PROMITHIAN INC.

HATCH™

22 July 2002

200 – 1550 Alberni St.
Vancouver, BC V6G 1A5
Tel: (604) 689-5767 ◆ Fax: (604) 689-3918 ◆ www.hatch.ca

This Report was prepared for Promithian Inc. by Hatch Associates Ltd. (Hatch), independent consultants. The material within this Report reflects the information available and the judgment of the Hatch engineering staff. Any use, which a third party makes of this Report, or any reliance on decisions to be based on it is the responsibility of such parties. The use of this report or any information contained therein shall be at the user's sole risk.

Table of Contents

Part I

Part II

List of Figures/Maps

List of Appendices

1 Executive Summary

In April 2002 Promithian Inc., the Nacho Nyak Dun Development Corporation, and the Yukon Department of Energy Mines and Resources engaged Hatch Associates Ltd. to carry out a high level evaluation of Promithian's plan for a mining–steel manufacturing operation in northeastern Yukon. The plan involves developing the Crest Iron deposit and the Wind River Coal Field for the purpose of producing high-pressure natural gas line-pipe. Pursuant to this task, Hatch has reviewed materials made available by Promithian, from other relevant sources, and consulted with appropriate resource people from both within and external to Hatch. This report summarizes the results of our investigation and analysis.

The Crest Iron property is one of the largest iron ore deposits in North America. Located approximately 350-km northeast of Elsa (see Figure 1) in a remote area of the Yukon and Northwest Territories. The total resource of the deposit is estimated to be in excess of eighteen billion tons of 43-46% Fe iron ore. Evaluation studies done between 1961 and 1965 indicated that, with a sufficient source of inexpensive energy, the ore could potentially be beneficiated with an 85% iron recovery rate.

Eighty kilometers southwest of the Crest deposit are the Bonnet Plume Coal Deposits. The coalfield was discovered and worked on between 1977 and 1983. Seven deposits, with five seams, contain some six hundred and sixty million tons of in-situ, bituminous C, thermal coal. In 2001 the principals of Promithian Inc. acquired rights to these deposits, which they have designated as the Wind River Coal Field. One of the deposits, Illtyd Creek, was explored in detail in order to prove reserves. In 1981 a Pre-feasibility Mining study was completed for the Illtyd Creek deposit in conjunction with a plan for onsite electric power generation and transmission to the existing Yukon power grid. Two years of environmental baseline studies were carried out between 1981 and 1983 before the project was abandoned due to a lack of demand for the electricity

In recent years there has been much discussion, study, analysis, and consultation surrounding a number of proposals to access and transport to market "locked-in" natural gas in the Mackenzie Delta and on the North Slope of Alaska. An anticipated two to three million tons of large diameter Arctic grade line-pipe could be needed for the first two major pipelines. Smaller feeder lines will proliferate into the numerous sedimentary basins in the region. An emerging regional market for line-pipe is envisioned.

Hatch believes that a minimum size for an economically viable steel mill in this context would be 1.2 million tons per year.

Hatch supports Promithian's view that the proposed steel mill, as well as the pipe and tube operations, should be at the Illtyd Creek coal-mining site. This would allow the sharing of infrastructure, management, technical and maintenance resources, as well as minimize transportation requirements and environmental impact.

Upwards of one million tons of coal per year would be required to support the iron production process directly as well as to provide electrical energy for mining, benefaction, steel production, processing, manufacturing, and infrastructure requirements. Five thousand tons a day of iron concentrate would be delivered via slurry pipeline from a plant at the Crest iron site. Electricity from the main plant will be provided to the Crest Plant via a power transmission line. Personnel could be transported to and from the Crest Plant by air to preclude the necessity of an all weather road between the sites.

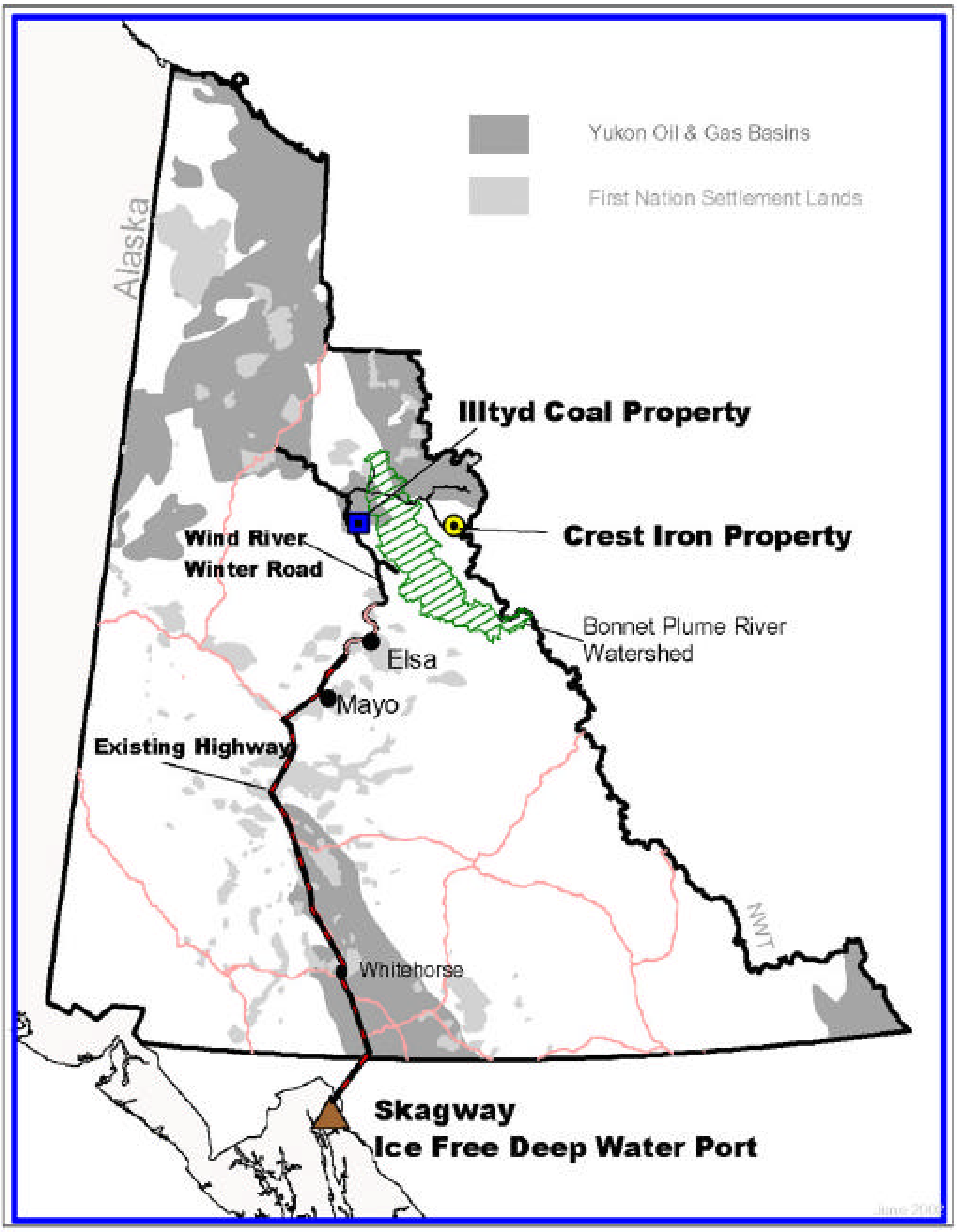
Plant workforce requirements could be considerable. Hatch would contemplate a workforce of some one thousand two hundred people: nine hundred at the main Illtyd Creek plant, one hundred at the attached coal-mining operation and two hundred at the Crest Plant. Hatch believes an operational area of some 245 hectares needs to be available for the considerable plant infrastructure requirements at the Illtyd site.

It is expected that upwards of one hundred, 40-tonne capacity, tractor-trailer units per day would travel the highway to Mayo. The existing Wind River winter road will have to be upgraded to a high quality all-weather highway. All weather access to the Yukon's existing transportation system – and a year round ocean port in Skagway – is of the utmost importance.

Hatch suggests thinking about the project based on a potential cost to full operation in the range of $ 2.5 to $ 3.0 billion dollars. This notional value is based on the costs of comparable projects, tempered for the location, process breadth, infrastructure and transportation requirements contemplated, as well as the length of time needed to achieve product qualification. While in the aggregate, this notional total to execute the project as conceived is large, it is to be remembered that while the steel industry is notoriously capital intensive, individual operations properly configured to serve high value markets can be significantly profitable. As well, the "economic value added" to a region that hosts such a steel making and manufacturing complex can be considerable.

