Port Fuels & Materials Services, Inc

Hamilton Energy-From-Waste Project

Environmental Screening Report

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Executive Summary

This Environmental Screening Report (ESR) contains the results of an Environmental Screening Process (ESP) undertaken by Port Fuels & Materials Services, Inc. (PFMSI), in accordance with the Waste Management Projects Regulation (Ontario Regulation 101/07) of the Ontario Environmental Assessment Act. The ESP was undertaken to determine the advantages and disadvantages associated with developing an energy from waste (EFW) Facility on a 17 acre parcel of leased land on Pier 15 in the Port of Hamilton, utilizing gasification-based technology known as the Gasplasma® process. This ESR includes a description of the project, the existing environment, consultation activities undertaken, mitigation and monitoring measures proposed, and the resulting net effects of the project.

Ontario continues to produce over 13 million tonnes of waste annually, including Industrial, Commercial and Institutional (IC&I) waste and Municipal Solid Waste (MSW). Over 6 million tonnes of waste are landfilled in other jurisdictions (i.e. across the border) and while IC&I makes up 60% of the total waste produced in Ontario, only 12% of the IC&I waste is diverted from landfill. Developing local solutions to address waste management is environmentally responsible, financially sound, and it provides secure waste management for the province.

There is potential within the Province of Ontario for advanced and efficient technologies focused on EFW, such as the Gasplasma® technology proposed by PFMSI, to meet social and environmental needs and the goals of reducing the amount of post diversion waste sent to landfills in Ontario or exported across the border. This project supports the Province of Ontario's *Green Energy Act* by reducing Greenhouse Gas (GHG) Emissions, improving Solid Waste Management, increasing Energy Efficiency, and avoiding the disposal of waste in landfills. This is an opportunity for Hamilton to become a leader in development of green projects thus changing the perception and reality of the past industrial Hamilton.

The Gasplasma® process offers a cleaner, variable scale, more efficient, community and industrial focused EFW process. The Gasplasma® process is an EFW technology that produces a net benefit to the environment with much lower emissions than alternative EFW technologies. The Gasplasma® process, which has tested successfully at a pilot plant in Swindon UK, uses a patented combination of two commercial industrial technologies (gasification and plasma conversion) to convert IC&I waste, and other organic wastes into a clean, hydrogen-rich synthesis gas (syngas) and a solid, vitrified product (Plasmarok®), each with multiple applications.

From a local perspective that seeks sustainable waste management solutions, the proposed undertaking intends to utilize the waste feedstock from the industries within and adjacent to the Port of Hamilton. Sourcing the waste within the immediate area will lower the amount of fuel consumption required, and ultimately reduce the carbon footprint of the PFMSI facility.

Further, the proposed undertaking is capable of providing heat and energy back to these properties as an additional closed loop benefit.

The Gasplasma® process reduces GHG as the process has higher levels of waste conversion efficiency compared to other EFW technologies. In addition, by utilizing the Gasplasma® process, an avoidance of methane emissions from landfilling material will occur. Methane has a higher global warming potential compared to the CO_2 generated from gas engines utilizing the syngas to produce electricity. Further, the facility reduces GHGs associated with mineral extraction by recycling materials at the Refuse-Derived Fuel (RDF) production stage and manufacturing of Plasmarok® which offsets the required mining of natural materials.

Project Description

The proposed EFW Facility would receive and process up to 170,000 tonnes per year of non-hazardous waste using the Gasplasma® process, an advanced thermal conversion technology developed to treat wastes and convert them into synthetic gas (syngas) and electrical energy. In addition, the facility would receive up to 30,000 tonnes per year of non-hazardous waste using a conventional direct plasma process.

It is important to note that the Gasplasma® process is not incineration. Unlike incineration, Gasplasma® does not burn (combust) the waste; rather it gasifies and converts the organic portion of the waste to a high quality fuel gas using a small fraction of the oxygen that is required for full combustion. In addition, Gasplasma® converts the remaining solid inorganic material into an environmentally inert and non-leaching slag-like product that is marketed under the trade name Plasmarok® and that can be used commercially as a construction material, for example. Plasmarok® has been approved as a commercial product in the UK.

