Penobscot Energy Recovery Company
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ESOCO ORRINGTON, LLC.
Plant Operator

September 13, 2018

Commissioner Paul Mercer
Maine Department of Environmental Protection
State House Station 17
Augusta, ME 04333-0017

Subject: Application for Public Benefit Determination / Crossroads Landfill

Dear Commissioner Mercer:

We are pleased to provide comments on the application for a Public Benefit Determination for the proposed expansion of the Crossroads Landfill located in Norridgewock, Maine.

As an overarching comment which we shall detail hereinafter, we are concerned about the support that landfilling appears to have garnered at the expense of other options higher on the solid waste management hierarchy (Hierarchy). Certainly, the State of Maine needs safe landfill capacity as a part of its waste management plan to address those situations where there are no other viable options for disposal. That is different than reliance on landfilling of municipal solid waste (MSW) as the State's predominant waste management strategy, which appears to be the path we are taking. It is dismaying to watch the waste stream proximate to PERC continue to stream into landfills despite the availability of the PERC facility to accept the waste at competitive price[1].

The Department has responded to such observations in the past by stating that it "*cannot direct waste to a specific facility*" or "*force someone to accept waste*", and, therefore, has no control over this phenomenon. The Department certainly and unambiguously *does* have the authority to restrict the types and amounts of wastes that may be accepted at landfills through the Public Benefit Determination Process that Crossroads is now navigating,[2] and PERC urges the Department to use this process to realign the reality of waste disposal in Maine with the solid waste management hierarchy and other management policies as set forth in the governing statutes and regulations.

Having said that, we believe that any decision on this application should wait until the appeal is decided on the Juniper Ridge Landfill license amendment[3] regarding acceptance of unprocessed municipal solid waste, and after the Department completes its *Maine Solid Waste Generation and Disposal Capacity*

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[1] MRC website. http://www.mrcmaine.org/wp-content/uploads/2018/06/Interim-Waste-Delivery-Locations-4.0.pdf

[2] 38 MRS §1310-AA. The Commissioner must make a determination that the standards under 38 MRS §1310-AA (3) are satisfied prior to further licensing action. In addition, the Commissioner may revisit the issue *at any time. See* 38 MRS 38 MRS §1310-AA (5) (the Commissioner may reopen a prior public benefit determination if there was a significant change or circumstance).

[3] BEP Appeal https://www.maine.gov/dep/waste/juniperridge/documents/2017amendment/2018_04_30%20Appeal%20Ed%20Spencer%20JRL%20Amend.pdf

Report: Calendar Year 2017[4]. Both of these actions may have significant impact on this application, and decisions on this application should be based on these outcomes, not vice-versa.

With respect to more specific comments, we will focus on those statements in the application that directly reference or impact PERC.

There Exists No Valid Contract With PERC

In contradiction to what is stated in this application, there are no valid agreements between Waste Management/Fiberight and PERC to accept so-called Bridge Waste from the Fiberight facility[5]. Nonetheless, PERC would welcome such a contract if it diverted a meaningful amount of Bridge and bypass Waste to PERC at reasonable tip fee, and therefore encourages both its execution and placement in any subsequent determinations and licensing action by the Department.

PERC Has Re-tooled its Process and Expanded its Menu of Acceptable Waste

The application makes statements regarding the limited menu of acceptable wastes for PERC, based on information posted on the MRC website.[6] Contrary to MRC's information, PERC has acquired licenses for, and is capable of handling, bulky wastes, RR ties, tires, and other materials that were previously sent for landfilling. However, such additional waste streams are meant to augment, not replace the MSW currently lost to landfilling.

