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December 21, 2022 **XCG File No. 5-5030-01-02**

Mr. Thomas Stephenson
Director, Projects and Marketing
Cobric Chemical Inc.
150 Albert Street
Midland, Ontario L4R 5E3

Re: Assessment of Groundwater Threats and Recommended Long-term Monitoring Plan for the Proposed Electric Arc Furnace Dust Recycling at 237 Brant Street, Hamilton,

Dear Mr. Stephenson:

1. INTRODUCTION

1.1 Project Understanding, Purpose, and Use

Further to your request, XCG Consulting Limited (XCG) is pleased to provide Cobric Chemicals Inc. (Cobric) and GFL Environmental Services Inc. (GFL) with our summary report for the Assessment of Groundwater Threats and Monitoring Plan conducted by XCG at 237 Brant Street, Hamilton, Ontario (Facility). Refer to the site location map shown on Figure 1.

It is understood that Cobric and GFL have proposed the construction of an Electric Arc Furnace Dust (EAFD) recycling operation at the Facility and are in the process of completing an Environmental Screening Review (ESR) as defined by Ontario Regulation (O. Reg.) 101/07 – Waste Management Projects under the Environmental Assessment Act.

In support of the ESR, XCG undertook a Preliminary Hydrogeologic Baseline Study for the Facility in May 2022, and issued the final report on July 12, 2022. The overall conclusions of this study were as follows:

- The Facility is underlain by a layer of granular fill material with a thickness ranging from approximately 0.5 m to 2.0 m.
- Underlying the granular fill material is native clay, with a confirmed depth of occurrence of at least 7.6 metres below ground surface (mbgs).
- The available information suggests the base of the native clay and the bedrock surface coincide at approximately 15 mbgs in the area of the Facility.
- The regional shallow groundwater reportedly flows in a northerly direction.
- The local shallow groundwater was inferred to flow to the west/southwest in the immediate area of the Facility. Buried utilities may be locally disrupting the natural flow of groundwater.

- The groundwater analytical results from May 2022 indicated that the groundwater quality at the newly installed monitoring wells (MW1 through MW6) did not exceed any of the Ministry of the Environment (MOE, or the Ministry[1]) Table 3 generic Site Condition Standards (SCS) for petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), or metals.
- The soil analytical results from May 2022 indicated that the granular fill underlying the Facility contains concentrations of metals (cadmium, lead, zinc) which exceed the respective MOE Table 3 generic SCS.
- The soil analytical results from May 2022 indicated that the native clay did not exceed any MOE Table 3 generic SCS for PHCs, VOCs, PAHs, or metals.

The monitoring well locations are shown on the attached Figure 2.

The purpose of the Preliminary Hydrogeologic Baseline Study was to determine the baseline groundwater characteristics/chemistry, to assist in the analysis on the potential for the EAFD recycling Facility to impact groundwater conditions, and to develop a long-term monitoring plan for implementation once the EAFD recycling Facility is operational.

1.2 Assessment Criteria

The environmental conditions on the subject site were compared to the generic site condition standards (SCS) published by the MOE in the document "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act,*" dated April 15, 2011 (MOE SCS).

Based on the site location, current and proposed future land use, the MOE SCS for industrial/ community/commercial (ICC) land uses in a non-potable groundwater situation (i.e., MOE Table 3 SCS) were used for assessment purposes.

2. REVIEW OF ACTIVITIES ASSOCIATED WITH PROPOSED EAFD RECYCLING

XCG conducted a review of the Design and Operations Report (Draft) for the EAFD recycling operation proposed for the Facility, the presentation slides prepared describing the associated Environmental Screening Process, dated February 22, 2022, and various plans and schematics depicting on-site infrastructure and processes, as provided by Cobric and/or GFL. Refer to Attachments A and B.

Key findings of this review, specific to groundwater issues, are generally summarized from the provided documents as follows:

- The raw EAFD is to be delivered to the Facility in bulk bags or by tanker truck, and will be stored in enclosed outdoor silos. Storage and handling procedures will be designed to eliminate fugitive dust emissions to the atmosphere.
- All EAFD processing will occur inside the enclosed main processing building.

[1]Previously known as the MOE, the Ministry of the Environment and Energy (MOEE), and the Ministry of the Environment and Climate Change (MOECC). Currently known as the Ministry of the Environment, Conservation and Parks (MECP).

- All parking and storage areas on the Facility are asphalt covered.
- Asphalt surfaces are sloped such that stormwater runoff is directed inward, i.e. does not drain off the Facility, but is directed to on-site drainage features for eventual discharge to the municipal storm sewer.
- The Facility has implemented a Contingency and Emergency Response Plan (CERP) which deals with the prevention of, preparedness for, response to, and recovery from spills, fires, process disruptions, power outages, and other emergencies.
- Incoming wastes will be EAFD only, no liquid wastes, which will reduce the likelihood of spills.
- Process water generated in the zinc purification process will be treated on the Facility by forward osmosis, allowing most of the water to be recycled and reused. Any water not recycled will be disposed off-site under the supervision of GFL staff according to standardized procedures.

3. ASSESSMENT OF GROUNDWATER THREATS

As described in Section 1, the granular fill underlying the Facility is impacted by metals (cadmium, lead, zinc). However, the analytical results from the May 2022 investigations indicate that the native clay underlying the granular fill, and the shallow groundwater underlying the Facility are not impacted, i.e., do not exceed the MOE Table 3 SCS.

These analytical results, combined with the proposed procedures and measures described in Section 2, suggest that the proposed EAFD recycling operation is unlikely to result in impacts to the groundwater under the Facility, and accordingly the occurrence of any off-site groundwater impacts is also considered unlikely.

4. RECOMMENDATIONS FOR MITIGATIONS STRATEGIES TO PREVENT GROUNDWATER IMPACTS

In additional to the comprehensive measures described in the attached Design and Operations Report (Draft) for the EAFD recycling operation, XCG recommends the following measures be undertaken:

- The exterior asphalt surfaces of the Facility should be maintained in good condition such that no large cracks or gaps are present that could allow storm water runoff or spills to enter the subsurface, and to potentially impact shallow groundwater below the Facility.
- The integrity of the stormwater collection drainage network should be verified to ensure that stormwater runoff or spills will not enter the subsurface through gaps, faulty joints, etc., in the stormwater drainage network prior to discharge to the storm sewer. This would likely be best undertaken by retaining a CCTV video inspection/flushing and cleaning contractor to conduct a one-time event.
- The monitoring well network consists of six monitoring wells identified as MW1 through MW6, as shown on Figure 2. The flush-mounted protective surface casings of these monitoring wells should be maintained in good condition to ensure surface run-off does not enter the casing or the PVC well piping, as this may potentially provide a pathway for

contaminants to enter the subsurface and impact groundwater in the vicinity of the well. Any damaged wells casings should be repaired by a licensed well contractor.

5. RECOMMENDED LONG-TERM GROUNDWATER MONITORING PLAN

XCG recommends the following long-term groundwater monitoring plan be implemented once the EAFD recycling facility is operational:

- Biennial groundwater sampling and water level measurements at monitoring wells MW1 through MW6.
- Concurrent with the biennial monitoring events, conduct a general assessment of the condition of the asphalt surfaces and monitoring wells.
- Submission of all groundwater samples to an accredited laboratory for analysis of PHCs, VOCs, PAHs, and metals.
- Comparison of analytical results to the MOE SCS for ICC land uses in a non-potable groundwater situation (i.e., MOE Table 3 SCS).
- Preparation of summary report of findings, including recommendations for additional tasks or modifications to the monitoring program appropriate.

The recommended biennial monitoring frequency is based on the favorable baseline groundwater quality results and native clay conditions observed in the May 2022 groundwater and soil sampling activities. However, if unplanned incidents, such as significant local spills or releases, occur which may result in groundwater impacts, additional groundwater sampling or subsurface investigations may be warranted to assess potential impacts and to allow for timely mitigation measures.

6. LIMITATIONS

6.1 Limitations

The scope of this report is limited to the matters expressly covered. This report was prepared for the sole benefit of Cobric Chemicals Inc. and GFL Environmental Services Inc. in support of the proposed construction of an Electric Arc Furnace Dust recycling operation at the Facility.

This report may not be relied upon by any other person or entity. Any use or reuse of this document (or the findings and conclusions represented herein), by parties other than those listed above, is at the sole risk of those parties.

The conclusions drawn were based on information collected during the preliminary hydrogeological assessment and information provided to XCG. Conditions between and beyond these locations may become apparent, during future investigations or on-site work, which could not be detected or anticipated at the time of this investigation. As such, XCG cannot be held responsible for environmental conditions that were not apparent from the available information.

7. CLOSURE

We trust this document meets your current requirements. Please contact the undersigned if you have any questions or comments related to this report.

