NORONT

Noront Ferrochrome Production Facility

October 2017

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Ferrochrome Production Facility

Summary

The Ferrochrome Production Facility (FPF) receives mined rock and concentrate (processed rock) from the mine and produces ferrochrome. The key design objectives for the FPF development are:

- Two stage project, to establish economic market penetration.
- The first stage is to produce 200,000 – 280,000 tonnes per year (t/y) of High Carbon Ferrochrome (HCFeCr) from lump ore sent from the Blackbird Mine.
- The second stage with annual production of 560,000 tonnes per year (t/y) of High Carbon Ferrochrome (HCFeCr) from lump and chips/fines concentrate sent from the Black Thor Mine and Concentrator (M&C)
- Highest quartile ferrochrome product quality
- Lowest quartile operating costs
- Operate in an environmentally responsible and sustainable manner.

The FPF flowsheet has not been finalized. The current flowsheet assumptions are based on pre-heating concentrate and calcining limestone and anthracite in rotary kilns. This is followed by reduction and metal production in direct current (DC) open bath furnaces. The main benefits of this flowsheet are improved energy efficiency, increased chromium recovery and the ability to process a range of concentrate size fractions from fines through to lump concentrate without pelletizing the fines. These features are fundamental to achieving the objectives of processing lump and chips/fines concentrate, while achieving the lowest quartile operating costs and minimal technology risk.

The process block flow diagram and number of equipment lines for the plant are summarized in Figure 1. The block flow and number of equipment lines are based on maximizing the operability of the plant and minimizing the number of operating staff and operating costs, while staying within proven equipment sizes. The Stage 1 plant will operate 2 lines producing 200,000 - 280,000 tpa and the Stage 2 facility producing 560,000 tpa from 4 lines.

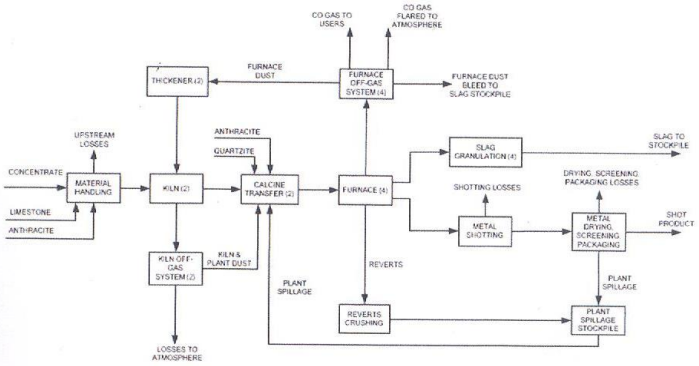

Figure 1: FPF Block Flow Diagram

Annually, 500,000 – 750,000 dry tonnes of lump ore in Stage 1 (and 1.2 million dry tonnes of lump ore and chips/fines concentrate in Stage 2) will arrive in containers by rail from Nakina after trucking from the mine site on the North-South Road. This ore/concentrate will maintain an average chromium oxide (Cr_2O_3) content of 40% in stage 1 and 43% in stage 2. Material will be crushed upon unloading from the ore/concentrate containers and prior to transfer to storage. Crushed lump, chips and fines concentrate, along with anthracite and limestone, will be pre-heated in two rotary kilns. The limestone and anthracite will be calcined. The hot calcine, along with quartzite and additional anthracite as needed, will be transferred directly into one of the four 65 megawatt (MW) DC furnaces via one of two calcine transfer systems.

The calcine is melted and the chromite and iron oxides are reduced by the anthracite. HCFeCr, at 55% to 58% chromium (Cr) and 6% to 8% carbon (C), will be tapped and shot at one of two shotting stations. Once dried and classified by size fraction, the shot product will be shipped to market via rail and transport ships. An overall chromium recovery of 90% is expected to be achieved.

Slag generated in the furnaces will be granulated and slurry pumped to the slag pile for long term storage. Further analysis is needed to understand the potential for industrial uses for the slag.

Carbon monoxide (CO) gas generated by the reduction process in the furnaces will be cooled, cleaned and used as a fuel, primarily in the kilns, but also as a utility fuel. Excess CO, which will predominantly occur in summer months, will utilized for power cogeneration, additional heating or will be flared. As with the overall flowsheet selection, utilization of CO-gas in the kilns is a critical component in the energy efficiency of the FPF and to achieving the lowest quartile operating cost objective.

The overall plant layout is presented in Figure 2.

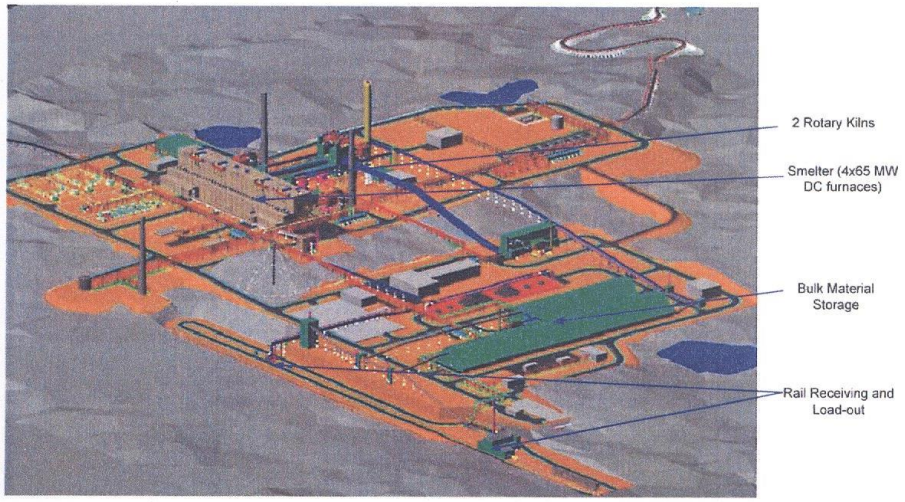

Figure 2: Ferrochrome Facility

All unit operations at the FPF use proven, state-of-the-art technology for the ferrochrome (FeCr) and/or ferroalloy industries. All operating parameters at the FPF are within the range seen in successfully operating facilities. For example, the kilns are 5 metres (m) in diameter by 140 m long and the DC furnaces are 65 MW (design capacity).

Project characteristics are:

- A 30 year minimum plant life
- A plant operating factor of 84%
- Continuous operation 24 hrs per day, 365 days per year. No planned plant-wide annual maintenance shutdown
- Best available technologies are used for dust capture from process and material handling steps. Dust is recycled to the process as filter cake into the kilns and as dry dust direct into the furnaces
- Power is supplied via a 230 kV double-circuit transmission line with a total connected load of 347 MW for stage 2 and a connected load of 210MW for stage 1
- A central control room, with local workstations is located near key process areas
- Utility supplies for nitrogen, oxygen, natural gas (or LPG as an alternative), diesel, compressed air, fresh water, process water, potable water and softened water are included.

To operate 24/7, 365 days per year, the Stage 2 FPF will be staffed with a total headcount of 494 personnel. This is distributed between a day shift and four rotational shifts of 12 hours each. The Stage 1 facility will have approximately 60% of the full plant staffing requirements.

The facility is to be wholly operated by Noront personnel and will only include contractors for non-core or intermittent specialist activities. All the required functions for operation will be performed by personnel based at the FPF site. This includes all administrative and support staff, as well as full maintenance capacity and operational coverage. Maintenance shutdowns of specific equipment items or lines will be planned for summer months whenever possible.

Conventions

The abbreviations that are commonly used in this document are defined below in Table 1.