The waste stream to be processed by the Gasplasma® system will be non-hazardous and may include, but not be limited to, a mixture of the following:

- Industrial, commercial, and institutional (IC&I)
- Construction and Demolition (C&D)
- Refuse-Derived Fuels (RDF)
- Municipal Solid Waste (MSW)
- Biomass (clean wood, leaf and yard waste, agricultural materials)
- Biosolids (limited to 15% of total waste input)
- Tires (limited to 20% of total waste input)
- Liquid wastes streams

Accepted waste for the Direct Plasma system may consist of:

- Residual metals for recovery
- Contaminated soils/sludges

Existing Environment & Net Effects

As part of the ESP, numerous studies were undertaken to describe the local environment and, based on the results of these studies, the potential impacts of the proposed facility on the surrounding environment were assessed. The assessment of effects associated with the proposed undertaking was conducted through a series of steps that are based, in part, on the description of existing conditions as well as the Project Description and Site Plan.

Opportunities for mitigation of any potential impacts to the surrounding environment and recommended monitoring of the area were also considered. Extensive documentation was prepared for each of the technical discipline studies listed below. The results of these studies are summarized in **Table E.1** below:

Table E.1 Studies Undertaken

STUDIES	REQUIREMENTS
Design & Operations Report	Provides detailed description of the proposed facility and technology
Surface Water Assessment	Mitigates and controls surface water on-site and in site vicinity
Geology & Hydrogeology Assessment	Leads to engineered surface water controls, will prevent impacts to groundwater
Land Use & Socio-Economic Assessment	Meets all Land Use requirements
Acoustic (Noise) Impact Assessment	Meets Ministry of the Environment and Climate Change Guidelines for noise limits
Air Quality Assessment*	Will comply with Ontario's Guideline A7 for thermal waste treatment facilities and Ontario Regulation 419/05 air quality standards
Natural Environment Assessment	Will not have an effect on surrounding Natural Environment
Cultural Heritage Assessment	Meets Ontario Heritage guidelines
Traffic Assessment	Overall capacity of intersection is expected to remain at or below 35% of its maximum traffic capacity

***Based on the feedback and input received at the 1st Open House, PFMSI added a Human Health Risk Assessment (HHRA) to the list of studies to be completed, which forms an Appendix to the Air Quality Assessment. The HHRA shows that the proposed facility's emissions as it relates to Human Health are below the Ministry of the Environment & Climate Change's (MOECC's) target levels.**

A majority of questions raised through the ESP related to the Air Quality Assessment and the HHRA. These studies showed that the air emissions from the Facility do not adversely affect the local air shed. The Gasplasma® process results in a net reduction in greenhouse gas (GHG)

emissions. PFMSI emissions meet all Ontario air quality and performance standards and the predicted ground level concentrations of all compounds are well below their respective Ontario Air Quality Standards as listed in O. Reg. 419/05. Further, stack concentrations of all compounds are below the Ontario Guideline A-7 standards.

The HHRA has demonstrated that potential health effects above the MOECC's acceptable target levels will not occur to residents of the Keith Neighbourhood, residents of the South Sherman Neighbourhood, residents of the Hamilton Mountain Neighbourhoods, and workers at industrial/commercial properties adjacent to the Site. These neighbourhoods were identified as the areas of maximum potential impact and any other neighbourhood would have lower impact. The plant will be designed to control the low particulate emissions from the refuse derived fuel to be used at the Facility and to protect the health of industrial/commercial workers and residents within the assessment area. Further, the EFW Facility's contribution to the potential presence of chemicals in ambient air, surface soil, backyard-grown garden produce/fruit, and breast milk is not of concern relative to acceptable levels for causing potential adverse human health effects.

