

## Noront Ferrochrome Production Facility (FPF)

### Environmental Issues and Approach

October 2017

(Simulated FPF)



## INTRODUCTION

Noront is proposing to develop a Ferrochrome Production Facility (FPF) in Northern Ontario. This production facility will be a state of the art facility that will be designed, built and operated in accordance with all the required federal and provincial environmental regulations and will meet the standard for best practice for a facility of this type.

This document describes the key environmental issues/risks and the Noront strategy for mitigation.

This document only addresses the physical environment. Social environment impacts and issues are more site dependent and are not addressed in this document.

## PROPOSED FERROCHROME PRODUCTION FACILITY DESCRIPTION

The Ferrochrome Production Facility (FPF) is planned to be built in one of 4 communities in Northern Ontario. The FPF will be built in two stages. The first stage of the facility will produce approximately 200,000 – 280,000 tonnes of ferrochrome per year depending on final furnace selection and market conditions. The second stage will produce approximately 560,000 tonnes of ferrochrome per year. Ferrochrome is a key component of stainless steel.

The FPF is made up of a ferrochrome production plant, slag management facility, marshalling yard and infrastructure supporting these facilities.

Specific installations include;

- A materials handling facility for receiving bulk materials: ore or concentrate, coal, and quartzite;
- Rotary kilns;
- DC Furnaces;
- Slag stockpile;
- Associated dust handling and environmental systems;
- A marshaling yard to enable the off-loading of supplies for the FPF
- Water and wastewater treatment facilities;
- Facility site and the on-loading of ferrochrome for sale to market and;
- Site access roads and administration and maintenance facilities.

## ENVIRONMENTAL ASSESSMENT PROCESS

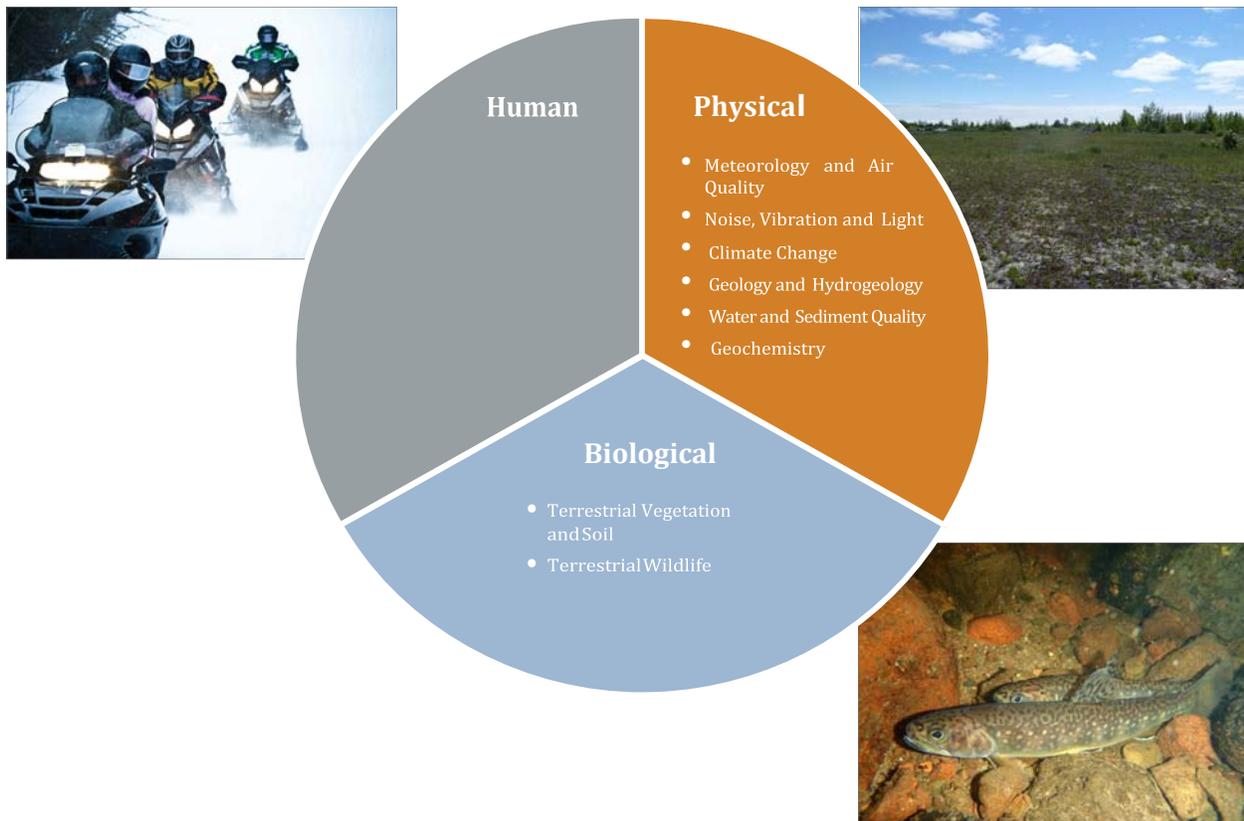
Environmental Assessment (EA) is a planning and environmental management tool used to predict, analyze and interpret the potential effects of a project on the environment and to identify measures to avoid, reduce or lessen (mitigate) potential adverse effects, and to promote sustainability. The EA process involves the following key steps:

- Describe the existing environmental features of the land, water and air that would support the Project (baseline studies);
- Describe potential Project interactions with the environment and likely adverse

(negative) and beneficial effects of the Project;

- Propose measures to mitigate the potential adverse effects; and
- Assess whether the Project would cause significant adverse effects despite implementation of mitigation measures; effects remaining after mitigation measures are in place are known as “net effects” or “residual effects”.

Technical specialists carry out the process shown below for a number of disciplines that are part of the physical, biological and human environments.



The process ensures participation of public and communications with aboriginal peoples in defining and reviewing the assessment.

The Noront FPF is at a very early stage of this process and will use a professional and inclusive methodology for the establishment of the environmental baseline, impacts and mitigations. Monitoring of key elements for the establishment of the required baseline will be done for the selected site. This is a multi-year process.

The process will ensure that the key environmental risks, issues and concerns are identified, managed and mitigated.

Noront is committed to best practice in environmental protection and recognized that

a facility of this type does not exist in Ontario. Consequently, best practices from mature jurisdictions where Ferrochrome facilities exist, such as Finland, will be benchmarked and appropriately integrated in the design and management of the facility.

**KEY PROJECT- ENVIRONMENT ISSUES AND MITIGATION MEASURES**

There are a number of key Project environment issues that have the potential to affect the environment near the proposed Ferrochrome Production Facility. The two broad areas are effects on the atmospheric environment, on the aquatic environment and on the terrestrial environment. The proposed Project strategy and plan include mitigation measures to address these issues.

**ATMOSPHERIC ENVIRONMENT ISSUES AND MITIGATION MEASURES**

Project-Environment Issues and Effects	Proposed Mitigation Measures
<p><b>Air Quality</b></p> <p>Air Quality is described by the concentrations of indicator compounds (such as particulate matter, nitrogen oxides and hexavalent chromium). How these concentrations are affected by the emissions released from the proposed Project will be determined using air dispersion models that have been accepted for use in Ontario. The assessment and dispersion modelling considers emissions from:</p> <ul style="list-style-type: none"> <li>• Operation of the material handling equipment; and</li> <li>• Operation of the kilns and furnaces.</li> </ul> <p>Changes in air quality also have the potential to affect human health and wildlife.</p>	<ul style="list-style-type: none"> <li>• Receiving chromite ore/concentrate indoors and in sealed containers; storing raw or finished materials indoors to minimize transportation emissions and other Best Management Practices;</li> <li>• Designing building ventilation to reduce dust emissions escaping from buildings, ventilation air will be cleaned using filters to minimize air pollution (baghouses);</li> <li>• Adding low sulphur coal to the sealed furnace to minimize the conversion of chromium to hexavalent chromium and as a means to minimize sulphur dioxide emissions;</li> <li>• The process will be designed to minimize dust and oxides of nitrogen formation by;             <ul style="list-style-type: none"> <li>• The kilns having dedicated exhaust cleaning systems, which includes filters, scrubbers and flares;</li> <li>• Exhaust from the furnace off-gas will be cleaned prior to being reused as fuel on-site in the rotary kilns, minimizing fuel use and GHG emissions; and</li> <li>• Concentrate will be unloaded from sealed containers and with minimal outdoor storage of any raw or finished materials in order to minimize transportation emissions.</li> </ul> </li> </ul>