Table 1: FPF Common Abbreviations

Term	Abbreviation
Carbon Monoxide	CO
Feasibility Study	FS
Ferrochrome Production Facility	FPF
Furnace off-gas	FOG
High Carbon Ferrochrome	HCFeCr
Kiln off-gas	KOG
Loss on Ignition	LOI
Liquid Propane Gas	LPG

Mine and Concentrator	M&C
Pre-Feasibility Study	PFS
Rotary Kiln	RK
Secondary off-gas	SOG

Ferrochrome Production Process

There are several processes in use today in the ferrochrome industry. Determining the preferred process is dependent on a number of factors, including the type of concentrate to be treated, minimizing emissions, and the cost of energy. Main processes in use globally include:

- Traditional ferrochrome production via direct feed of dried lump and chips concentrate to a submerged arc alternating current (AC) furnace
- Traditional ferrochrome production via direct feed of dried concentrate, including lump and chips/fines, to an open bath DC furnace
- The Outokumpu process where pellets are sintered and fed to a submerged arc AC furnace.

A final flow sheet choice has not been made at this time and will be the conclusion will be the result of future work. The current assumption is a pre-heat reduction kiln followed by reduction and metal production in direct current (DC) open bath furnaces The main flowsheet items at the FPF are laid out below:

- Lump ore/concentrate will be crushed as it is unloaded from the concentrate containers and prior to transfer to the concentrate storage building
- Lump ore/concentrate, limestone, and anthracite will be pre-treated and pre-heated in two direct-fired rotary kilns
- Each kiln off-gas system will consist of a cyclone, spray cooler and baghouse with the addition of tempering air between the spray cooler and baghouse
- Transfer of hot calcine from rotary kiln discharge to electric furnace feed bins will be handled via two calcine transfer systems
- Four 65 MW DC open-bath electric furnaces will be used for chromite smelting
- Each furnace will have dedicated 1st and 2nd stage furnace off-gas cleaning systems. The gas cleaning equipment was selected to maintain positive pressures throughout the system
- Two secondary off-gas systems, each servicing two furnaces and one calcine transfer system
- A distribution system will be use to distribute CO-gas as a utility fuel
- Molten metal will be shot in one of two metal shotting systems, with a footprint allowance for metal casting.

Open bath furnace operation is proven in ferrochrome and in the processing of fine material in general. Open bath (molten metal exposed near the electrode) furnace operations achieve much higher chrome

recovery than submerged arc (slag covers molten metal) furnace operations. NB: both these types of furnaces are closed furnaces, which keep air from entering the furnace where it could react with metal or the carbon-rich atmosphere.

Pre-treatment of furnace feed has other benefits aside from processing fines into pellets. There are significant energy savings with the drying, pre-heating and pre-reduction of feed in a kiln prior to addition to the furnaces. Additional benefits include lower carbon consumption, lower hydrogen (H_2) formation in the furnaces resulting in a more stable furnace operation and lower furnace off-gas volumes. Pre-heating with CO from furnace off-gas reduces natural gas consumption and overall greenhouse gas (GHG) emissions.

To produce HCFeCr, the following reductant and fluxes are required:

- Anthracite as a reductant
- Limestone to control the slag basicity and lower the slag liquidus temperature
- Quartzite as a flux in the furnaces to control the slag basicity and lower the slag liquidus temperature.

Reduction Kilns and Transfer

At the FPF, rotary kilns will pre-treat furnace feed, which may include concentrate fines. The rotary kiln size is 5 m diameter by 140 m long, which is well within the demonstrated kiln sizes in the industry, where the largest kilns are over 6 m in diameter and up to 185 m long.

The temperatures were targeted to achieve pre-reduction levels of 80% Fe and 40% Cr metallization. The kilns are not expected to experience sintering issues because the design kiln hot zone temperature is 1,200°C, well below 1,300°C where sintering began to occur in the lab scale and pilot kiln testwork.

Fines pre-reduction in a rotary kilns is a well-developed process and practised by the industrial sands, FeNi and cement industries. The process conditions for industrial sands are very similar to chromite pre-reduction, with similar carbothermic reactions and operating temperatures.

Kiln off-gas will be cleaned of dust by a dedicated system per kiln, consisting of a dual cyclone, spray cooler, baghouse and scrubbing system..

Hot calcine is discharged from the kilns and is mixed with quartzite, plant spillage and dust in the calcine transfer container. The containers are then transferred via a combination of calcine transfer car and crane to the top of the furnace feed bins.

One calcine transfer car and one calcine transfer crane will generally service two furnaces, although cross-feeding is possible. Two calcine containers service each kiln, transfer car and crane combination; there are four containers in total that are operational at all times. Spare containers will be available.

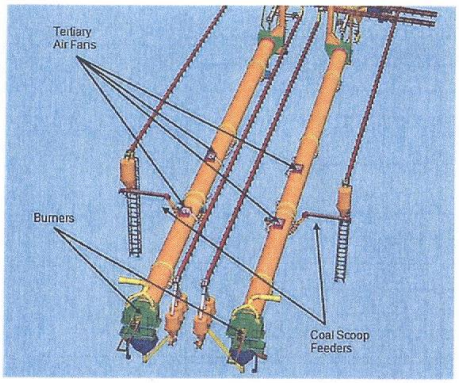

Figure 3: Rotary Kilns

DC Furnaces

The FPF will include two 65 and ultimately four circular 65 MW DC furnaces.

Each of the four FPF furnaces will have a dedicated gas cooling and cleaning system consisting of a quencher, jet venturi, spray tower and disintegrator.

The off-gas system has a dedicated gas system per furnace. The main driver for this is to allow the operation of each furnace to be independent of the downstream CO-gas distribution system. Each furnace can flare it's off-gas after cleaning, prior to tie-in to the CO-gas collection header. This would not be possible with other configurations, as the gas would contain significant particulates at the tie-in point, and environmental constraints would severely limit the operating time while flaring this gas.

Metal Shotting

Metal handling in the FeCr industry has traditionally been done by metal casting. A final decision has not been made on this and depends on further customer input. The current assumption is to shot the material. With casting, molten metal is poured into moulds formed from product fines on the floor of a bay and allowed to cool into solid pigs, which are subsequently crushed to customer specifications. However, metal casting requires a large casting bay, results in higher handling losses and is a large source of fugitive dust emissions. Instead, the FPF will have two metal shotting stations for metal handling.

With metal shotting, full metal ladles will be placed onto a ladle tilter, which will pour the molten metal onto a heated tundish. Molten metal will flow over a refractory plate. Metal dropping onto the plate will be deflected into a water filled tank. The solidified shot product is dewatered, dried and classified by size prior to shipping.

The FPF will produce low silicon HCFeCr. The ferrochrome will be sold as a shot or cast product. The product specifications are provided in Table 2.

Table 2: HCFeCr Properties

Parameter	Units	Nominal	Design
Particle SG		6.8	
Bulk Density			
High Si Shot Product	t/m^3	4.0	
Low Si Shot Product	t/m^3	2.4	
Composition			
Cr total	wt%	57.6	55.1 to 57.8
C total	wt%	8.0	6 to 8
Fe total	wt%	32.5	30 to 35
Cr°	wt%	57.6	55.1 to 57.8
C	wt%	6.1	6 to 8
Fe°	wt%	6.4	
Fe_3C	wt%	28.0	
S	wt%	0.027	0.012 to 0.03
Si	wt%	1.0	0.5 to 4
Al	wt%	0.06	0.25
Ca	wt%	0.20	
P	wt%	0.02	0.015 to 0.025
Ni	wt%	0.19	0.50
Co	wt%	0.025	0.10
Cu	wt%	0.009	0.050
Hg	wt%	0.0003	
Mn	wt%	0.25	0.33
Pb	wt%	0.0	0.005
Ti	wt%	0.026	0.50
V	wt%	0.10	0.50
Zn	wt%	0.0029	0.005
Total	wt%	100.0	

Slag Handling

Slag is typically handled by either slag granulation or molten hauling. With slag granulation, molten slag flows into a sluicing launder where a water spray head breaks up and granulates the molten flow. The material is collected in a tank and dewatered via one of many methods (e.g., bucket excavator, gravity drain). With molten hauling, pots of molten slag are transported by Kress hauler for dumping into a pit or valley.

