Pellet Plant Producers

A Similar situation is observed with DR pellet producers, where again the quality of the iron ore plays the most important role in the productivity of the plant and consequently in the final capacity.

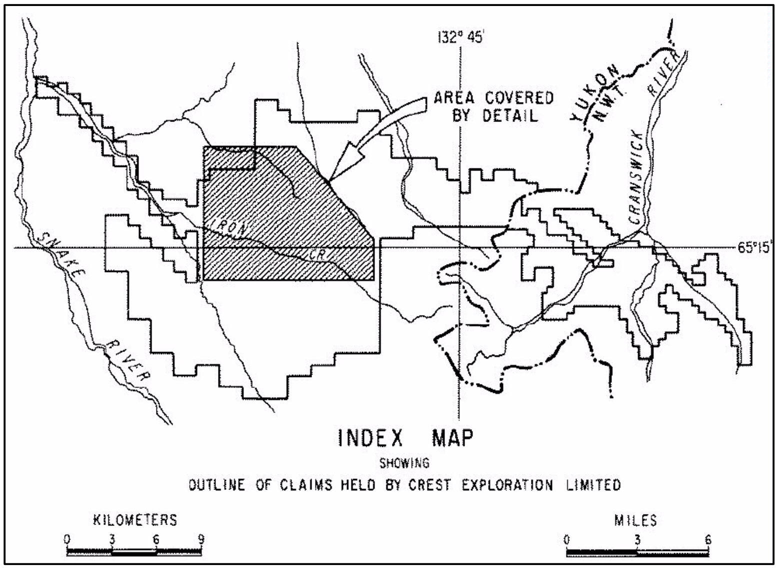


A conservative estimate of tonnage increase from existing projects or capacity improvements in the next 5 years is approximately 55 65 MTPY of pellets. It is expected that the market will require even more than this estimated increase provided by existing sources, and new sources could be evaluated to fill the gap.

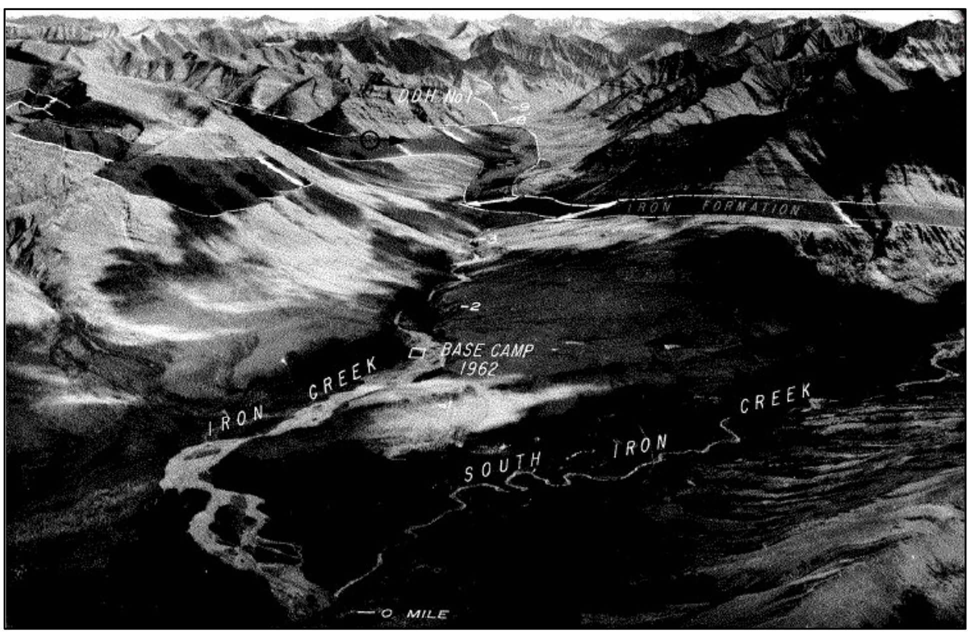
8.4 Technical Overview of Snake River Iron Ore Beneficiation and Pelletization

"Resources" and Concentration Ratio

The Snake River iron ore deposit in the Yukon Territory reports (Bechtel study) preliminary estimates of total reserves from 20 to 30 billion tons of ore. Approximately 50% can reportedly be mined by open pit methods, the remaining 50% might be mined by underground technology. The most favourable segment is shown below:



Iron Creek (photo below) is the most suitable area for open pit operations where it is reported that six (6) billion tonnes can be processed with a stripping ratio of 0.2:1.0 and maximum 1:1 (over-burden : ore)



Past reports indicate that one pit alone has one (1) billion tonnes with virtually no overburden. Metallurgical studies promise encouraging potential with reserves for 400 years operation (these values should be reconfirmed).

The pits considered of interest (Bechtel, Jan 1963) were D and E in the Iron Creek valley (photo above), at elevations 823 to 1130m with moderate overburden, and favourable conditions for development of benches and hauling of ore. Potential pits are A, B, C, F, G and H at 1219 to 1555m elevation (difficult access). A summary of these potential pits is shown below:

SUMMARY OF RESERVES

AREA	ORE Millions Long Tons	WASTE Millions Cubic Yards	WASTE : ORE RATIO Cubic Yards:Long Tons
A	230	15	0.065
B	50		0.000
C	800	98	0.123
D	730	42	0.058
E	115	9	0.078
F	230	23	0.100
G	120	17	0.142
TOTAL	**2,275**	**204**	**0.090**

(*) Referenced to Canadian Bechtel Limited, 1963 and Kaiser Eng 1976

The specific gravity for hematite has been calculated by the geologists to be 4.3, and for calculation purposes, 4.1 has been used.

Comment

New exploration is required. The data available and considered in all studies corresponds to the original information generated in the Geology study and used by Bechtel in generating the 1963 report.

It is highly desirable to obtain new defined drilling and sampling under international procedures to analyze the data in digital format, applying mathematical models to predict with accuracy the capacity and quality of the deposit.

The 1976 Kaiser Evaluation states "the Crest iron ore is further penalized by a 3.5:1 concentration ratio, which increases the investment relative to the original study, which assumes 2:1 concentration ratio".

The concentration ratio must be clearly defined due to its influence in engineering calculations and capital and operating cost estimates.

The concentration ratio given in the 1998 Kaiser report is the one which we consider is probably more appropriate "A concentration ratio of 3.5:1 is anticipated for conventional ore dressing/pelletizing and a 2.5:1 ratio for direct reduction of the iron".

Iron Ore Chemistry

The iron ore deposits at Snake River consist of Hematite ore, with Calcite and Silica in the following proportions:

Material	Hematite	Calcite	Silica
Percentage (%)	60	15	25

The analysis shown in the table below is the result of intensive vertical cutting channel sampling across the exposed horizontal beds:

CHANNEL SAMPLE AVERAGE

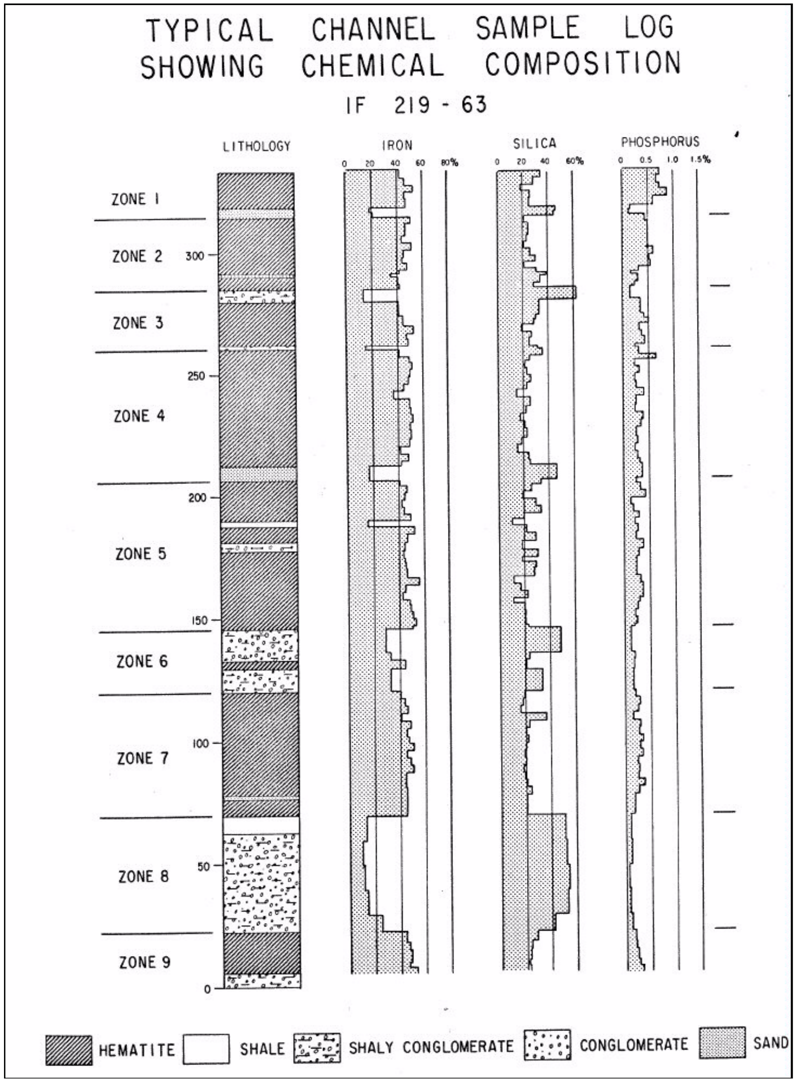
CHANNEL No	FOOTAGE	WEIGHTED AVERAGE (%)			
		Fe	SiO2	P	S
13	135	46.5	24.46	0.53	0.02
6	150	48.2	24.32	0.32	0.02
9	206	46.8	24.66	0.36	0.01
19	218	46.4	23.68	0.33	0.01
37	160	46.2	25.86	0.30	0.01
44	132	45.9	24.59	0.41	0.01
TOTALS	**1,001**	**46.7**	**24.6**	**0.37**	**0.01**

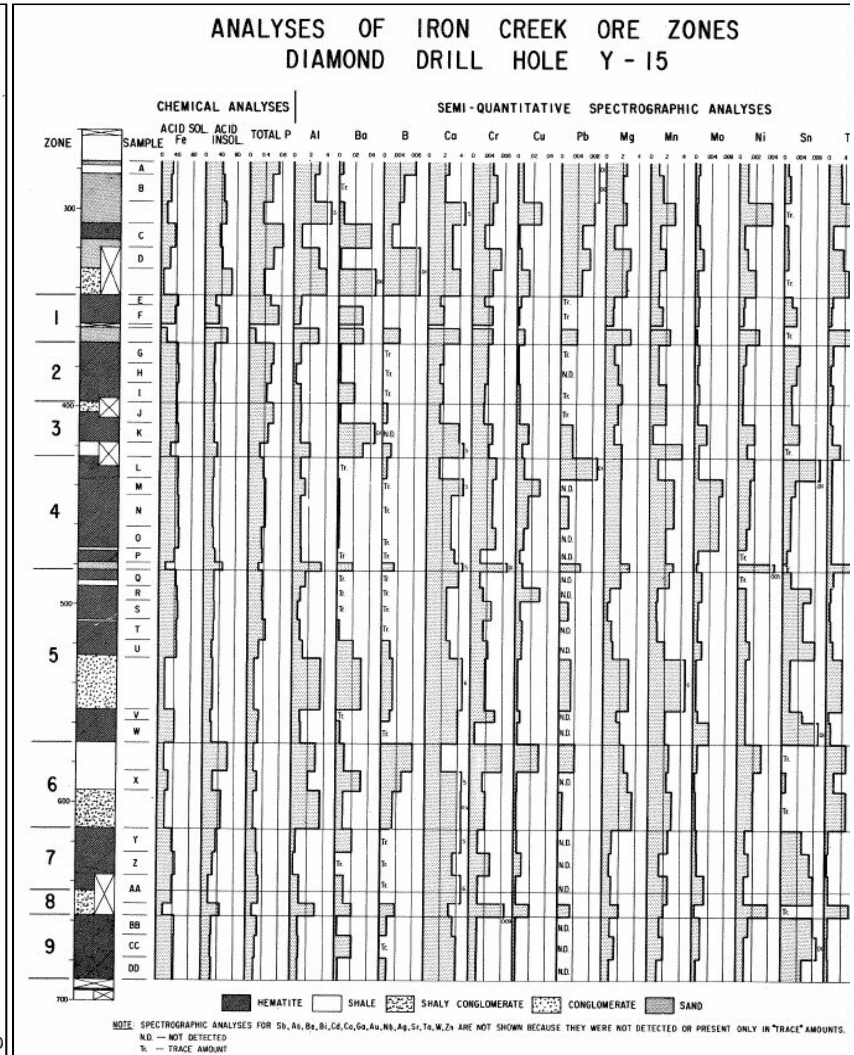
Phosphorous Variability

One of the issues regarding the chemical quality of the deposit and the beneficiation potential is the Phosphorus content variability. The phosphorus is higher in the upper zones, but diminishes with depth from 0.75% to 0.25%, according to past testing. The following results illustrate phosphorus values, with the zones representing depth (upper to lower).