Agreements in Possible Violation of Maine Statutes

To the extent a contract with PERC to take Bridge Waste from the MRC communities was contemplated, the intent of the contract was to deliver Bridge Waste to PERC to address transportation infrastructure concerns over sending the waste to Crossroads. Any such agreement was contingent on Waste Management giving permission to MRC and Coastal Resources of Maine LLC (a/k/a Fiberight) to do so[7]. Instead, a so-called Waste Swap Agreement was allegedly pressed for by the Department[8] at agreed price[9], through which Waste Management imposed a $30/ton fee on any Bridge Waste directed to PERC

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[4] 38 M.R.S. § 2124-A, the next report from the Department to the Maine Legislature is due January 1, 2019.

[5] Application at Page 12 states: "*Crossroads also recently entered into an agreement with Fiberight to send MSW bridge capacity waste to Penobscot Energy Recovery Company ("PERC").*"

[6] Application at Page 18, Footnote 35 states: "*For example, the MRC website includes a list of materials that the PERC facility will not accept for incineration.*"

[7] Letter from Coastal Resources of Maine LLC (a/k/a Fiberight) to the Department, February 20, 2018. This letter details options for taking the waste to PERC given problems with "*insufficient available disposal infrastructure*" to take the waste to Crossroads. https://www.maine.gov/dep/waste/juniperridge/documents/2017amendment/2018_03_02%20BGS%20-%20NEWSME%20Response%20to%20DEP's%20Comments.pdf

[8] MRC website. "*MRC and, on behalf of its members, worked with the DEP, Crossroads, Coastal, and JRL for an MSW swap to be put in place allowing Biddeford area trash to go to Crossroads instead of JRL and MRC community bridge waste to go to JRL instead of south to Crossroads.*" Also the following statement made by Chip Reeves, MRC Board Chair, at a meeting dated May 31, 2018 (audio recording available, at 29:50), "*...We were pushed very hard by DEP to come up with a swap, and to utilize the PERC plant.*"

[9] Juniper Ridge Landfill License Amendment #S-020700-WD-BL-A, March 31, 2018 at Pp 21, 25, 32 "*In the follow-up response to comments, a draft swap agreement between MRC, Waste Management Disposal Services of Maine,*

as administered by contracts held by the Municipal Review Committee[10]. The financial/ contractual constraints put in place have all but excluded the PERC facility from competing for this waste and have created barriers that, in effect, divide the waste between the Crossroads Landfill and the Juniper Ridge Landfill at an agreed price in direct contravention to the plain language in Maine Statutes regarding the solid waste management hierarchy[11] and in restraint of trade[12].

Unsubstantiated Environmental Benefits For Bridge Waste

The Application notes that there are environmental benefits associated with transporting waste a shorter distance and opines that deliveries to facilities located further from some waste sheds would incur unacceptable environmental liability[13]. Absent in this discussion are the negative environmental impacts, such as increased greenhouse gas emissions[14], and leachate containing chemicals such as bisphenyl-A[15], both of which are associated with landfilling of municipal solid waste.
While facilities such as PERC also emit greenhouse gases, we do not generate problematic leachate. In fact, the PERC facility is a negative discharge facility and accepts select waste waters for re-use.

Non-Bypass Municipal Solid Waste Sent to a Landfill Does Not Support Waste-to-Energy

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Inc. (WMDSM) in Norridgewock, NEWSME, Pine Tree Waste, Inc., and CRM was described further, with the potential for a waste swap on a one to one (1:1) tonnage basis at agreed tip fees."

[10] MRC Website. http://www.mrcmaine.org/wp-content/uploads/2018/07/MRC-Special-Board-Meeting-Minutes-May-31-2018-02838410xAE394.pdf

[11] 38 MRS §2101.1 Priorities. It is the policy of the State to plan for and implement an integrated approach to solid waste management for solid waste generated in this State and solid waste imported into this State, which must be based on the following order of priority:
A. Reduction of waste generated at the source, including both amount and toxicity of the waste;
B. Reuse of waste;
C. Recycling of waste;
D. Composting of biodegradable waste;
E. Waste processing that reduces the volume of waste needing land disposal, including incineration; and
F. Land disposal of waste.
It is the policy of the State to use the order of priority in this subsection as a guiding principle in making decisions related to solid waste management

[12] 10 MRS §1101; 5 MRS §205-A, et.seq.