Current analysis indicates slag granulation is preferred due to lower operating costs and additional flexibility with respect to site constraints. The granulated slag will be pumped as a slurry to the slag handling facility, where the water will gravity drain from the slag pile into the slag pond and be treated before release. Other countries use granulated slag as a construction material, since its properties are quite stable and leaching of metals is minimal or not seen. The specific properties of Noront's slag are being determined in conjunction with government agencies, so applications for slag are still being considered in Ontario.

Dust Collection and Wet Scrubbing

The production processes apply best practices and technology to minimize the creation of the toxic and soluble compound Hexavalent Chromium (Cr(VI)) which can be formed at high temperatures in the presence of oxygen or strong bases. To avoid these conditions, the DC furnaces are the closed type to prevent air ingress, the furnace charge is carbon-rich so any oxygen converts to carbon monoxide (CO, which is used as a fuel elsewhere), and the furnace charge composition is maintain slightly acidic. Similarly, the preheating/pre-reducing kiln process is carbon-rich and slightly acidic.

Even with precautions, it is assumed there may be some hexavalent chromium formed in processes, so the off-gasses and dusts are passed through dust collection and wet scrubbing systems. The wet scrubbers use the high solubility of hexavalent chromium to capture it. The water from the wet scrubbers is treated with an acidic solution to convert hexavalent chromium into the stable tri-valent chromium (Cr(III) which settles and is collected. The collected dusts from the baghouses and settled material from the scubbers are return to the furnaces for conversion to ferrochrome.

Overall Location Selection

A number of factors need to be evaluated for potential locations for the FPF, including:

- Proximity to suitable electrical infrastructure and robustness in the electrical grid to support over 300 MW of electrical demand including electric furnaces
- Proximity to a main rail line
- Proximity to a natural gas line
- Road infrastructure and access
- Cost of power and certainty with respect to the power cost via a long term supply agreement
- Transportation costs to the location, both from mine and from the sources of the major consumables, especially anthracite
- Transportation costs to the main ferrochrome customers
- Availability of a trained and experienced workforce to staff the operation.
- Expected environmental impacts of the smelter on the various locations

The Noront strategy is to utilize a brownfield site in Ontario.

Overall Site Layout

The overall FPF site layout for the main process facility is shown in Figure 5. The red and blue arrows represent the high level flow of feed and product, respectively, through the site.

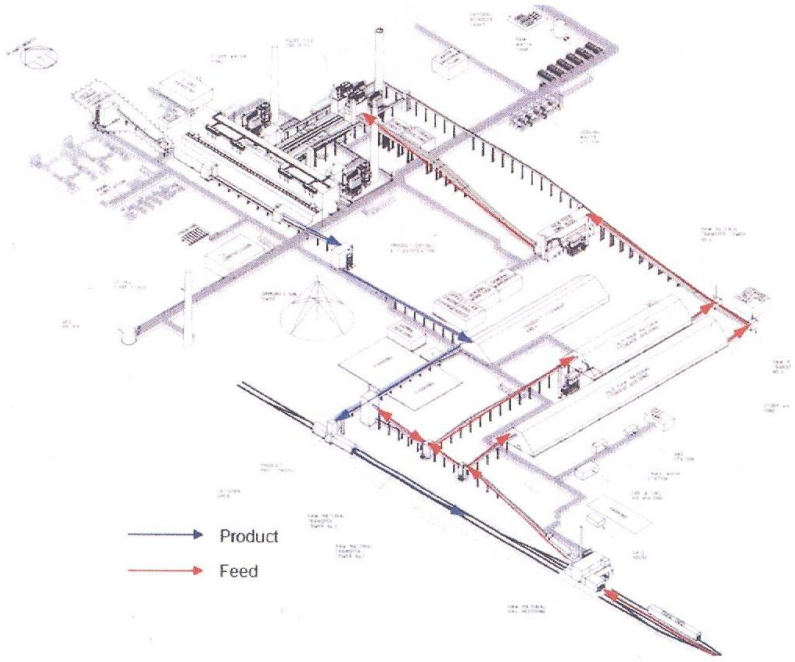

Figure 5: FPF Overall Site Plan

The FPF site layout will be developed based on the flow of material through the plant, the nature of the equipment and its fundamental layout requirements, the optimization of bulk earthworks given existing topography and access throughout the facility for maintenance.

The site will require a suitable footprint for process facilities, logistics facilties, utilities and waste storage areas. The size of the ultimate property is in the range 1.5km by 1.5km or 556 acres.

Consumables

The following consumables are based on the Stage 2 plant. The requirements for Stage 1 are approximately 50% of this need.

Power

Electrical power at the FPF will be procured from the Ontario Grid under agreements signed with various regulatory bodies as part of the Ontario Power Authority (OPA) Industrial Electricity Incentive (IEI) Program.

Power will be delivered to the FPF site at 60 Hz and transformed to the plant voltages summarized in Table 3.

Table 3: FPF Voltage Levels and Application

Voltage	System	Grounding	Application
230 kV	3-Phase/3-Wire	Solid	Utility Supply/Main Substation
69 kV	3-Phase/3-Wire	Solid	Furnace Distribution
34.5 kV	3-Phase/3-Wire	400 A Resistance	Plant Primary Distribution
13.8 kV	3-Phase/3-Wire	Solid	Overhead Line
4.16 kV	3-Phase/3-Wire	25 A Resistance	MV Motors
600 V	3-Phase/3-Wire	5 A Resistance	LV Motors/Welding Receptacles
600/347 V	3-Phase/4-Wire	Solid	Process Area & Outdoor Lighting
208/120 V	3-Phase/4-Wire	Solid	Indoor Lighting/Receptacles/UPS
125 VDC	2-Wire DC	Not Grounded	Switchgear Control

The stage 2 peak electrical load demand at the FPF is expected to be approximately 320 MW. This includes 260 MW of furnace load and 60 MW of motive and service loads. The stage 1 will require approximately 50% of this requirement and shown in Table 4.

Table 4: Electricity Requirement for Full Plant

Parameter	Value
Connected Power (MW)	347
Peak Demand (MW)	320
Annual Nominal Demand (MW)	257

Power consumption including furnace and motive power per year is:

- Stage 1 – 0.8 – 1.35 million MWhr
- Stage 2- 2.25 million MWhr

Fuels

Natural gas has been specified the following operations:

- As a supplementary and back-up fuel for CO-gas users (including kilns, dryer, building heating)
- For the rail car thaw shed heaters
- For the liquid nitrogen vaporizer.

The original design used LPG, but compressed natural gas will be evaluated depending on availability to meet facility requirements. LPG delivery and distribution system is sized to supply the fuel requirements suitable for the continuous (24 hours a day, seven days a week) operation of the FPF, with no CO-gas available. The quantities of LPG required at the FPF are shown in Table 5 for the for the Stage 2 project. Stage 1 requirements are 40 - 50% of the Stage 2.

LPG storage, at a minimum, will equal two days of the FPF operating purely on LPG (660,000 L).

Table 5: FPF LPG Requirements

LPG Supply	Units	Value
Plant Start-up (6 months)	L	52,000,000
Nominal Operation	L/y	5,000,000
Instantaneous Peak Rate	L/h	25,400

Diesel fuel will be required at the FPF as fuel for mobile equipment and emergency power generation. Diesel requirements for the FPF are summarized below in Table 6.

Table 6: FPF Diesel Requirements

Mobile Equipment Type	Annual Requirements (L/y)
Vocational Trucks	571,809
Heavy Construction Equipment	1,415,178
Light Construction Equipment	336,340
Miscellaneous	217,073
Contracts	135,517
Total	2,675,917

Diesel will be delivered to the FPF in trucks and stored in a 100,000 L storage tank. Based on the nominal demand of the FPF mobile equipment, this corresponds to approximately 15 days of on-site storage.

Utilities

Compressed air will be required on-site for process equipment and instrumentation. The areas that use the most compressed air are as follows:

- Kilns
- Kiln off-gas systems
- Furnace off-gas systems.