## Noise

Noise levels in and around the Project area may be affected by noise emissions from Project activities at the proposed FPF. The existing noise levels will be determined using continuous noise monitoring carried out at various locations in the vicinity of the FPF.

How the proposed Project emissions affect noise levels will be determined using a noise model accepted for use in Ontario. The assessment considered noise emissions from:

- on-site vehicle and equipment movement;
- process equipment such as kilns and furnaces; and
- activity of heavy equipment.

Consideration will also be given to the existing noise levels during the daytime and nighttime periods.

- Noise levels will be a consideration in the layout and the design of the FPF.
- Noise control measures will be established for fixed plant and mobile equipment.

## Vibration

Vibration is not considered a significant issue during the FPF operation. Blasting activities will occur during the construction of the FPF including foundations and underground facilities (e.g., pipes, cables and gas lines). These activities have the potential to affect both air and ground vibration levels in and around the proposed Ferrochrome Production Facility. The effects of the proposed Project on air and ground vibration will be predicted using models consistent with the requirements in Ontario and federal guidelines.

- Blasting will be carried out in compliance with: Ontario Model Municipal Noise Control By Law (NPC 119) which limits Peak Particle Velocity for ground vibration.

## Light

Light levels in and around the Project area may be affected through activities at the proposed FPF.

Assessment of how the proposed Project emissions affect both when light is seen outside of the site (light trespass) and how bright the light source makes the night sky (sky glow) will be done using internationally accepted modelling methods. Currently there are no Ontario methods or requirements for the assessment of light effects.

- Lighting fixtures should be fully shielded to focus light downwards; and
- Colouring on-site structures with dark colours to absorb most of the incident light.

## Climate Change

The climate change assessment for the proposed FPF will consider how the greenhouse gas (GHG) emissions from the Project could contribute to climate change. In assessing the GHG emissions from the proposed FPF, consideration will be given to both the direct emissions (e.g., reduction reaction), as well as the indirect emissions. These emissions will be put into a provincial, national and global context.

The climate change assessment will also consider the potential for changes in climate that may affect the proposed Project. Projections of future climate change will be assessed as well as the future changes in climate based on Global Circulation Models identified by the Inter-Governmental Panel on Climate Change.

- Cleaning exhaust from the furnace off-gas prior to being reused as fuel in the rotary kilns will minimize fuel use and GHG emissions;
- Maintaining vehicles to reduce excess fuel consumption and related emissions; and
- Incorporating information from the climate change assessment to design of the Project in a way that allows it to adapt to a possibly changing climate.

### NET EFFECTS

There will be an evaluation to determine the net (residual) effects changes to the atmospheric environment, including air quality, noise, light and vibration, the Project-environment interactions identified above will be evaluated and modelled, taking mitigation measures into account.

The proposed Project is not likely to affect climate change. Emission of greenhouse gases expressed as carbon dioxide (CO<sub>2</sub>) equivalents are not significant in comparison to the global emissions used in the Inter-governmental Panel on Climate Change scenarios.

### MONITORING AND COMMITMENTS

Noront is committed to implementing the mitigation measures identified in the above section, to obtaining all required permits for air, noise and vibration, and to carrying out follow-up monitoring activities that are meant to confirm predicted effects. These monitoring activities will include:

- Verification of silt content in dust from the on-site roadways and testing for trace metal concentrations to confirm transport emissions have been minimized;
- Testing of selected stacks for emissions generated by the proposed FPF to confirm the estimated emission rates used in the dispersion modelling assessment;
- Noise monitoring will be carried out to demonstrate compliance with MOE publication NPC 232; and
- Ambient air monitoring of particulate compounds in order to confirm compliance with Ontario Regulation 419/05.