Respectfully submitted,

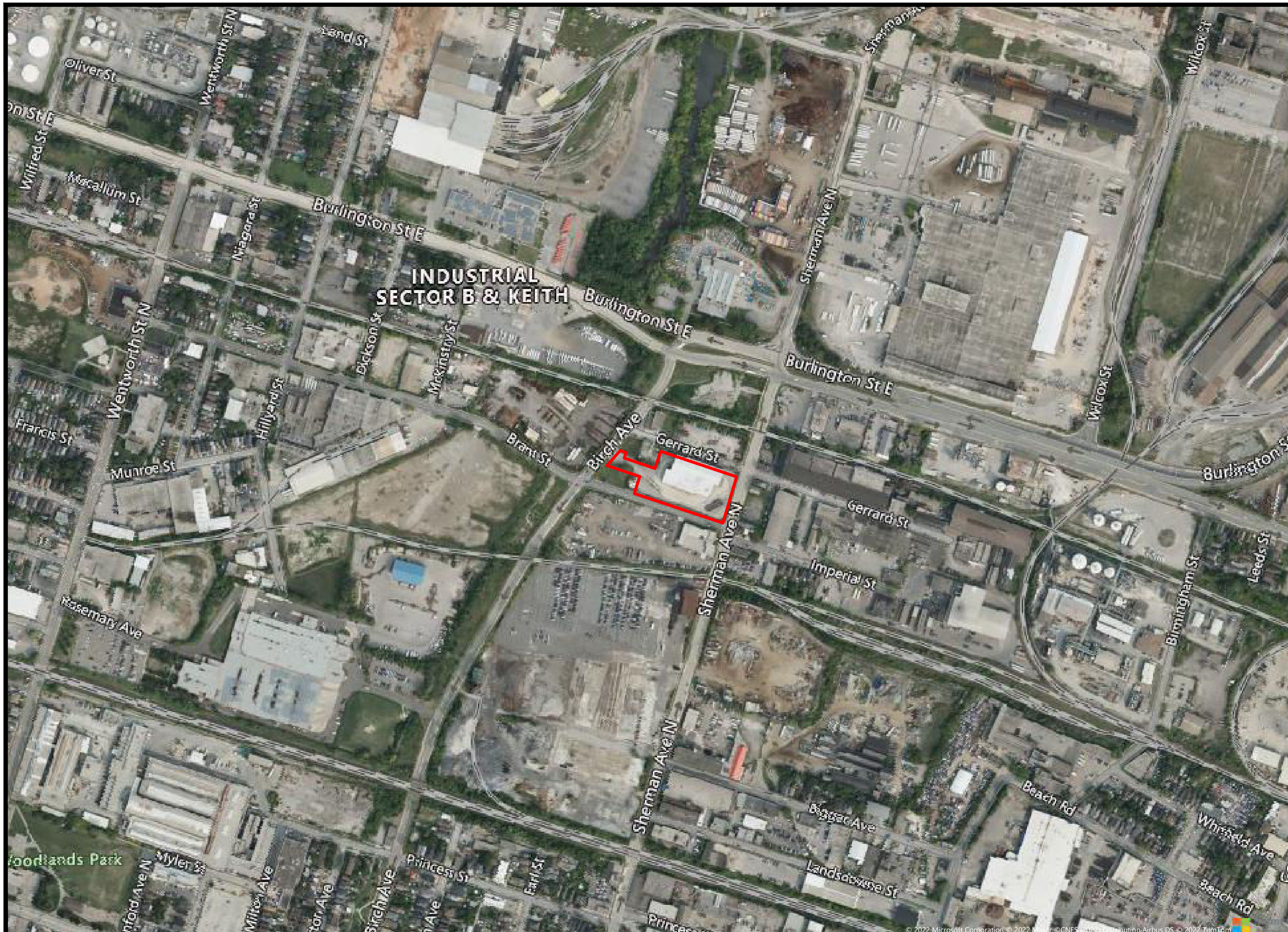
XCG CONSULTING LIMITED

Michael P. Schriver, P.Eng.
Senior Project Engineer

Pamela Cameron, B.A.Sc., P.Eng., QP
Senior Project Manager

Attachments: Figures 1-2
Attachment A – Design and Operations Report (Draft)
Attachment B – Environmental Screening Process- EAFD Recycling

FIGURES



SITE LOCATION MAP

237 BRANT STREET
HAMILTON, ONTARIO

XCG Environmental Engineers & Scientists

DATE	JOB NO.	FIGURE NO.
JULY 2022	5-5030-01-02	1

DRAWING REFERENCE: Base drawing supplied by City of Hamilton online mapping, grading plans provided by the client and XCG field notes.
NOTE: Location of building, underground utilities, etc. are for reference only and should not be relied upon for detailed design, renovation, or construction purposes. Property boundary and building locations shown may not represent actual surveyed boundaries.

SHEET: R550300102002FIG01.pdf
FILE: R550300102002.dwg

LEGEND:

- APPROXIMATE SUBJECT PROPERTY BOUNDARIES
- APPROXIMATE PROPERTY BOUNDARIES
- STRUCTURE
- APPROXIMATE MONITORING WELL LOCATION (MAY 2022, XCG)

0 15 30m

MONITORING WELL LOCATIONS

237 BRANT STREET
HAMILTON, ONTARIO

XCG Environmental Engineers & Scientists

DATE	JOB NO.	FIGURE NO.
JULY 2022	5-5030-01-02	2

DRAWING REFERENCE: Base drawing supplied by City of Hamilton online mapping, grading plans provided by the client and XCG field notes.
NOTE: Location of building, underground utilities, etc. are for reference only and should not be relied upon for detailed design, renovation, or construction purposes. Property boundary and building locations shown may not represent actual surveyed boundaries.

SHEET: R550300102002FIG02.pdf
FILE: R550300102002.dwg

ATTACHMENT A

DESIGN AND OPERATIONS REPORT (DRAFT)

PROPOSED EAFD RECYCLING FACILITY

DESIGN AND OPERATIONS REPORT (DRAFT)

Electric Arc Furnace Dust Recycling
ECA A100143

Prepared by:

Prepared for:

Revolution Landfill Acquisition GP Inc.
GFL Brant Street Facility
227-237 Brant Street
Hamilton, ON

DOCUMENT APPROVAL

Report Preparation

Position	Name	Signature	Date

Technical/Management Review

Position	Name	Signature	Date

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1. Introduction

Revolution Landfill Acquisition GP Inc., operating as GFL, owns (see, Appendix 1: Certificate of Incorporation) and operates the Brant Street Facility which is permitted (see, Appendix 2: ECA A100143) for the bulking, transfer, processing, and temporary storage of non-hazardous solid industrial waste (excluding asbestos), solid hazardous waste classes 145 and 262, solid hazardous waste classes 221 and 222 generated from spill cleanup, and liquid industrial/hazardous waste classes 122, 132, 143, 146 and 150. This document represents the up-to-date Design and Operations Report for the facility.

1.1 Purpose

The purpose of this version of the Design and Operations Report is to recognize the addition of a High Temperature Metal Recovery (HTMR) Electric Arc Furnace Dust (EAFD) recycling technology to the facility, and the associated receipt, storage and processing of class 143 (residues from steel making) solid hazardous waste (see, Appendix 3: ECA A100143 Amendment Application).

1.2 Site Location and Area

The Brant Street Facility is located at 227-237 Brant Street, Hamilton, Ontario; situated between Gerard Street to the North, Sherman Avenue North to the East, Brant Street to the South, and Birch Avenue to the West (see, Appendix 4: Site Maps). The facility is located in an industrial area (*i.e.,* City of Hamilton M5: General Industrial Zone). The neighbouring properties include a mix of mostly industrial and commercial, and some residential land uses. The facility is in close proximity to the major steel manufacturers in Ontario.

1.3 Property and Layout

The Brant Street Facility property is 0.9 hectares (2.22 acres), which includes an entrance and incoming scale, an administration building (with office and change rooms), a large storage/processing building, and a separate exit and outgoing scale (see, Appendix 5: Site Layout). The main storage/processing building is a 3229.15 m² (34,758.28 sq. ft.) single storey industrial building centrally located on the property. The EAF Dust and Additive storage occurs outside this building. All other material storage and processing at the site, occurs inside this building. The second building is a small administration building measuring 179.28 m² (1929.74 sq. ft.) located in the southeast corner of the property. The property is fully enclosed with a 1.83m high security fence with barbed-wire and lockable gates. All parking and storage areas are asphalt covered.

2. Facility Design and Features

The Brant Street Facility is approved to receive waste 365 days a year, 24 hours per day. Typically, waste is received Monday to Friday from 7 am to 5 pm. In practice, the facility

currently only receives non-hazardous solid waste (although it is approved for more). With approval of the new ECA A100143 Amendment Application, the facility will also receive waste class 143 (residues from steel making) solid hazardous waste for the purpose of waste recycling and zinc manufacturing.
Due to continuous operation of steel companies EAFD waste will be received 7 days a week but only if necessary, during weekend from 6 am to 8 pm.
A description of the facility, with particular focus on the equipment and processes associated with EAFD recycling, is contained in the sections below.

2.1 Administration Building

The administration building contains an office and change rooms. The office is for supervisory and management staff. The change rooms include bathrooms and wash areas for male and female operations employees. A small lunch area is also provided.