Eight air compressors (7 operating, 1 standby) will provide the required flows. Each air compressor must have a capacity of 3,566 Nm^3/h. The total compressed air demand is calculated to be 21,120 Nm^3/h.

The air will be fed into two primary air receivers and dried by three air-dryers. Plant air is discharged to the required users while instrument air is discharged through a separate air receiver.

Water is used at the FPF in the following capacities.

- Fresh water

- Process water make-up
- Potable water
- Softened water.

Water demand for the Stage 2 FPF is summarized in Table 7. Stage 1 demand is 50% of stage 2.

Table 7: Water Demand by Type of Water

Water Type	Units	Nominal	Design
Fresh Water Demand	m^3/h	306.3	367.6
Process Water Make-up Demand	m^3/h	261.8	322.4
Potable Water Demand	m^3/h	3.8	22.6
Softened Water Demand	m^3/h	41.3	61.3

Waste Design and Layout

The process at the FPF will produce two main streams of waste material:

- Slag, produced as a by-product of smelting
- Dust, generated in the furnace.

Dust will be recycled into the process.

Slag tapped from the furnace will flow from a hot launder to a sluicing launder where it will be granulated with pressurized water. The granulated slag from the granulation tank, along with furnace dust bleed, will be pumped as slurry to the slag handling facility for storage.

The footprint and development of the common slag pile is constructed in two stages. Stages 1 and 2 will occupy approximately 14.8 ha and 29.8 ha, respectively. This will also enable progressive closure and minimize the catchment area of impacted water. Commercial application of slag are being pursued, as done in Europe and elsewhere.

Greenhouse Gas Emissions

The main source of CO_2 emissions from the FPF is from anthracite used in the process as a reductant. Table 8 is the FPF carbon mass balance. This estimate only encompasses on-site CO_2 emissions, excluding all upstream emissions associated with the production and shipment of reagents, concentrate, fuel and electricity. The total CO_2 life cycle footprint for the facility will be higher. The carbon balance shown is based on anthracite being used as 100% of the reductant requirements.

Table 8: FPF Carbon Balance

Parameter	t/y
Carbon Inputs to Site	
Limestone	12,200
Anthracite	256,900

Parameter	t/y
LPG	2,100
Diesel	2,000
Total Carbon Inputs to Site	273,200
Carbon Outputs from Site	
Ferrochrome	34,160
Carbon as CO_2	239,040
Total Carbon Output from Site	273,200
Annual CO_2 tonnage	880,000

Stage 1 emissions are 40-50% of the Stage 2 per year.

Greenhouse gas emissions are minimized at the FPF by using furnace off-gas, which is rich in carbon monoxide, as a fuel on-site. Cleaned CO-gas will be used as the primary fuel for:

- The two rotary kiln burners
- The shot product dryer burner
- Ladle pre-heaters and curing station burners
- The boiler for all process and non-process building heating
- Flare stack pilot burners.

Using the furnace off-gasses reduces the amount of natural gas consumed for these pre-heating (87MW) and heating requirements, reducing CO2 emissions from the FPF by 187,500 tonnes per year for the Stage 2 facility.

NORONT

Guidelines for

Proposing Sites to Locate

Noront Resources Ltd's

Ferrochrome Production Facility

October 2017

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1. INTRODUCTION

Noront Resources is planning to develop a Ferrochrome Production Facility on a Brownfield site in Northern Ontario. It is anticipated this facility could operate for many years. This guideline is provided to aid communities to prepare a compelling case for locating the facility in their community. The case or proposal should address the topics listed in the order provided below, with sufficient information to express the case and to aid Noront to make an informed decision.

Noront recognizes that each community will have differing strengths and weaknesses. Noront will apply a rating to the answers on each topic to allow comparison.

Each community's response should provide sufficient information to Noront to aid the selection of a site for its facility. The compelling case should explain the rationale as to why the ferrochrome production facility should be installed in or near the proposed community. It is crucial to ensure that critical information be provided in all areas Noront requires to make this decision. The following topics are shown as guidance on the type of information to be provided, however communities are requested to elaborate and add other factors which will enhance the proposal and aid Noront in its selection.

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2. SUITABILITY OF THE PROPOSED FERROCHROME PRODUCTION FACILITY SITE

Noront has prepared a separate document describing the processes and other facility details for a Ferrochrome Production Facility: "Noront Resources: Ferrochrome Production Facility", October, 2017. The site will be developed in 2 phases with 2 electric arc furnaces being required for each phase. Phase 1 will process lump ore, whereas the Phase 2 facility will process concentrate and lump ore which contains more material. The site will need space to store stock piles of raw materials (chromite ore, coal, quartzite, limestone) and stock piles of finished products (ferrochrome) and granulated slag.

Preference is being given to developing on an existing Brownfield site which offers:

- Proximity to a community that is familiar with large resource sector infrastructure and has the labour force and supplier network to support the facility.
- Infrastructure for shipping (roads, rail, port), gas and electrical power supplies, and water and waste water facilities.
- Existing environmental legacy and suitability for future environmental conditions: emissions, process waste handing.

2.1. Site Description

This first section should describe the proposed site. Noront's requirements are noted. Each community needs to address the requirements listed and to elaborate as appropriate.

2.1.1. Size of the Site

The site will have to be large enough to contain all the operations, including stockpiling of raw materials, slag, and products; the pretreatment and production processes; offices, warehousing, and ancillary buildings; site roads, services, and utilities. The site size aids with retaining any emissions within the property boundaries. An area of 1.5 kilometres by 1.5 kilometres is specified. Dimensions should be provided. Topographic conditions are also required since the useable space will have to be reasonably flat. The area of the proposed site should be stated clearly.

2.1.2. Distance to Nearest Water Bodies

Provide distances to nearest water bodies. Facilities will need to beset back from creeks, rivers, ponds, and lakes so distances must be provided. If the site has internal waterbodies this must be clearly shown,

2.1.3. Separation of the Site from Residential Areas and Other Neighbouring Facilities.
Noise, light, traffic and other factors make it attractive to have separation between the facility and any other occupied areas or public spaces, like parks. Please provide distances and directions to the nearest neighbouring areas and explain the use of them. Note distances to public areas, schools, other businesses and government offices. Note distances to any environmentally sensitive areas, like conservation areas or protected sites.

2.1.4. Proximity to Other Large Industrial Facilities.
Distances and shared services should be described. As well, any factors which would be considered cumulative effects for permitting. This could also impact availability of labour and services. Please discuss all relevant information regarding neighbours to the proposed site.

2.1.5. Environmental History of the Site
It is extremely important that prior uses of the site be understood. There may be restrictions on use and other stipulations which could impact the suitability of the site or future remediation requirements. It could be advantageous to apply another industrial use on a site rather than leaving it vacant or remediating, however Noront will need to know about any impacts previously made to the site and possible cumulative effects or compatibility issues. Describe any known spills of contamination. If remediation is likely to be required before Noront can use the site or an area of the site, explain the extent, cost and how this work will be done and funded.

Describe all previous uses, spills, remediation activities and other impacts on the proposed site. This should include industries that have been located there, including any temporary storage which could have contaminated or disturbed the site. If any additional remediation is required, this should be described and copies of relevant ministry filings appended for reference.

2.1.6. Zoning
Note the zoning of the site and neighbouring areas. Indicate whether changes to zoning will be required to make the site suitable for use by Noront. Note any community or regional planning that could lead to zoning changes.

2.1.7. Local Community Sensitivities and Concerns for Adding a Metallurgical Facility
Noront will be conducting "open house" meetings with local residents as part of the site permitting process. The information in this section should sensitize Noront to key local issues or concerns. Describe the local community's familiarity with and history of supporting or opposing industrial facilities, especially metallurgical facilities.

2.1.8. Weather Conditions and History

Along with typical rain and snow levels, please describe any weather events that could impact a facility, like relatively high levels of fog, whiteout conditions, flooding, shadfly infestations or other site-specific conditions which would have to be accommodated.