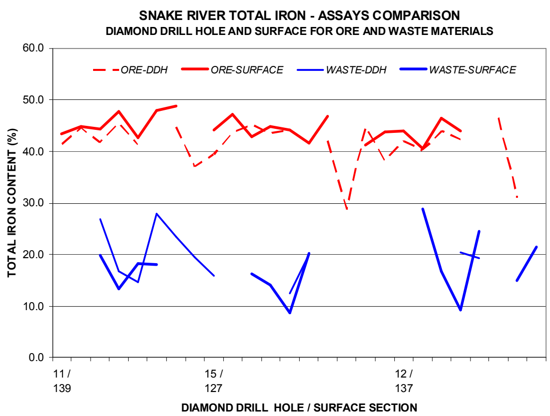
Zone	% Phosphorus Range	% Phosphorus Average
1	0.46 - 0.86	0.68
2	0.38 - 0.65	0.52
3	0.31 - 0.52	0.40
4	0.29 - 0.46	0.37
5	0.27 - 0.44	0.32
7	0.21 - 0.33	0.25
9	0.15 - 0.28	0.22

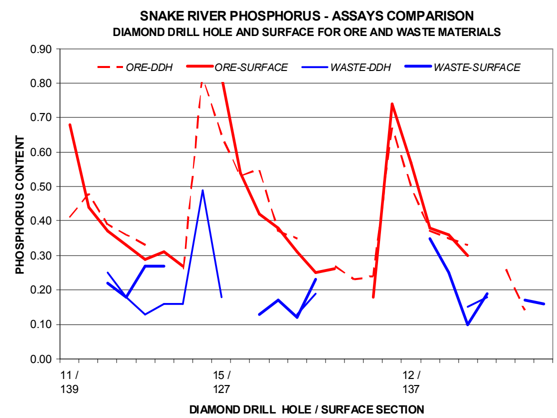
Details of the assays of a channel sample and a diamond drill hole are shown in the charts below. Both charts show the same pattern for iron, silica and phosphorus distribution.

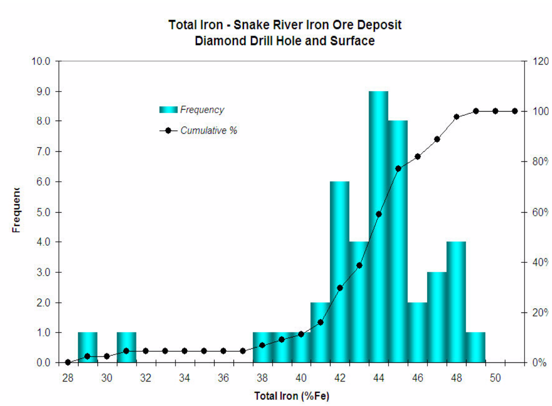

TYPICAL CHANNEL SAMPLE LOG
SHOWING CHEMICAL COMPOSITION
IF 219 - 63
LITHOLOGY
IRON
SILICA
PHOSPHORUS
ZONE 1
ZONE 2
ZONE 3
ZONE 4
ZONE 5
ZONE 6
ZONE 7
ZONE 8
ZONE 9
HEMATITE
SHALE
SHALY CONGLOMERATE
CONGLOMERATE
SAND

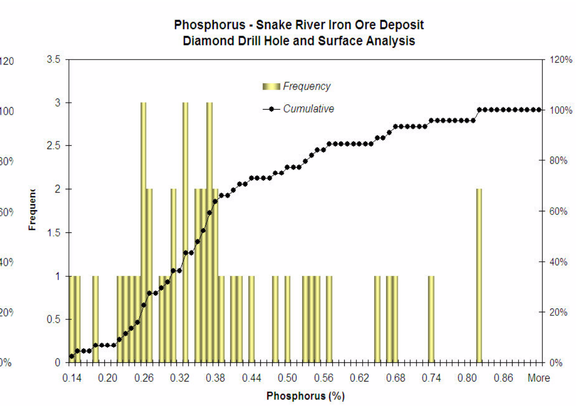

ANALYSES OF IRON CREEK ORE ZONES
DIAMOND DRILL HOLE Y - 15
CHEMICAL ANALYSES
SEMI - QUANTITATIVE SPECTROGRAPHIC ANALYSES
ZONE
SAMPLE
ACID SOL. Fe
ACID INSOL.
TOTAL P
Al
Ba
B
Ca
Cr
Cu
Pb
Mg
Mn
Mo
Ni
Sn
HEMATITE
SHALE
SHALY CONGLOMERATE
CONGLOMERATE
SAND
NOTE: SPECTROGRAPHIC ANALYSES FOR Sb, As, Be, Bi, Cd, Co, Ga, Au, Nb, Ag, Sr, Ta, W, Zn ARE NOT SHOWN BECAUSE THEY WERE NOT DETECTED OR PRESENT ONLY IN "TRACE" AMOUNTS.
N.D. — NOT DETECTED
Tr. — TRACE AMOUNT

The mineral variability for Total Iron and Phosphorus is shown in the following figure *(Data from Section F of the Crest Summary Report - Reserves and Grades)*









The statistical analysis of the data gathered during sampling of the iron ore deposit shows high variability of Phosphorus content. The decrease in phosphorus grade with depth is present with each sample. The table below shows the variability of total iron and phosphorus in the ore and waste material that was analyzed.

	ORE				WASTE			
ZONE	**Total Iron Fe(%)**		**Phosphorus (P)**		**Total Iron Fe(%)**		**Phosphorus (P)**	
	DDH	**SURFACE**	**DDH**	**SURFACE**	**DDH**	**SURFACE**	**DDH**	**SURFACE**
AVG	**41.44**	**44.63**	**0.42**	**0.39**	**19.43**	**17.89**	**0.22**	**0.22**
MIN	**28.75**	**40.45**	**0.23**	**0.15**	**8.68**	**8.72**	**0.13**	**0.10**
MAX	**46.50**	**48.82**	**0.82**	**0.82**	**27.93**	**28.88**	**0.49**	**0.50**
RANGE	**5.06**	**4.19**	**0.40**	**0.43**	**8.50**	**10.99**	**0.27**	**0.28**
STDV	***4.45***	***2.31***	***0.16***	***0.18***	***5.07***	***4.88***	***0.10***	***0.09***

Comment

According to the results of the program carried out in the 1960's, the reduction of the phosphorus content in the crude ore to achieve concentrate levels acceptable for the market was not possible with conventional beneficiation methods at the time. In our investigation we found an integrated steel complex with an operating mine, concentration, slurry pipeline transportation, pellet plant, blast furnace, BOF, continuous casting, rolling and finishing plant, using iron ore with some very similar characteristics to those reported for Snake River. The following table provides a simple comparison:

HEAD CHEMICAL ANALYSIS OF IRON ORE COMPOSITE

PLANT	SNAKE RIVER (*)	REFERENCE PLANT		
		PAST	CURRENT (2000 - 2006)	
IRON ORE TYPE	SPECULAR HEMATITE	SPECULAR HEMATITE	MAGNETITE	HEMATITE (**)
Total Iron (%Fe)	46.67	43.00	50.00	57.00
Silica (%SiO2)	24.55	16.80	15.00	5.00
Phosphorus (%P)	**0.37**	**0.30**	**0.30**	**0.70**
Sulphur (%S)	0.01			

*Referenced to Canadian Bechtel Limited, 1963

** The reference plant was initially mining specular hematite, and the ore body has changed to a magnetite/hematite mix

Based on the results of the table, Hatch believes that the possibility of increasing the total iron content of the Snake River iron ore in beneficiation (through silica and phosphorus reduction) should be evaluated. Modern and standardised metallurgical laboratory procedures, advances in chemical products for flotation and new operating practices for liberation applied industrially give enormous opportunity to improve the final concentrate quality.

The iron ore mined at the reference plant has changed over time. This plant was operating with specular hematite with similar grindability to Snake River iron ore and recently the ore body has mined magnetite with high Phosphorus content. Additionally, the reference plant was operating using open pit methods and is now simultaneously using underground methods.

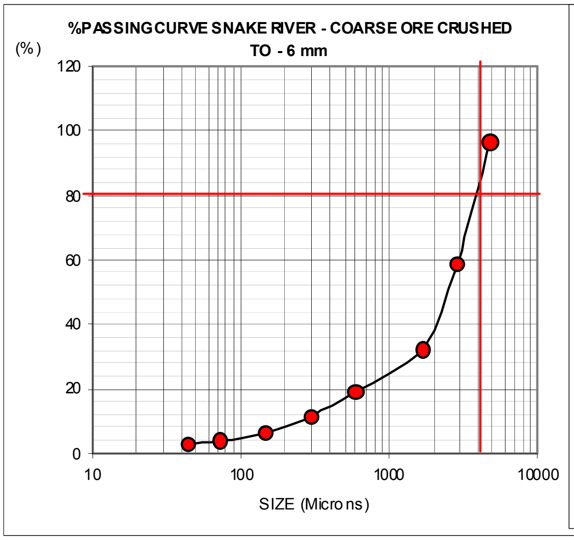
Iron Ore Size Distribution (Coarse Ore)

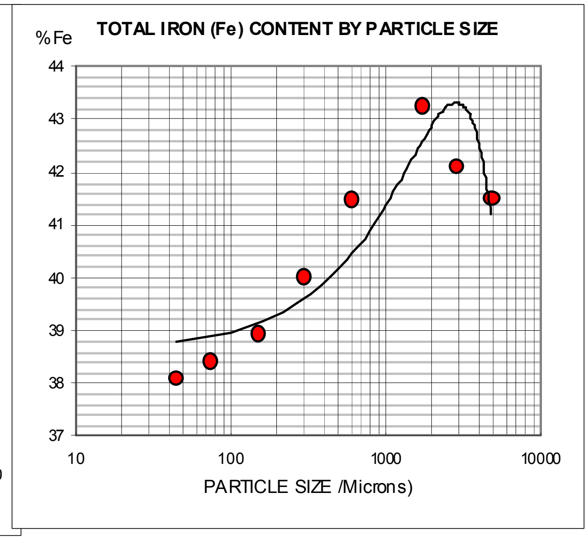
The size of the crude ore was analyzed in previous reports to anticipate crushing or grinding operations and evaluate the amenability of the ore to beneficiation. The size analysis was performed on material from the channel IF127-63.

METALLURGICAL BALANCE - SIZE ANALYSIS - CHANNEL SAMPLE IF127-63

				GRADE (%)			CONTENT			DISTRIBUTION (%)		
MESH	Microns	%	%Passing	Fe	P	SiO2	Fe	P	SiO2	Fe	P	SiO2
+4	4760	3.49	96.51	41.53	0.41	29.58	145	1.43	103	3.47	4.31	3.36
+8	2840	37.84	58.67	42.13	0.308	31.88	1594	11.65	1206	38.14	35.10	39.28
+14	1690	26.32	32.35	43.26	0.303	28.8	1139	7.97	758	27.24	24.02	24.68
+28	595	13.18	19.17	41.51	0.354	31.08	547	4.67	410	13.09	14.05	13.34
+48	297	7.76	11.41	40.01	0.352	30.92	310	2.73	240	7.43	8.23	7.81
+100	149	5.03	6.38	38.95	0.369	32.76	196	1.86	165	4.69	5.59	5.37
+200	74	2.42	3.96	38.44	0.394	32.76	93	0.95	79	2.23	2.87	2.58
+325	44	1.07	2.89	38.1	0.41	31.7	41	0.44	34	0.98	1.32	1.10
-325	-44	2.89		39.81	0.519	26.3	115	1.50	76	2.75	4.52	2.47
TOTALS		100					4180	33	3071			
				AVERAGE GRADE			**41.80%**	**0.33%**	**30.71%**			

The percentage of minus 200 mesh (-74microns) produced during the coarse crushing was 3.96% this fine material is referred as slimes, IF the fraction -200 mesh is lost, this would reduce the iron recovery to about 96%. Today, we are better able to recover the iron in fines than what was possible in the 1960's.





Iron Ore Grindability

The grind-ability test for Snake River iron ore was performed according to the standard Bond grind-ability Test. This evaluation determines the "hardness" of the material, the value is frequently used to quantify the energy required to grind the iron ore.