All incoming and outgoing Truck Drivers must provide the necessary shipping documents (for review, signature and retention) to GFL staff at the administration building. Once the paperwork is reviewed, Truck Drivers will be directed to scale in or out of the facility. Incoming Truck Drivers will then be directed to the appropriate location to unload or load their waste. Drivers are asked to always remain inside their vehicle while they are in the waste processing/transfer building.

Non-operational visitors are directed by signage to the administration building. All visitors are required to sign in and out of the facility (this is standard practice in case of emergency). All workers and visitors onsite are required to wear the necessary personal protection equipment (*i.e.,* hard hat, safety glasses, steel-toe boots, *etc.*) and follow all site rules.

2.2 Storage and Processing Building

The maximum amount of waste permitted to be stored at the site is 8,000 tonnes. Waste is received and then sent out for final disposal (generally, to GFL's industrial landfill located at 65 Green Mountain Road West in Hamilton) relatively quickly. Although ECA A100143 allows a maximum storage period of 180 days, incoming waste is generally bulked/processed and sent offsite within days or weeks.

Other than the proposed addition of the HTMR EAFD recycling technology, there is no other processing equipment (aside from a loader required for handling bulk non-hazardous solids) used onsite. When HTMR equipment is installed and ready for use, the building will be enclosed.

2.3 Main Yard Area

The main yard area is fully paved. It contains space for trucks that cannot be immediately unloaded or loaded; they are directed to a section of the main yard until provided further authorization. While waiting, Truck Drivers are informed to not let their vehicles idle. A portion of the main yard is also used to store unused equipment. The facility has developed Best

Management Practices (see, Appendix 6: Best Management Practices for Odour, Noise and Dust) to ensure any potential nuisances in the main yard are kept to a minimum. Facility staff have been trained on these practices.

There is no stormwater collection system on site. All stormwater makes its way to the sanitary sewer.

2.4 Site Security

The Brant Street Facility security features include:

- Steel perimeter fencing (with lockable gates, that are locked during all non-operating hours) with barbed-wire surrounding the entire facility;
- Site access that is regulated during hours of operation by onsite staff to prevent unauthorized entry;
- Video camera surveillance (in use 24 hours per day) that monitors the main yard areas, access gates, and storage/processing building;
- Company name and emergency phone number posted on signage adjacent to the roadway;
- Up-to-date Emergency Response Plan and Fire Safety Plan;
- Adequate lighting onsite at all times and
- Alarm system that is activated at the main scale house by unauthorized access (disarmed each day during operating hours and armed during non-operating hours).

2.5 Environmental Emergency and Contingency Plan

The site's Contingency and Emergency Response Plan (CERP) is included in Appendix 20. An up-to-date version of the CERP is stored in a labeled cabinet located near the main entrance to the office building and will be always accessible to facility personnel.

The CERP is developed in accordance with the ECA. It will deal with the prevention of, preparedness for, response to and recovery from spills, fires, process upsets, power outages and other emergency situations. The CERP is submitted to the Hamilton Fire Department and is available in the building.

The CERP contains a notification protocol with names and telephone numbers of persons to be contacted, including persons responsible for the site, the MOE's District Office and Spills Action Centre, police, fire and ambulance, and the Ministry of Labour. The CERP also provides an organized set of procedures for responding to unexpected but possible problems at the facility, including but not limited to: power failures, labour disruptions, and alternate waste disposal plans. Also, the plan outlines the schedule for the inspection of emergency response equipment and for the annual review and update of the plan.

3. Receiving and Storage

Although permitted for more waste classes (as described in the Introduction section), the Brant Street Facility currently only receives and stores (*i.e.,* for purposes of bulking) non-hazardous solid wastes. With approval of the ECA A100143 Amendment Application, the site will also receive, store, and recycle class 143 (residues from steel making) hazardous solid waste.

Incoming trucks to the facility arrive onsite and stop on the scale in front of the administration building. At this point, Truck Drivers provide their shipping documents (and any other relevant paperwork) to GFL staff for review (*i.e.,* to ensure the shipping documents are accurately completed and the facility can rightfully accept the incoming waste). A Waste Stream Information Sheet (WSIS) describing the incoming waste stream characteristics (including signature verification that all information is accurate and up to date) is completed and provided to GFL staff ahead of time by the Client (see, Appendix 7: Waste Stream Information Sheet). This information is initially reviewed by GFL Technical Operations staff, maintained at the facility as well as electronically, and periodically re-evaluated. No offloading of bulk wastes will take place until the WSIS has been internally approved. All inbound solid waste is analyzed ahead of time, based on a collected sample, and pre-approved before receipt onsite. Furthermore, any available documentation pertaining to the waste composition (*e.g.,* Safety Data Sheet) is also reviewed. The Operations Supervisor and/or Branch Manager, at their discretion, may choose to conduct additional analysis on any material. All incoming class 143 hazardous solid waste will require upfront metals analysis from the generator. If an incoming waste does not match an approved facility waste class, the generator (or Client) will be contacted, and the Truck Driver will be informed to return the waste to the generator or to take the waste to another approved facility for disposal. Any onsite waste rejections are documented by GFL staff (see, Appendix 8: Waste Rejection Procedure SOP). Trucks entering the site utilize the commercial scale (*i.e.,* the empty truck is either scaled on its way in or out for the tare weight, which is used to confirm the volume received). Receiving is conducted using the facility approved Standard Operating Procedure (see, Appendix 9: Receiving SOP). If further assistance is needed, the Operations Supervisor or Branch Manager will be consulted.

Bulk non-hazardous solid waste is stockpiled in the storage/processing building. Bulk class 143 (residues from steel making) hazardous solids are received and stored in designated silos. The stored materials are distinctly labelled, and the labelling is manually kept up to date.

4. Processing

The only processing that will be conducted onsite at the Brant Street Facility, aside from the handling of bulk non-hazardous solids using a loader, is Electric Arc Furnace Dust (EAFD) recycling using High Temperature Metal Reclamation (HTMR) technology. This recycling technology is described in the sections below. The HTMR technology for recycling electric arc furnace dust is exempt from Part V of the EPA and Regulation 347. (See attached application with respect to air emissions - sections 9 EPA)

The HTMR recycling technology (see, Appendix 10: Equipment Drawings) separates zinc and lead from waste class 143 (residues from steel making) generated by steel mills.

GFL is seeking an amendment of the existing ECA permit for processing of waste class 143 (residues from steel making) and for the HTMR technology air permit.

The HTMR technology includes:

- a/ Pelletizing, Drying, HTMR Thermo-process for thermo-extraction of Zinc
- b/ Raw Zinc Purification process for refining of Raw Zinc which includes mixer, filter-press, drier with dust collector, liquid storage tanks, osmosis to recycle process liquid.

The EAFD waste handling and processing includes four outdoor storage silos, one indoor silo for Raw zinc product, five storage containers or trailers for indoor or outdoor storage of iron slag and zinc products. More details about process are in Plant Layout Appendix 12, Appendix 13, EAFD or Zinc Process Block Flow Diagrams, and Appendix 16, On Site Storage Capacity Calculation.

4.1 EAFD Recycling Equipment

4.1.1 Storage of the EAFD

The raw material (i.e., feedstock to the HTMR process) electric arc furnace dust (EAFD) is delivered to the Site from steel mills in bulk bags or in bulk (via tanker trucks). The bulk bags containing EAFD are stored at the site in enclosed area. The bulk EAFD is stored in enclosed outdoor silos. Due to the dusty nature of the material transportation, storage and handling is designed to eliminate dust escaping into the atmosphere. The material from the silos is conveyed into Pelletizing Process.

4.1.2 Pelletizing

EAFD and additives are mixed and homogenized. The homogenized mixture is charged into a pelletizing drum via a screw conveyor. Liquid consisting of water and water-based binder is sprayed in the pelletizing drum to bind the particulate material. The rotary action of the pelletizing drum agglomerates the mixture into round pellets of the desired size. The water spray also acts as a dust suppressant inside the pelletizing drum. Slightly negative pressure is maintained in the drum during pelletizing by the dust collector. The dust collector also serves to control emissions generated from the two hoppers. The air from the dust collector serving the pelletizing process is released outdoors through the stack.

4.1.3 Drying of wet pellets

The wet pellets from pelletizer are fed into the directly heated Dryer. The hot flue gas mixed with air is used to dry wet pellets to 5% moisture. The dried pellets are screened into the oversize, middle and undersize fractions. The oversize fraction is broken down by Delumper into smaller particles which goes back into the screen. The undersize fraction is milled and reintroduced into the pelletizing process. The middle fraction of dried pellets is further dried by a Microwave drier to below 0.5% moisture. It is then transferred into the HTMR processing.

4.1.4 HTMR processing

The key process step of zinc recovery from EAFD is based on the HTMR reactor. The dry pellets are indirectly heated in the HTMR reactor to induce a thermo-chemical reaction accompanied by metallic zinc volatilization. The reactor is an indirectly heated rotary tube furnace, which consists of a sealed rotary tube located within the furnace chamber. The furnace uses natural gas as the indirect source of energy to heat the rotary tube. Metals and oxides (such as zinc and lead oxides), along with halides and alkali metals vaporize and are carried into the process gas. The volatilization of metals from the pellets creates the desirable separation of zinc and other volatile metals from non-volatile metals. Non-volatile iron-rich material is called "slag". The slag pellets are cooled in the cooling section of the rotary tube and discharged into a hopper.