Consultation

Consultation is a hallmark of the ESP, as described in this ESR. PFMSI is continually striving to openly communicate the facts and developments of their proposed EFW Facility to various stakeholder groups who might be affected by the project. The stakeholder groups who have been consulted as part of this ESP include: the City of Hamilton; Government Agencies; Aboriginal Communities; environmental groups; local community groups; the local business community and the public. PFMSI has consulted with these stakeholder groups in a number of ways, ranging from verbal communication, email correspondence and the delivery of presentations, to the organization of consultation events. The major consultation milestones held and organized by PFMSI include:

- Circulation and Publication of the Notice of Commencement and Notice of Public Open House – *week of March 31, 2014*
- Public Open House #1 – *April 17, 2014*
- Public Open House #2 – *November 13, 2014*
- Publication of the Notice of Completion – *Week of December 22, 2014*

In addition to the Public Open House events, a number of other consultation and engagement events took place over the course of the ESP. A commitment was made at the first Open House, that if requested, PFMSI would meet with groups who had further questions or concerns and discuss the issues raised. This has resulted in an open, two-way dialogue between PFMSI and the local community and has facilitated information sharing between the two parties (i.e. PFMSI educating interested parties about the technology and local community groups providing input on their concerns, their neighbourhood, etc.).

As committed to at the first Open House, individual meetings with a specific stakeholder or stakeholder groups occurred throughout the ESP and separate meetings were held with: Environment Hamilton; Keith Community Hub Association; and, Sherman Hub Community Planning Team. In addition, the proponent made a presentation to the City of Hamilton's Board of Health. A Community Liaison Committee (CLC) was also established after the first Open House to facilitate additional dialogue between a smaller group of citizen and community stakeholder representatives and PFMSI. It should be noted that a CLC is not a requirement of the ESP or mandatory for PFMSI project development. However, PFMSI and the entire project team believed strongly in the opportunity to have an engaged group of stakeholders providing honest and constructive feedback throughout the ESP.

The consultation activities carried out were developed in accordance with the consultation expectations set out in the Ontario *Environmental Assessment Act*, MOECC's *Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario* (January 2014) and in MOECC's *Guide to Environmental Assessment Requirements for Waste Management Projects* (Guide)(March, 2007).

Advantages & Disadvantages to the Environment

In accordance with the *Environmental Assessment Act* and the Guide, the advantages and disadvantages to the environment of the proposed undertaking compared to the Base Case or "do nothing" alternative are required under O.Reg. 101/07. Advantages are positive net environmental effects, and disadvantages are negative net environmental effects. The purpose of this exercise is to provide an overall conclusion as to whether the net negative environmental effects of the project are acceptable, based on a balanced assessment against the positive benefits, the screening criteria, and the results and conclusions of the ESP. Table E.2 summarizes the key advantages and disadvantages to the environment of the proposed project.

Table E.2 Summary of Advantages and Disadvantages to the Environment

Advantages	Disadvantages
• Economically and environmentally sustainable solution to waste management as the waste will be sourced within the immediate area, reducing carbon footprint, while also providing for technology development. • Operates within Air Emissions Regulations established by Ontario Government and reduces Carbon Footprint. Vastly improved greenhouse gas emissions compared to emissions associated with landfilling. Emissions from the facility are largely limited to on-site engines.	• Removal of existing building may temporarily displace common/ threatened breeding bird species. (Should be noted no Species At Risk were observed on-site during field investigations) • Creation of minimal non-hazardous wastes during construction and operation (inert residuals from the process)

Table E.2 Summary of Advantages and Disadvantages to the Environment	
Advantages	**Disadvantages**
• Addresses wastes that would otherwise be destined for a landfill, by either converting to energy and a product that may be utilized elsewhere (Plasmarok) • All generated energy will be either used on-site, sold to adjacent business or the Grid. • Site is located within an existing Industrial area, immediately surrounded by other Industrial (Heavy and Light) uses. • Economic stimulus by investing in the community, create local (temporary) construction jobs as well as permanent jobs (operation). • Implementation of on-site infrastructure will improve the control and quality of surface water	• Minimal increase in traffic (but the additional truck movements can be accommodated on Burlington Street and Site Entrance intersection).