[13] Application at page 21

[14] Environmental reports from George Aronson, MRC consultant, stating that PERC emits substantially less greenhouse gas than equivalent landfilling. (attached, as were recently removed from the MRC website).

[15] *Plastic Waste: Ecological and Human Health Impacts,* European Commission, 2011, *"A review by Talsness et al. (2009) has identified several studies that demonstrate BPA is leaching from products that have been thrown into landfills and entering groundwater, contaminating rivers, streams and drinking water. Because BPA breaks down slowly, the compound could build up in waters and harm fish and other aquatic life. Research on 10 landfill sites in Japan (Yamamoto et al., 2001) found concentrations of BPA ranging from 1.3 to 17,200 µg per litre with a median concentration of 269 µg per litre. In some cases, the concentrations exceeded the level above which it is considered toxic to aquatic biota. Plastic waste was the major type of waste in landfills with the highest levels of BPA, indicating that plastic waste was an important source of the BPA."* http://ec.europa.eu/environment/integration/research/newsalert/pdf/IR1_en.pdf

The application makes statements that landfilling, which currently includes unprocessed Bridge MSW diverted from the nascent Fiberight facility, supports waste-to-energy[16]. The circular logic being that landfilling of unprocessed, non-bypass and Bridge MSW supports a facility that does not currently operate, thus justifies the need for more landfill space, and therefore complies with the Hierarchy. We believe this logic to be fundamentally flawed. Landfilling of unprocessed, non-bypass and Bridge MSW subverts the Hierarchy and thus does not support waste-to-energy, or for that matter, recycling as the landfilled MSW contains both heating value and recyclables. This is relevant within the context that PERC has available capacity, notably where such capacity would be at competitive price if not for the $30/ton impairment imposed by Waste Management for the Bridge Waste on top of the tipping fee normally charged by PERC.

For all these reasons, we cannot support some underpinning arguments regarding the application for a Public Benefit Determination for the expansion of the Crossroads Landfill. Specifically, we do not believe that landfilling of unprocessed, non-bypass and Bridge MSW provides environmental benefits and permitting this to occur will only set another precedent that subverts the Hierarchy. Please contact me at (207) 825-4566 extension 116 if you have any questions or comments on this matter.

Regards,

Henry Lang
Plant Manager

Cc: Linda Butler, MeDEP, BRWM

ATTACHMENTS

[16] Application at page 16.

ATTACHMENTS (FOOTNOTE 14)

MEMORANDUM

TO: Charter Municipalities
FROM: Greg Lounder, Municipal Review Committee, Inc.
RE: Environmental Performance of the PERC Facility
DATE: 24 February 2010

This memorandum presents our annual update on the key aspects of the PERC facility's record of environmental performance in 2009. The memorandum also presents an estimate of the impact of the Facility to avoid greenhouse gas emissions by diverting waste from landfills. A key part of the MRC's mission is to ensure the long-term disposal of solid waste via methods that are environmentally sound. Thus, this information is being shared to enable the Charter Municipalities to understand the superb performance of the PERC facility in achieving this aspect of the MRC's mission, and to be able to present accurate information to those with interest in the PERC facility's record.

Air Emission Test Results

Every year PERC conducts tests to assess whether the facility complies with the emissions limits and operating conditions that are specified in its air emissions license from the Maine DEP. The tests are intended to ensure that the level of various constituents emitted by the PERC facility avoid significant impacts on public health and the environment. Some constituents are measured around the clock using devices known as continuous emissions monitoring systems, or CEMS. For other constituents, PERC hires an independent third-party testing firm to conduct special tests known as "stack tests" to measure what is being emitted. Tests are conducted for the following:

Type	*Measured constituent*
Ozone precursors	Nitrogen oxides (NOx) [measured by CEMS] Carbon monoxide (CO) [measured by CEMS]
Acid gases	Sulfur dioxides (SOx) [measured by CEMS] Hydrogen chloride (HCl)
Particulate matter	Total particulates
Trace metals	Arsenic, beryllium, cadmium, chromium, lead, mercury, nickel
Trace organics	Dioxins and furans
Fugitive emissions	Dust from the ash management system

The most recent stack tests were conducted on September 22-23, 2009. To ensure objectivity, the tests are conducted by an independent contractor in accordance with strict protocols and standards, and the conduct of the tests can be witnessed by representatives of the Maine DEP.