4.1.5 Zinc Collection System

The hot process gas from the HTMR reactor containing raw zinc product is cooled down to allow the solids to be collected in the zinc dust collector. The gas containing a small concentration of sulphur dioxide is purified in a sodium hydroxide scrubber system. The system consists of countercurrent flow of gas and sodium hydroxide solution which eliminates sulphur dioxide from the gas stream.

The collected particulates are referred to as Raw zinc concentrate. Raw zinc concentrate includes metallic Zinc, metal oxides (including zinc and lead oxide) and alkali metal salts. Raw zinc concentrate is transferred to the Zinc Purification System.

4.1.6 Zinc Purification System

Raw zinc concentrate is transferred to the Zinc Purification System to separate water soluble impurities from zinc and zinc oxide. Zinc oxide is removed from the liquid slurry by filtration. The filter cake is further washed with fresh water in the same filter to minimize the amount of the salts in the product. Water from filtration containing soluble salts is treated by Osmosis and reused. A small amount of concentrated salt solution is disposed of.

The zinc filter cake is transferred into the Zinc Dryer. The dried zinc product is further sized by a Delumper to customer particle size specifications.

4.1.7 HRV, Oxidizer and Heat Recuperating System

The filtered and scrubbed gas stream from the zinc collection system enters the Heat Recuperating Vessel (HRV). A gas stream from the zinc collection system is oxidized in the (HRV) and sent to the Mixing Chamber where the temperature of the gas stream is regulated by mixing the hot gas stream from the HRV with fresh ambient air. The mixed air from the Mixing Chamber is subsequently directed to the pellet Dryer.

4.1.8 Automation, HMI Control System and Process Safety

An HMI software application collects all the important parameters of the process and presents the information to operators. The system will have two operator interface terminals: one in the building, where the processing equipment is housed; and the second one in the administrative building, where plant manager is located. The HTMR process is a continuous process, with all the parameters operating at steady state levels. In case of process deviation, alarms will be activated to advise operators of the process status.

The HMI program communicates with the PLC and all critical equipment. In case of emergency, the software will initiate the controlled shut down of the process. Push buttons will be also installed in strategic locations to execute an emergency shutdown.

4.2 Processing Results

Using HTMR recycling technology, high recovery efficiency (*i.e.,* 99.9%) of zinc and lead can be achieved with very low iron content in the produced zinc concentrate. The low iron content can be achieved by controlling the creation of dust from pellets, flow of pellets in HTMR reactor and by controlling the velocity of process gas through the reactor tube.

Very low residual zinc and lead content in the produced iron Slag is achieved by process conditions in the HTMR reactor. The outputs of HTMR recycling technology are further described below.

4.2.1 Raw Zinc Concentrate

The Raw zinc concentrate is separated from the process gas stream exiting the rotary tube of the HTMR reactor. It is collected in Zinc Collector System. From there, the collected Raw zinc concentrate is transferred to the Zinc Purification System.

4.2.2 Purified Zinc Concentrate

The Raw zinc concentrate must be washed to remove the soluble impurities in Zinc Purification System. Wet zinc filter cake from the Zinc Purification System is transferred to the Zinc Dryer. The Zinc Dryer is used to dry the zinc filter cake to a final moisture content of approximately 8%. Washed and dried zinc oxides can be refined by smelting or hydrometallurgical processes to produce metallic zinc, zinc oxide, zinc sulphate, or zinc carbonate.

4.2.3 Slag - Iron/Calcium Concentrate

Non-volatile Ferrous material and other stable metal oxides remain with the solid pellets and is referred to as ‘slag’. The slag is high in iron oxide, calcium oxide and contains other non-volatile compounds as well as low levels of residual zinc. The slag is cooled in the cooling section of the rotary tube and exits through the discharge end into hopper. The slag from hopper is discharged and stored in the slag storage area. The slag is then shipped off-site for possible reuse in still mills, in cement manufacturing as source of iron and calcium, or as non-hazardous aggregate.

4.3 Quality Assurance (QA)

QA is a way of preventing mistakes and defects in manufactured products and avoiding problems when delivering products to customers. QA includes quality of the products, critical process parameters during steady state manufacturing and actions when the process deviates from the optimal parameters and quality of products is not met.

QA includes:

- SOP’s - Standard operating procedures
- SPC – Statistical process control
- Daily and Monthly Operating and Maintenance Reports
- Functional Training for all Employees

- Maintenance Management System such as SAP and Standard maintenance procedures
- Accredited Occupational Health and Safety System

Achieving **steady state processing** is defined by the quality of zinc product and slag (iron rich pellets) coming out of HTMR system. The process parameters are clearly oscillating at steady values. The most important parameters are monitored continuously, and the processing trends recorded by the Human-Machine Interface (HMI). If the process parameters deviate from parameter set point limits, an interlock will warn the operator or shut down the process if necessary.

Major areas of QA in the EAFD plant are:

1. Quality of incoming EAFD and Additives
2. Quality of wet and dry pellets
3. Important process parameters at steady state
4. Quality of wet and dry Zinc product
5. Quality of Slag
6. Quality of all gas emission points V1-V4
7. Quality of waste liquid from zinc purification system

Measurement point, size of samples and frequency is identified in the Quality Assurance manual. Collecting and analyzing samples of raw materials, products and by-products daily on-site is a necessary requirement for proper quality control. The Quality control will be performed every day 24 hours. A GFL laboratory and other certified lab will be utilized to do all analyses necessary for successful operation of the EAFD recycling process.

4.4 Material Balance

The site is designed is to process a maximum daily quantity of 30 tonnes of EAFD waste per day, to a maximum of 10,000 tonnes per year. The Material balance is summarized in

~~Table 1~~ "Material Mass Balance" and provided in Appendix 14. Maximum daily, weekly, and yearly production inputs and outputs are also provided.

4.5 Benefits of the HTMR Technology

EAFD is generated by steel mills 24 hours a day, captured in dust collectors. The proposed recycling technology has demonstrated significant and quantifiable environmental and economic benefits for steel mills which generate zinc bearing EAFD waste. This technology provides steel mills in Ontario, Canada, and North America a new alternative to recycle one of their large waste streams, which is packed with valuable metal resources and is currently being shipped and recycled in the USA or being disposed in hazardous waste landfills.

The Brant Street Facility provides the ideal location to manage this material, as it is in close proximity to major steel mills. Local treatment of EAFD offers a solution to long distance hauling experienced by Ontario steel mills (generally, this waste is hauled from Ontario into the United States). It also provides a Canadian solution that reduces our reliance on waste disposal sites in the U.S. (particularly with recent situations resulting in border closures). Cutting down on long-distance hauling will have a positive impact on the release of diesel exhaust fumes (which degrades the natural environment and the quality of life experienced by citizens, ultimately reducing the impact associated with global warming). Cutting down on long-distance hauling will benefit the quality of the air we breath (through reduced CO_2 emissions) and the noise pollution we are subject to daily. Ultimately, this recycling technology will reduce energy and water consumption (*i.e.,* it consumes less resources than traditional zinc refining technologies). Furthermore, this recycling solution will make landfilling these valuable resources unnecessary. Reduced discharge of hazardous waste into the landfill will reduce potential leachate issues. Production of zinc using reclaimed zinc materials also means less mining of virgin material and thus less environmental burden. The carbon footprint of zinc production can be reduced significantly if the metals are recovered from secondary instead of primary sources.

4.6 A Timely Market Solution

Recycling of steel scrap accounts for approximately 50% of global steel production. Steel scrap generally contains a significant portion of zinc galvanized steel. Zinc, during the processing of scrap, is volatilized with other impurities and collected in the form of EAFD via dust collection systems. Over 4,000,000 MT of EAFD is generated annually worldwide, which due to the galvanized nature of scrap typically contains from 15% to 25% zinc (EAFD contains about 800,000 tones of zinc, which is about 7% of the zinc global demand). EAFD is significantly richer in zinc than most primary zinc deposits. Due to the hazardous nature of EAFD, steel producers generally pay to have it disposed. EAFD is not usable for re-processing in existing zinc smelters because of lowering throughput due to low bulk density and because of containing undesirable impurities and, as such, the material is not usable directly in metal refineries. EAFD is either deposited in special hazardous waste landfills at a significant cost to the steel mills, or transported (usually, long distances) to recycling facilities with a Waelz Kiln to produce an intermediary zinc concentrate. The Waelz Kiln process is not cost effective and relies heavily on the subsidy that the steel mills pay to the recycling plants.

5. Residual Waste Transfer and Disposal

Outgoing non-hazardous solid wastes do not require any further testing, after being bulked and prepared for landfill, as they are TCLP tested before arriving at the Brant Street Facility. Any residual wastes from the EAFD recycling process will be shipped by a Waste management Company.