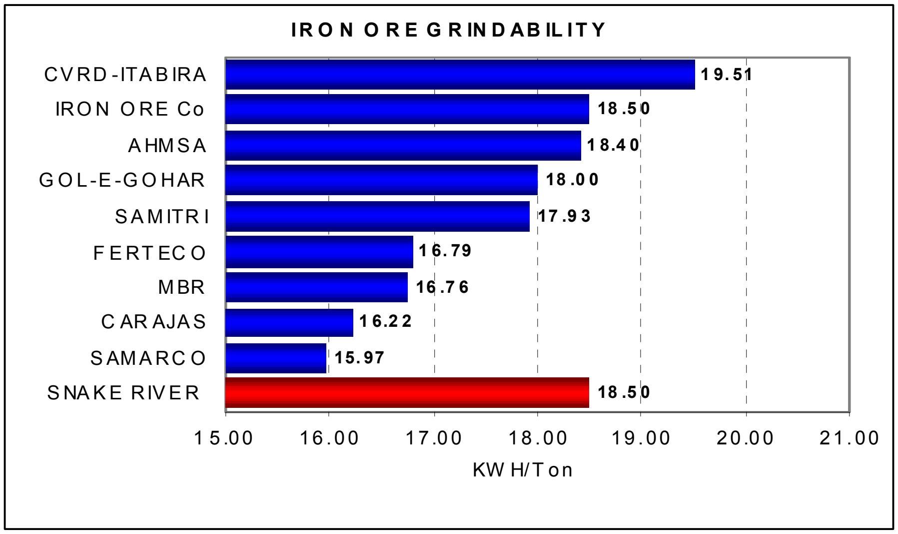
The work index values obtained are relatively high compared to those published for other ores as indicated in the following table:

	Wi
Snake River ore	19 - 25
Other iron ores	
Hematite	12.7
Specular hematite	15.4
Limonite	8.5
Magnetite	10.2
Taconite	14.9
Copper porphyry	10.5
Gold quartz	15

In another section a Wi value of 18.5 is reported, which is more in line with this type of ore.

If we assume that the 18.5 value is correct, the grindability of Snake River iron ore is similar to Specular Hematite of Canadian ores at IOC and Brazilian Itabarite (CVRD).

The following table from our data base shows the grindability of iron ores from Brazil, Canada, Mexico and Iran:



The grindability (Work Bond Index) gives an indication of the iron ore productivity in the grinding process, assuming that a ball mill has 3200 KW available; the production level potential for each material is as follows (assumed Snake River iron ore value):

IRON ORE	KWH/Ton	TPH
SNAKE RIVER	18.50	173
SAMARCO	15.97	200
CARAJAS	16.22	197
MBR	16.76	191
FERTECO	16.79	191
SAMITRI	17.93	178
GOL-E-GOHAR	18.00	178
AHMSA	18.40	174
IRON ORE Co	18.50	173
CVRD-ITABIRA	19.51	164

Expected productivity of a mill processing Snake River iron ore (based on assumed grindability value for Snake River) is very similar to Canadian and Brazilian (CVRD Itabira) pellet producers.

Comment:

The mineral has (3) three characteristics regarding communition.

- The coarse material prepared for crushing and/or spiral classification indicated the fines generation (slimes), which can be better processed today than at the time of the testing.
- Grindability tests indicate that Snake River iron ore is a hard material that requires high energy consumption to achieve the particle size required for liberation and beneficiation.
- The particle size for pelletizing is dictated by Blaine surface area (cm2/gr), in conjunction with the particle size distribution, where 85% should be minus 325mesh (44mirons). Snake River iron ore should be tested with smaller particle size).

Careful attention must be given to the slimes production due to carbonates present. This should be confirmed through a new testing program.

Concentrate Chemistry

Previous testing showed the following chemistry for the concentrate after beneficiation of Snake River iron ore:

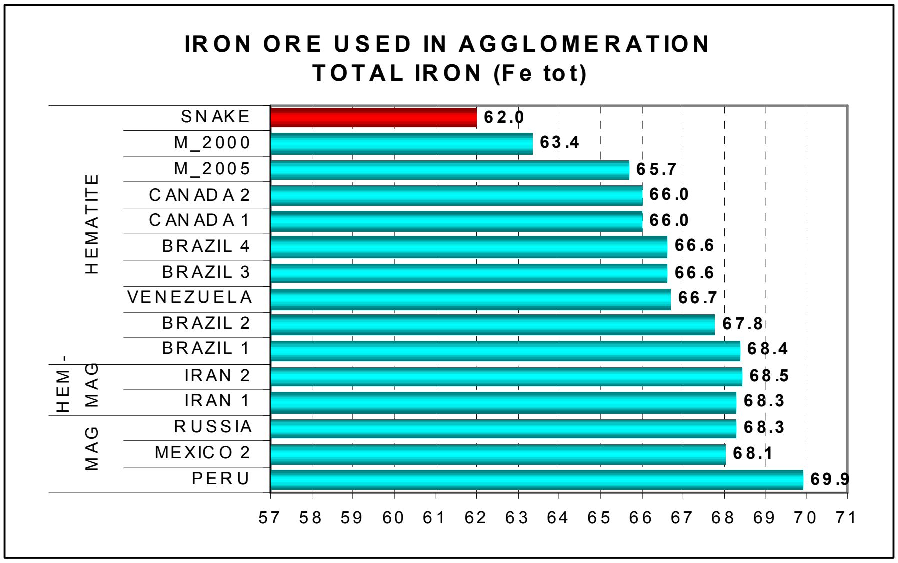
CONCENTRATE AFTER BENEFICIATION

PLANT	SNAKE RIVER (*)	REFERENCE PLANT		
		PAST	PRESENT	SPECIFICATION
Fe tot	**60 - 62**	**63.36**	**65.67**	**63 Min.**
Fe++		3.20	2.11	
Silica (%SiO2)	**5 - 10**	**4.25**	**2.85**	**3.0 - 4.5**
CaO		1.06	0.98	
MgO		0.37	0.42	
Al2O3		0.81	0.78	
Gangue		6.49	5.03	
Sulphur (S)		**0.14**	**0.10**	**0.20 Max.**
Phosphorus (%P)	**0.15 - 0.20**	**0.15**	**0.13**	**0.19 Max.**

*The Snake River values are based on the previous test work that was done. Hatch believes that there could be potential to improve these results using current methods of beneficiation, etc.

The following table and graph provide a comparison of the characteristics of iron ore concentrate used in pelletizing today, with examples of hematite, hematite-magnetite and magnetite ores. Potential values for Snake River iron ore are given, based on previous test results, benchmarking and theoretical calculations.

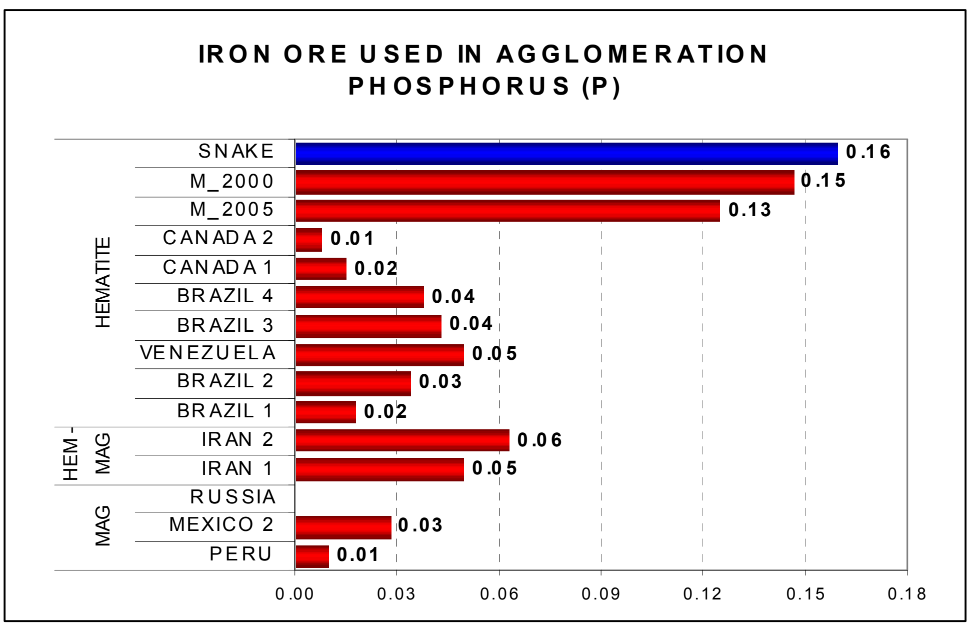
IRON ORE TYPE	COUNTRY	CHEMISTRY (%)				PELLET TYPE	CONSUMPTION	SIZE -325 Mesh (0.044mm)	BRAND OF IRON ORE
		Fe tot	SiO2	S	P				
MAG	PERU	69.90	1.42	0.140	0.010	DR	MARKET	70%	PELLET FEED
	MEXICO 2	68.05	2.32	0.270	0.028	DR	INTERNAL	83% - 400 Mesh	PELLET FEED
	RUSSIA	68.30	4.50	0.013		DR	INTERNAL		
HEM - MAG	IRAN 1	68.29	1.20	0.118	0.050	DR	INTERNAL	38%	FINES FOR RE-GRINDING
	IRAN 2	68.45	1.52	0.031	0.063	DR	INTERNAL	84%	PELLET FEED
HEMATITE	BRAZIL 1	68.40	1.10	0.003	0.018	BF - DR	MARKET	41%	FINES FOR RE-GRINDING
	BRAZIL 2	67.80	1.37	0.003	0.034	DR	MARKET	59%	FINES FOR RE-GRINDING
	VENEZUELA	66.71	1.05	0.015	0.050	DR	INTER - MARK	40%	FINES FOR RE-GRINDING
	BRAZIL 3	66.60	1.40	0.002	0.043	BF - DR	MARKET	80%	PELLET FEED
	BRAZIL 4	66.60	0.73	0.001	0.038	BF - DR	MARKET	66%	FINES FOR RE-GRINDING
	CANADA 1	66.00	4.90	0.005	0.015	BF	MARKET	68%	FINES FOR RE-GRINDING
	CANADA 2	66.00	4.50	0.003	0.008	BF	MARKET	40%	FINES FOR RE-GRINDING
	M_2005	65.67	2.85	0.098	0.125	BF	INTERNAL	80%	PELLET FEED
	M_2000	63.36	4.25	0.135	0.147	BF	INTERNAL	80%	PELLET FEED
	SNAKE (*)	**62.00**	**5 to 10**		**0.160**	**BF**	**MARKET**	**80%**	**PELLET FEED**



Usually magnetite and magnetite-hematite ores contain high total iron. Snake River iron ore has the lowest total iron in the comparison with hematite ores, due at least partly to the fact that the research completed in the 1960's did not have available current methods for concentration and beneficiation to reduce gangue and increase iron content.

The metallurgical analysis of Crest's testing report concludes that high iron recovery is obtained at high fineness. Once again, Hatch considers that there is an opportunity to remove impurities (P and SiO2) and at the same time improve iron ore (oxide pellets) reducibility.

The following figure provides a comparison of phosphorus content of iron ores currently used to produce blast furnace and direct reduction grade pellets with that of Snake River. The Canadian ores are after beneficiation.

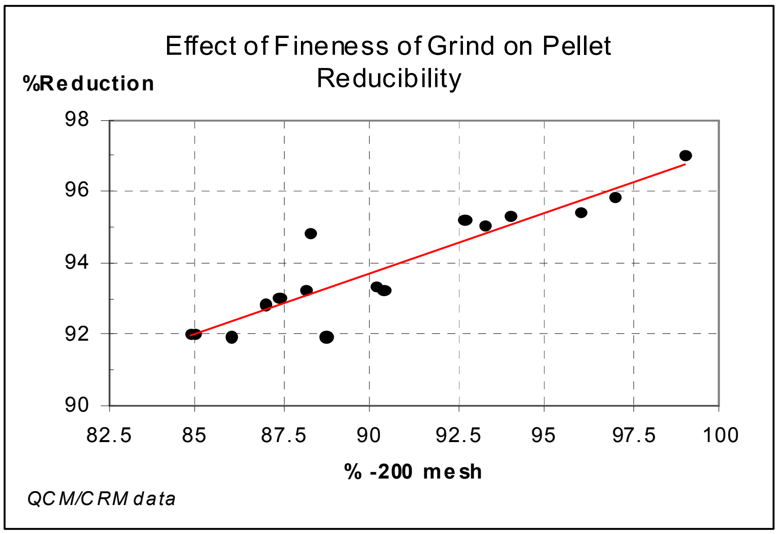


Low levels of phosphorus content are shown, particularly in the Brazilian concentrates, but also in Canadian concentrates, which are processed to remove impurities.

The plant M_2000, M_2005 (the reference plant that was referred to earlier) indicates the phosphorus content in years 2000 and 2005. This plant produces pellets for blast furnace with unusually high levels of phosphorus, approaching the levels reported at Snake River.

Concentrate Particle Size

Concentration plants today are working intensively to liberate impurities such as silica, phosphorus and sulphur and increase the iron content. They are able to more effectively process fine material than what was possible in the past. An additional benefit of fine grinding, aside from liberation, is improved metallurgical behaviour of pellets produced with smaller particle size for blast furnace or direct reduction processes. The figure below provides an example of the improved pelletizing with particle size reduction.