Follow-up light monitoring is not required as the predicted light emission levels are not considered to be a substantive change from existing levels.

## AQUATIC ENVIRONMENT ISSUES AND MITIGATION MEASURES

Studies will be carried out to assess the potential effects of the proposed FPF on the aquatic environment which includes water quality, hydrology, hydrogeology and aquatic ecology.

There are number of key Project-environment issues that have the potential to affect the aquatic environment near the proposed FPF. The proposed Project includes mitigation measures to address these potential issues.

Project-Environment Issues and Effects	Proposed Mitigation Measures
<p>Land clearing during construction of the proposed FPF has the potential to increase erosion and sedimentation.</p> <p>These activities have the potential to affect fish habitat.</p>	<ul style="list-style-type: none"> <li>• Implementing erosion and sediment control plans; and</li> <li>• Maintaining a minimum buffer zone of vegetation between areas to be cleared and all water bodies and/or ecologically sensitive areas.</li> </ul>
<p>Taking of water from the environment for construction and operation activities (e.g., drinking water for workers, ferrochrome processing, slag management). This water taking has the potential to affect fish habitat.</p>	<ul style="list-style-type: none"> <li>• Collecting surface water from the slag management facility for re-use in ferrochrome processing, minimizing water withdrawal from the environment;</li> <li>• All surface water will be collected in the water reclamation pond and treated for reuse in the FPF process. This water will not be released to the environment.</li> </ul>
<p>The development of the proposed FPF infrastructure has the potential to affect local drainage patterns and increase runoff.</p>	<ul style="list-style-type: none"> <li>• Constructing appropriate storm water management ponds around the proposed FPF;</li> <li>• Directing stormwater away from natural streams and ponds or lakes.</li> </ul>
<p>The processing of materials at the proposed FPF has the potential to release metals into water.</p>	<ul style="list-style-type: none"> <li>• There will be no discharge of surface water from the slag management facility. This water will be collected and re-used in ferrochrome processing; and</li> <li>• All process water will be collected in the water reclamation pond and treated for reuse in the FPF process. This water will not be released to the environment.</li> </ul>
<p>Water release into the environment has the potential to impact fish habitat.</p>	<ul style="list-style-type: none"> <li>• Development of a No Net Loss Plan (also known as a Habitat Offset Plan) for fish habitat.</li> <li>• Creation of slag water reclaim pond.</li> </ul>

## NET EFFECTS

In order to determine the net (residual) effects of changes to water flow, water quality, fish and fish habitat around the proposed FPF, the Project will identify, evaluate and model net effects. Mitigation measures will be established. Items of concern for net effects include;

- Potential for erosion and sediment transport during construction;
- Changes in infiltration resulting from removal and redistribution of overburden and bedrock materials;
- Withdrawal of water from ponds; and
- Alteration of fish habitats in several isolated ponds. However, the No Net Loss Plan will improve and create habitat to offset any habitat loss.

## MONITORING AND COMMITMENTS

Noront is committed to implementing the mitigation measures identified in the above section, obtaining all required permits and to follow-up monitoring activities to confirm predicted effects. Additional work may be required depending on the results of monitoring. These monitoring activities include:

- Inspection of erosion and sediment control measures during the Construction and Operations
- Water level monitoring in the proximal water bodies;
- Post-closure treated effluent discharge monitoring;
- Groundwater level monitoring through groundwater wells;
- Water quality monitoring in the proximal water bodies for relevant compounds;
- Monitoring of water taking flowrates.

## TERRESTRIAL ENVIRONMENT ISSUES AND MITIGATION MEASURES

Studies will be carried out to assess the potential effects of the proposed FPF on the terrestrial environment which includes wildlife and vegetation. Changes in soil will be studied as a potential pathway for changes to wildlife and vegetation. The effects of changes in air quality, noise, light and hydrology on the terrestrial environment will also be considered in the assessment.