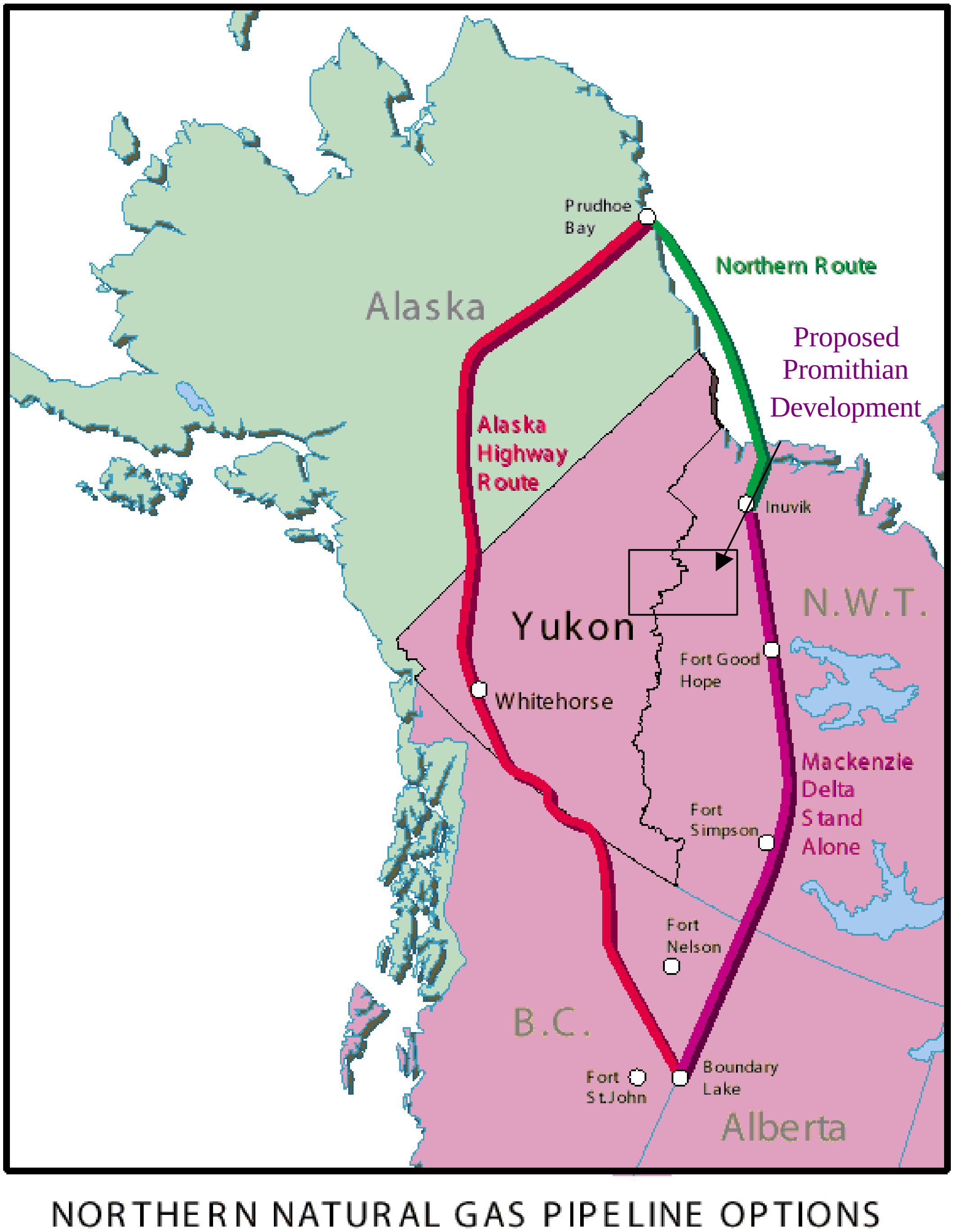
On an operating basis, Hatch would not expect the facilities to have substantial environmental impacts, based on the successful operations of comparable facilities located in environmentally sensitive areas around the world. Particular attention will have to be given to ensuring the compability of any of the corollary impacts of the project with the "Canadian Heritage River" designation given to the Bonnet Plume River.

Hatch is of the opinion that this unique and complex project could be realized, subject to the resolution of the uncertainties and issues raised in this review - many of which are material. These include the permitting and access considerations, the timing and extent of development of the nearby market for line pipe, the beneficiability of the iron ore, the energy and iron unit production routes, and the availability of human resources. Accordingly we recommend to advance this project to the Pre-Feasibility Study stage to more fully assess and define these issues as well as the economical viability of the project.



Map by Promithian Inc.

Figure 1 – Area Map



Map by Promithian Inc.

Figure 2

2 Methodology

Hatch gathered data and formed its opinions using input from a number of sources including:

- discussions with Promithian management
- discussions with members of the steel trading and strategy consulting communities on a "no-names" basis
- recent studies Hatch has participated in or was aware of involving similar projects and/or technological approaches
- staff expertise available from other Hatch Offices
- discussions with external environmental consultants
- existing

3 Historical Perspective

The principals of Promithian had identified opportunities, and established interests in iron ore, coal, and potentially, coal-bed methane resources in the Yukon Territory. Promithian's considerations evolved to adding value to these resources through locally situated conversion to saleable steel products with a focus on the substantial quantities of large diameter, high pressure gas transmission line pipe forecast to be required to access resources currently locked-in in Alaska and the MacKenzie Delta in the future. Promithian has, as well, fostered relationships with Territorial Authorities, First Nations, and with the current holders of the Crest Iron Ore Deposit.

By agreement with Promithian, this review is concerned with, and limited to an assessment of the concepts formulated by Promithian, with appropriate emphasis on:

- the potential viability of such a project given the remote location, the technological requirements, and the market cyclicalities
- the potential environmental, regulatory and community implications
- the justification for further studies

While not specifically included in our mandate, Hatch has nonetheless considered some of the broad economic implications of the project in order to facilitate an appreciation of its potential viability.

The balance of this Summary should be read in conjunction with the Project Outline in Part II and the supporting materials in the balance of the Appendices.

Unless otherwise noted, any dollar amounts are expressed as Canadian dollars.

4 Principal Materials and Energy

In principle, the necessary iron, carbon, and energy units to support a 1.2 million ton per year (an economic minimum size) are available within some 80 kilometres of each other at the site.

Subject to a thorough assessment of the characteristics of the Crest Iron ore and a test-based flow sheet for its beneficiation, Hatch would postulate up to a 10,000 ton per day mining operation, with 5000 ton/day of concentrate delivered to the main operational site at Illtyd Creek by slurry pipeline. The iron ore mining operation would be conventional open pit, with maximal automation and minimal labor requirement, with personnel based in a site camp to avoid all-year all-weather road access. Some 200 people could be required based on our experience.

Significant uncertainties with the Crest ore noted in the reference materials include its high silica and phosphorous contents, and difficulties in elimination of sulfates to permit pelletizing for reduction to electric furnace feed. These can only be resolved through appropriately detailed investigation.

Upwards of 1.0 million tons per year of coal are required to support the iron production process directly and to provide electrical energy for the mining, beneficiation, steel production, processing, and manufacturing operations, as well as for the infrastructural requirements at both sites.

A study will be required to establish the most cost effective mining approach for the Illtyd Creek resource – open pit vs. underground. Decisions as to the degree to which the coal will have to be upgraded will flow from the selection of the iron reduction/energy production process route as discussed at length in the outline. That notwithstanding, Hatch would expect that coal mining operations would engage some 100 people at the Illtyd Creek site.

Based on the materials provided, the coal should be suitable for the processes contemplated.

As well as the principal raw materials, there are several key commodities required to support a steel mill: high purity oxygen, nitrogen, and argon; burnt and dolomitic lime, other fluxes and alloying materials, as well as refractories, electrodes, and other consumables. While the process gases can be produced on-site, the balance must be regularly transported, requiring year-round, high quality road access (as will outbound product shipments) and significant on site warehousing capacity.

5 Plant and Process

Hatch would support Promithian's view that the steel operations should be at the Illtyd Creek Site, inasmuch as there are opportunities to co-generate energy in conjunction with the iron reduction process. Hatch would also suggest that pipe and tube making operations be at the same location, in order to share infrastructure and management/technical/maintenance resources as well as minimize transportation requirements.

As described in the outline attached as Part II of this report, all of the plant and process downstream of the steelmaking furnaces is dictated by the core product requirements, and is known, proven, and in regular operation at numerous locations, including some with harsh winter environments and/or remote locations.

The aspects requiring major study are the energy generation/iron reduction steps. The selection of these technologies is key to establishing the project cost and economics.