Materials with coarse particles are desirable to the market, and are mainly due to the high grade of the iron ore, high total iron and low content of impurities. That is the case with CVRD's Brazilian ores, which are suitable to produce any type of pellet by adjusting the final chemistry through the addition of fluxes normally limestone or dolomite those materials require a re-grinding process to achieve the particle size for required for pelletizing, approximately 80-85% minus 325mesh (44 microns).

Pellet feed is the common name for materials ready to agglomerate. Pellet feed is also known as filter cake, because it comes from the filtering step. Very few companies supply pellet feed for the market. Samarco in Brazil and Shougang in Peru are two companies that do supply pellet feed.

These companies offer this material because during the concentration process, they require a high degree of liberation to remove the gangue. The reduction of the particle size corresponds to the size required by their own pellet plants to produce pellets.

A percentage of the concentrate is used internally to produce pellets and the rest is sold to the market. Samarco currently has two machines (producing pellets) and a third is under construction, which will reduce (or maybe exhaust) what they supply to the market.

8.5 Blast Furnace Pellet Quality

There is not currently an international standard quality requirement for Direct Reduction processes Midrex and HYL.

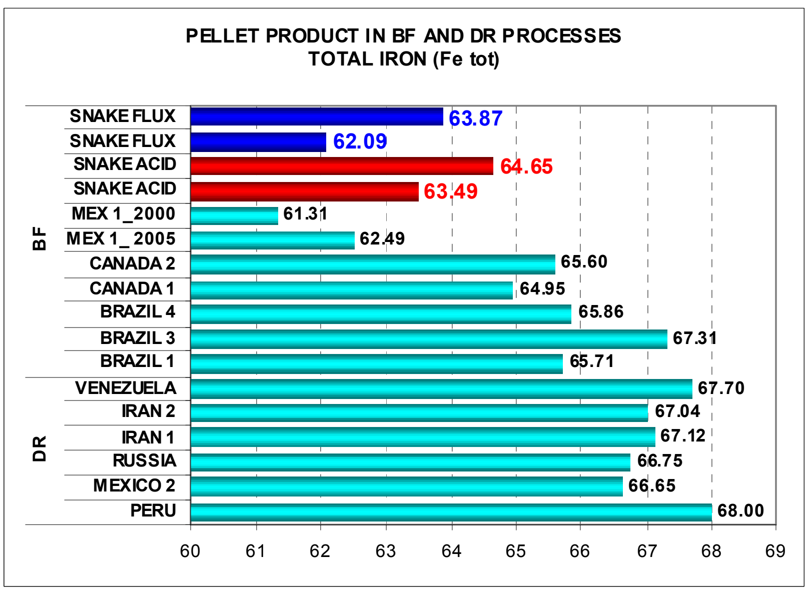
The specification for blast furnace operations is standard and varies according to the operating philosophy of the plant and raw materials available. Although there do exist some fundamentals that are required for good productivity in the blast furnace operation:

- Pellet Size
- Pellet Chemistry
- Physical Properties
- Metallurgical Quality

Pellet size is synonymous with permeability and is very important for pelletizing and blast furnace operations; the size structure is determined in the balling section when the green balls are introduced and the material is screened before being fed at the indurating process, making a pellet.

Pellet Chemistry

Hatch considers that although low chemical quality was obtained during the testing program in 1962-1965 on Snake iron ore, today it is potentially feasible to increase the total iron by reducing phosphorus and silica through modern processing techniques. (See technological routes for beneficiation)



The table above contains the pellet quality of various types of pellets, where the higher content of total iron is in DR pellets. In the section of BF pellets we include theoretical Snake River values with two scenarios and two iron ore qualities:

Acid pellet and basic flux pellet were calculated using the chemistry reported by the beneficiation studies (Fe = 62%, SiO_2 = 4%, P = 0.15%) and calculations considering the potential iron ore quality (Fe = 64.5%, SiO_2 = 2.90%, P = 0.8%).

The results obtained are as follows:

SNAKE	ACID			FLUX		
RIVER PELLET	EXP	POT	DIFF	EXP	POT	DIFF
%Fe	**63.49**	**64.65**	**1.17**	**62.09**	**63.87**	**1.78**
%SiO2	4.35	3.16	-1.19	4.29	3.14	-1.15
%CaO	2.36	2.01	-0.35	4.01	2.81	-1.20
%MgO	**1.24**	**1.21**	**-0.03**	**1.67**	**1.56**	**-0.11**
%Al2O3	1.09	1.07	-0.02	1.07	1.06	-0.01
%S	0.00	0.00	0.00	0.00	0.00	0.00
%P	**0.15**	**0.08**	**-0.07**	**0.15**	**0.08**	**-0.07**
B2 (CaO/SiO2)	0.54	0.63	0.09	0.94	0.90	-0.04
B4	0.66	0.76	0.10	1.06	1.04	-0.02
%GANGUE	9.04	7.45	-1.59	11.05	8.57	-2.47

Note: EXP = expected based on previous studies' results, POT = potential today

The potential values are based on previous report results, benchmarking and theoretical calculations and must be confirmed through additional testing.

For acid pellets, the binary basicity (CaO/SiO2) for acid pellet gives 0.54 and potential 0.63; in the case of flux pellets, the values were 0.94 and o.90 respectively.

A positive chemical fact-finding is the MgO content, with values from 1.21 to 1.67%.

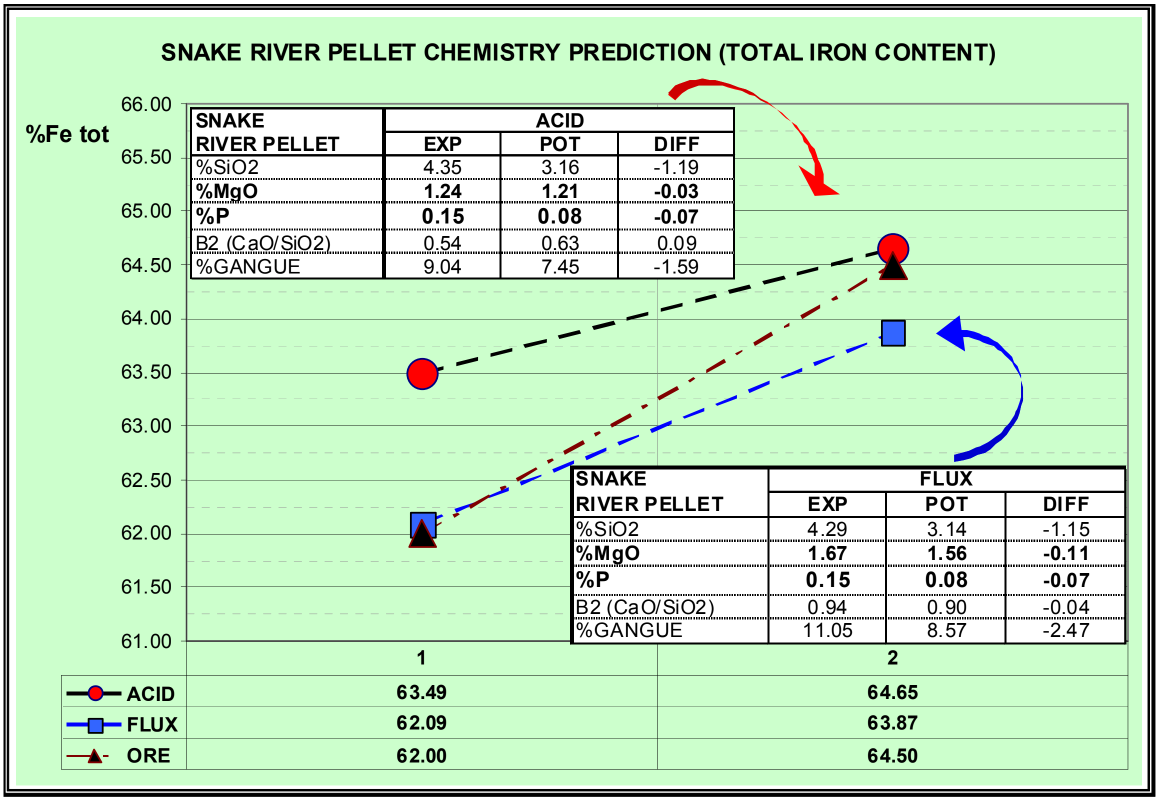
Essentially pellets with high content of MgO are produced with the main objective of increase the melting temperature of the slag phase and narrow melting interval, resulting in a comparatively small pressure drop over the reduction zone of the furnace, which allows for high production blast furnace rate and operational stability.

The MgO content in the pellet quality calculated for Snake River iron ore is encouraging, as the compound has a positive effect in the metallurgical behaviour of pellets.

Metallurgical Quality

- Reducibility: It has been demonstrated that the reducibility is associated with the grinding size (mentioned in particle size section) and solid fuel additions; in both cases when these variables are increased, the reducibility has increased also.
- Low Temperature Breakdown (LTB): To maintain the pellet bed permeability in the blast furnace, this variable has a strong influence combined with the physical properties of the pellet. Good results in physical quality are not strictly due to acceptable LTB.

The following figure summarizes Hatch's calculations and potential expectations of Snake River iron ore formulated for Blast Furnace Pellets:



8.6 Testing Technologies

8.6.1 Laboratory Test Work

Intensive, professional and high quality testing programs and investigation were conducted by laboratories that participated during the 30 months of exploration Sep 1962 to Feb 1965 - on Snake River ore characterization to evaluate the best procedure technological route to process and remove the impurities in the Snake River iron ore.

Laboratory	Investigation
Ontario Research Foundation in Toronto	Gravity concentration methods Roasting and magnetic separation
Humphreys Engineering Company of Denver, Colorado	Humphreys spiral concentrator
Mineral Process Division of the Department of Mines and Technical Survey	Gravity separation Flotation Roasting High intensity magnetic separation

The following list is a summary of the laboratory test assays:

- Metallurgical Petrology (Geology)
- Head Samples Analysis
- Grindability and Size Analysis

- Gravimetric Concentration
- Wet High Intensity Magnetic Separation (WIMS)
- High Tension Separation
- Froth Flotation
- Column Flotation
- Spherical Agglomeration
- Magnetic Reduction Roasting (Roasting Test)
- Direct Reduction

A metallurgical consultant, Dr. J. E. Lawver, Director of the University of Minnesota Mines Experiment Station was engaged to review experimentation results and assess the commercial potential of Snake River iron ore deposit.

Dr. Lawver's conclusions regarding the test work are as follows:

A. Liberation of coarse gangue at about 4mesh (4.76mm) will allow partial concentration by simple gravity methods

B. The hematite contains extremely fine silica so that a low silica concentrate can be obtained only after grinding to about 80% minus 325mesh (0.044mm = 44 microns))

C. The phosphorus minerals are associated with both the gangue and hematite. Complete liberation of the phosphorus minerals requires grinding about 500mesh (0.025mm = 25 microns)

D. The deposit is remarkably uniform in composition with the exception of the phosphorus grade which decreases with depth. Selective mining could be employed to take advantage of this feature

E. Direct reduction of gravity concentrate will produce high grade sponge iron with an acceptable phosphorus content

Hatch Comments:

1. Results: Total iron recovery was consistently low in the test results.

2. Conclusions Validation

Hatch agrees with the points A, B, C and D above, based on our practical experience producing blast furnace and direct reduction pellets with essentially all types of concentrates around the world.

3. Practical Cases highlighting process improvements

a) Hematite Blast Furnace Pellets

Blast furnace grade pellets are currently produced in an integrated steel complex, from specular hematite iron ore with similar content of phosphorus in the crude ore (P = 0.30%) to Snake River (P = 0.34%). Through optimization work in conventional flotation processes; the concentrate feed at the pellet plant contains approximately 0.13% phosphorus and produces pellets with the same level of phosphorus (0.13%) and total iron of 63% using the addition of fluxes for basicity control and binder for agglomeration.

b) Magnetite Direct Reduction Pellets

A mine, concentration plant and pellet plant is producing direct reduction grade pellets using magnetite ore, with a high content of sulphur and silica. Due to the amorphous formation of the ore, the liberation was difficult.

Recently the introduction of Verti-mills to the operation has increased the overall plant productivity. It is now producing pellets with extremely fine ground ore, controlling the grinding process with 75-80% minus 400mesh (0.037mm = 37 microns), when typically this variable is controlled in other plants with around 80% minus 325mesh (0.044mm = 44 microns). Five (5) vertimills are now planned for a concentration plant in Iran.

This plant is operating with a world class productivity level according to benchmarking with pellet plants producing DR grade pellets. The productivity has improved to 32t/m2/d from 28 or 29 t/m2/day, which is outstanding. This was possible because of the ability to work with very fine materials through the introduction of verti-mills.

NOTE: both plants have implemented rigorous controls on the mine to allow selected deposits in the stockyard to blend appropriately the material fed to the process.