Yet again, we have reason to be proud of the results of these tests. As presented in Exhibit A, not only did the PERC facility comply with all of the standards in its air emissions license, but it performed significantly better than the license requirements – and by a wide margin.

Specific results can be summarized as follows:

- Emissions of total particulates were at 11.8 percent of the permitted level.
- Emissions of trace metals were very low. Emissions of arsenic, beryllium and cadmium were too low to be detected during the stack test, even though the detection limits are quite low. For mercury, emissions were less than three percent of the permitted level. Emissions of lead were at 0.43 percent of the permitted level.
- Emissions of dioxins and furans were very low. In fact, emissions of dioxins and furans together were at 4.7 percent of the permitted level.
- Emissions of HCl (a contributor to acid rain), which are controlled by the facility's dry scrubbers, were well below the allowable limits. HCl emissions were at only 1.4 percent of the permitted level.
- No fugitive emissions were observed from the facility's ash handling system.

General Environmental Performance

The Charter Municipalities should be aware of the following information regarding the performance of the PERC facility in 2009:

- For the three pollutants that are monitored continuously (NOx, CO and SOx), average emission levels for each constituent throughout the year were well below the permit limits. Average emissions of NOx and CO (the contributors to smog), which are controlled through good combustion practices, were at 78 percent and 60 percent of the allowable limits. Emissions of SO_2 (which contributes to acid rain), were at only 8.3 percent of the allowable limit. The Facility recorded only one occasion on which average emissions levels exceeded applicable daily limits for these pollutants – a compliance record through the year of 99.73 percent. This outstanding record for 2009 represents a significant improvement in performance over the late 1990s and is the culmination of steady improvements in environmental performance since the facility was retrofitted with a new boiler fuel feed system in 2000.

- The PERC facility generated and delivered to the grid 162,409 MWh of electricity in 2009. This represents enough electricity to power more than 16,000 homes. By using solid waste as fuel, the PERC facility avoided the need to combust the equivalent of 1220 billion cubic feet of natural gas or nearly 14 million gallons of #2 fuel oil in order to generate electricity. In that context, the PERC facility also avoided the emissions of greenhouse gases and other constituents that are associated with the production, importation and combustion of fossil fuels to generate electricity.

- The PERC facility received 316,009 tons of solid waste, but bypassed only 1,219 tons of processible solid waste to landfills for disposal in 2009. Accounting for residuals materials such as ash and front-end process residue, the PERC facility reduced the volume of material going to landfills by nearly 638,000 cubic yards, which is

approximately 85 percent of the volume that would have been required for landfill disposal of the solid waste delivered to the PERC facility.

- The PERC facility continued to implement its supplementary grinding program to convert waste elements previously considered "non-processible" into fuel. In 2009, only 14 tons of the waste received by the PERC facility were sent to a landfill for disposal as non-processible material.

- The PERC facility recovered 10,284 tons of ferrous material from incoming solid waste in 2009, making it one of the largest recycling facilities in Maine. The ferrous material was transported to a processing facility in southern New England for beneficiation and marketing for re-use as scrap metal. Moreover, by recovering the ferrous materials, the PERC facility avoided the emissions that would have been incurred during the course of mining and manufacturing a similar amount of ferrous material from natural sources.