Plant infrastructure requirements at the Illtyd Creek site will be considerable. Hatch would contemplate an operational area required of some 245 hectares. A workforce of some 900 people should be contemplated at full operation of all facilities, in addition to the 100 or so involved in the coal mining operation.

The question of whether a "townsite" as contrasted with a "camp" is more appropriate at the Illtyd Creek site will inevitably arise.

6 Marketing

There is little doubt that, given the location, in the absence of an accessible market for high value steel products, the project would not be viable. There is simply too much capacity presently available at too many locations for commodity steel products for a remotely situated new entrant to be successful.

The unique characteristic of the Promithian project is that it could be "drawn up the value scale" by its advantageous proximity to what should be an ongoing market for high value energy related products, enabling it to supply outside markets as well. Hatch would see the large diameter pipe capability supplemented by a smaller diameter capability to enable "full service" to the energy market, minimizing the amount of production directed to the commodity areas.

After process definition and qualification, a core portfolio of some 250,000 tons per year of large diameter transmission pipe from the market identified by Promithian (Appendix A), supplemented by an equivalent amount of smaller diameter ERW gathering, distribution and processing API pipe could provide the basis for a viable order book. The balance of capacity would be of necessity directed to the hot rolled and plate-in-coil markets.

Taking all-weather, year round access as a given, Promithian compares favorably with respect to both on-shore and off-shore competitors for access to end markets as diverse as Anchorage, Fort St. John, the MacKenzie Delta, and so forth. That being said, the range of products contemplated parallels that of IPSCO's Regina operation, an aggressive and capable competitor that would be likely to respond commercially.

As discussed in the outline, a substantial period of time will be involved in establishing the capability to supply the high-end markets. For that period, and going forward, for the product not sold to the accessible high end markets the project will require access to the "international" markets through, most probably, Skagway. Study as to the logistics of such a distribution mechanism is required. As well, arrangements with the distribution and trading community will have to be explored.

Steel trade rules are notoriously volatile. At present, Canadian steel is in general not having difficulty in entering the US – 10 years ago, this was not the case, and there is no certainty with respect to the future, given the rising tide of protectionism around the world. Having noted that, there is also a significant level of interest on the part of offshore producers in establishing operations in North America.

Marketing and distribution are absolutely fundamental to the prospects for the project. Structured discussions with potential customers, distributors, and processors of the target products should commence as a next stage.

7 Environment and Regulatory

In broad terms, the project would involve:

- permitting a 1.5 million ton per year iron ore mine with on site tailings storage and substantial water exports
- permitting a 1.0 million ton per year coal mine
- permitting a slurry pipeline from the Crest site to the Illtyd Creek site
- permitting a power line and access road from Illtyd Creek to Crest
- permitting of a facility having characteristics equivalent to a power station consuming 1.0 million tons per year of coal with respect to air emissions and ash storage
- permitting of a facility having characteristics equivalent to a 1.2 million ton per year electric furnace steel mill with respect to air emissions, water emissions and on-site slag, dust, and waste storage
- permitting an all weather, high capacity, high quality road some 165 kilometres to the vicinity of Elsa (to handle upwards of 100, 40 ton capacity tractor-trailer units per day on a 360 day per year basis)
- permitting residential amenities for upwards of 1200 people between the two sites
- potential permitting of a product marshalling and shipping facility at Skagway
- permitting of airstrips/helipads at both operating sites

On an operating basis, Hatch would not expect the facilities to have substantial environmental impacts, based on the successful operations of comparable facilities located in environmentally sensitive areas around the world. Beyond the basic issue of CO_2 generation resulting from the oxidation of coal, technologies to mitigate all other emissions to generally accepted standards are available. An advantage of the project is that as iron ore and coal resources are withdrawn, space is created for storage of the solid by-products arising from their beneficiation and for those from the iron, steel and energy production processes. As well, many of these latter byproducts are suitable for construction/infrastructural purposes, replacing otherwise virgin aggregates.

Recognition of these requirements by the appropriate regulatory authorities and community groups should be sought as a next stage. Particular attention will have to be given to ensuring the compatibility of any development with the “Canadian Heritage River” designation given to the Bonnet Plume River in 1998 (Appendix H).

8 Management and Human Resources

As noted in the outline, the Project is complex, has highly technical operating and maintenance requirements, and the products require the highest degree of certification. Attracting and retaining appropriately qualified personnel to comparable operations in less “hostile” settings is difficult, this will be an area of significant challenge for Promithian. Of the 1200 or so people identified, specialized skill sets would be required for probably 50 or less; the operations force of some 600 could have basic “mining and milling” qualifications; the 400 person maintenance cohort would require journeyman or technician qualifications comparable to those in the pulp and paper or petrochemical industries, the balance would be clerical and support personnel. A cadre of a dozen or so “veterans” of the business would be required at the senior management and technical positions.

Almost without exception, the successful operations in this segment of the steel industry do not have workforces represented by organized labor. While that is not the sole determinant of success, the need for high performance, versatile, fully committed people to ensure the success of the business generally leads to highly participative work forces with a strong economic interest in the fortunes of the enterprise – a regime that most of the “old-line” industrial unions have considerable difficulty supporting.

Early and on-going involvement of personnel knowledgeable of the industry will be important to credibly assessing and advancing the project.

9 Financial and Economic

In order to assist Promithian in its deliberations, Hatch suggests thinking about the project based on a potential cost to full operation in the range of $2.5 to 3.0 billion dollars. This notional value is based on the costs of comparable projects, tempered for the location, process breadth, infrastructural and transportation requirements contemplated, as well as the length of time needed to achieve product qualification.

Robustly profitable steel operations, albeit in more "benign" locations, generally can be characterized as having total employment costs of 20% or less of their normalized revenue base. In the present case, for some 1200 people at an average cost of say $100,000 per year, a revenue base for the operation of some $500 million per year is implied on a comparable basis. While Promithian is unique in that its personnel cost includes the labor implicit in provision of ore, coal, and energy (which are substantial costs to other operators), all else equal, the impacts of the remote, harsh location, and the high financing costs would offset much of that advantage, and could, in fact, require a materially higher revenue base.

The important point to be made is that in today's market, hot roll coil is selling for over U$300 per ton, freight equalized at point of consumption – up from U$250 or less a year ago prior to the section 201 tariffs in the US; plate-in-coil is of the order of U$400 per ton on a similar basis. Accordingly, for the project to be viable, not only will enough high value product have to be produced and marketed to raise the average net realized revenue to $500 per ton and beyond, the operation will have to be "supported" for the, hopefully, "reasonable" period of time necessary to establish capability, qualification, and credibility as a supplier of the $700 per ton and beyond energy related pipe and tubular products. The large diameter, high quality, line-pipe contemplated to be used by the North Slope producers will sell for approximately $1,000 per ton delivered.

10 Government and Community

Steel mill projects such as that contemplated by Promithian are generally highly sought after by communities given their tremendous economic impact, and relatively small and benign ecological footprint. It is not uncommon in the USA to see substantial state and local incentives provided, as well as sponsored financing in terms of municipal revenue bonds. Offshore, such projects are used as levers to spur development in otherwise disadvantaged regions.

In the present case, not only are there the obvious direct benefits of construction and operation, but also the ancillary employment and value adding in terms of support services, transportation and logistics, and so forth throughout the impacted area. Hatch would suggest that as part of any permitting approach, that a comprehensive economic impact assessment be prepared to attract the interest of the Nacho Nyak Dun First Nation, other First Nations, Yukoners, and the Federal Government, and to strategically mitigate the inevitable anti-development forces.

11 Conclusions and Recommendations

On a conceptual basis, the Promithian Project has strengths including:

- iron ore, coal and energy in close proximity to a potentially large market for high value steel products
- the opportunity to use proven, low cost, mining, steel production and processing technologies
- a community potentially receptive to new investment and development
- an opportunity to engage and provide meaningful employment for local residents

Its conceptual disadvantages include:

- potentially difficult iron ore to beneficiate
- a remote and harsh environment
- potential adverse attention from environmental groups
- high capital costs relative to competitors
- complex technology and stringent product requirements
- long development cycle

The number of uncertainties and issues raised in this review is reflective of the dated and/or otherwise incomplete documentation available to us. Accordingly, Hatch would find it difficult to recommend a Bankable Feasibility Study as a next stage in the advancement of the Project. Rather, we would suggest a "6-month, $350,000 Pre Feasibility Study, managed by an internationally credible Iron and Steel consulting engineering concern, supported by a knowledgeable environmental consultancy with public hearings expertise.