8.7 Economic Analysis

In previous reports, an analysis of the potential of the Snake River project was completed; a summary of the results is as follows:

PRODUCT		Sinter Feed (*)	Pellets	Pellets (*)	Sponge Iron
PROCESS		Gravity	Gravity	Gravity	Jig Concentrate
			Flotation	Magnetic Roatsing	R-N* (Rotary Kiln)
	UNIT		Leaching		
Total Iron	%Fe	60.00	63.60	66.00	94.00
Silica	%SiO2	9.50	6.00	6.00	2.40
Phosphorus	%P	0.20	0.20	0.20	0.10
CAPITAL COST	$musd	109	272	287	264
COST	usd	9.89	15.13	16.29	24.47
PRICE	usd	10.50	15.90	15.85	40.00

(*) Products not attractive commercially at price

The recommendations of Dr. Lawver were:

A. The area should be considered in terms of producing partially reduced agglomerate as blast furnace burden or of producing a sponge iron product as a blast furnace supplement

B. No further test-work should be expended on efforts for conventional product

C. Direct reduction processes using natural gas should be studied and tests carried out on raw ore and gravity concentrates

D. The phosphorus level in the final product should receive primary attention. If an acceptable level cannot be attained the project should be dropped

Hatch Comments:

Costing

- We consider that the capital investment and operation costs calculated are not valid at this time because the market situation and improved processing will have an influence on the recommended process route.

Test-work

- Complete test-work should be done for conventional product Pellets. Hatch doesn't recommend producing a saleable concentrate; the concentrate will be used to produce pellets on site for the market; or potentially an integrated steel plant.
- Investigation of further processing with Hi-smelt technology should be considered.
- Testing at that time (1960's) did not offer hope for success. Today the situation is very different and the potential for success is better.

Laboratory Techniques

- Techniques such as roasting don't merit attention and should not be considered in any future testing; roasting is the reduction of hematite to magnetite at temperature in a reducing atmosphere. It is not required before straight grate pelletizing because we can effectively add carbon to produce artificial magnetite on the grate.
- Roasting may be relevant for grate kilns but not for new plants. The cost of making the grate in a grate kiln plant to process hematite is much less than building a magnetite roasting plant. We can add carbon to hematite for Grate Kiln plants, but it does not have the same power as adding it on a straight grate.
- Spherical Agglomeration Without industrial application
- Column Flotation. Experience has demonstrated that column cells for flotation have not performed well in North American iron ore production and they have been taken out of service.

8.8 Potential Process Technology Strategy

The following is a preliminary process technology strategy considered by Hatch. These concepts, and all calculations, will have to be re-evaluated after new testing is completed. The transportation route chosen here is based on discussions with the Yukon Government and their comments on likely routes for the Alaska Canada rail link currently being studied. There are other potential transportation routes, including locating the pellet plant in Dawson, that would have to be analyzed in the next steps of development.

8.8.1 *Process Basis Design*

Hatch agrees with the conclusions of the specialists that recommend in previous studies the importance of new testing. Metallurgical studies are strongly recommended to define the potential to minimize Snake River iron ore impurities, particularly the Phosphorus (P) content, and define with accuracy the process basis design of the technology selected

Hatch recommends the testing of new equipment available for particle size reduction such as the High Pressure Roller Press (HPRP) for primary grinding and Verti-mills for secondary grinding to liberate the iron oxide for subsequent flotation through new chemicals developed in this field

A complete testing program in a pilot plant, in addition to Beneficiation laboratory techniques, for Pelletizing is recommended, including filtration tests (Leaf-kit), agglomeration (Balling) and Pot-Grate, to define the process conditions to produce high quality fired pellets.

8.8.2 *Pellet Production Benchmarking*

A 7 MTPY complex with straight grate machines and producing pellets is considered as a potential configuration for a feasibility study. This level of production has been demonstrated by the following pellet plants in South America (Brazil) and in the Middle East (Iran):

Country	Company	Location	Start – Up	Grate Area	Capacity (MTPY)	
			Year	(m2)	Design	Actual
Brazil	Samarco I	Ponta Ubu	1977	704	5.00	6.60
Brazil	Samarco II	Ponta Ubu	1997	744	6.00	6.61
Iran	NISCO	Mobarakeh	1980	708	4.50	6.20
Brazil	CVRD-Sn Luis	Ponta Madeira	2002	768	6.00	6.23

The pellet plants of Brazil operate with their own concentrate (hematite ores).

Samarco sends the concentrate from Germano mine to Ponta Ubu through a slurry pipeline, where the pellets are produced and shipped. The San Luis pellet plant receives filter cake in Ponta Madeira from Carajas mines via railroad. Both plants produce DR and BF grade pellets for the international market.

Mobarakeh in Iran is an integrated steel complex. The pellet plant receives the concentrate (hematite magnetite ore) from two mines (Gol-E-Gohar for re-grinding and Chadermalu pellet feed for balling) via railroad, forming stockpiles to control the feed for production of direct reduction grade pellet for internal consumption. The fired pellet is fed to Midrex modules to produce sponge iron which is then transported to the steelmaking (EAF) plant, continuous casting, rolling and finishing.

8.8.3 *Production Basis for Potential Future Pre-Feasibility Study*

Based on Hatch's experience, a scenario is provided to be illustrative only. Optimization and metallurgical test work would have to be done to determine size and modules of pellets.

The production basis for mass balance calculations will be seven (7) million tonnes per year (MTPY) of fired pellets and a projected capacity of twenty eight (28) MTPY in the fourth phase.

This preliminary concept for production basis design considers four (4) phases to produce 28mtpy of pellets for blast furnace:

SNAKE RIVER'S PHASE	I	II	III	IV
MINE & CONC (MTPY)	14.00	14.00	28.00	28.00
PELLET (MTPY)	7.00	14.00	21.00	28.00

Phase I. Production of 7.0 MTPY of BF Pellets

- The concentrate will be transported by slurry pipeline from Iron Creek mine to the pellet plant that will be located at Carmacks, approximately 400 km from the mine facilities. The mine will have an initial capacity of 14MTPY concentrate.
- The pelletizing plant will have an initial capacity of 7.0 MTPY blast furnace grade pellets using Outokumpu (formerly Lurgi) or Kvaerner (formerly Davy) technologies straight grate machine with state-of-the-art instrumentation and automatic process controls.
- The most modern demonstrated technologies in concentration (roller press, vertimills, flotation etc) and in pelletizing (solid fuel, balling control for green pellets, double deck roller screen, deep bed, thermal profiles, etc) will be implemented to achieve the maximum productivity and the quality required by the international market.

Phase II. Production of 14.0 MTPY of BF Pellets.

- Erection and commissioning of the second line with design capacity of 7.0mtpy of blast furnace grade pellets.

Phase III. Production of 21.0 MTPY of BF Pellets.

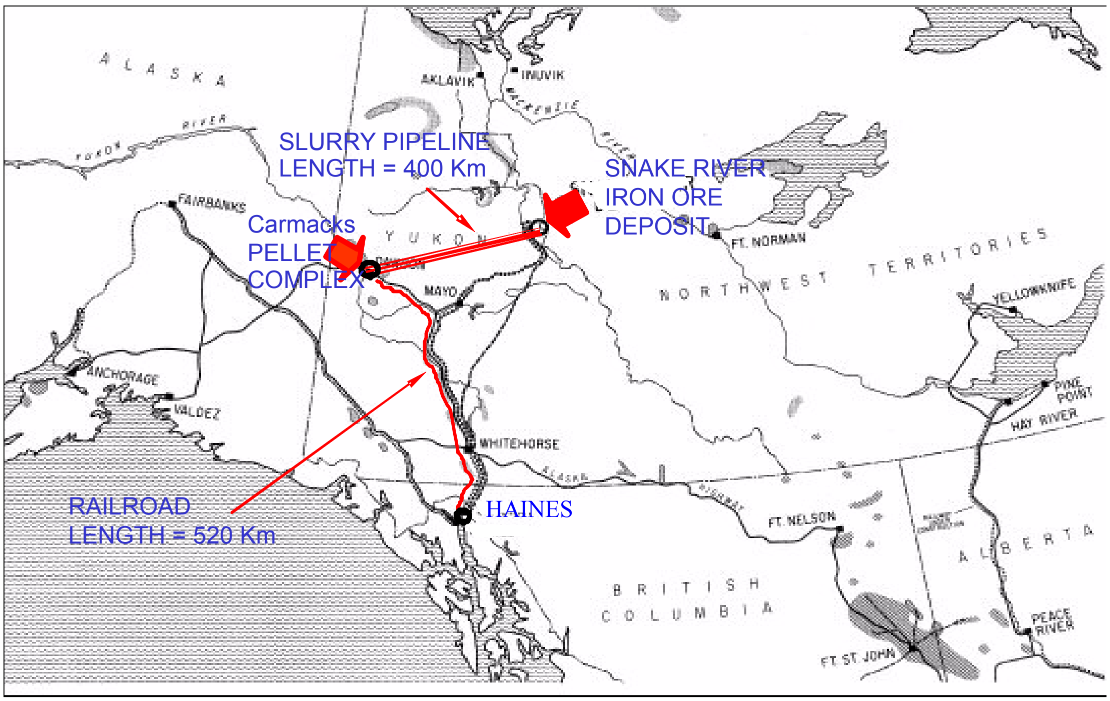
- Mine and concentration expansion project, new slurry pipeline, third line for pellets.

Phase IV. Production of 28.0 MTPY of BF Pellets.

- Erection and commissioning of the fourth line with design capacity of 7.0mtpy of blast furnace grade pellets.

8.8.4 Pellet Plant Complex Location

Due to the remote location of Snake River, it is expected the deposit would be mined and concentrated at the mine site, and the concentrated material could be transported to Carmacks (approximately 400km) via slurry pipeline. Dawson City could be an alternative location as could the mine site.



The pelletizing complex will be located at Carmacks where the material will be received in a concentrate thickener or Marcona tank to pump the material to slurry tanks to be processed for BF grade pellet production.

8.8.5 Process Route Operational Strategy

The Concentration and Pellet Plant operating strategy indicated below is proposed based on preliminary studies, plants operating with similar ore and according to requirements of the steel industry raw materials market, and is illustrative only. There are several potential transportation routes involving both rail and slurry pipeline that should be evaluated.

The objective of this approach is to orientate Hatch's technical expectations of Snake River iron ore.

The potential process routes suggested by Hatch as one possibility are the following (laboratory testing is required to finalize a process route):

Mine and Concentration (Possibility I)

Mine Iron Ore Homogenization Storage Yard Cone Crushing Screening Wet Autogenus Grinding Screening Classification (Cyclones) Primary Grinding Classification (Cyclones) Hydro-sizer Conditioner Tanks Primary Flotation Secondary Grinding (Vertimills) Secondary Flotation Concentrate Thickener Slurry Storage Slurry Transportation (Pipe-line) - Pelletizing

Mine and Concentration (Possibility II)

Mine Iron Ore Homogenization Storage Yard Cone Crushing Screening Wet Autogenus Grinding Screening Classification (Cyclones) Concentration Rougher Spiral Cleaner Spiral Re-cleaner Spirals Wet Primary Grinding Classification (Cyclones) Hydrosizer Conditioner Tanks Primary Flotation Secondary Wet Grinding (Spirals) Secondary Flotation Concentrate Thickener Slurry Storage Slurry Transportation (Pipe-line) - Pelletizing

Pelletizing Process

Filtering Balling Screening Indurating Product Handling Pellet Storage Yard Screening Shipment