Waste materials and process additives are delivered to the site in bulk via transport truck, with access the site via the driveway on the west side of the building using an incoming scale. Trucks transport material off-site via the east side outgoing scale and driveway. Materials may be also received in small containers, totes or super-sacks which arrive on flatbed transport trucks or enclosed trailers.

For the material handling and disposal amounts see Material Mass Balance - Table 1 in Appendix 14 and On Site Storage Capacity Calculation in Appendix 15.

6. Facility Inspections and Preventative Maintenance

Daily inspections (see, Appendix 11: Daily Inspection Form) of the entire facility, including all equipment, are conducted on each operating day by Operations staff. The focus of the daily inspections include:

- Site security (*e.g.,* fencing, gates, signage, doors, *etc.*);
- Site nuisances (*e.g.,* fugitive refuse, dust, noise, odours, *etc.*);
- Potential for adverse effects to the surrounding environment; and
- Compliance with all ECA conditions.

The Daily Inspection Form includes a list of each aspect of the site inspected and the name and signature of the inspector, date and time of the inspection, deficiencies discovered, recommendations for mitigation/remediation measures, and the date/time and description of any outcomes of mitigation/remediation measures taken.

A paper copy of the Daily Inspection Form is maintained in a binder in the Operations Supervisor's office. Each Daily Inspection Form is also scanned and stored electronically in the GFL common drive.

The Branch Manager also conducts a monthly inspection (see, Appendix 12: Monthly Inspection Form) of the site. Furthermore, the Environmental Affairs and Health and Safety Advisors also perform inspections throughout the year.

The HTMR operation consists of processing equipment. Regular preventative maintenance procedures for the processing equipment are provided in the Maintenance Manual. The Preventative Maintenance Program document includes inspections and preventative maintenance as required. The Operating procedures and Maintenance program includes records on the maintenance, repair and inspection of the equipment related to the process.

7. Record Keeping and Reporting

Record keeping for the Brant Street Facility includes, but is not limited to:

- Daily and Monthly Facility Inspections;
- Waste receiving, processing and shipment details (including generators and destinations);
- Waste volumes by type on-site;
- Waste Stream Information Sheets and any results of analysis;
- Staff training;
- Incident reports;
- Standard Operating Procedures (*e.g.,* Waste Labelling, Waste Inventory Recording, Equipment Preventative Maintenance, *etc.*);
- Emergency Response and Spill Contingency Plan;
- Fire Safety Plan;
- Complaints received; and
- Regulatory inspections.

As per Condition 12 of ECA A100143, a written report is prepared annually and submitted to the Ministry District Manager by February 1 for the previous calendar year. The annual report covers the following:

- A monthly summary of quantities of waste received at the site;
- A monthly mass balance of materials received and shipped from the site; and
- A monthly summary of quantities of each waste and recyclable material generated at the site and transported off-site, including the name and location of the facilities receiving each waste and/or recyclable material.

8. Contingency Planning

The Brant Street Facility has a comprehensive Fire Safety Plan and Emergency Response and Spill Contingency Plan (see, Appendix 13: FSP and ERSCP). These plans are reviewed annually and updated as needed. Updated copies are submitted within 30 days to the MECP District Manager. All onsite staff are trained on these plans. These plans are stored electronically on the GFL common drive.

The Operations Supervisor is responsible for initiating and following-up with any emergency situations and procedures, until emergency responders arrive onsite. GFL has its own trained Emergency Response Team that will be called in to help manage any environmental incidents. There is a manual fire alarm pull station system, situated just inside the scale house door to the left, which sends an alert once manually activated. Fire extinguishers at the site are inspected monthly (see, Appendix 14: Fire Extinguisher Location Map). If a fire is observed and the alarm is raised, the Operations Supervisor will inform non-essential personnel to move to a safe location (*i.e.,* muster point). The Operations Supervisor will ensure emergency responders (both internal and external if required) are contacted. The emergency shut off switch will be employed to shut down the EAFD recycling equipment, if it is safe to do so. Facility staff are trained in the use of the recycling technology, including shutting down the technology in case of emergency. If it is not safe to shut down the technology, staff will stand well back in a safe area until emergency responders arrive and mitigate the issue. GFL management, Health and Safety, and the Ontario Environmental Affairs Advisor will be informed of any environmental issues at the site and steps taken to report and mitigate these issues.

9. Closure Planning

It is anticipated that once the decision to close the Brant Street Facility is made, any and all unprocessed waste will be recycled or processed and transferred to the appropriate facilities for reuse or disposal. Building and equipment cleaning, and decommissioning activities, will also be completed. Example of Closure Plan steps are described below.

Step 1 – Select and Retain a Consultant
GFL management and the Environmental Affairs Team will select an Environmental Consultant to provide services in support of the closure.

Step 2 – Prepare the Closure Plan
Preparation of the Closure Plan will occur, which will form the basis of the steps to be followed through the Closure Process.

Step 3 – Submit the Closure Plan to MECP EAAB
The Closure Plan document and anticipated schedule will be submitted to the EAAB of the MECP at least 6 months before the actual facility closure. This will serve as the official notice of closure to the MECP and evidence that the Closure Plan is being followed.

Step 4 – Discussions with MECP Hamilton Area Staff
In addition to the EAAB of the MECP, the Closure Plan and Schedule will be submitted to the Manager of the Hamilton District Office of the MECP as notification and for review/comment.

Step 5 – Site Inspection
The selected Consultant will visit the site to conduct a detailed site inspection and observe the condition of all former waste management facilities, equipment and appurtenances. Interviews with facility management staff who have knowledge of the facility operations and process over the past number of years will be completed while on-site. The site inspection will form the basis for developing a list of outstanding issues to be investigated and/or followed up with.

Step 6 – Compile all Site Documents Related to Closure Activities to Date
All facility details (including dates, volumes, destinations, manifest references, *etc.*) associated with the waste being removed from the site, as well as other activities (such as cleaning) will be requested for inclusion in the closure documentation.

Step 7 – Phase I Environmental Site Assessment
A standard Canadian Standards Association (CSA) Z768 Phase I Environmental Site Assessment (ESA) report for the property will be prepared, which will include detailed observations, file reviews and database searches, interviews with facility staff knowledgeable about the facility, and professional judgement statements of impacts to the property conditions. A full review of all previously prepared and available documentation and reports for the property will also be completed.

Step 8 – Phase II Environmental Site Assessment
Based on the findings of the Phase I ESA, a Phase II ESA will be designed and recommended. The Phase II ESA will include any potential issues that need further investigation.

Step 9 – Site Remediation (if necessary)
At the time of the Closure Plan preparation, the requirements for any site remediation (if necessary) may not be anticipated. However, if deemed necessary, remediation of impacts resulting from historical waste handling activities onsite will be completed. The findings of the Phase II ESA activities in Step 8 will form the basis for designing a remedial program. Full documentation of the remediation activities will be prepared.

Step 10 – Prepare Closure Documentation
Details of waste removal, observations, cleaning, results of sampling and verification analyses, and professional judgement statements of the impacts to the property conditions will be included in this document. The Phase I and II ESA findings and Remediation Confirmation documents along with a Waste Removal Summary will form the basis of the Closure Documentation to be filed with the MECP.

10. Financial Assurance

The facility has Financial Assurance (FA) in place for the Brant Street Facility in accordance with ECA A100143. This FA is reviewed annually and maintained on-site. Re-evaluations of the FA are submitted to the Ministry every 3 years, as required.

An updated calculation to reflect the proposed ECA Amendment will be completed upon application approval.

11. Staff Training

Brant Street Facility staff are trained in the following areas:

1. Terms, conditions and operating requirements of ECA A100143 (and the Air ECA once approved);
2. Operation and maintenance of the recycling and processing equipment;
3. Any environmental concerns relating to storage and processing of wastes (*e.g.,* GFL Chemical Hazards Training);
4. Occupational health and safety concerns relating to storage and processing of wastes (*e.g.,* WHMIS, GFL Slips/Trips/Falls Training, GFL General Safety Awareness Training, GFL Respirator Protective Equipment Training);
5. Relevant waste management legislation and regulations (including the Transportation of Dangerous Goods Act and Ontario Regulation 347);
6. Operation of all onsite equipment and procedures to be followed in case of an emergency (*e.g.,* Fire Safety Plan, Emergency Response and Spill Contingency Plan); and
7. Site Specific Standard Operating Procedures.

All onsite staff will ensure they exercise all necessary care to perform their jobs safely.

ATTACHMENT B

ENVIRONMENTAL SCREENING PROCESS

ELECTRIC ARC FURNACE DUST RECYCLING

PUBLIC CONSULTATION #1

FEBRUARY 3, 2022

GFL GREEN FOR LIFE
environmental

ENVIRONMENTAL SCREENING PROCESS

ELECTRIC ARC FURNACE DUST RECYCLING FACILITY

February 3, 2022.