Project-Environment issues and Effects	Proposed Mitigation Measures
<b>Wildlife</b>	
Land clearing may result in a loss or alteration of vegetation and wildlife habitat as well as habitat fragmentation and a decrease in connectivity.	<ul style="list-style-type: none"> <li>• Limiting surface disturbance as much as possible;</li> <li>• Using existing infrastructure such as tailings impoundment, roads and a former rail bed, and paralleling transmission line corridors to limit habitat loss and fragmentation;</li> <li>• Reclaiming and revegetating during the Operation Phase, where practical and Retirement Phase, to reduce the amount of disturbed habitat.</li> </ul>
The operation of the Project will result in air emissions and sensory disturbance which can decrease habitat quality and alter movement and behavior.	<ul style="list-style-type: none"> <li>• Implementing mitigation as previously proposed on to reduce air, noise and light emissions.</li> </ul>
Vehicle movement may result in collisions which may cause injury or mortality to individual animals.	<ul style="list-style-type: none"> <li>• Applying and enforcing speed limits.</li> </ul>
Disposal of food waste may increase predator numbers and carnivore-human encounters which may result in the loss of individual animals.	<ul style="list-style-type: none"> <li>• Educating and reinforcing proper waste management practices for all workers and visitors to the site;</li> <li>• Prohibiting littering and feeding of wildlife;</li> <li>• Disposing food waste and non-toxic waste according to the Waste Management Plan to limit the presence of food attractants; and</li> <li>• Storing food waste in a designated area until it can be shipped off-site.</li> </ul>

### NET EFFECTS

To determine the net (residual) effect of changes to the terrestrial environment, the project-environment interactions identified above will be evaluated and modelled, taking mitigation measures into account.

### MONITORING AND COMMITMENTS

Noront is committed to mitigation measures identified in the above section, to obtaining all required permits, and to carrying out follow-up monitoring activities to confirm predicted effects. For the terrestrial environment these monitoring activities include:

- Monitoring to confirm that no large concentrations of traditional use plants are present, for approximately five years into the Operation Phase;
- Site surveillance monitoring of wildlife, including a species log;
- Monitoring direct habitat loss

Government experts have responsibility to review and enforce the requirements of the Federal and Ontario Environmental Assessment Acts. Their scientists and experts will oversee Noront’s plans, studies, and reports of results of the environmental assessment. Public reviews also take place at several defined times in the EA process, as noted in the following table

ACTIONS BY NORONT	GOVERNMENT REVIEWS	PUBLIC REVIEWS
Write a Project Description	Federal Environmental Assessment Agency. Outcome: Federal Guidelines for Noront Environmental Assessment activities.	Review period for public comments on Project Description
Prepare Environmental Assessment “Draft Terms of Reference” outlining how baseline EA will be done.	Ontario Ministry of Environment and Climate Change reviews and amends.	
Hold Open House meetings in local communities to share plans and results with the public, and to obtain comments which must be responded to in the EA report.		Public notifications of Open Houses are provided in media (newspapers, bulletin boards, websites).
After collecting base line environmental data and meeting requirements of the Terms of Reference, write the Draft Environmental Assessment Report	EA Report is reviewed by Federal and Ontario government scientists and experts.	EA Report is available for public review and comments. Noront must address these comments
Final EA Report is prepared with any comments or actions from government reviews of the draft report and public comments	Final EA Report is reviewed by MoECC and CEAA. Once satisfied the EA is complete, a recommendation is made to the Minister of E and CC. Federal officials prepare an Environmental Impact Statement that the Federal Environment Minister will review and sign if satisfied with it.	Public review of final documents and comment periods.
Once the EA approvals are signed, Noront begins the other permit applications, like air emissions, water taking and discharge, power connections, and other applicable permits	Government experts review the permit applications and state any requirements for additional information.	Public reviews are part of most permit applications.