In the course of that study:

- basic layouts and general arrangements for the operating sites, corridors, and transshipment points could be developed, leading to capital cost estimate based on estimating criteria to ±30%
- the access, permitting, and environmental requirements could be established
- the economic impacts and benefits established
- the energy/iron production route established from among the options
- the overall process flowsheet established and a cost model developed
- credible heat and mass balances established permitting determination of cogeneration potential
- marketing strategy determined, with particular emphasis on transition operations from start-up to full qualification
- support services and infrastructure assessed and developed
- financial models and cash flows determined

As well, in the course of this work, potential participants in the project would be identified and, in conjunction with Promithian, approached as to their level of interest. The universe of potential players includes customers, traders/distributors, suppliers, and financial investors as well as other steel producers and governments.

The deliverables from such a pre-feasibility study and related activities would be most helpful in establishing the viability and sustainability of the project, and, in all likelihood, would significantly lower the costs of a Bankable Study if that were the next step to be taken.

Hatch is pleased to have had this opportunity to be of service to Promithian, the Nacho Nyak Dun Development Corporation, and the Yukon Department of Energy Mines and Resources, in the preparation of this review.

Part II

1 Project Outline

Process Flow and Facility Requirements

The following summarizes our view as to the potential approaches and context to realizing on the concepts for development of a steel mill and line-pipe manufacturing complex to be situated in the Yukon Territory. It is intended to be in most respectives reflective of the scope advanced to us by Promithian, and should be read in conjunction with the developmental flowsheets Figures 2A, 2B & 2C (at the end of this Part II).

While there are many uncertainties with respect to the Crest Iron Ore and Wind River Coal properties, which are covered elsewhere in our Report, it is our view that there are no fundamental impediments to the realization of the concepts. Having said that, the processes involved are of high capital cost, of significant technical and operational complexity, and the product specifications and quality assurance levels required are among the most stringent in the universe of steel products. As well, the proposed locations are climatologically severe, environmentally sensitive, infrastructurally spartan, and present significant permitting, construction, operational, and transportation challenges.

While we have considered development of the Ore and Coal properties only to the degree necessary to support a nominal 1.2 million ton per year steel complex, given that the transportation infrastructure to support it should support much higher volumes of shipments, opportunities exist to develop the Ore and Coal properties to significantly higher levels of product and energy output to serve third party customers, assuming that capital and operating costs for extraction and beneficiation are such that returns could be realized independent of the captive market and particular economics provided by the steel mill.

The notion that a substantial proportion of the output of the steel mill will be directed towards the production of Artic grade API X70 (or higher) line pipe at a proximate facility puts significant constraints on the nature of the supplying facilities. While there are several recognized production routes for this product, the most cost effective and flexible is that used by IPSCO at their Regina, Sask. Operations. Essentially, plate-in-coil is uncoiled, leveled, edge prepared, and submerged arc welded along the “long seams” as an endless spiral in a built for purpose mill. While this technique was used for many years in the production of lower service duty pipe products, IPSCO pioneered its successful application to severe service API line pipe.

Subsequent to forming and welding, and cut-off-at-length, the product must be 100% X-Ray and flaw detected, hydrotested, the ends prepared, and the pipe protectively coated. Prior to placement in the field, the pipe must be corrosion protected – this is generally done by a third party such as Shaw Pipe at a proximate plant or at an intermediate location. While straightforward in concept and execution, the spiral pipe process for API line pipe must be extremely tightly controlled; there are many variables involved and a high degree of metallurgical and welding expertise is required. Production is generally supervised by inspectors retained by the customer, notwithstanding which, long term liabilities accrue to the producer as field failures-in-service are neither uncommon nor minimal in consequence. Qualification as a supplier is difficult and time consuming – as well as the demonstrated capability at the pipe making stage (usually based on six-sigma type stasticial process control), similar considerations apply to the quality assurance, consistency and history of the feedstock plate. Full-scale burst tests to demonstrate weld and parent material crack propagation resistance are required.

There are two qualified Canadian producers, and three US based producers who compete for the market. All except Berg Pipe in Panama City, Fla. have captive plate supply, however, because of the "project" nature of the market, it is not uncommon for all except IPSCO to purchase plate, or slabs from which to roll plate, from either each other or, from offshore qualified suppliers. Offshore production of qualified slabs, plate, and pipe is concentrated in Japan, Germany, and Italy. While there have been some exceptions, freight and political considerations have generally seen the bulk of supply for on-shore pipeline projects in North America come from the North American pipe producers.

Given the value of the order of $1000/ton for the product – coated and delivered to field, freight per-se is not as determining a competitive consideration as it is in the case of lower valued intermediates such as plate, plate in coil, and hot rolled coil, which are in the range of $400 to $600/ton. Accordingly, the international market is accessible to those producers who are tidewater situate, generally the Japanese and Europeans. In North America, only Berg and the Napa, Calif. mill of Oregon Steel Mills are considered to be players. Stelco's Welland Tube operation in Welland, Ont., IPSCO in Regina, and the Stelco/Oregon Steel JV in Camrose, Alta are generally considered to be landlocked.

For Promithian to access the export markets for all of its products, year round access to a terminus such as Skagway, Alaska will be required. For advantageous supply to the target Alaska and Mackenzie Valley projects, year round road shipping, or road to a rail interconnection will be required for its pipe.

Given that Promithian will have to start-up, develop, and certify it's production processes and products over a nominal two year period (given an aggressive programme and first class, experienced management) in order to access the high value line pipe markets, it follows that the mill producing the plate, and the units which supply it (potentially back to the iron ore and coal properties) must be configured, and the necessary infrastructure put in place, so that these intermediate units can be put on line and into regular capacity- level operations to generate cash and establish Promithian as a quality capable producer.

As noted above, the decision to have line-pipe as a principal product puts significant constraints on the nature of the supplying facilities – particularly since the feedstock plate must be in the 1/2" or greater thickness range – beyond the capability of any "direct" strip production process. All three of Oregon Steel, IPSCO, and Stelco in Hamilton, Ont. have so-called "Steckel" type combination plate/plate-in-coil/wide hot strip mills. These relatively low cost, flexible mills generally consist of a 4-roll-high reversing mill with coiling furnaces on either side (to preserve heat during the extended rolling cycle). To produce lighter gages of product, the coiling furnaces are used; to produce heavier gage flat products, the furnaces are bypassed. Final product is either coiled in an upcoiler after spray cooling, or if flat, run out to a leveling/shearing facility. These units, like the spiral pipe mills, are robust, proven technologically, and in the appropriate capacity range. While simple in concept and execution, here again, a variety of sophisticated systems are involved in operation, in-depth metallurgical knowledge is required. A physical testing and metallographic laboratory of some sophistication is a necessity.

As well as the Steckel mills operated by the pipe producers, numerous others exist in North America and elsewhere, generally supplied by scrap-fed Electric Arc Furnaces (EAF). Product can be directed to virtually all the conventional market segments for plate, plate-in-coil, and wide hot strip, both domestically and internationally. A significant portion of these markets is of a commodity nature, enabling start-up and developmental product to be sold, albeit at distressed prices, to offset developmental costs and provide cash flow, given that year-round road access to tidewater and/or a railhead can be made available.

Appendix B provides a description of a comparable steel production facility to that suggested for Promithian – IPSCO's new mill at Mobile, Alabama. While this mill is scrap fed, and does not have on-site pipe production or iron reduction/energy generation, it nonetheless is representative of the assets required at the heart of the process.

Steckel mills are generally supplied with continuously cast slabs ranging in thickness from 5 to 10 inches, and in width from 40 to over 100 inches, and lengths from 30 feet upwards. The combination gives rise to the Pounds per Inch of Width (PIW) of the coiled products, and has direct impact on product saleability, and significant corollary impacts on caster productivity, mill productivity, product applicability (due to surface condition and degree of reduction), and slab heating requirements, as well as on capital and operating costs. While an in-depth optimization simulation is required to establish the ideal dimensional set for any given situation, we would expect to see the Promithian caster fall in the 5 to 7 inch thickness range with width of 100 inches maximum, and slab lengths in the 60 foot range. While such slabs would not be ideally tradable, they would suit the Steckel mill product range required and give a saleable PIW. Such continuous slab casters are in regular operation in the trade, are amenable to "sequence casting" of multiple ladles (heats), and can be operated in tandem (linked) with the Steckel Mill, thus avoiding extensive reheating furnace requirements.