Avoided greenhouse gas emissions

The PERC Facility combusts MSW that might otherwise be accepted for disposal at landfills. The Facility thereby avoids the creation of methane that would otherwise have been created by the degradation of MSW in a landfill through the anaerobic decomposition process. In particular:

1. In 2009, PERC processed 313,211 tons of MSW at the Facility, of which 56,766 tons were glass and grit with an organic content approximately half that of the MSW.

2. If all of the 313,211 tons of MSW had been disposed of in a landfill, such MSW would generate 23,034 additional tons of methane over the time of its active decomposition (at least 30 years). Thus, by processing 313,211 tons of MSW in 2009, PERC avoided the generation of approximately 23,000 tons of methane.

3. Taking into account the global warming potential of methane and other factors, by avoiding generation of 23,000 tons of methane in 2009, PERC avoided emitting the equivalent of 420,000 metric tons of carbon dioxide.

Exhibit A
Summary Results of Air Emissions Testing at the PERC Facility in 2009
Sources: Final Report, Stack Emissions Compliance Test Program, PERC Facility, 2009;PERC CEM data

Constituent	*Allowable limit*	*Average of test results*	*Test result value as percent of allowable limit*
Nitrogen oxides (NOx)	230 ppmdv @ 7% O2	178.7 ppmdv @ 7% O2	78% of limit
Carbon monoxide (CO)	200 ppmdv @ 7% O2	119.6 ppmdv @ 7% O2	60% of limit
Sulfur dioxides (SOx)	29 ppmdv @ 7% O2	2.4 ppmdv @ 7% O2	8.3% of limit
Hydrogen chloride (HCl)	29 ppm @ 7% O2	0.41 ppm @ 7% O2	1.4% of limit
Particulate matter	22.9 mg/dscm @ 7% O2	2.7 mg/dscm @ 7% O2	11.8% of limit
Trace metals			
• Arsenic	• No limit in permit	• <0.00044 mg/dscm @ 7% O2	None detected, no permit limit
• Beryllium	• No limit in permit	• <0.00011 mg/dscm @ 7% O2	None detected, no permit limit
• Cadmium	• 0.03500 mg/dscm @ 7% O2	• <0.00031 mg/dscm @ 7% O2	None detected, <0.89% of limit
• Chromium	• No limit in permit	• 0.0091 mg/dscm @ 7% O2	No permit limit
• Lead	• 0.4000 mg/dscm @ 7% O2	• 0.0017 mg/dscm @ 7% O2	0.43% of limit
• Mercury	• 0.0280 mg/dscm @ 7% O2	• <0.00081 mg/dscm @ 7% O2	None detected, <2.9% of limit
• Nickel	• No limit in permit	• 0.0121 mg/dscm @ 7% O2	No permit limit
Dioxins/furans	25 ng/dscm @ 7% O2	1.174 ng/dscm @ 7% O2	4.7% of limit
Fugitive emissions, ash system	< 5% of observation period	0% of observation period	0% of limit

Abbreviations
- ppmdv = parts per million dry volume
- mg/dscm = milligrams per dry standard cubic meter
- ng/dscm = nanograms per dry standard cubic meter

Values with < (a "less than" sign) are the detection limits, which are provided for tests when the identified constituent was not detected. In such cases, the emission level of such identified constituent was below the lowest value that could be detected by the test equipment used during the test (the detection limit).
Values are adjusted to 7% oxygen concentration to correct for dilution by excess combustion air.
Test results for NOx, CO and SOx represent average emission concentrations throughout the year as measured by the Facility's continuous emissions monitoring systems.

MEMORANDUM

TO: Charter Municipalities
FROM: Greg Lounder, Municipal Review Committee, Inc.
RE: Environmental Performance of the PERC Facility
DATE: 10 February 2011

This memorandum presents our annual update on the key aspects of the PERC facility's record of environmental performance in 2010. The memorandum also presents an estimate of the impact of the Facility to avoid greenhouse gas emissions by diverting waste from landfills. A key part of the MRC's mission is to ensure the long-term disposal of solid waste via methods that are environmentally sound. Thus, this information is being shared to enable the Charter Municipalities to understand the superb performance of the PERC facility in achieving this aspect of the MRC's mission, and to be able to present accurate information to those with interest in the PERC facility's record.