Contents

Introductions

Todd Smith
VP Operations, Ontario and Quebec
GFL Environmental

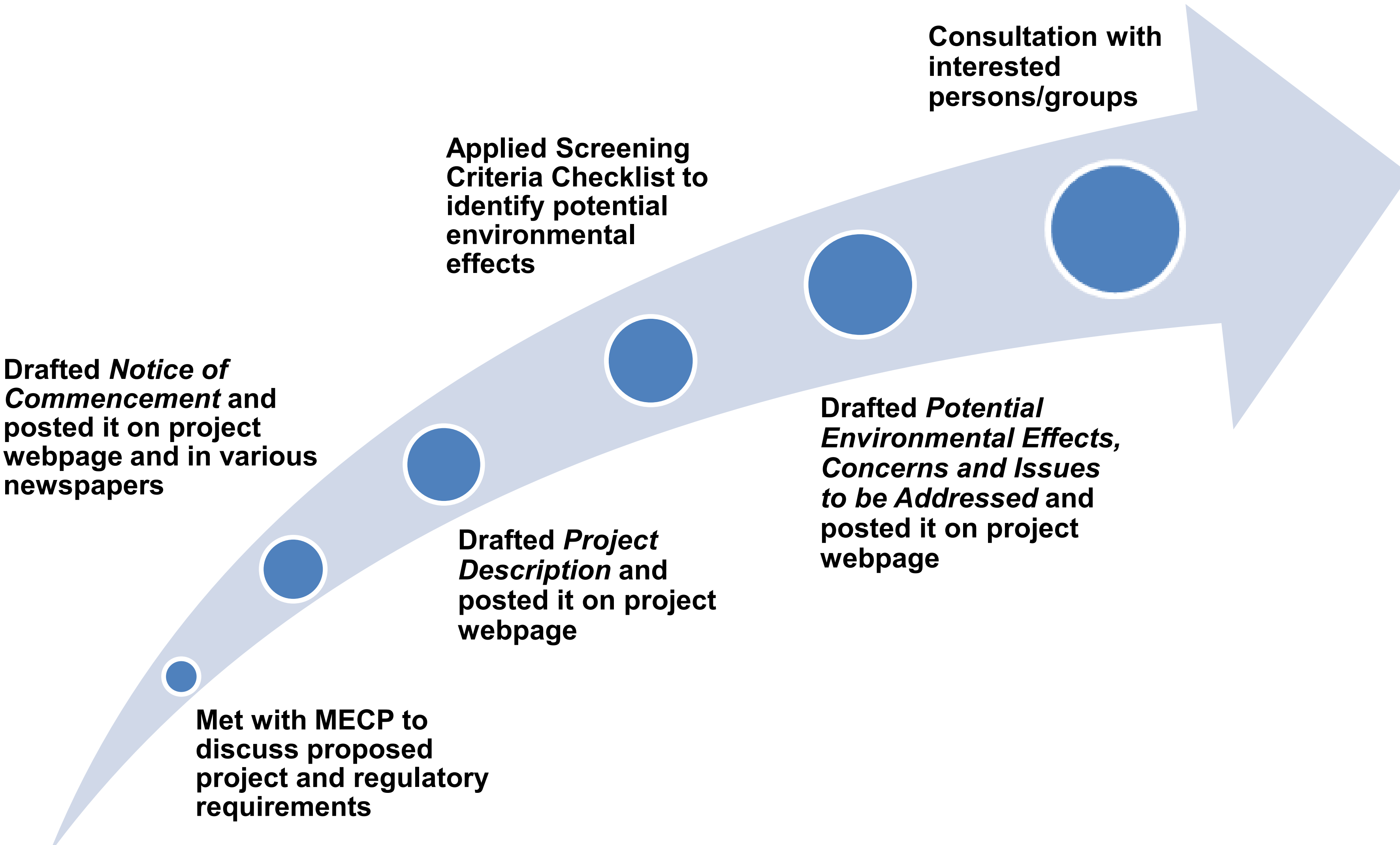
Rich Lagani, M.A.
EH&S Manager of Regulatory Compliance
GFL Environmental

Thomas Stephenson, M.A.Sc., DEA
Director, Projects and Marketing
Cobric Chemicals Inc.

Company Background

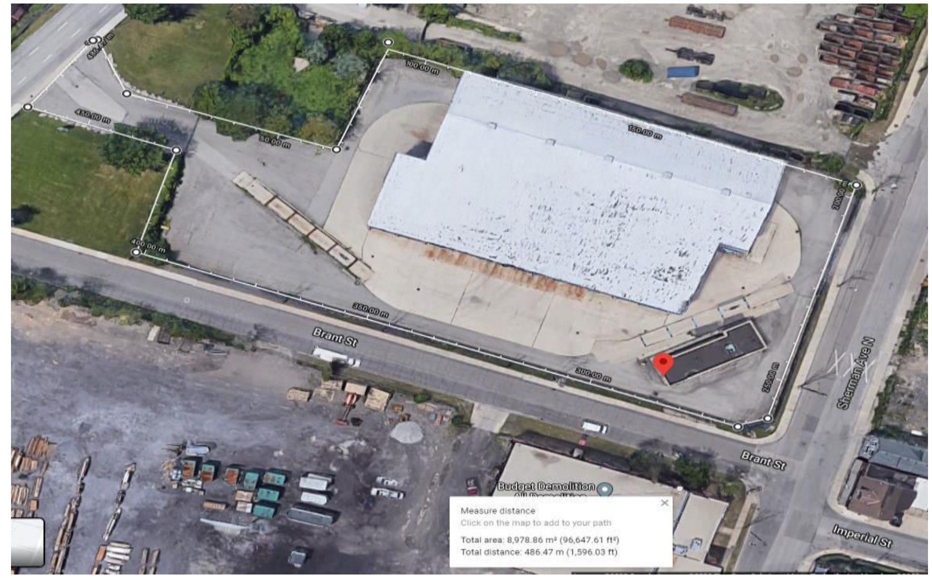
- Offers wide range of environmental and industrial services to businesses, communities and households, including:
  - Solid waste management (*e.g.,* recycling, organics, garbage),
  - Liquid waste management (*e.g.,* industrial chemicals, automotive fluids), and
  - Infrastructure development (*e.g.,* soil remediation, demolition).
- Owns/operates network of diverse state-of-the-art waste disposal, transfer and recycling facilities across North America.
- Priority #1 – commitment to 'Safe for Life' safety culture pledge, maintaining safety for every worker, subcontractor, visitor and member of the public in every service provided.