2.2. Site, Local and Regional Infrastructure

This section will provide details on pertinent aspects of the site to meeting Noront's needs. Each site has unique conditions and factors in its favour or making it less attractive. The list of topics below may have missed an important aspect of the proposed site, which should be discussed at the end of this section.

2.2.1. Roads To and On the Site:

Depending on options for shipping materials to and from the site (rail, port), Noront will require adequate road access to the site. Overall material handling could be several million tonnes per year, which would equate to over 200 truckloads per day if access is by road only. Additional traffic will come from personnel, contractors, and suppliers. Construction activities may also require oversized loads, coming from elsewhere in North America or overseas, so accommodations for heavy and large loads should also be discussed.

2.2.1.1. Traffic restrictions

Describe any restrictions to site access, including peak times of traffic congestion and seasonal variations in traffic volume along local and regional routes. Note typical and maximum historical periods of half-load restrictions. Note whether access is direct or must travel through communities, residential areas, or other areas with stop-and-go traffic, noise restrictions, tight corners, one-way streets or other factors which would impede or aid access or add to travel times. Provide aerial images and maps to illustrate access routes.

2.2.1.2. Road Surfacing

Note road surfacing and whether regular maintenance is required, for instance, a high traffic load gravel road would require periodic grading and addition of granular material.

2.2.1.3. Road Shared Use

Describe current uses of the routs to the site. Note any impediments to traffic flow that could result from shared use, including school bus, slow-moving vehicles or other uses that could impact travel times and traffic levels.

2.2.1.4. Road Maintenance

Describe snow plowing, road maintenance, wash-out conditions, and other factors affecting the use of the roads to the site or impeding traffic flow.

2.2.1.5. Road Upgrades

If regional or local road upgrading is required or planned, explain timing and impact of this. Also, note how the costs for such upgrades would be covered and whether Noront would be expected to share in the cost or have a toll or other fee applied to cover the costs.

2.2.2. Rail Service To and On the Site

Noront expects to ship chromite by rail. Depending on other transportation options, rail could also be used to deliver coal, quartz and lime and to ship out ferrochrome products and by-products. This could amount to several million tonnes per year. Details are required for local rail service. Explain local rail services. Provide an assessment of rail services on the site, including age, condition and any other information to aid determination of the suitability of such infrastructure to support Noront's requirements. Provide regional, local and site maps showing rail routes, sidings, and other features.

2.2.2.1. Other Rail Users

Describe other users of rail in the region and area around the site, and how these users could impact the use by Noront, both positively (shared costs) and negatively.

2.2.2.2. Rail Condition or Upgrading Requirements

Likely, Noront will be shipping chromite in 110 tonne gondola cars, which will place a high load level on tracks. Shipping containers could also be used. Report the condition of any applicable rail tracks for such loading. If the tracks will have to be upgraded, how will this work be done and how will the cost be covered?

2.2.2.3. Shunting Equipment and Other Track Services

Describe local rail services and support for rail users in the region or community. If tracks will be shared with other users, will they have railcar handling systems and would or could these be available for Noront to use or share?

2.2.2.4. Distance to Nearest Existing Marshalling Yard

Describe local or regional rail yards, stack tracks or other sidings where railcars can be temporarily stored or where transfer operations can be done to load or unload railcars. Report the conditions of such facilities and availability for use by Noront, especially if direct access to the site is not available by rail service.

2.2.2.5. Rail Ownership

Note the ownership of all regional and local rail infrastructure to access the site and on the site. Note any existing rail service agreements in the area around the site.

2.2.3. Port Facilities at or near the Site

Noront may receive raw materials in bulk form, equipment and/or ship final products by water. Annual shipping of bulk materials could be in the hundreds of thousands of tonnes. Describe the nearest dock or port facilities and whether Noront could have access to these facilities.

2.2.3.1. Dock or Port Access

Access to dock facilities should be described, including roads, laydown areas, and other features which would aid in the use of such facilities for shipping or receiving bulk materials. Note is these access routes are shared with other users.

2.2.3.2. Restrictions and Other Users

Note operating restrictions and other factors which could impact the use of the dock or port. Other users or uses for the facility should also be noted.

2.2.3.3. Condition of the Dock

Note requirements to assess or repair the dock and if upgrades will be required to make it suitable for unloading or loading bulk materials.

2.2.3.4. Depth of Water

Provide water depth, including low season minimum depth. Note if dredging is required to maintain depth.

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Describe any seasonal restrictions for the use of the dock and whether ice-breakers or other services are available to aid with extending the shipping season.

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If the dock has existing bulk handling or storage infrastructure which is available for use or modification, describe the prior use and current condition of this infrastructure. Note any ownership or lien concerns that may exist for this infrastructure.

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Noront will require air access to the community so executives, consultants, suppliers and other people can travel to the site. Please provide a description of local air service. Note any restrictions.

2.2.4.1. Regular Scheduled Service by Common Carriers

Describe which carriers service the airstrip and from where regular flights come and frequency of service. Note any pending or likely changes to the air service.

2.2.4.2. Charter Services

Note charter services available from the local airstrip and the types of aircraft which can be chartered. Provide information on special charter services, like gravel strip or floatplane.

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Note airport access alternatives, including local taxi and car rental services.

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When fully developed, Noront's FPF will require 230kV supply for a connected load of 350MW, . Provide details of the electrical supply to the region and community and capacity for adding this demand. Long range plans should be discussed, as well as other large power consumers and their long term plans, for an overall review of current and future power use. Redundant sources should also be discussed. If new lines will be required, explain what this entails and how costs will be covered.

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Note the age and condition of power lines and other infrastructure to supply the site as well as any infrastructure on the site.

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Describe local substation facilities, their current and other future uses, age and condition, the location, fault levels, existing connections and capacity. Describe the overall connection to the balance of the grid.

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Noront will negotiate with the province on electrical power rate, however local pricing for power and delivery costs should be explained. Rates for other industries and residential

customers should be noted. Please describe any pending changes which could impact long term pricing.

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Noront will use natural gas for general site heating and in processes. Nominal use is expected to be 5 million cubic metres per year, but with higher consumption of roughly 10 million cubic metres per month when starting the plant or restarting after a maintenance shut-down.

Describe existing natural gas infrastructure at the site and any restrictions of supply. Provide the capacity and age of infrastructure, information on the service provider, and on industrial rates applicable at the site. Also, note any other pending gas users or changes to the system.

2.2.7. Water Supply

Noront will require roughly 300 m3/h of water of total water demand. Around 4 m3/h of this will be potable water. Water supply should be discussed in conjunction with discharge and treatment systems, especially regarding capacity and any restrictions, seasonal or otherwise.

2.2.7.1. Process and Potable Water

Describe local water management, supply and demand, other large users, current and expected demand, and other aspects of the water system.

2.2.7.2. Mains and Branch Lines To and On the Site

Provide details of the service to the proposed site, including condition, age, and capacity of all lines. Describe the water distribution system on the site. Describe firefighting water supply to the site.

2.2.7.3. Ability to Take Water from Local Water Bodies

If local water sources or resources are available for access, provide details for them and any restrictions for using this water, including seasonal ones.

2.2.8. Waste Water

Describe on-site and off-site waste water and sewage treatment capabilities. Explain any limits or restrictions, including seasonal ones, other users of these systems, and the condition of this infrastructure.

2.2.8.1. Existing Site Treatment Facilities and Capacities

Provide details of any existing waste water or sewage handling and/or treatment infrastructure on the site, along with any restrictions to their use, condition of this infrastructure, and other

pertinent information to aid Noront to determine the suitability of existing systems for our needs.

2.2.8.2. Shared Use

Describe any facilities that could be shared with others and any restrictions, limitations and/or costs that could be applicable.

2.2.8.3. Waste Water Discharge

Describe the ability and other factors affecting discharges of waste water to the local surrounding area, or if this is not an option.