A single strand caster as described above, supplied with 120t (net) heats is capable of producing some 1.0 to 1.2 million tons of useable slabs per year. While liquid steel can be produced from a variety of processes, for the product mix and circumstances contemplated, an EAF based process is preferred for reasons of capital cost, operating flexibility, operating cost, and robustness. EAF's have a fundamental advantage over Basic Oxygen Furnace (BOF) based processes in that they can be operated on an "irregular" pattern, heats can be held for extended periods if required, gas collection and cleaning is simple, and a variety of charge materials can be dealt with – BOF's generally require that 70% or more of the metallic charge be in the form of Blast Furnace or equivalent hot metal. Virtually all recently built steelmaking complexes are based on EAF technology.

Subsequent to refining in the EAF, the heats are generally further processed at a "ladle metallurgy facility" (LMF) for desulfurization and final temperature and analysis control before being sent to the caster. These facilities generally consist of low powered EAF in which the roof and electrodes are swung over and lowered into the ladle of steel, which forms the balance of the "furnace." Argon gas is circulated through the steel during treatment, fluxes and alloys are batched and added (or injected) through weight controlled systems. An analytical laboratory is required to serve both the EAF refining operation and the LMF. If hydrogen control is necessary due to product requirements (pipe for sour gas, etc.) a degassing station may also be required.

To this point in the process from shippable pipe back to steelmaking, all of the facilities required are "known, proven, and available off-the shelf." The spiral pipe mill, Steckel Mill, Caster, LMF and EAF and their ancillaries require only final sizing, dimensioning, and respecification for severe/remote location service. Utility and energy requirements are known and readily quantifiable, byproduct and "waste" volumes and characteristics are known as are operating and maintenance manpower and consumable requirements. All metallic scrap and by-products are either recyclable within the facilities (eg. skulls, scrap, crops) or saleable in their own right (eg off-spec pipe).

To now bridge from the iron ore and coal deposits to the feedstock for the EAF becomes considerably more complex, and many more choices for process routes and technologies are involved. This suite of assets not only has to be looked to provide the reductants and energy to convert the iron ore to EAF feed, it should also provide the energy required for melting, rolling, processing and site infrastructure, and be configured to minimize the "dumping" of wastes (dusts, scale, slag, etc) from the steel production processes and as well minimize the volumes of waste water and concomitant treatment costs for the whole complex.

As covered elsewhere, the Crest iron ore deposit, while minimally characterized, is indicated as requiring complex processing in order to beneficiate it to a degree suitable for ironmaking feed, including fine grinding. Given that, and mindful of Promithian's guidance as to the desirability of locating the principal operations at the Illtyd Creek mine site, we believe that the beneficiated fine ore should be transferred the 70-odd km to the coal site by slurry pipeline, and that the water balance at the Crest site should be designed to ensure that virtually all industrial waste water from that site is used as the transport medium for the ore fines. In reverse, we would see that power generated at the coal site be furnished to the Crest site. This configuration would serve to minimize the "environmental footprint" at the Crest site, minimize the need for permanent road haulage, reduce operating and capital costs, and concentrate infrastructural management requirements at the coal site.

Given the fine grinding requirement, the iron ore will have to be agglomerated (pelletized or briquetted) before introduction to any conventional, proven, reduction process unit. We note that while many fine ore based reduction processes for iron ore are in development around the world, none, in our view, is sufficiently demonstrated on a commercial scale to be recommended by us for this project at this time - a number of large-scale operations have in fact been mothballed. A conventional filter plant would be adequate to dewater the iron ore slurry to the level compatible with pelletizing, with the transport water available for site purposes.

We have looked at three process routes of progressive complexity and risk for provision of reduced metallics to the EAF, identified as Options A to C on the referenced flowsheets (Figures 2A, 2B & 2C).

Options A and B both involve the Midrex Shaft Furnace technology for production of Direct Reduced Iron (DRI) to supply all, or a major portion, of the virgin iron units needed to support the EAF. The Midrex technical paper (Appendix C) should be read in conjunction with this discussion. Numerous successful, high productivity, high quality EAF based steelmills around the world use Midrex DRI for up to 100% of their feed. Notable in North America are ISPAT's operations in Quebec, Trinidad, and Mexico, and GSI's at Georgetown SC. All however, have natural gas available to be utilized to produce the reducing gas, and have electric power available from other sources for the steel mill operations.

For A, which involves 100% Midrex DRI feed, in the absence of natural gas at the Illtyd Creek site, and with the prospects for Coal Bed Methane (Appendix G) production as yet uncrystallized, it would seem most reasonable to employ a suitably sized gasifier to produce the required quantities of gas, with consideration given to an overage for supplementing input energy to a high-ash-coal fired generating station - if appropriate to optimize coal mining, preparation, and utilizing. The gasifier-only configuration would be the simplest from an operating standpoint, and produces a product, which can be either used on-site, or sold. Offsetting these advantages, EAF operations on 100% DRI are intensive consumers of electricity, and produce high volumes of slag, with concomitantly lower yields and high flux consumptions. Appendix D addresses some of the gasification technology considerations.

Option B, which has been successfully demonstrated at Saldahna Bay Steel in South Africa, sees the coal gasifier replaced with a "Corex" hot metal (3-4% Carbon) production unit. These units generate substantial quantities of by-product gas, which can be conditioned to be a suitable Midrex shaft furnace feed. While detailed study is required to size the Corex unit to provide the appropriate amount of reducing gas plus supplemental power station feed at the Promithian mill, the Saldahna Bay complex operates with a 0.8:1.0 ratio of hot metal to DRI.

The advantage with this process mix is that a substantial upgrading of the metallic content of the EAF feed is achieved, energy requirements for the EAF are reduced along with flux requirements. Offsetting these advantages are the added costs and complexity of managing the liquid hot metal, slag, etc. as well as the notionally more demanding process control aspects of the Corex melter/gasifier compared to a straight gasifier. Corex hot metal can be granulated, or cast as "pigs" to provide intermediate, readily saleable products.

The iron ore feed for both the Midrex and Corex units would have to be pelletized, normally a relatively straightforward operation, with some degree of induration required to minimize degradation in handling and reduction. Additional gas and or waste heat is required for firing the induration unit, with some offset available by incorporating fine coal in the pellets.

Both the coal gasifier and the Corex melter require considerable tonnages of high purity, high pressure oxygen, as does the EAF refining process. Inasmuch as the principal consumable used in oxygen separation is electricity, and since there are trade-offs available between the unit oxygen and electricity requirements for each of the processes, an optimization simulation is required to establish the relative sizing of each of the units involved.

In summary, we would potentially see the front-end of the Promithian mill as being either an "integrated mini-mill" complex – Option A, or a "Saldahna Bay" complex – Option B as described at pages 11 and 12 respectively of the referenced Midrex paper.

As noted in the Midrex paper, in 1998, only 3% of world DRI production was directly coal based. Midrex has more recently reported that 4.7% and 8.4% of world DRI production was directly coal based in the years 2000 and 2001 respectively. That notwithstanding, we believe there could be significant value in considering a coal based DRI route as an alternative to the Midrex dominated options above. In Option C we reflect the "Red-Smelt," "Iron Dynamics," or Midrex "Fast-Met" rotary hearth processes for primary metallization purposes.

In these processes, ore is pelletized with coal and fluxes, the pellets are introduced into a large rotary hearth furnace (RHF), typically fired with gas or pulverized coal, and discharged after reduction to either a briquetter, or as metallized pellets to a submerged arc furnace (SAF). The logic for further processing a portion of the DRI to liquid hot metal in the SAF is similar to that previously referenced in the Corex/Midrex discussion. In this case, the core technologies have been established – SAF's in many smelting operations, and the RHF's at Inmetco in Detroit, Mich. and in Japan. There is a higher risk of start up and development problems, as commercial scale operation has not been demonstrated on a consistent basis. The installation at Iron Dynamics in Illinois has had successful periods of operation, but is currently under modification. An attractive feature of this process route is that the RHF and SAF off-gases have substantial fuel value. An offsetting disadvantage is that precise control of the incoming materials with respect to their composition and size distribution as well as their proportions is necessary.

It conclusion, it is important that the process route for preparation of the EAF metallic feed, and supply of mill/mines energy requirements be evaluated and finalized in order that the beneficiation requirements for the input coal and iron ore can be established.

While the iron ore requirement is straightforward – the Phosphorous and Silica levels have to be brought down to industry standard to avoid large energy and productivity penalties, the situation with respect to the coal is much more complex. At one extreme, if 100% Midrex DRI were employed, supported by a gasifier complex, then it is possible that minimal beneficiation would be required; at the other, with 100% RHF DRI, ash and impurities in the coal would have to be dealt with in the subsequent hot metal and steelmaking processes, and beneficiation to at least metallurgical coal ash levels would be required.