8.9 Process Description

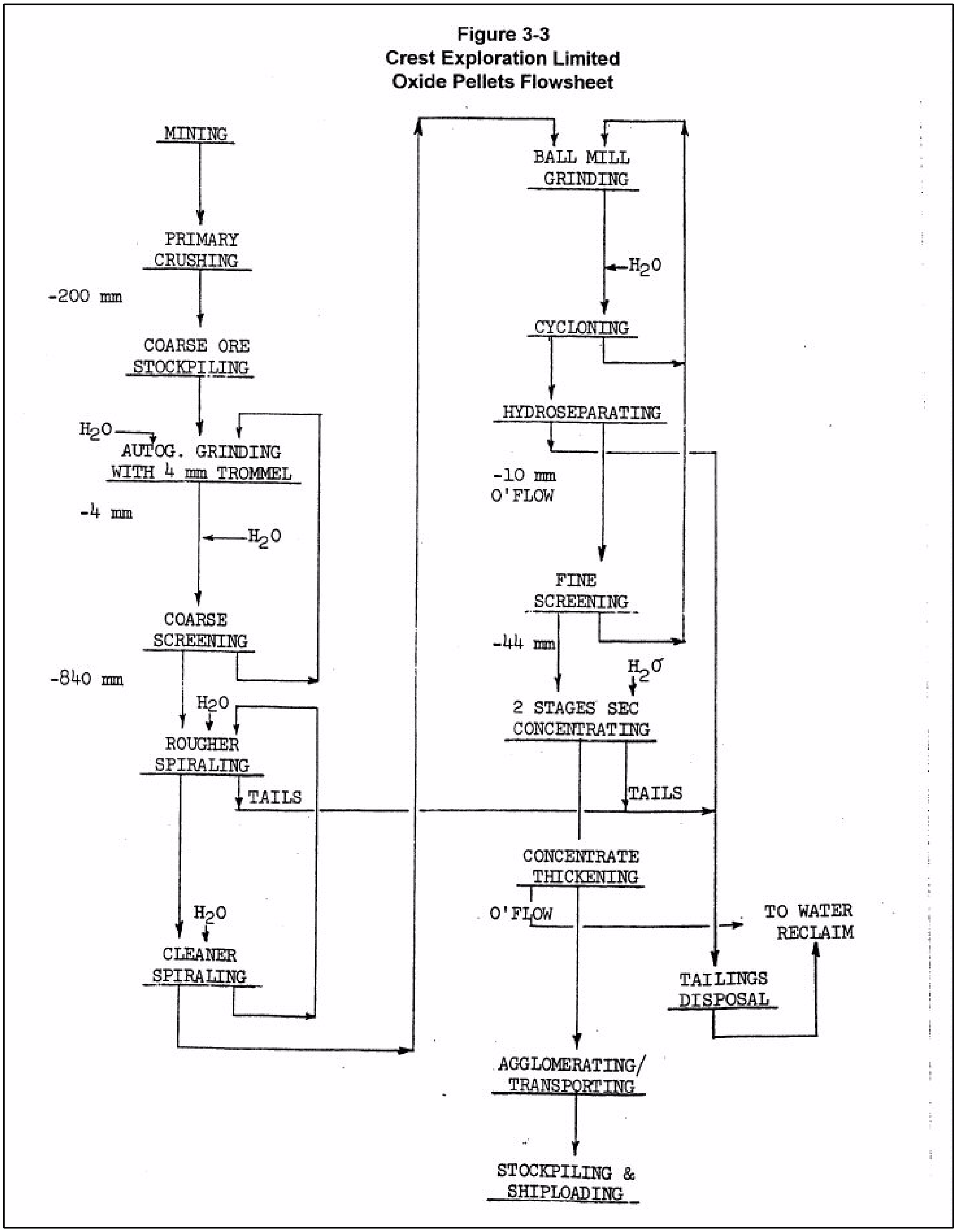
This section describes at a conceptual level processes that could be implemented after iron ore characterization has been defined by further lab-testing confirmation.

Hatch has considered some of the concepts described by Bechtel and Kaiser in their previous reports on Snake River. Simple process flow diagrams have been prepared taking into account the properties of the ore indicated in the reports.

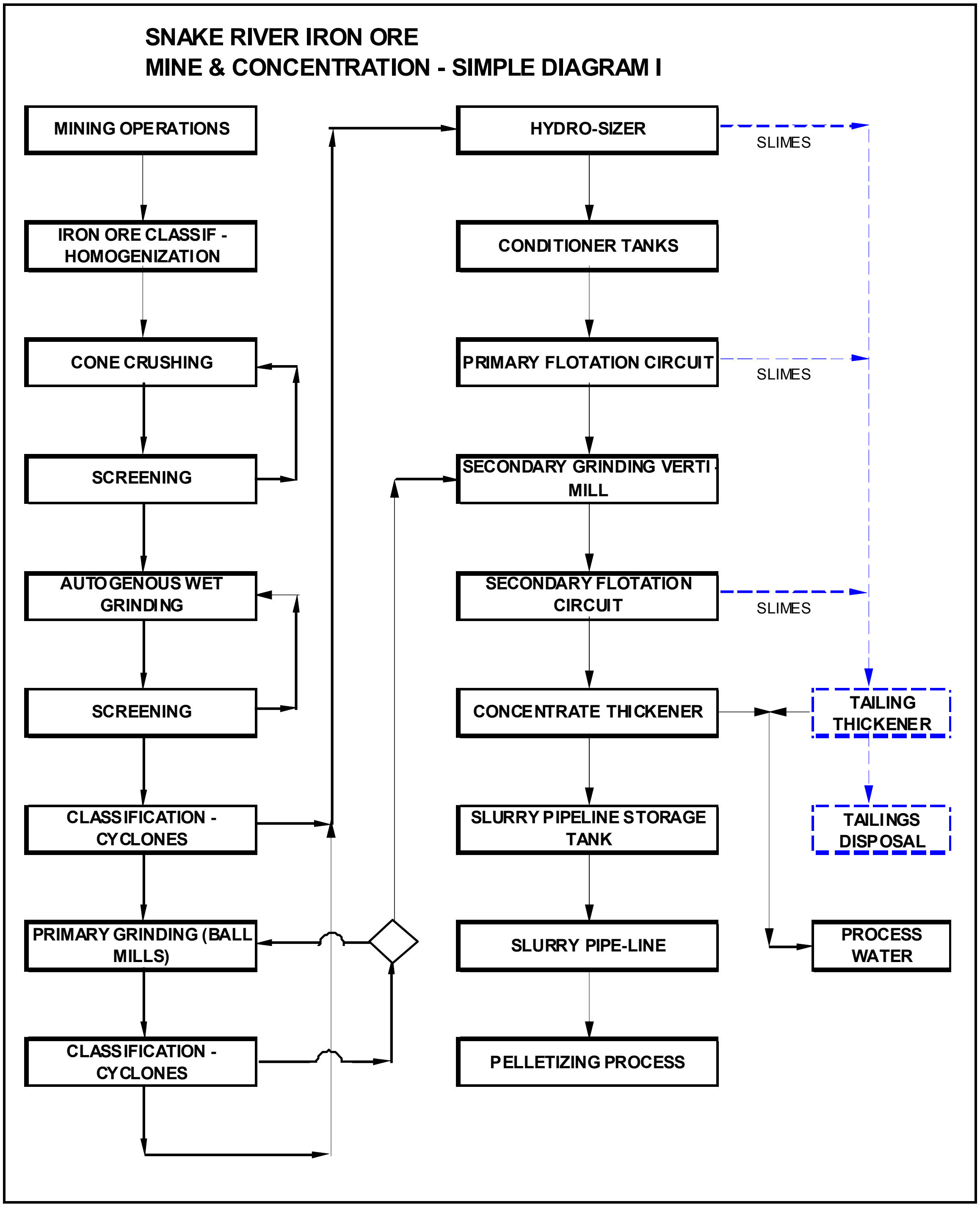
The flow sheet (Fig 3-3 from Kaiser's report shown below), prepared by Kaiser in their 1976 study is included only for comparison purposes with the possible operational strategies recommended by Hatch to be re-confirmed through pilot testing.

Hatch has prepared two (2) Simple Diagrams for potential Mine and Concentration routes and one (1) process route for Pelletizing.

Crest Exploration Process Route- Kaiser 1976



Snake River Mine and Concentration (Route I)



Mining and Concentration (Route I)

NOTES:

- Operational Philosophy. The description included is based in our expertise with similar materials.
- Process variables and tonnage. The particle size, iron content, impurity levels and equipment characteristics (production rate) will be fully defined after testing programs and basic engineering study(feasibility).

Mining

Snake River's production process begins with the mining operation. The raw material is basically specular hematite with an average iron content of 44%. Open pit operations at Iron Creek Mine are considered; the typical method is to drill a pre-determined pattern of holes, which are loaded with explosives and blasted.

The fragmented ore is transported to stockpiles classified according to ore characteristics high or low phosphorus, ore hardness or other criteria defined by geological metallurgical studies.

Primary Crushing

The ore extraction for loading and haulage will be performed with electric shovel, front loader, front end loader, and trucks to transport the iron ore to defined areas depending of ore characteristics (high phosphorus, low phosphorus, hard material, soft material, etc)

For the primary crushing the ore is fed at a closed circuit cone crusher in the pit; for the first reduction, the material is screened. The discharge is screened and the coarse ore returned to the cone crusher and material passing goes to the autogenus grinding mill.

Probably two steps of crushing will be required, depending on new testing results.

Autogenous Grinding

Wet closed circuit autogenous grinding receives the ore from the silo for further grinding, the mill discharge is screened; the oversize is returned for grinding, while the undersize is pumped for classification by cyclones. The coarse material (cyclone underflow) is discharged on a primary grinding mill and fines go to a hydro-sizer gravimetric separation.

Primary Grinding

A wet closed ball mill circuit is considered to reduce the particle size for liberation to approx 85% minus 200mesh, the ball mill discharge is classified with cyclones, the cyclone underflow is transported to secondary grinding and overflow is delivered to the hydrosizer.

Hydro-sizer

The hydrosizer will remove the slimes produced by autogenus and primary grinding by overflow to be discharged into the tailings thickener tank.

The underflow is transported to two (2) conditioner tanks to prepare the slurry for primary flotation.

Primary Flotation

Before flotation two (2) conditioner tanks are considered for floating reactive additions (depressor and collector). The circuit is inverse flotation to remove apatite ore (phosphorus) and quartz (silica).

Secondary Grinding

The discharge of the flotation cell and underflow from the cyclones of primary grinding is received by the secondary grinding that could be performed by a Verti mill, operating in closed circuit; the verti-mill will discharge for classification by cyclones; the underflow (coarse particles) is returned to the verti-mill and overflow (expected 75% minus 400 mesh) is delivered to the secondary flotation cells to remove as much as possible of the phosphorus and silica impurities.

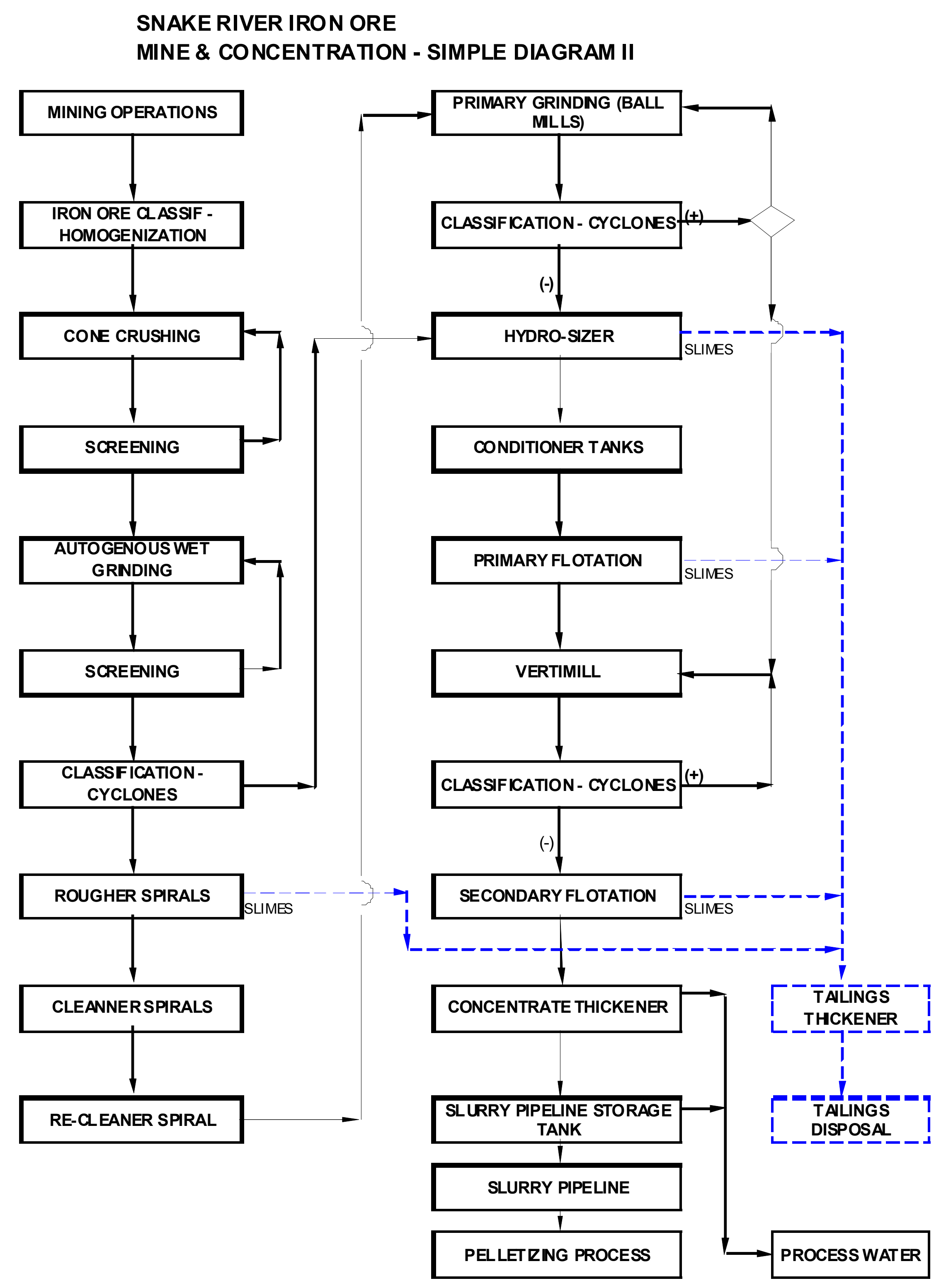
Secondary Flotation

Before the secondary flotation step, one (1) conditioner tank is considered for chemical adjustments of the depressor and collector. Slimes and gangue are delivered to the tailing tank for disposal. The concentrate, with 65% minimum total iron is delivered to the concentrate thickener tank.