2.2.9. Community and Housing

Depending on local labour capabilities and expertise, Noront will have people move to the local community. In this section, please describe housing availability, community facilities, and other factors concerning relocating people to the community.

2.2.9.1. Housing Availability

Note vacancy rates, housing pricing, taxes, utility costs and other aspects on availability and cost of ownership for local housing. Rental and lease properties should also be discussed.

2.2.9.2. Community Services and Amenities

Review existing and pending community facilities and services. Note factors like public transit, school and bussing, firefighting, hospital, shopping, cultural, recreation and other services and features of the local and regional area.

3. CAPITAL COST CONSIDERATIONS

Developing the FPF will take approximately 3 years and involve more than a thousand contract and construction workers, have large scale deliveries of equipment and materials for construction, and require installation of temporary construction facilities, depending on site conditions and availability and condition of existing facilities on site. The sections below cover the main construction cost areas. Other relevant aspects of your community and site can be added after these sections.

3.1. Existing Facilities on or near the Site to Support Construction

Describe the condition of offices, shops, warehousing, plant buildings, and other facilities on site, especially regarding their availability and suitability to support construction activities. Noront may want to change these facilities as part of the FPF development, but "base case" conditions should be clarified. What off-site facilities could be available to support construction; provide the distance and conditions or restrictions to accessing these facilities.

3.2. Known Geotechnical Limitations

Describe known load bearing or stability concerns for the site which could impact location and scale of facilities; like if "black earth" (with organics in it) or loose fill have been identified or used on site. Are there soft or "swampy" areas on the site. Note any groundwater information as well.

3.3. Local Construction Companies and Trade Unions

Noront will try to maximize the use of local services and trades for the development of the FPF. Explain the availability and relevant experience of local construction services for participating in the development of a large scale industrial facility. List local unions and any agreements which may impact development of the site. Note which contractors are unionized. Noront is not implying any concern for working with unionized labour, but wishes to understand the local labour conditions.

3.4. Local Services

What suppliers and other services are available locally. Include equipment suppliers, rental services, and other skilled trades in the information; such as, crane rentals, civil constructors, electricians, mechanical shops, welding services and other services which could support site development activities. Rates and price lists should be provided, if possible.

3.5. Engineering and Technical Services

Describe local and regional engineering and technical services that may be able to support the site development design, inspection, testing, or support after development. Relevant

experience on large scale industrial developments will be required for each of these service providers. Areas of competency include civil, site development, environmental monitoring, concrete testing, water and waste water systems and testing, and other such support services for developing a site.

3.6. Local Hiring by Noront for the Construction Phase

Describe the labour situation in the community. Explain the availability and skills of the available workforce. Describe the history of the community in operating industrial facilities of a similar nature. Provide outlook on the communities development plans which may compete with Noront for a skilled workforce.

3.7. Accommodation and Food Services

The site development work will require accommodations for hundreds of workers, consultants, service providers, and company employees. Noront will have to set up temporary accommodations if local facilities are not able to meet these needs. Describe hotel, apartment, and other accommodation in the area. Also note restaurants, confectionaries, grocery stores and other supporting services. If local accommodations are not sufficient, please explain regional accommodations.

3.8. Site Access for Construction

Oversized and heavy loads will be transported to site. If rail or water access is not suitable for this, then roads will be used to move these. Describe route restrictions, including tight corners, low overhead power lines, steep hills, or other factors, and any temporary or permanent changes that could be made to resolve them and whether associated costs would be borne by the community or Noront.

3.9. Seasonal Construction Restrictions

Note any seasonal events or conditions which would or could impact site access or construction activities; such as hunting season, half-loads, migration, or other.

3.10. Building or Site Limitations

Note local restrictions on building heights, lighting (light pollution), noise, or other regulation or by-law aspects that may affect the facility design, construction or operation.

NORONT

4. OPERATING COST CONSIDERATIONS

In this section, describe factors which will impact the costs to operation of the site. Additional factors should be added in a section after the following areas are covered.

4.1. Labour Force

Noront will be hiring people for pre-development activities (environmental studies, site design studies, etc), construction and operations. Peak labour requirement will be during construction, but longer term employment should benefit the community most. Most positions during construction will be contracted, however Noront will want to use the construction period to prepare staff for operating the facility, so some construction roles will transition into operations. Labour for operations will increase with the Phase 2 expansion, since additional processes will be installed and higher production volumes will result. Noront will require operating and maintenance personnel, including management, supervision, operators, support labour, technical staff (instrumentation technicians, laboratory technicians), and shop, service and site maintenance crews, as well as other such typical operations personnel.

Describe the labour situation in the community. Explain the availability and skills of the available workforce. Describe the history of the community in operating industrial facilities of a similar nature.

The site will be a metallurgical, heavy industrial facility, requiring many roles to be filled by experienced smelter operators, maintenance and technical personnel. Most of the roles will require regular industrial skills, like electricians, plumbers, welders, mechanical and instrument technicians, site maintenance people, and site equipment operators. Some of these requirements may be filled by contracted services. Your review of local skills and capabilities should provide details on the local labour pool. Training and retraining were discussed in the construction section, however, timing is extended to training for operations positions, since these will follow construction roles. Again, local training funding should be discussed along with relevant training facilities.

Provide an outlook on the communities development plans which may compete with Noront for a skilled workforce.

4.1.1. Labour Compensation

Provide details of typical local wages, benefits, and other compensation expectations within the community. Discuss factors affecting cost of living.

4.1.2. Other Industry Labour Force Demand

Note other local industries, their labour requirements, turn-over, future plans, and other factors that impact the appropriate skills being available in the community and demand for them.

4.1.3. Skilled Labour: Electricians, IT, Welders, Plumbers, Mechanical, Other

Describe local labour availability, capabilities and capacity for working in a metallurgical facility. If training will be required to prepare workers, explain what the community is able to do to support this: local training capabilities, funding for training local people, or otherwise.

4.2. Utility and Service Costs

In the relevant subsections below, please provide details of industrial rates for utilities.

4.2.1. Electrical Power Costs and Delivery

Noront will negotiate with the Province for application of reduced electrical rates, but local power costs and delivery fees should be described. This should include industrial and residential costs, as the residential rates will factor into overall cost to locate the business and house employees. Describe any planned changes or upgrades to the system or other factors that could alter local costs.

4.2.2. Water

Provide rates and other costs for supplying water to the site. Note any planned changes to the supply or users of this water.

4.2.3. Waste Water

Describe any charges for sewage, storm water or other water discharges. Noront will collect site water for testing before release, after any applicable treatment. Describe any other requirements and costs associated with site discharges.

4.2.4. Natural Gas

Provide rates and other costs for natural gas delivery to the site and community residences.

4.2.5. Communications

Provide condition and rates for local telephone and broadband use, along with a description of the age and condition of infrastructure and any plans to change or upgrade this infrastructure.

4.2.6. Solid Waste

Garbage, recycling, bulk waste handling, hazardous waste handling and disposal and other local capacity and capabilities should be outlined along with rates or fees. Local garbage dump rates should be noted.

4.2.7. Public Services

Describe the availability of health services, policing, public works and other supporting services that will be provided by the community and any fees that could be applied for them, other than through tax fees (covered below).

4.2.8. Local Suppliers

Describe other local service and supplier rates that could apply to the cost to operate the site.

4.2.9. Transportation Costs

Note any fees or other charges associated with using roads, rail or water transportation that could apply to operation of the facility. This should include any pending applicable rates.

4.2.10. Taxes and Tax Incentives

Describe local tax rates for the site and residential communities, and whether there will be any tax or other incentives for locating the facility in or near the community. Note any other charges or fees which could apply.

NORONT

Guidelines for

Proposing Sites to Locate

Noront Resources Ltd's

Ferrochrome Production Facility

October 2017

Noront Resources Ltd. 400-110 Yonge St. Toronto, ON M5C 1T4
www.norontresources.com

NORONT

Contents

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1. INTRODUCTION

Noront Resources is planning to develop a Ferrochrome Production Facility on a Brownfield site in Northern Ontario. It is anticipated this facility could operate for many years. This guideline is provided to aid communities to prepare a compelling case for locating the facility in their community. The case or proposal should address the topics listed in the order provided below, with sufficient information to express the case and to aid Noront to make an informed decision.