The principal elements of the process routes discussed above, together with some of the important support systems for each step are summarized in the following Table 1. Elsewhere in the Report we have included capital cost data as available to us from our reference materials to provide guidance as to the potential capital costs of such a project. While in the aggregate, the notional total of $2.5 to 3.0 billion to execute a project as conceived by Promithian are large, it is to be remembered that the steel industry is notoriously capital intensive, but that, properly configured to serve higher value markets, individual operations can be significantly profitable. As well, the "'economic value added" to a region that hosts such a steelmaking and manufacturing complex can be considerable.

Table 1

Facilities Listing

Crest Iron Ore Site – 1.5 million ton/yr shipped

- Camp/Office Complex
- Mobile Shop and Maintenance Facilities
- Trucks, Shovels and Misc. Mobile Equipment
- Water Treatment/Distribution
- Concentrator incl. Control Lab
- Substation
- Product Stocking/Ex-stocking
- Slurry Pumping Station
- Overburden and Tailings disposal
- Airstrip/helipad

Wind River Site

- Camp/Office/Admin.
- Power Station
- Oxygen/Argon Separation plant
- Water Treatment/Distribution/Disposal
- Coal Operation – 1.0 to 1.5 million ton/yr
- Office/Dry
- Surface Mining Equipment or Underground Mining Equipment
- Wash Plant incl. Control/Laboratory Complex
- Product Stocking/Ex-Stocking
- Maintenance Facilities
- Overburden and Tailings Disposal
- Airstrip/Helipad

Primary Metallics Production

Option A

- Gasifier
- Char/Ash Separation, Handling and Disposal
- Slurry Dewatering
- Pelletizing/Aglomeration (ore +plant dusts/scale)
- Midrex Megamod Shaft Furnace
- Gas Cleaning/Conditioning/Recirculation
- Product Stocking/Ex-Stocking
- Water Recirculation/Treatment
- Control/laboratory Complex

Option B

- Slurry Dewatering
- Pelletizing/Agglomeration (ore + plant dusts/scale)
- Corex Gasifier/Melter
- Slag Separation, Handling and Disposal
- Hot Metal Transport Ladles
- Hot Metal Granulation or Pig Casting machine
- Water treatment/Recirculation
- Gas Cleaning/Conditioning
- Midrex Shaft Furnace
- Gas Cleaning/Conditioning/Recirculation
- Product Stocking/Ex-Stocking
- Water Treatment/recirculation
- Control/Laboratory Complex

Option C

- Slurry Dewatering
- Coal Pulverization
- Pelletizing/Agglomeration (ore+coal+plant dusts/scale)
- Rotary Hearth Reduction Furnace
- Gas Cleaning
- Briquetting
- Product Stocking/Ex-Stocking
- Submerged Arc Furnace
- Slag Seperation, Handling and Disposal
- Hot Metal Transport Ladles
- Hot Metal Granulation or Pig Casting Machine
- Gas Cleaning
- Water Treatment/Recirculation
- Control/Laboratory Complex

Steelmaking

Option A

- TwinShell 150ton Electric Arc Furnace Complex
- UHP Transformer/Regulation System
- Batch and Continuous Charging Systems for Metallics
- Batch and Continuous Feeding Systems for Fluxes and Additives
- Gas, Oxygen (low volume), Carbon Injection Systems
- Slag Handling, Processing and Disposal
- Steel Transport Ladles
- Gas/Fume Collection/Handling/Conditioning system
- Water Treatment and Recirculation System
- Maintenance Complex for Furnace Components/Transport Ladles
- Ladle Drying/preheating Stations
- Control/Laboratory Complex

Option B & C

- Hot Metal Desulfurization/Deslagging Station
- Twin Station Conarc Furnace Complex
- UHP Transformer/Regulation System
- Batch Charging Systems for Metallics, Hot Metal
- Batch and Continuous feeding Systems for Fluxes and Additives
- Gas, Oxygen (high volume), Carbon Injection Systems
- Slag Handling, Processing and Disposal
- Gas/Fume Collection/Handling/Conditioning System
- Water Treatment and Recirculation System
- Maintenance Complex for Furnace Components/Transport Ladles
- Ladle Drying/Preheating Stations
- Control/Laboratory Complex

Ladle Metallurgy

- Steel ladle Transfer Cars
- Twin Station Electric Arc Reheating Station
- LP Transformer Regulation System
- Argon Injection
- Cored Alloy Wire Feeding
- Alloy Batching and Addition System
- Gas/Fume Collection/Handling/Conditioning System
- Water Treatment and Recirculation System
- Control/Laboratory Complex

Slab Casting

- Twin Turret for Steel Ladles
- Twin Cars for Tundishes with Preheat
- Weighing Systems for Ladles and Tundishes
- Shroud Handling Systems for Ladles and Tundishes
- Single Strand Fully Segmented Casting Machine
- Top Entry Starter Bar System
- Mold Level Control System
- Fume Collection and Conditioning Systems
- Mold, Machine and Spray Water Control/Recirculation/Treatment
- Slab Measurement/Cut-off/Identification System
- Swarf /Scale Handling System
- Crop Handling System
- Tundish Skulling/Repair/Relining/Drying Stations
- Control Complex

Hot Rolling

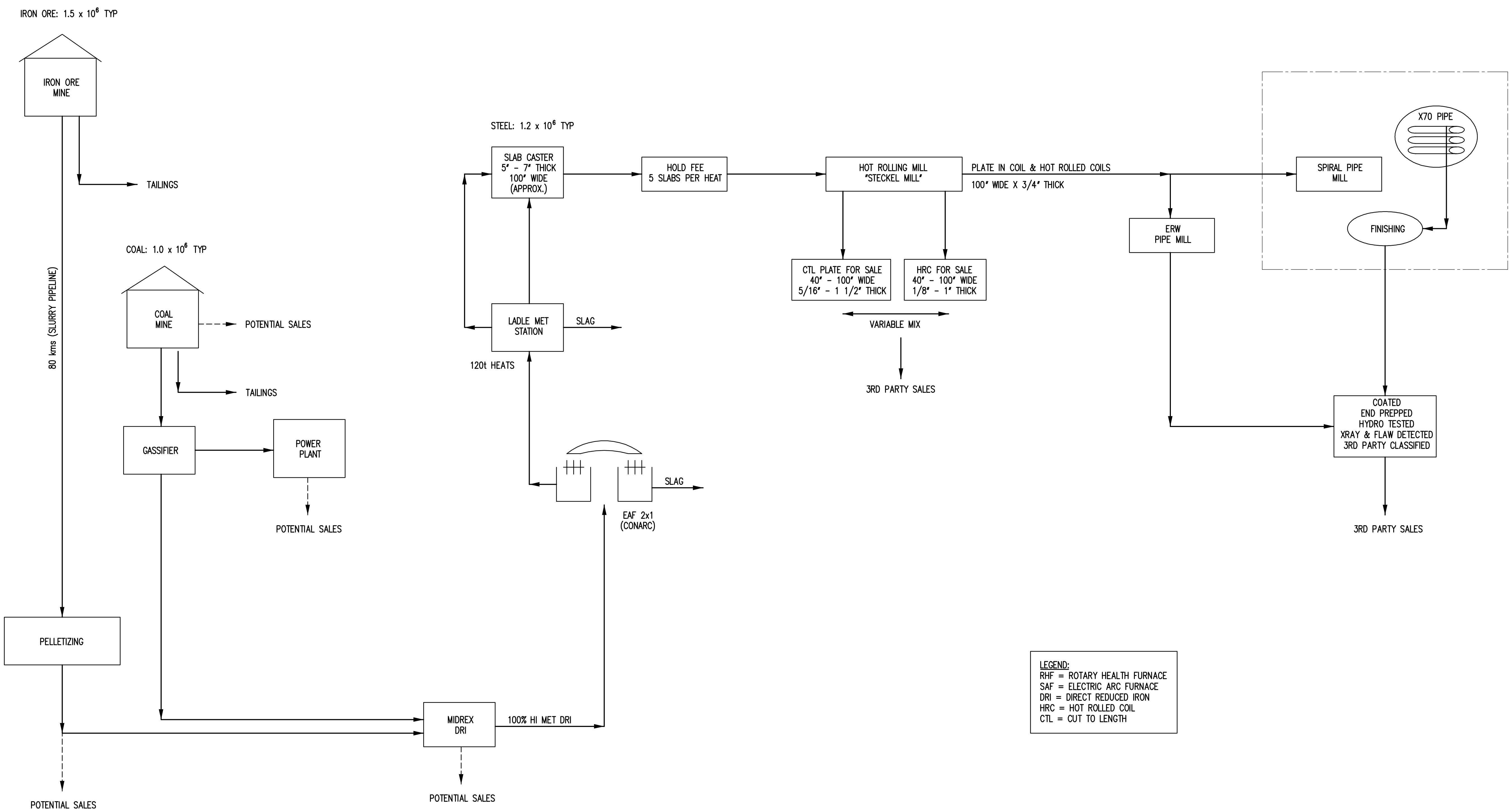
- Slab Equalizing/Reheating Furnace
- High Pressure Descaling System
- Crop Shear with Crop handling System
- Single Stand, 4-Hi Steckel Mill Complex with Edging
- Hydraulic AGC, Roll Bending/ Crown Control
- Coiling Furnaces
- Run-out Table with Laminar Spray Cooling
- Upcoiler with Transfer/Identification System for Coils
- In-Line Leveler for Plate
- Plate Shear and Identification/Handling System
- Scale Handling System
- Water Recirculation and Treatment System