While there are some disadvantages to the environment, the advantages to the environment that this proposed undertaking presents outweigh the net negative effects. From an overall environment perspective (Natural, Social, Cultural, Economic), this project will address wastes that would otherwise be landfilled elsewhere in the Province, which reduces the typical emissions associated with the landfilling practice. Further, as the preferred source of waste is within the Hamilton Port Authority (HPA), transportation costs and carbon emissions as a result of transporting the waste are vastly reduced. Energy is produced and partly utilized on site or with neighbouring properties, leading to a significant benefit for the local community, through capital inflows, but also through local temporary construction and permanent operation jobs.

In addition, this project represents an opportunity to implement new and emerging advanced thermal conversion technology within the Province of Ontario. Recently, PFMSI submitted an application under the New Environmental Technology Evaluation (NETE) program under the MOECC, which allows the MOECC to review and comment on new technology within the Province. MOECC recently issued PFMSI a Certificate of Technology Assessment, which states:

"Based on a review of the data and the information submitted in support of the technology, the ministry concludes that the Gasplasma® energy from waste process, by Port Fuels & Materials Services, Inc. and Leveraged Green Energy, may be used to convert waste material into a fuel gas suitable to generate power."

A copy of the NETE Certificate is available on the Project website (www.pfmsi.com).

Approvals & Commitments

Other approvals that will be required for the construction and operation of the proposed EFW Facility include:

- Environmental Compliance Approval (ECA) from the MOECC under Section 27 (waste) of the *Environmental Protection Act*; Section 9 (noise and air emissions) of the *Environmental Protection Act*; and Section 53 (industrial sewage works – i.e., surface water management) of the *Ontario Water Resources Act*
- Federal environmental effects determination according to the *Canadian Environmental Assessment Act* 2012 (CEAA 2012), Section 67*
  *(*Note that the Provincial Screening will provide enough detail to make a determination and decision in accordance with CEAA 2012 requirements. The Federal process is on-going in conjunction with the Federal Authority involved, Hamilton Port Authority.)*
- Although not required given that the property is located on Federal Lands (HPA), typically the HPA does provide information to the City of Hamilton's Site Plan and Building Department out of courtesy and from a safety perspective
- Although not required given that the property is on Federal lands, HPA will require tenants to comply with City fire protection requirements (i.e., availability of sufficient water supply for fire-fighting purposes)

In addition to the commitment to seek the other necessary approvals, PFMSI has also made several other specific commitments related to:

- Facility design;
- Accidental spills or releases;
- Air quality, noise and natural environment monitoring;
- Oil grit separator unit inspection;
- Photographic documentation of building to be removed;
- Maintenance of the Community Liaison Committee throughout the Construction and Operation phase; and,
- Adherence to the addendum provisions described in the Waste Management Projects Regulation and Section B.4 of the Guide should it not be feasible to implement the project in a manner outlined in this ESR.

The findings of this ESR conclude that the proposed Facility will, with the implementation of the impact management measures recommended herein, have no significant negative effects on the environment; will be constructed and operated within all applicable Federal, Provincial and municipal statues, regulations, policies and guidelines; and will make a positive contribution to the economic, waste management and energy supply conditions in Hamilton and the surrounding area.

In addition, Gasplasma® provides a transition to safe and reliable green technology for processing of locally generated waste that otherwise would be sent to a landfill (local or across the border) and contribute to GHG emissions. Gasplasma® is a tool to mitigate part of the Hamilton pollution issues, creates an energy efficient solution and creates local jobs. PFMSI is already initiating this transformation by planning to locate here and to invest multi-millions of investment within Hamilton. We want to be part of Hamilton's sustainable evolution and growth. PFMSI will assist Hamilton in not only changing the waste paradigm, but the perception and reality that Hamilton can change and make progress in the areas of waste, green energy, employment and the environment.

This PFMSI proposed Facility will benefit the local industry in the Port, providing competitive and unsubsidized energy and waste mitigation. It will also provide the basis for an industrial cluster around the proposed site at HPA with additional programs of research and development (R&D) with McMaster University, and solid oxide fuel cell (SOFC) development and manufacturing, creating additional jobs and attracting other high tech industry.

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