Noront recognizes that each community will have differing strengths and weaknesses. Noront will apply a rating to the answers on each topic to allow comparison.

Each community's response should provide sufficient information to Noront to aid the selection of a site for its facility. The compelling case should explain the rationale as to why the ferrochrome production facility should be installed in or near the proposed community. It is crucial to ensure that critical information be provided in all areas Noront requires to make this decision. The following topics are shown as guidance on the type of information to be provided, however communities are requested to elaborate and add other factors which will enhance the proposal and aid Noront in its selection.

NORONT

2. SUITABILITY OF THE PROPOSED FERROCHROME PRODUCTION FACILITY SITE

Noront has prepared a separate document describing the processes and other facility details for a Ferrochrome Production Facility: "Noront Resources: Ferrochrome Production Facility", October, 2017. The site will be developed in 2 phases with 2 electric arc furnaces being required for each phase. Phase 1 will process lump ore, whereas the Phase 2 facility will process concentrate and lump ore which contains more material. The site will need space to store stock piles of raw materials (chromite ore, coal, quartzite, limestone) and stock piles of finished products (ferrochrome) and granulated slag.

Preference is being given to developing on an existing Brownfield site which offers:

- Proximity to a community that is familiar with large resource sector infrastructure and has the labour force and supplier network to support the facility.
- Infrastructure for shipping (roads, rail, port), gas and electrical power supplies, and water and waste water facilities.
- Existing environmental legacy and suitability for future environmental conditions: emissions, process waste handing.

2.1. Site Description

This first section should describe the proposed site. Noront's requirements are noted. Each community needs to address the requirements listed and to elaborate as appropriate.

2.1.1. Size of the Site

The site will have to be large enough to contain all the operations, including stockpiling of raw materials, slag, and products; the pretreatment and production processes; offices, warehousing, and ancillary buildings; site roads, services, and utilities. The site size aids with retaining any emissions within the property boundaries. An area of 1.5 kilometres by 1.5 kilometres is specified. Dimensions should be provided. Topographic conditions are also required since the useable space will have to be reasonably flat. The area of the proposed site should be stated clearly.

2.1.2. Distance to Nearest Water Bodies

Provide distances to nearest water bodies. Facilities will need to beset back from creeks, rivers, ponds, and lakes so distances must be provided. If the site has internal waterbodies this must be clearly shown,

2.1.3. Separation of the Site from Residential Areas and Other Neighbouring Facilities.
Noise, light, traffic and other factors make it attractive to have separation between the facility and any other occupied areas or public spaces, like parks. Please provide distances and directions to the nearest neighbouring areas and explain the use of them. Note distances to public areas, schools, other businesses and government offices. Note distances to any environmentally sensitive areas, like conservation areas or protected sites.

2.1.4. Proximity to Other Large Industrial Facilities.
Distances and shared services should be described. As well, any factors which would be considered cumulative effects for permitting. This could also impact availability of labour and services. Please discuss all relevant information regarding neighbours to the proposed site.

2.1.5. Environmental History of the Site
It is extremely important that prior uses of the site be understood. There may be restrictions on use and other stipulations which could impact the suitability of the site or future remediation requirements. It could be advantageous to apply another industrial use on a site rather than leaving it vacant or remediating, however Noront will need to know about any impacts previously made to the site and possible cumulative effects or compatibility issues. Describe any known spills of contamination. If remediation is likely to be required before Noront can use the site or an area of the site, explain the extent, cost and how this work will be done and funded.

Describe all previous uses, spills, remediation activities and other impacts on the proposed site. This should include industries that have been located there, including any temporary storage which could have contaminated or disturbed the site. If any additional remediation is required, this should be described and copies of relevant ministry filings appended for reference.

2.1.6. Zoning
Note the zoning of the site and neighbouring areas. Indicate whether changes to zoning will be required to make the site suitable for use by Noront. Note any community or regional planning that could lead to zoning changes.

2.1.7. Local Community Sensitivities and Concerns for Adding a Metallurgical Facility
Noront will be conducting "open house" meetings with local residents as part of the site permitting process. The information in this section should sensitize Noront to key local issues or concerns. Describe the local community's familiarity with and history of supporting or opposing industrial facilities, especially metallurgical facilities.

2.1.8. Weather Conditions and History

Along with typical rain and snow levels, please describe any weather events that could impact a facility, like relatively high levels of fog, whiteout conditions, flooding, shadfly infestations or other site-specific conditions which would have to be accommodated.

2.2. Site, Local and Regional Infrastructure

This section will provide details on pertinent aspects of the site to meeting Noront's needs. Each site has unique conditions and factors in its favour or making it less attractive. The list of topics below may have missed an important aspect of the proposed site, which should be discussed at the end of this section.

2.2.1. Roads To and On the Site:

Depending on options for shipping materials to and from the site (rail, port), Noront will require adequate road access to the site. Overall material handling could be several million tonnes per year, which would equate to over 200 truckloads per day if access is by road only. Additional traffic will come from personnel, contractors, and suppliers. Construction activities may also require oversized loads, coming from elsewhere in North America or overseas, so accommodations for heavy and large loads should also be discussed.

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Describe any restrictions to site access, including peak times of traffic congestion and seasonal variations in traffic volume along local and regional routes. Note typical and maximum historical periods of half-load restrictions. Note whether access is direct or must travel through communities, residential areas, or other areas with stop-and-go traffic, noise restrictions, tight corners, one-way streets or other factors which would impede or aid access or add to travel times. Provide aerial images and maps to illustrate access routes.

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Describe other users of rail in the region and area around the site, and how these users could impact the use by Noront, both positively (shared costs) and negatively.

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Provide water depth, including low season minimum depth. Note if dredging is required to maintain depth.

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Describe local water management, supply and demand, other large users, current and expected demand, and other aspects of the water system.

2.2.7.2. Mains and Branch Lines To and On the Site

Provide details of the service to the proposed site, including condition, age, and capacity of all lines. Describe the water distribution system on the site. Describe firefighting water supply to the site.

2.2.7.3. Ability to Take Water from Local Water Bodies

If local water sources or resources are available for access, provide details for them and any restrictions for using this water, including seasonal ones.

2.2.8. Waste Water

Describe on-site and off-site waste water and sewage treatment capabilities. Explain any limits or restrictions, including seasonal ones, other users of these systems, and the condition of this infrastructure.

2.2.8.1. Existing Site Treatment Facilities and Capacities

Provide details of any existing waste water or sewage handling and/or treatment infrastructure on the site, along with any restrictions to their use, condition of this infrastructure, and other

pertinent information to aid Noront to determine the suitability of existing systems for our needs.

2.2.8.2. Shared Use

Describe any facilities that could be shared with others and any restrictions, limitations and/or costs that could be applicable.

2.2.8.3. Waste Water Discharge

Describe the ability and other factors affecting discharges of waste water to the local surrounding area, or if this is not an option.

2.2.9. Community and Housing

Depending on local labour capabilities and expertise, Noront will have people move to the local community. In this section, please describe housing availability, community facilities, and other factors concerning relocating people to the community.

2.2.9.1. Housing Availability

Note vacancy rates, housing pricing, taxes, utility costs and other aspects on availability and cost of ownership for local housing. Rental and lease properties should also be discussed.

2.2.9.2. Community Services and Amenities

Review existing and pending community facilities and services. Note factors like public transit, school and bussing, firefighting, hospital, shopping, cultural, recreation and other services and features of the local and regional area.

3. CAPITAL COST CONSIDERATIONS

Developing the FPF will take approximately 3 years and involve more than a thousand contract and construction workers, have large scale deliveries of equipment and materials for construction, and require installation of temporary construction facilities, depending on site conditions and availability and condition of existing facilities on site. The sections below cover the main construction cost areas. Other relevant aspects of your community and site can be added after these sections.