Hot Strip Finishing

- Cooling Yard
- 4- Hi Temper Mill/Rewind Mill
- Cut-to Length Line (Optional)
- Slitter (Optional)
- Packaging and Shipping Complex
- Transfer System to Pipe and Tube Mills

Pipe and Tube Making

- Spiral Mill(s) for 24" + Heavy Wall Pipe incl.
- Uncoiler/Leveller
- Edge Milling
- Strip-to Strip Butt Welding
- High-Speed SA Welding
- NDT
- Pipe Cutoff
- Pipe Handling System
- End Facing
- ND and Hydro-Test
- Coating and Shipping Complex
- Fume Collection and Conditioning
- Water Recirculation and Treatment
- Slag, Scale,Scrap Collection and Handling Systems
- Testing Laboratory
- Control Complex
- Electric Resistance Welding Mill for -32" Pipe and Tube and HSS (Optional) incl.
- Uncoiler/Leveler
- Edge Milling
- ERW Welding
- NDT
- Product Cutoff
- Product Handling System
- End Facing and Coating
- Warehousing and Shipping Complex
- Control Complex



PROGRESS PRINT

JUNE 06, 2002

72291STD.DWG 2002/06/17 08:35

DWG. NO.	REFERENCE DRAWINGS

PROJECT	PROCESS	CIVIL	MECH.	STRUCT.	PIPING	SERVICES	ELECT.	INSTR.	NO	DESCRIPTION	BY	DATE
										ISSUE/REVISIONS		

PROJECT	PROCESS	CIVIL	MECH.	STRUCT.	PIPING	SERVICES	ELECT.	INSTR.	NO	DESCRIPTION	BY	DATE
										ISSUE/REVISIONS		

SECTION:	GENERAL	
SCALE:	NONE	DATE
DESIGN. BY	AM	JUNE/02
DRAWN BY:	DH	JUNE/02
CHECK. BY		
APP. BY:		

PROMITHIAN INC.

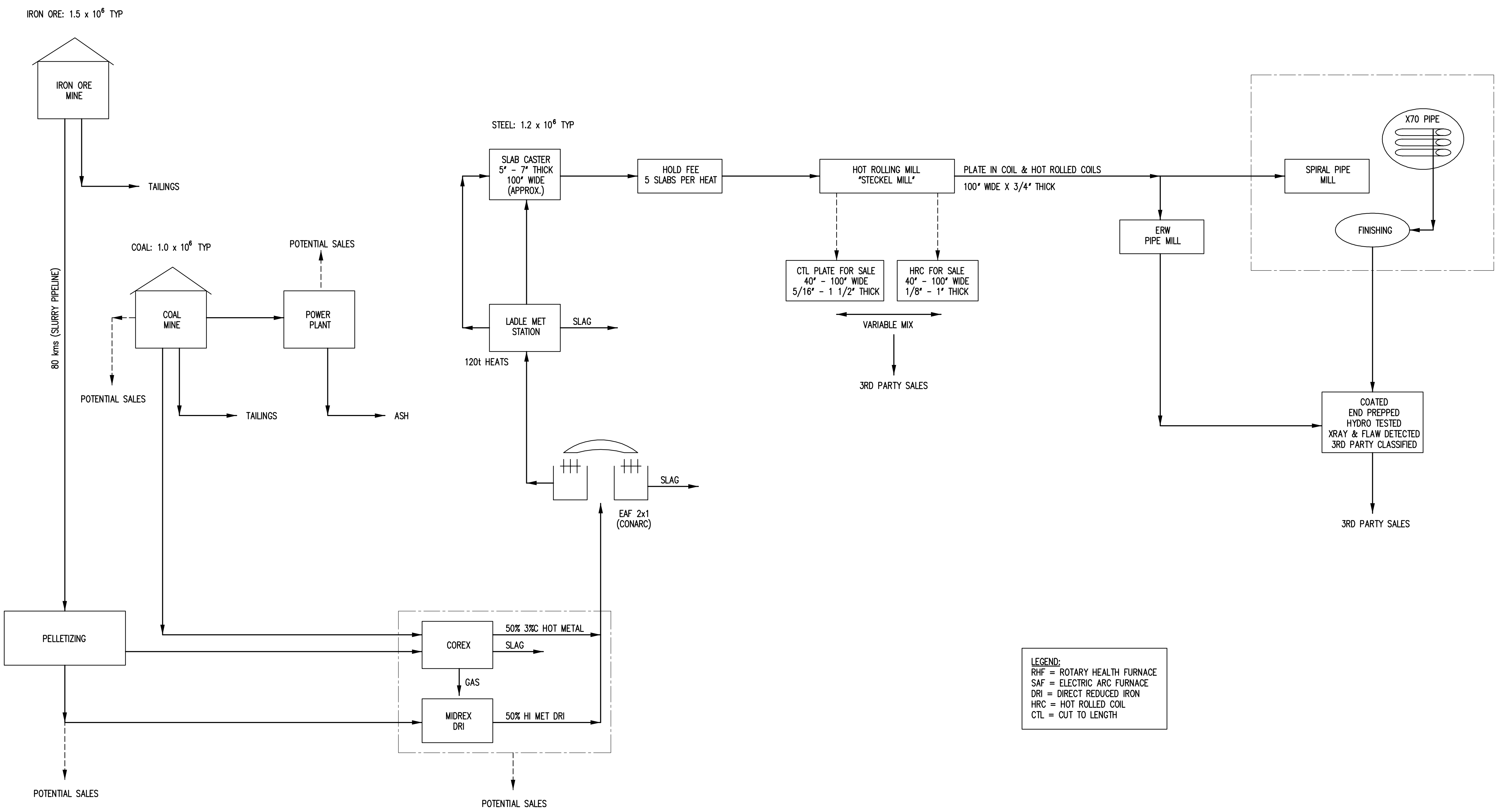
YUKON ILLTYD CREEK

HATCH

TITLE PROMITHIAN STEEL COMPLEX

FLOWSHEET OPTION "A"

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
A0F001A.DWG	72291	FIGURE 2A	A



PROGRESS PRINT

JUNE 06, 2002

THIS DRAWING HAS NOT BEEN PUBLISHED BUT RATHER HAS BEEN PREPARED BY HATCH FOR USE BY THE CLIENT NAMED IN THE TITLE BLOCK SOLELY IN RESPECT OF THE CONSTRUCTION, OPERATION AND MAINTENANCE OF THE FACILITY NAMED IN THE TITLE BLOCK AND SHALL NOT BE USED FOR ANY OTHER PURPOSE OR FURNISHED TO ANY OTHER PARTY WITHOUT THE EXPRESS CONSENT OF HATCH

72291STD.DWG 2002/06/17 08:36

DWG. NO. | REFERENCE DRAWINGS

PROJECT | PROCESS | CIVIL | MECH. | STRUCT. | PIPING | SERVICES | ELECT. | INSTR. | NO | DESCRIPTION | BY | DATE — ISSUE/REVISIONS

PROJECT | PROCESS | CIVIL | MECH. | STRUCT. | PIPING | SERVICES | ELECT. | INSTR. | NO | DESCRIPTION | BY | DATE — ISSUE/REVISIONS

SECTION:	GENERAL	
SCALE:	NONE	DATE
DESIGN. BY	AM	JUNE/02
DRAWN BY:	DH	JUNE/02
CHECK. BY		
APP. BY:		

PROMITHIAN INC.