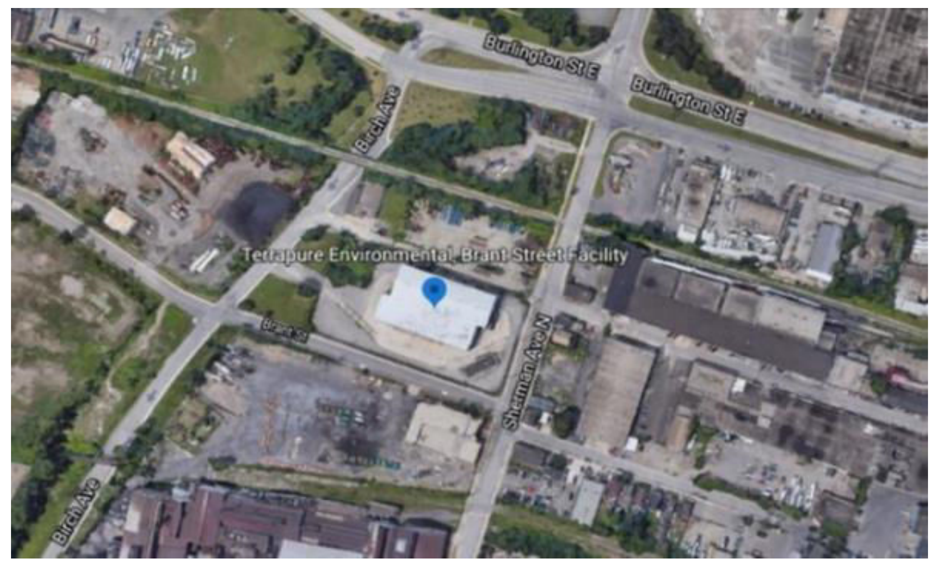
ESP: Steps Completed To Date



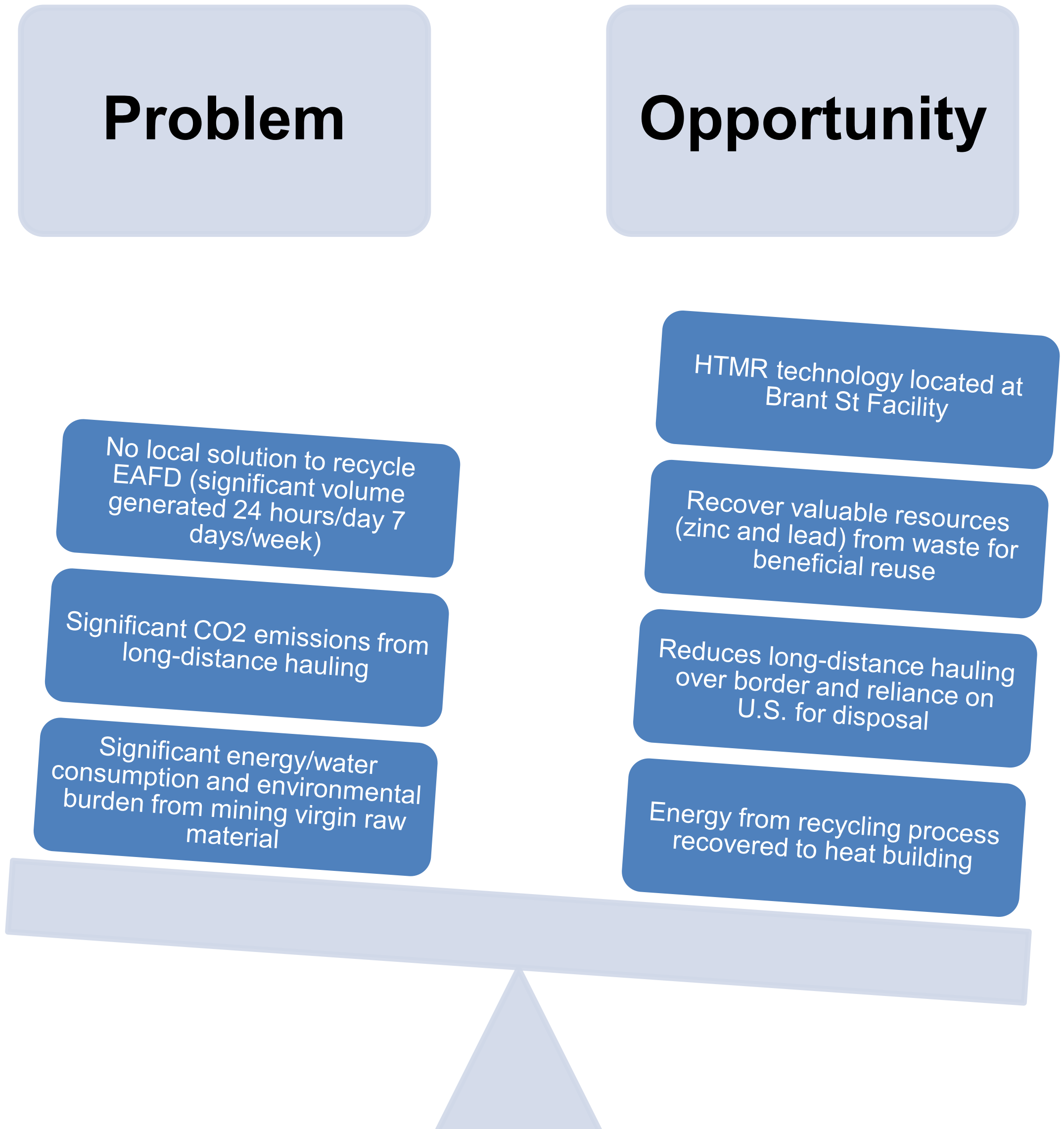
Site Description: Brant Street Facility

- 227-237 Brant Street, Hamilton, Ontario.
- Operating as waste transfer station since early 1990s.
- Currently approved to receive/store solid non-hazardous and hazardous waste (ECA #A100143).
- Ideally located to manage EAFD (in close proximity to major steel mills).
- Applying to MECP to amend current Site ECA.
- Applying to MECP for new Air/Noise ECA.