Concentrate Thickener

The concentrate thickener will adjust the slurry density of a concentrate with an expected Fe of 65% and low level of impurities ($P << 0.1\%$) to be pumped to a slurry storage tank and transported to the Carmacks pellet complex through the slurry pipeline.

Snake River Mine and Concentration (Route II)



Mining and Concentration (Route II)

NOTES:

- Operational Philosophy. The description included is based on our expertise with similar materials.
- Process variables and tonnage. The particle size, iron content, impurity levels and equipment characteristics will be fully defined after testing program and basic engineering study (feasibility).

Mining

Snake River's production process begins with the mining operation. The raw material is basically specular hematite with an average iron content of 44%. Open pit operations at Iron Creek Mine are considered; the typical method is to drill a pre-determined pattern of holes, which are loaded with explosives and blasted.

The fragmented ore is transported to stockpiles classified according to ore characteristics high or low phosphorus, ore hardness or other criteria defined by geological metallurgical studies.

Primary Crushing

The ore extraction for loading and haulage will be performed with electric shovel, front loader, front end loader, and trucks to transport the iron ore to defined areas depending on ore characteristics (high phosphorus, low phosphorus, hard material, soft material, etc).

For the primary crushing the ore is fed at a closed circuit cone crusher in the pit; for the first reduction, the material is screened. The discharge is screened and the coarse ore returned to the cone crusher and the material passing goes to the autogenus grinding mill.

Probably two steps of crushing will be required, depending on new testing results.

Autogenous Grinding

Wet closed circuit autogenous grinding receives the ore from the silo for further grinding, the mill discharge is screened; the oversize is returned for grinding, while the undersize is pumped for classification by cyclones. The coarse material (cyclone underflow) is discharged on a primary grinding mill and fines go to the hydro-sizer for gravimetric separation.

Spiral Concentration

For primary concentration a series of spirals are considered for gravity separation, Rougher and Cleaner. From Rougher spirals, slimes are delivered to the tailings thickener.

The product of the spirals is transported to a primary grinding closed circuit.

Primary Grinding

A wet closed ball mill circuit is considered to reduce that particle size for liberation to approx 85% minus 200mesh, the ball mill discharge is classified by cyclones, the cyclone underflow is transported to secondary grinding and overflow is delivered to the hydrosizer.

Hydro-sizer

The hydrosizer will remove the slimes produced by autogenus and primary grinding by overflow to be discharged in to tailings thickener.

The underflow is transported to two (2) conditioner tanks to prepare the slurry for primary flotation.

Primary Flotation

Before flotation two (2) conditioner tanks are considered for floating reactive additions (depressor and collector). The circuit is inverse flotation to remove apatite ore (phosphorus) and quartz (silica).

Secondary Grinding

The discharge of the flotation cell and underflow from the cyclones of primary grinding is received by the secondary grinding that could be performed by a Verti mill, operating in closed circuit; the verti-mill will discharge for classification by cyclones; the underflow (coarse particles) is returned to the verti-mill and overflow (expected 75% minus 400 mesh) is delivered to the secondary flotation cells to remove as much as possible of the phosphorus and silica impurities.

Secondary Flotation

Before the secondary flotation step, one (1) conditioner tank is considered for chemical adjustments of the depressor and collector. Slimes and gangue are delivered to the tailing tank for disposal. The concentrate, with 65% minimum total iron is delivered to the concentrate thickener tank.

Concentrate Thickener

The concentrate thickener will adjust the slurry density of a concentrate with an expected Fe of 65% and low level of impurities ($P << 0.1\%$) to be pumped to a slurry storage tank and transported to the Dawson pellet complex through the slurry pipeline.

Concentrate Handling

Slurry Transportation

Special attention was paid to slurry handling during the engineering and costing work performed by Bechtel for Crest Exploration.

One of Bechtel's primary concerns in the 1960's, along with finding an economic method for beneficiation, was the transportation cost and where they might find savings. An Engineering study was carried out on this matter:

On the potential for slurry pipeline transportation of iron ore, the report noted "if the method proves to be practical, considerable savings in transportation cost could be made"

Today, slurry pipelines are a proven technology for transportation of iron ore. Successful pellet plant producers for the international market and captive plants producing pellets for internal use are using slurry pipelines to transport concentrate. The following are examples of slurry pipelines currently in use.

Pellet Plant	Iron Ore	Pellet Type	Destination	Final Product	Capacity MTPY	*Pipe-line (Km)*
Samarco (Brazil)	Hematite	BF & DR (HYL & Midrex)	Merchant	Pellets	13.70	***396***
Ahmsa (Mexico)	Hem – 70% Mag – 30%	BF	Captive	Steel	4.00	***382***
Peña (Mexico)	Magnetite	DR (HYL)	Captive	Slabs	3.84	***46***
Hy-Grade (India)	Hematite	BF & DR Grades	Merchant	Pellets	3.00	***270***

Brazil's existing slurry pipeline (See Appendix D) stretches 396 km. A $25 million investment made to modify the pumping system in 2005 was effective.

Currently Samarco has under construction a second 396km slurry pipe-line with 8 MTPY capacity and improvements in the mine operation to match the pellet production, a third 7.0 MTPY pellet plant, beneficiation and port facilities are part of an expansion plan which should raise its capacity to 24 MTPY of iron ore, including 21 MTPY of pellets and 2 MTPY fines, by the second-half 2007.

The pipeline reduces the cost of transporting the ore from the mines to the pellet plant to around 1:4 ratio in USD/Ton compared with local rail freight costs.

Similar technology can potentially be implemented for Snake River (See Annex "Slurry Pipeline").

Snake River Pellet Plant Concept

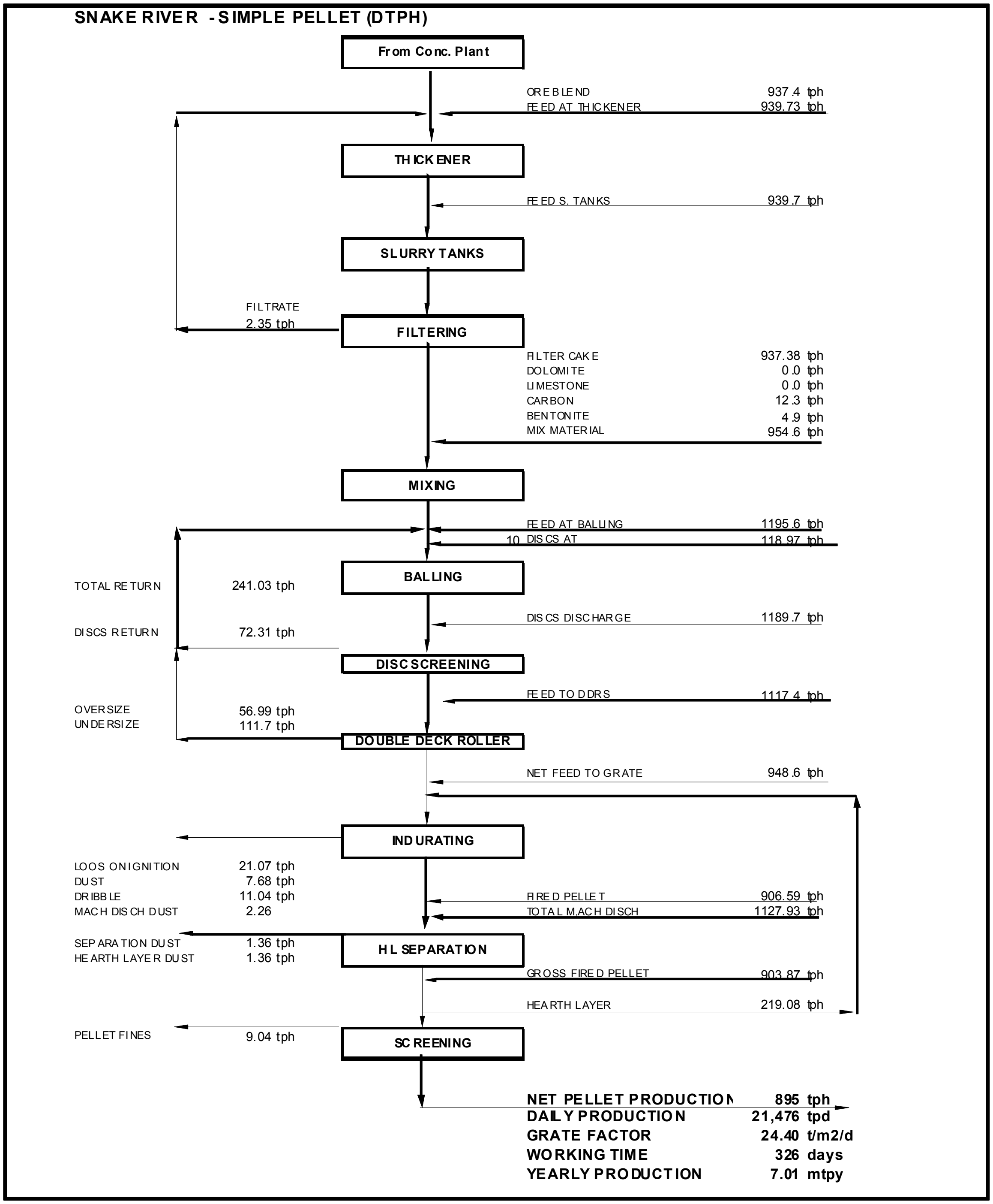
The pelletzing complex would located at Carmacks, where four (4) straight grate machines with Lurgi or Lurgi-Dravo technologies can be operated to produce 28mtpy of blast furnace grade pellets. The concept considers one (1) line with capacity to produce 7mtpy. The description defines the highly feasible process criteria for a pellet plant operating 326 days per year with a production rate of 895tph (21,476tpd).

The conceptual plant facilities include:

- Slurry Storage and Handling
- Vacuum Filtering
- Mixing
- Balling
- Indurating
- Product Handling

The following is a simple diagram of the conceptual pelletizing technology (See Appendix E).

Snake River Pelletizing Plant Concept for BF Acid Pellet



Process Description

The potential production of BF pellets from Snake River iron ore concentrate involves the following process steps:

- Dewatering for proper moisture content
- Mixing to achieve a homogeneous blend
- Balling to obtain suitable sized pellets
- Indurating to adequately harden the pellets

The steps are part of a continuous process. The slurry is received from slurry pipeline which discharges to a concentrate thickener or Marcona tank.

The slurry is pumped to slurry storage tanks, consisting of three (3) tanks in series. The slurry density must be controlled (usually 68% solids). From the slurry tanks, the concentrate is pumped to dewatering a stage (filtering) to produce a filter cake with controlled moisture (typically 8.5-9.0%).

The filter cake is conveyed to the mixing station, for homogeneous blending with fluxes (limestone, dolomite), silo fuel (coke) and binder (bentonite), depending the type of pellet to be produced, flux or acid.

The blending is accomplished by means of intensive mechanical mixing in horizontal shaft mixers, which ensures that the resultant mix will yield pellets having the required physical wet strength characteristics to withstand the subsequent processing steps.

The mixed material is transported to the balling section, where the material is fed to rotating discs to produce agglomerates called green pellets. Control of size is important to ensure uniform heat treatment in indurating, the last step of the process.

NOTES:

The process variables will be defined in the pilot pant testing for Pelletizing.

Strict control of parameters at each step is necessary to ensure that the following step can perform its part of the continuous process of producing a high quality product for the blast furnaces.

Slurry Handling

The slurry handling facility consists of the three cylindrical open top slurry storage tanks typically about 15.2 m high by 15.2 m diameter equipped with agitators.

The slurry arriving from the concentration plant through slurry pipeline is received in the elevated primary distributor.

Filtering

The dewatering process takes place in the filtering area of the plant.

The variable speed filter feed slurry pump draws the slurry from either storage tank No. 2 or No. 3 (normally No 3) and pumps it into the common pipeline, feeding a pressure distributor in the filtering area.

Density of the slurry being feed to the pressure distributor is usually controlled at 78%. At the filter, the slurry is fed into an agitated filter tank to ensure that the solids remain in suspension.

Rotating filter discs, covered with filtering media (filter cloth) are submerged in the slurry, at which time a vacuum is applied through the filter cloth causing the solids to be retained on the cloth while the water (filtrate) is drawn through.