3.1. Existing Facilities on or near the Site to Support Construction

Describe the condition of offices, shops, warehousing, plant buildings, and other facilities on site, especially regarding their availability and suitability to support construction activities. Noront may want to change these facilities as part of the FPF development, but "base case" conditions should be clarified. What off-site facilities could be available to support construction; provide the distance and conditions or restrictions to accessing these facilities.

3.2. Known Geotechnical Limitations

Describe known load bearing or stability concerns for the site which could impact location and scale of facilities; like if "black earth" (with organics in it) or loose fill have been identified or used on site. Are there soft or "swampy" areas on the site. Note any groundwater information as well.

3.3. Local Construction Companies and Trade Unions

Noront will try to maximize the use of local services and trades for the development of the FPF. Explain the availability and relevant experience of local construction services for participating in the development of a large scale industrial facility. List local unions and any agreements which may impact development of the site. Note which contractors are unionized. Noront is not implying any concern for working with unionized labour, but wishes to understand the local labour conditions.

3.4. Local Services

What suppliers and other services are available locally. Include equipment suppliers, rental services, and other skilled trades in the information; such as, crane rentals, civil constructors, electricians, mechanical shops, welding services and other services which could support site development activities. Rates and price lists should be provided, if possible.

3.5. Engineering and Technical Services

Describe local and regional engineering and technical services that may be able to support the site development design, inspection, testing, or support after development. Relevant

experience on large scale industrial developments will be required for each of these service providers. Areas of competency include civil, site development, environmental monitoring, concrete testing, water and waste water systems and testing, and other such support services for developing a site.

3.6. Local Hiring by Noront for the Construction Phase

Describe the labour situation in the community. Explain the availability and skills of the available workforce. Describe the history of the community in operating industrial facilities of a similar nature. Provide outlook on the communities development plans which may compete with Noront for a skilled workforce.

3.7. Accommodation and Food Services

The site development work will require accommodations for hundreds of workers, consultants, service providers, and company employees. Noront will have to set up temporary accommodations if local facilities are not able to meet these needs. Describe hotel, apartment, and other accommodation in the area. Also note restaurants, confectionaries, grocery stores and other supporting services. If local accommodations are not sufficient, please explain regional accommodations.

3.8. Site Access for Construction

Oversized and heavy loads will be transported to site. If rail or water access is not suitable for this, then roads will be used to move these. Describe route restrictions, including tight corners, low overhead power lines, steep hills, or other factors, and any temporary or permanent changes that could be made to resolve them and whether associated costs would be borne by the community or Noront.

3.9. Seasonal Construction Restrictions

Note any seasonal events or conditions which would or could impact site access or construction activities; such as hunting season, half-loads, migration, or other.

3.10. Building or Site Limitations

Note local restrictions on building heights, lighting (light pollution), noise, or other regulation or by-law aspects that may affect the facility design, construction or operation.

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4. OPERATING COST CONSIDERATIONS

In this section, describe factors which will impact the costs to operation of the site. Additional factors should be added in a section after the following areas are covered.

4.1. Labour Force

Noront will be hiring people for pre-development activities (environmental studies, site design studies, etc), construction and operations. Peak labour requirement will be during construction, but longer term employment should benefit the community most. Most positions during construction will be contracted, however Noront will want to use the construction period to prepare staff for operating the facility, so some construction roles will transition into operations. Labour for operations will increase with the Phase 2 expansion, since additional processes will be installed and higher production volumes will result. Noront will require operating and maintenance personnel, including management, supervision, operators, support labour, technical staff (instrumentation technicians, laboratory technicians), and shop, service and site maintenance crews, as well as other such typical operations personnel.

Describe the labour situation in the community. Explain the availability and skills of the available workforce. Describe the history of the community in operating industrial facilities of a similar nature.

The site will be a metallurgical, heavy industrial facility, requiring many roles to be filled by experienced smelter operators, maintenance and technical personnel. Most of the roles will require regular industrial skills, like electricians, plumbers, welders, mechanical and instrument technicians, site maintenance people, and site equipment operators. Some of these requirements may be filled by contracted services. Your review of local skills and capabilities should provide details on the local labour pool. Training and retraining were discussed in the construction section, however, timing is extended to training for operations positions, since these will follow construction roles. Again, local training funding should be discussed along with relevant training facilities.

Provide an outlook on the communities development plans which may compete with Noront for a skilled workforce.

4.1.1. Labour Compensation

Provide details of typical local wages, benefits, and other compensation expectations within the community. Discuss factors affecting cost of living.

4.1.2. Other Industry Labour Force Demand

Note other local industries, their labour requirements, turn-over, future plans, and other factors that impact the appropriate skills being available in the community and demand for them.

4.1.3. Skilled Labour: Electricians, IT, Welders, Plumbers, Mechanical, Other

Describe local labour availability, capabilities and capacity for working in a metallurgical facility. If training will be required to prepare workers, explain what the community is able to do to support this: local training capabilities, funding for training local people, or otherwise.

4.2. Utility and Service Costs

In the relevant subsections below, please provide details of industrial rates for utilities.

4.2.1. Electrical Power Costs and Delivery

Noront will negotiate with the Province for application of reduced electrical rates, but local power costs and delivery fees should be described. This should include industrial and residential costs, as the residential rates will factor into overall cost to locate the business and house employees. Describe any planned changes or upgrades to the system or other factors that could alter local costs.

4.2.2. Water

Provide rates and other costs for supplying water to the site. Note any planned changes to the supply or users of this water.

4.2.3. Waste Water

Describe any charges for sewage, storm water or other water discharges. Noront will collect site water for testing before release, after any applicable treatment. Describe any other requirements and costs associated with site discharges.

4.2.4. Natural Gas

Provide rates and other costs for natural gas delivery to the site and community residences.

4.2.5. Communications

Provide condition and rates for local telephone and broadband use, along with a description of the age and condition of infrastructure and any plans to change or upgrade this infrastructure.

4.2.6. Solid Waste

Garbage, recycling, bulk waste handling, hazardous waste handling and disposal and other local capacity and capabilities should be outlined along with rates or fees. Local garbage dump rates should be noted.

4.2.7. Public Services

Describe the availability of health services, policing, public works and other supporting services that will be provided by the community and any fees that could be applied for them, other than through tax fees (covered below).

4.2.8. Local Suppliers

Describe other local service and supplier rates that could apply to the cost to operate the site.

4.2.9. Transportation Costs

Note any fees or other charges associated with using roads, rail or water transportation that could apply to operation of the facility. This should include any pending applicable rates.

4.2.10. Taxes and Tax Incentives

Describe local tax rates for the site and residential communities, and whether there will be any tax or other incentives for locating the facility in or near the community. Note any other charges or fees which could apply.

Andrea Viotto

From:	Dan Hollingsworth
Sent:	Wednesday, November 08, 2017 2:18 PM
To:	Tom Vair; Al Horsman; Nevin Buconjic
Cc:	Andrea Viotto
Subject:	Noront - Project Management Team
Attachments:	Noront Ferrochrome Production Facility 20171031.pdf; Noront_FPF_SitingProposalGuidance_31Oct2017.pdf; NorontFerrochromeProductionFacilityEnvironment_31Oct2017.pdf

Hello project management team:

I would like to have a meeting next Monday to map out a collective project management plan and the work that needs to get completed over the next 90 days. After reviewing the document, we may want to consider some of the work we collectively have the ability to gather and analyze as well as the work that will require a third party expert for further assessment. We can then begin to coordinate the organizations and individuals that we need to speak to in the coming days.

I would like to block two hours and work through a project management plan that I hope to get out on tomorrow.

Please advise is 1-3pm is available next Monday, November 13.

Please take the time to review the three attachments enclosed in this note.

Best,

Daniel Hollingsworth, MBA
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