Air Emission Test Results

Every year PERC conducts tests to assess whether the facility complies with the emissions limits and operating conditions that are specified in its air emissions license from the Maine DEP. The tests are intended to ensure that the level of various constituents emitted by the PERC facility avoid significant impacts on public health and the environment. Some constituents are measured around the clock using devices known as continuous emissions monitoring systems, or CEMS. For other constituents, PERC hires an independent third-party testing firm to conduct special tests known as "stack tests" to measure what is being emitted. Tests are conducted for the following:

Type	*Measured constituent*
Ozone precursors	Nitrogen oxides (NOx) [measured by CEMS] Carbon monoxide (CO) [measured by CEMS]
Acid gases	Sulfur dioxides (SOx) [measured by CEMS] Hydrogen chloride (HCl)
Particulate matter	Total particulates
Trace metals	Arsenic, beryllium, cadmium, chromium, lead, mercury, nickel
Trace organics	Dioxins and furans
Fugitive emissions	Dust from the ash management system

The most recent stack tests were conducted on September 14-15, 2010. To ensure objectivity, the tests are conducted by an independent contractor in accordance with strict protocols and standards, and the conduct of the tests can be witnessed by representatives of the Maine DEP.

Yet again, we have reason to be proud of the results of these tests. As presented in Exhibit A, not only did the PERC facility comply with all of the standards in its air emissions license, but it performed significantly better than the license requirements – often by a wide margin.

Specific results can be summarized as follows:

- Emissions of total particulates were at 11.1 percent of the permitted level.
- Emissions of trace metals were very low. Emissions of beryllium were too low to be detected during the stack test, even though the detection limits are quite low. Emissions of cadmium, mercury and were at small fractions of the permitted levels.
- Emissions of dioxins and furans were very low. In fact, emissions of dioxins and furans together were at 2.5 percent of the permitted level.
- Emissions of HCl (a contributor to acid rain), which are controlled by the facility's dry scrubbers, were well below the allowable limits. HCl emissions were at only 7.2 percent of the permitted level.
- No fugitive emissions were observed from the facility's ash handling system.

General Environmental Performance

The Charter Municipalities should be aware of the following information regarding the performance of the PERC facility in 2010:

- For the three pollutants that are monitored continuously (NOx, CO and SOx), average emission levels for each constituent throughout the year were below the permit limits. Average emissions of NOx and CO (the contributors to smog), which are controlled through good combustion practices, were at 80 percent and 51 percent of the allowable limits. Emissions of SO_2 (which contributes to acid rain), were at only 8.3 percent of the allowable limit. The Facility recorded only four occasions on which average emissions levels exceeded applicable daily limits for these pollutants – a compliance record through the year of 99.54 percent. This outstanding record for 2010 represents a significant improvement in performance that has been sustained since the facility was retrofitted with a new boiler fuel feed system in 2000.

- The PERC facility generated and delivered to the grid 161,928 MWh of electricity in 2010. This represents enough electricity to power more than 16,000 homes. By using solid waste as fuel, the PERC facility avoided the need to combust the equivalent of 1200 billion cubic feet of natural gas or nearly 14 million gallons of #2 fuel oil in order to generate electricity. In that context, the PERC facility also avoided the emissions of greenhouse gases and other constituents that are associated with the production, importation and combustion of fossil fuels to generate electricity.

- The PERC facility received 311,698 tons of solid waste, but bypassed only 1,988 tons of processible solid waste to landfills for disposal in 2010. Accounting for residuals materials such as ash and front-end process residue, the PERC facility reduced the volume of material going to landfills by nearly 630,000 cubic yards, which is approximately 84 percent of the volume that would have been required for landfill disposal of the solid waste delivered to the PERC facility.