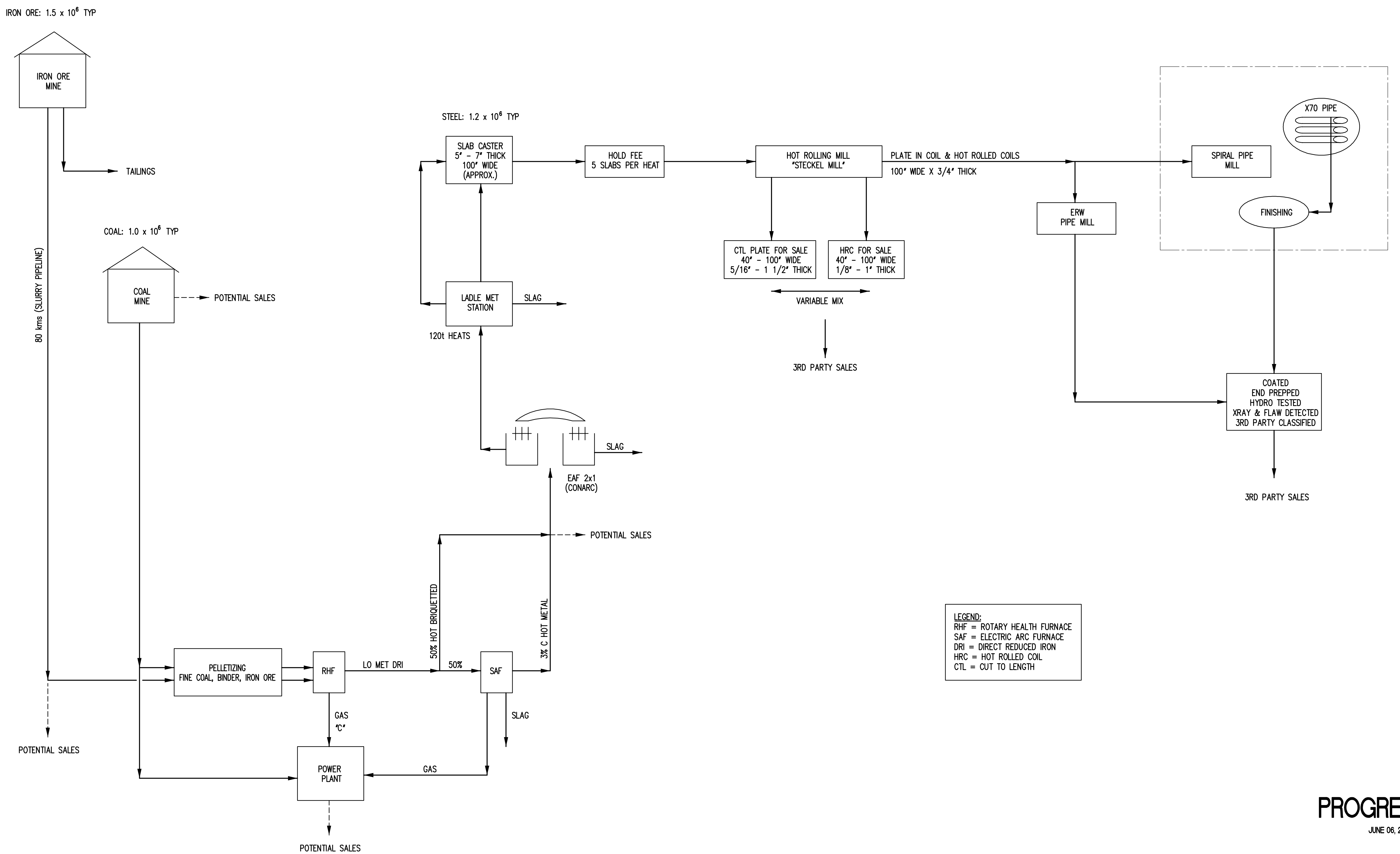
YUKON — ILLTYD CREEK

HATCH

TITLE: PROMITHIAN STEEL COMPLEX

FLOWSHEET OPTION "B"

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
A0F001B.DWG	72291	FIGURE 2B	A



PROGRESS PRINT

JUNE 06, 2002

72291STD.DWG 2002/06/17 08:36

DWG. NO.	REFERENCE DRAWINGS

PROJECT	PROCESS	CIVIL	MECH.	STRUCT.	PIPING	SERVICES	ELECT.	INSTR.	NO	DESCRIPTION ISSUE/REVISIONS	BY	DATE

PROJECT	PROCESS	CIVIL	MECH.	STRUCT.	PIPING	SERVICES	ELECT.	INSTR.	NO	DESCRIPTION ISSUE/REVISIONS	BY	DATE

SECTION:	GENERAL	
SCALE:	NONE	DATE
DESIGN. BY	AM	JUNE/02
DRAWN BY:	DH	JUNE/02
CHECK. BY		
APP. BY:		

PROMITHIAN INC.

YUKON ILLTYD CREEK

HATCH

TITLE PROMITHIAN STEEL COMPLEX

FLOWSHEET OPTION "C"

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
A0F001C.DWG	72291	FIGURE 2C	A

3 Project Contacts

Philip Wheelton
President, Promithian Inc.
209-2995 Princess
Coquitlam, B.C.
V3B 7N1
Phone (604) 715-2274
Fax (604) 468-8390
wheelton@direct.ca

Sam Wallingham
President, Nacho Nyak Dun Development Corporation
405 Ogilvia Street
Whitehorse, Yukon
Y1A 2S5
Cell (867) 333-2403
Fax (867) 456-2172
sam.nnddc@northwestel.net

Lori Walton
Senior Mineral Development Advisor
Department of Energy, Mines and Resources
Government of Yukon
Box 2703
Whitehorse, Yukon
Y1A 2C6
Phone (867) 667-5462
Fax (867) 393-6232
lori.walton@gov.yk.ca

Appendix A
Promithian Pipeline Demand Forecast

Option	**Prudhoe Bay Pipeline**				
1	42 inch diameter 3/4" wall thickness x80 steel (80,000 psi specific min. yield strength)				
	1084 lbs/meter		1084		
				Total weight of steel	
	2816	kilometers		Pounds	Tonnes (metric)
	2816000	meters		3,052,544,000	1,387,520
2	52 inch diameter 1" wall thickness (x100 steel?)				
	estimated weight= interpolation from 30 to 42 to 52 inch = 1356 lbs/meter				
		from 3/4" to 1" = 1.333 x 1356 lbs/meter = 1808 lbs/meter			
			1808		
				Total weight of steel	
	2816	kilometers		Pounds	Tonnes (metric)
	2816000	meters		5,091,328,000	2,314,240
3	**MacKenzie Valley Pipeline**				
	30 inch Diameter Pipeline 3/4" wall thickness				
	769 lbs/meter			Pounds	Tonnes (metric)
	2200	kilometers	769	1,691,800,000	769,000
	2200000	meters			
	Total Steel Weight (tonnes)				
	Low estimate is Option #1 + #3				**2,156,520**
	High estimate is Option #2 + #3				**3,083,240**

Pipeline steel is approx. 97% Iron (Fe) by weight

----- Original Message -----
From: Phil Wheelton
To: Klawonn, Rob
Sent: Tuesday, February 05, 2002 9:33 PM
Subject: Promithian - Pipeline scenarios

Rob,

I hope you have received the cd's with the information on the Wind River Coalfield and the Snake River Iron ore deposit by now. They were sent on Monday.

As I mentioned in my last E-mail I have worked out a number of scenario's to do with possible pipeline steel tonnage demand:

# 1 MacKenzie Valley Pipeline only:	769,000 mt
# 2 MacKenzie Valley Pipeline followed by	769,000
Foothill's Southern Route Prudoe Bay Pipeline	1,387,520
	2,156,520 mt
# 3 MacKenzie Valley Pipeline followed by	769,000
Northern Route Prudoe Bay Pipeline-twin 36"	2,196,990
	2,965,990 mt
# 4 MacKenzie Valley Pipeline followed by	769,000
Prudoe Bay Northern Route single 36" and	1,098,495
Prudoe Bay Northern Route twin 42"	2,569,080
	4,436,575 mt

At this time I would have to say that scenario number 3 is the most likely to occur - with scenario number 2 following it. An affordable, local, supply of pipeline pipe will substantially reduce transportation costs and thus increase the likelyhood that all pipelines will eventually be built - scenario number 4. These numbers exclude any collection systems needed or spur line connections to other sedimentary basins.

As an aside - the Hunt Brothers, from Texas, have just acquired a 450 square kilometre oil and natural gas license in a sedimentary basin just north of our location.

Philip J. Wheelton
Promithian Inc.

Appendix B
IPSCO Plate Mill

Appendix C
Midrex Technical Paper

Appendix D
Technical Paper on Gasification

Appendix E
Technical Report on Iron Reduction Process

Appendix F
Coalbed Methane Potential of the Bonnet Plume Basin

Appendix G

The Bonnet Plume – A Canadian Heritage River