It is important at this step in the process that the dewatering is completed, to give optimum moisture (8.5% to 9.0%), for the next steps of mixing and balling.

Moisture content of the filter cake is affected mainly by the density of the slurry, fineness of the particles of iron ore in the slurry, blaine surface area of the particles, the rotating speed of the filter disc, and the measure of the vacuum applied.

A total of ten (10) filters are considered, along with the auxiliary systems of ten (10) vacuum pumps and six (6) snap blow compressors. One in each set functions as a spare.

Mixing

Filter cake discharged from the two banks of the disc filters is collected on the two collecting conveyors.

Filter cake is drawn from the two storage bins by variable speed feed conveyors and conveyed to the mixer feed bin in the mixing building by conveyors.

Ground bentonite, fluxes and coke are pneumatically conveyed to the day bin for each material in the mixing building from the ground additive area.

The mix material is sent to mixer feed conveyors and conveyed to any two (2) of the three (3) intensive mixers.

The blended filter cake is discharged from the mixers onto a conveyor and transported to the balling feed bins.

Balling

In order to obtain an end product of good quality fired pellets, it is necessary to have uniformly sized, adequately strong green balls. The balling disc is the mechanical means of forming these agglomerates. A feed mix of finely ground filter cake fluxes and moisture, and binder, combine in a rolling action of the disc to form these green balls.

The filter cake mixture received from the mixing area is deposited in the ten (10) balling feed bins, from the transporting conveyor.

Further iron ore addition, rolling in the disc causes the seeds to grow. The rate of growth of the green balls can be controlled by the disc speed and the addition of spray water as necessary.

The operator-controlled parameters, which govern the balling operation, are primarily feed moisture, disc speed, and feed rate. Additional parameters usually determined at start-up are disc angle, the point at which feed is introduced to the disc, plow location, and water spray location. Ore size structure, blaine particle surface area, and level of binder additive is also important factors for quality balling feed.

Indurating

The on-size green pellets from the balling section are heat hardened on the indurating machine.

The roller conveyor will screen out oversize and undersize material; the green balls that pass through the upper and over the lower deck of the roller conveyor are discharged onto the travelling grate indurating machine.

Control of the bed depth of the green pellets on the indurating grate will be accomplished by modifying the grate speed through the variable frequency AC drives.

For efficient operation, the machine should be run at full tonnage.

The travelling grate carries the pellets through the indurating furnace where they are subjected to the sequential zones for thermal treatment:

- Updraft drying
- Downdraft drying
- Preheating
- Firing
- After firing,
- First cooling zone
- Second cooling zone

The process time (machine length) for each zone is determined experimentally via pot grate testing (Laboratory testing), for design of firing patterns and process parameters.

Product Handling

The fired pellets are discharged from the indurating machine with controlled temperature. The material is transported to the product storage yard via belt conveyors sequence.

9. Transportation and Infrastructure

Previous studies analyzed both slurry pipeline and rail as potential transportation options. In Hatch's review, a conceptual process route includes both slurry pipeline for transporting concentrate to Carmacks or Dawson city where a pellet plant complex could be located, and rail to transport pellets to the Port. The economics of transporting pellets from Carmacks to the Haines or Anchorage Port will be influenced heavily by the decisions made on the Alaska Canada Rail Link. The Crest mine site is another potential location for the pellet plant complex, which offers the advantage of being close to local coal deposits. Another potential location for a pellet plant complex would be the port chosen for development.

Transportation route alternatives would have to be analyzed after decisions are made with regard to the Alaska Canada Rail Link (see below) and further testing of the ore is completed to define a process basis design.

Alaska Canada Rail Link

Alaska Canada Rail Link is conducting a study into the feasibility of a rail link connecting the Alaska Railroad to the North American rail system in Canada. A primary purpose of a rail link would be to improve the economics of developing the extensive resource deposits in Alaska, Yukon, and British Columbia.

A rail line with a linking point at Carmacks, Yukon is being investigated. Carmacks is approximately 400 km from the Snake River site (see Figure 2.1 for a map of the area), and would become a potential site for a pelletizing plant if a rail link was there.

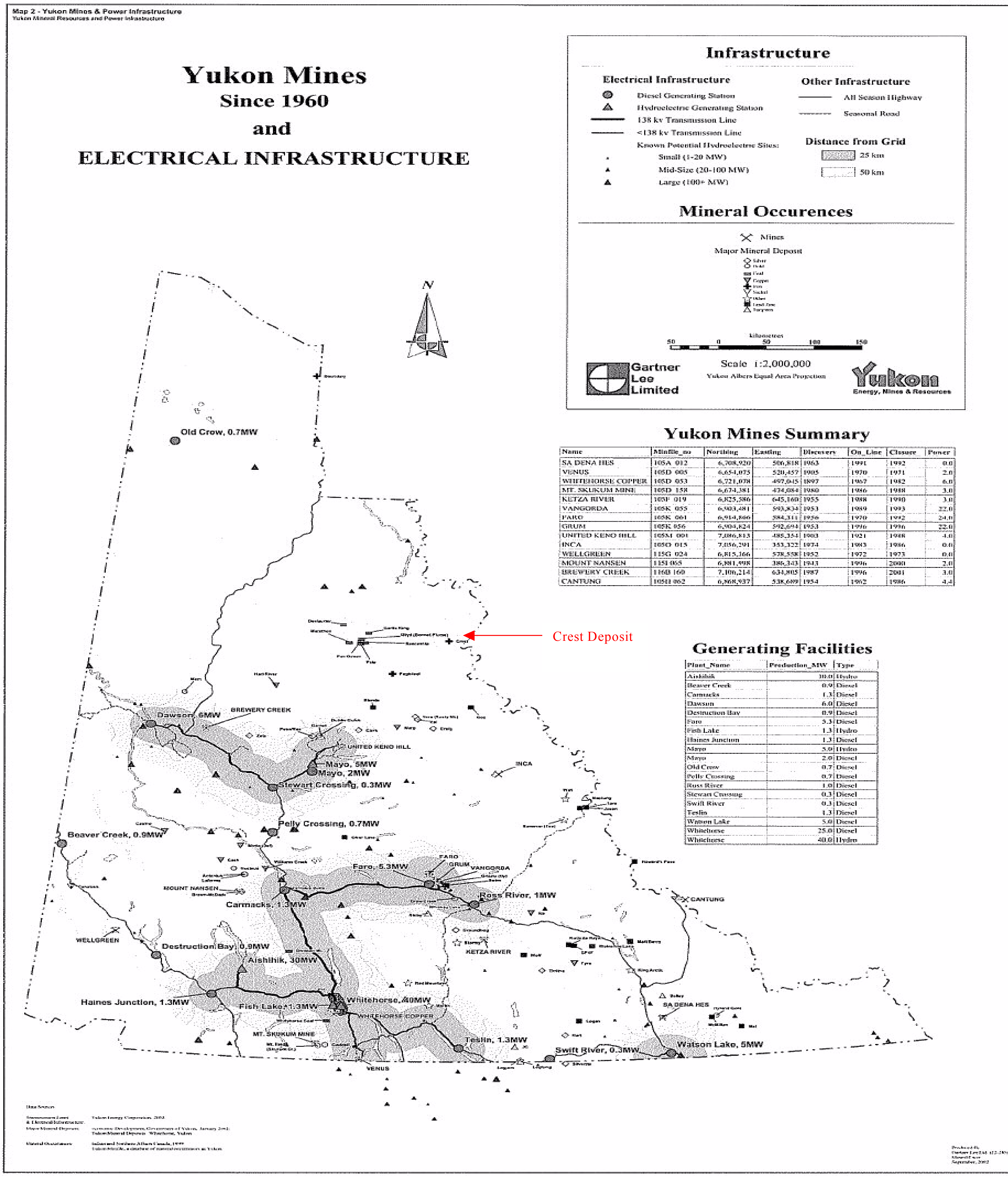
The study is being managed jointly by the State of Alaska and the Yukon Territory. A project office has been established in Whitehorse, Yukon and a project manager is working out of that office.

The completed study will provide long range transportation planning data aimed at better integrating Alaska, Yukon and British Columbia with emerging international markets and supply chains.

Infrastructure

There is an all-weather road terminating at the settlement of Elsa, 193 km southwest of the deposit. Whitehorse, an additional 483 km to the south, is the northern terminus of the nearest railroad, and Skagway, 161 km farther south is the nearest seaport. Other settlements in the vicinity of the deposit include Mayo Landing, 241 km southwest, Dawson City, 338 km west-southwest, Norman Wells, 290 km east, and Inuvik, 338 km north.

The following map shows the highway and electrical infrastructure in the Yukon (from the Government of Yukon web site: http://www.emr.gov.yk.ca/mining/maps.html):



Yukon Mines Summary

Name	Minfile_no	Northing	Easting	Discovery	On_Line	Closure	Power
SA DENA HES	105A 012	6,708,920	506,818	1963	1991	1992	0.0
VENUS	105D 005	6,654,075	520,457	1905	1970	1971	2.0
WHITEHORSE COPPER	105D 053	6,721,078	497,045	1897	1967	1982	6.0
MT. SKUKUM MINE	105D 158	6,674,381	474,084	1980	1986	1988	3.0
KETZA RIVER	105F 019	6,825,586	645,160	1955	1988	1990	3.0
VANGORDA	105K 055	6,903,481	593,834	1953	1989	1993	22.0
FARO	105K 061	6,914,866	584,311	1956	1970	1992	24.0
GRUM	105K 056	6,904,824	592,694	1953	1996	1996	22.0
UNITED KENO HILL	105M 001	7,086,813	485,354	1903	1921	1988	4.0
INCA	105O 015	7,056,291	353,322	1974	1983	1986	0.0
WELLGREEN	115G 024	6,815,366	578,558	1952	1972	1973	0.0
MOUNT NANSEN	115I 065	6,881,998	386,343	1943	1996	2000	2.0
BREWERY CREEK	116B 160	7,106,214	634,805	1987	1996	2001	3.0
CANTUNG	105H 062	6,868,937	538,689	1954	1962	1986	4.4

Generating Facilities

Plant_Name	Production_MW	Type
Aishihik	30.0	Hydro
Beaver Creek	0.9	Diesel
Carmacks	1.3	Diesel
Dawson	6.0	Diesel
Destruction Bay	0.9	Diesel
Faro	5.3	Diesel
Fish Lake	1.3	Hydro
Haines Junction	1.3	Diesel
Mayo	5.0	Hydro
Mayo	2.0	Diesel
Old Crow	0.7	Diesel
Pelly Crossing	0.7	Diesel
Ross River	1.0	Diesel
Stewart Crossing	0.3	Diesel
Swift River	0.3	Diesel
Teslin	1.3	Diesel
Watson Lake	5.0	Diesel
Whitehorse	25.0	Diesel
Whitehorse	40.0	Hydro

Port

There is an existing port facility at Haines, Alaska (approximately 920 km from Carmacks). It has been estimated that Haines could have a capacity of 30 million tons per year, with something of the order of $1.5 billion development costs required to bring the port to operating condition at this capacity.

Port MacKenzie, Alaska (approximately 1400 km from Carmacks) is further from Crest than Haines, but it is reported that minimal capital would be required.

A decision on which Port to use will depend on further study regarding capital and operating costs, as well as what role the government plays in developing the infrastructure.

10. Influence of Government on Development

Yukon Economic Development:

There has been a significant increase in mining and mineral exploration and development in the Yukon over the last three years or so. Last year $50 million was spent on exploration and in 2006 the figure will be $150 million, including development. Two projects are close to construction.

All the projects are listed on the weblink and the key ones are as follows:

- The Minto Project by Sherwood Copper (small open pit copper mine has all the permits in place)
- Yukon Zinc's Wolverine deposit - zinc and silver underground mine. The permitting will be complete this year and the concentrate will be trucked to Stewart, BC and shipped from the port there. This port is approximately 1,600 km from Dawson has been recently refurbished and handles other ore shipments.
- Alaska Rail Link- described further below. Phase One a US$6 million 'opportunity study' has been completed. There is a strong will in Alaska to connect with the North American rail system.

There is new legislation in the Yukon - YESA- Yukon Environmental and Social Economic Assessment Act which clearly defines the requirements to obtain permits for projects. The Yukon Government clearly supports the environmental and socially sound development of projects and can offer assistance to prospective developers of the Crest deposit.

11. Conclusions and Recommendations

Hatch has reviewed previous studies on Snake River and analysed changes in technology and the iron ore market that could have an impact on the project. The Snake River/Crest deposit is one of the largest undeveloped iron ore deposits in the world with 20 to 30 billion tonnes of resources reported. Iron ore demand is increasing and traditional known large deposits are depleting their Reserves quickly. By far the largest challenge will be infrastructure, although the Yukon has a history of mining and the port facilities are already in place in several optional locations.

Given the current circumstances, Hatch believes this deposit is worthy of further development to define the Resources and processing and infrastructure options.

Appendix A – List of Documents