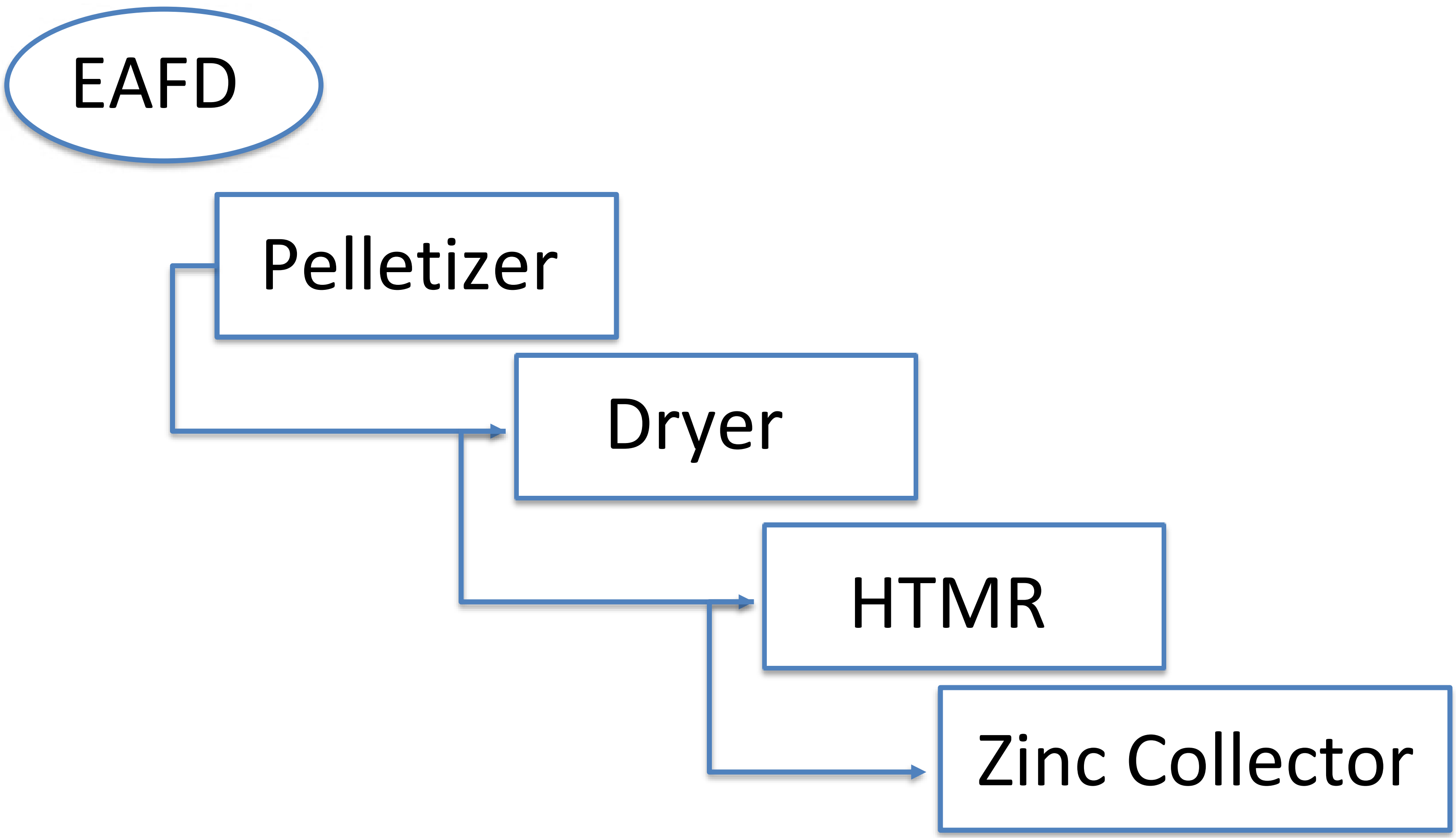
Problem and Opportunity



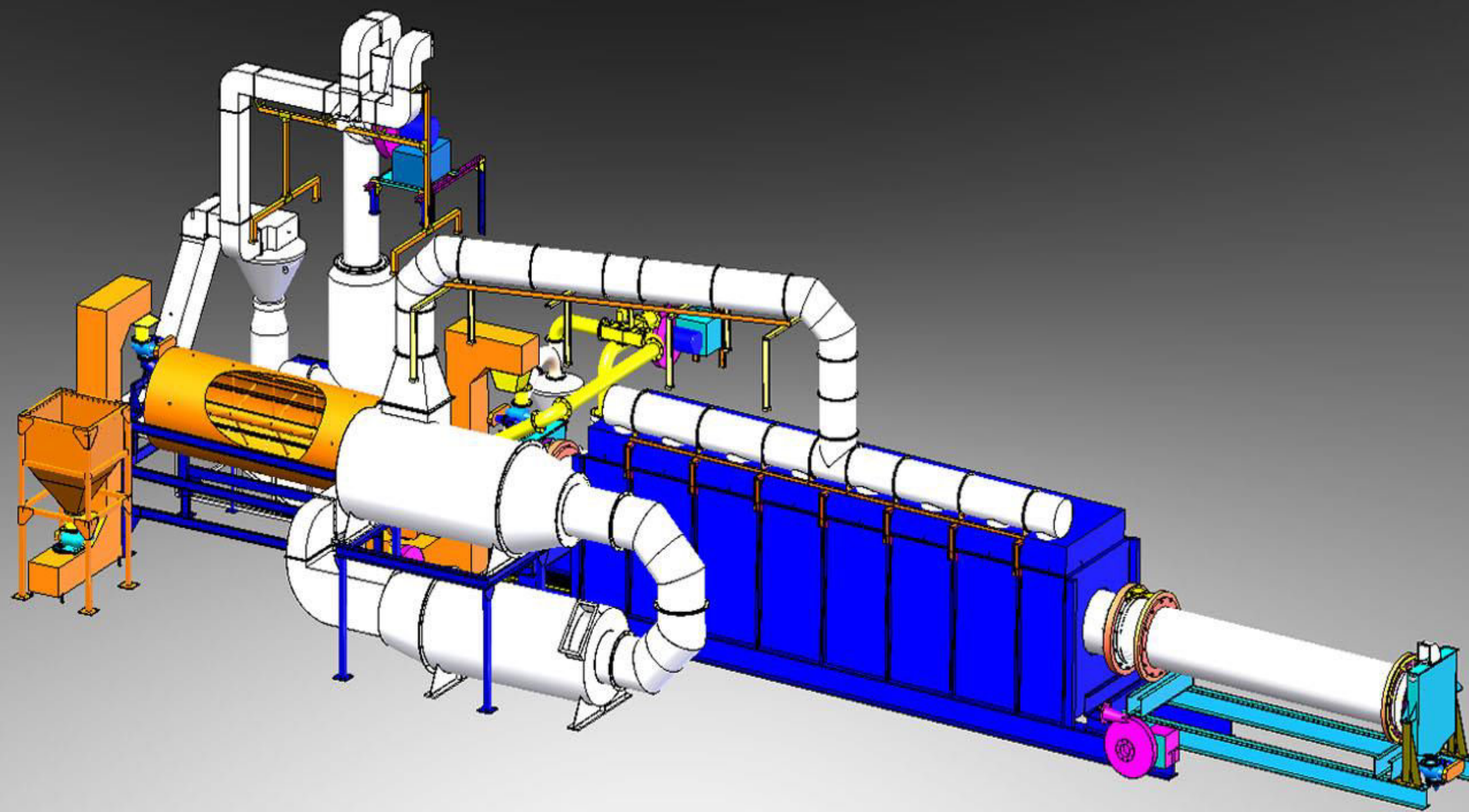
Project Description

- Proprietary (Canadian Clean-Tech) High Temperature Metal Recovery (HTMR) technology that separates zinc and lead from electric arc furnace dust (EAFD) generated by steel mills.
- Initial throughput capacity of 10,000 MT/year (serving Ontario market), with ability to increase in future to 32,000 MT/year (serving larger market).
- Potential environmental effects/concerns/issues (*i.e.,* pre-mitigation measures) will be assessed by qualified professionals as part of detailed engineering.

Project Description



Project Description



Potential Environmental Effects: Surface and Groundwater

Notes:

- Incoming waste is EAFD only (no liquid waste received), reduces spill risks.
- Vehicles traveling to site fully contain EAFD to prevent release and unload in closed silos.
- All processing activities indoors.
- Regularly inspected facility.
- Process water generated from zinc purification is treated by forward osmosis onsite with majority recycled and reused and remainder transferred offsite (under direct supervision of staff and in accordance with SOP).

Potential Environmental Effects: Surface and Groundwater

Next Steps:

- Scope-of-service/quote to assess hydrogeological features of site.
- Establish surface/groundwater baseline data (*e.g.*, measurements and elevations, flow patterns, chemistry) compared against MECP standards.
- Construct groundwater-monitoring network for early detection of potential impacts (if necessary).
- Develop Stormwater Management Plan to assess potential drainage and erosion concerns.
- Develop Spill Prevention and Contingency Plan.

Potential Environmental Effects: Air and Noise

Notes:

- HTMR process designed to prevent fugitive dust (handling/storage in enclosed systems).
- HTMR technology has overall net-positive impact on GHG emissions.

Next Steps:

- Scope-of-service/quote to conduct air and noise studies.
- Identify sensitive receptors.
- Assess local air and noise quality (including existing industrial activities and emission sources).
- Complete ESDM, including identification of emission sources, assessment of emissions and potential pollutants, collection of SDS's and equipment specifications (*e.g.,* flow rates, stack dimensions, building/stack heights), and model off-site concentrations.
- Perform Air Quality Impact Assessment of emissions.

Potential Environmental Effects: Air and Noise

Next Steps Continued:

- Develop Best Management Practices to minimize metals in fugitive dust; identify sources of fugitive dust, potential receptors, and planned control measures.
- Develop Dust Monitoring Plan.
- Complete AAR to determine max. potential noise impacts at sensitive receptors; noise levels (factoring in equipment installations, building layout, supplier/manufacturer recommendations) predicted based on worst-case operating scenario and compared to NPC-300 Guideline; potential offsite impacts modelled and compared to MECP noise guidelines.
- Sources not able to meet NPC-300 guidelines will be designed with appropriate controls to achieve compliance.

Potential Environmental Effects: Socio-Economic Impacts

Notes:

- Local employment opportunities and local solution to be proud of.
- Reduced reliance on landfills for EAFD and cost-savings for local steel mills.
- Less energy/water consumption relative to primary zinc production through mining.
- Minimal truck traffic anticipated onsite per day and elimination of long-distance truck haulage of EAFD waste.

Next Step:

- Scope-of-service/quote to conduct socio-economic impact assessment.

Potential Environmental Effects: Other

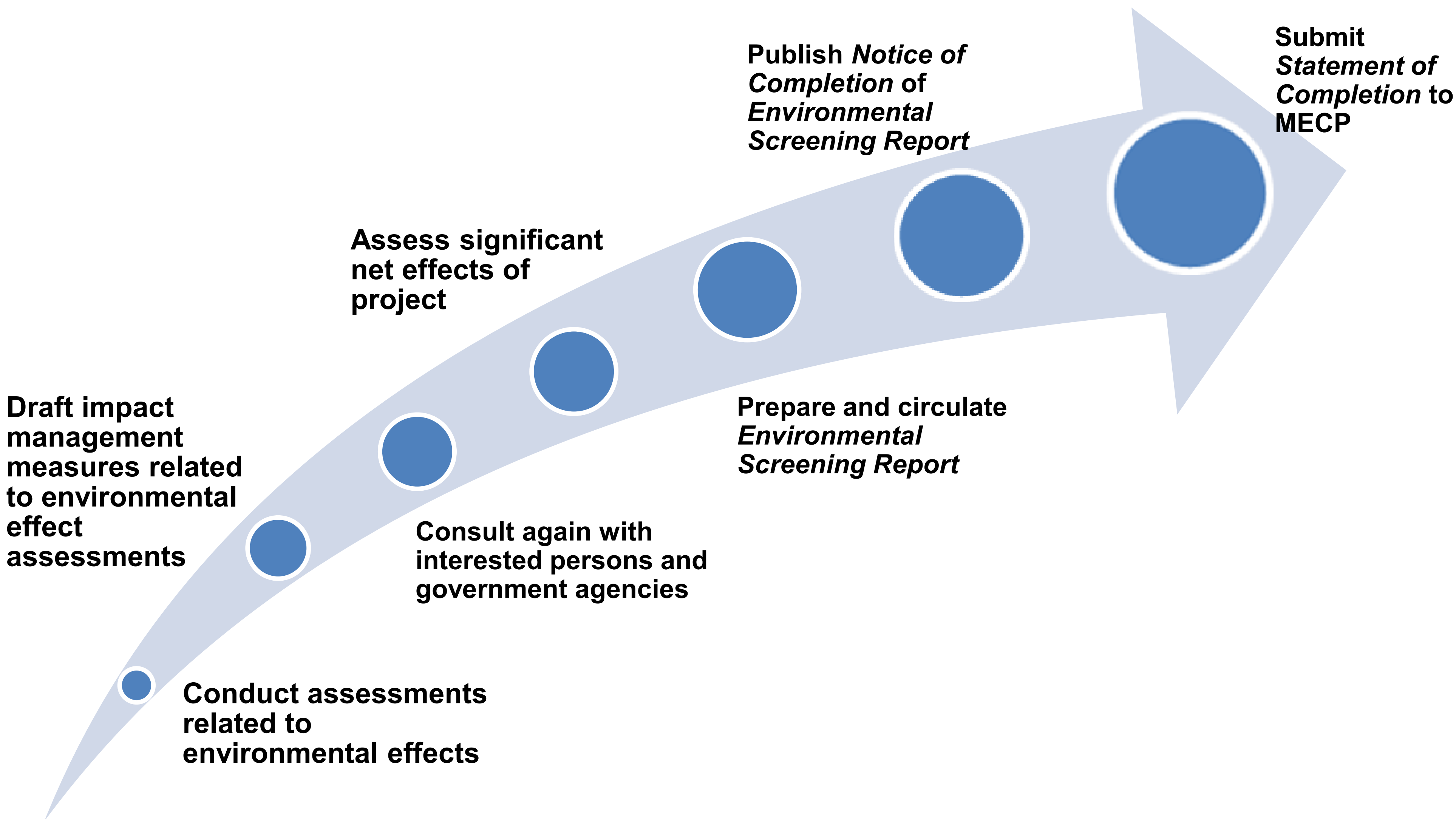
Notes:

- Evaluating options for highest value reuse of secondary product (iron slag).

Next Steps:

- Amend current Waste Disposal Site ECA (receipt of Waste Class 143 and new design and operational changes).
- Develop new Design and Operations Report.

ESP: Next Steps



THANK YOU

QUESTIONS?

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GFL environmental

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