- The PERC facility continued to implement its supplementary grinding program to convert waste elements previously considered "non-processible" into fuel. In 2010, only 32 tons of the waste received by the PERC facility were sent to a landfill for disposal as non-processible material.

- The PERC facility recovered 10,277 tons of ferrous material from incoming solid waste in 2010, making it one of the largest recycling facilities in Maine. The ferrous material was transported to a processing facility in southern New England for beneficiation and marketing for re-use as scrap metal. Moreover, by recovering the ferrous materials, the PERC facility avoided the emissions that would have been incurred during the course of mining and manufacturing a similar amount of ferrous material from natural sources.

Avoided greenhouse gas emissions

The PERC Facility combusts MSW that might otherwise be accepted for disposal at landfills. The Facility thereby avoids the creation of methane that would otherwise have been created by the degradation of MSW in a landfill through the anaerobic decomposition process. In particular:

1. In 2010, PERC processed 311,257 tons of MSW at the Facility, of which 62,725 tons were glass and grit with an organic content approximately half that of the MSW.

2. If all of the 311,257 tons of MSW had been disposed of in a landfill, such MSW would generate 23,841 additional tons of methane over the time of its active decomposition (at least 30 years). Adjusting for methane generation from PERC's glass and grit stream, on a net basis, PERC's MSW processing activities in 2010 avoided the generation and emission of approximately 22,841 tons of methane.

3. Taking into account the global warming potential of methane and other factors, by avoiding such methane generation in 2010, PERC avoided emitting the equivalent of 372,840 metric tons of carbon dioxide.

Exhibit A
Summary Results of Air Emissions Testing at the PERC Facility in 2010
Sources: Final Report, Stack Emissions Compliance Test Program, PERC Facility, 2010;PERC CEM data

Constituent	*Allowable limit*	*Average of test results*	*Test result value as percent of allowable limit*
Nitrogen oxides (NOx)	230 ppmdv @ 7% O2	185.0 ppmdv @ 7% O2	80% of limit
Carbon monoxide (CO)	200 ppmdv @ 7% O2	100.9 ppmdv @ 7% O2	51% of limit
Sulfur dioxides (SOx)	29 ppmdv @ 7% O2	2.4 ppmdv @ 7% O2	8.3% of limit
Hydrogen chloride (HCl)	29 ppm @ 7% O2	2.08 ppm @ 7% O2	7.2% of limit
Particulate matter	22.9 mg/dscm @ 7% O2	2.54 mg/dscm @ 7% O2	11.1% of limit
Trace metals			
• Arsenic	• No limit in permit	• 0.00026 mg/dscm @ 7% O2	No permit limit
• Beryllium	• No limit in permit	• <0.00006 mg/dscm @ 7% O2	None detected, no permit limit
• Cadmium	• 0.03500 mg/dscm @ 7% O2	• <0.00011 mg/dscm @ 7% O2	<0.3%. None detected on one run
• Chromium	• No limit in permit	• 0.0023 mg/dscm @ 7% O2	No permit limit
• Lead	• 0.4000 mg/dscm @ 7% O2	• 0.0009 mg/dscm @ 7% O2	0.20% of limit
• Mercury	• 0.0280 mg/dscm @ 7% O2	• <0.0014 mg/dscm @ 7% O2	<5%. None detected on some runs
• Nickel	• No limit in permit	• 0.0016 mg/dscm @ 7% O2	No permit limit
Dioxins/furans	25 ng/dscm @ 7% O2	0.62 ng/dscm @ 7% O2	2.5% of limit
Fugitive emissions, ash system	< 5% of observation period	0% of observation period	0% of limit

Abbreviations
- ppmdv = parts per million dry volume
- mg/dscm = milligrams per dry standard cubic meter
- ng/dscm = nanograms per dry standard cubic meter

Values with < (a "less than" sign) are the detection limits, which are provided for tests when the identified constituent was not detected. In such cases, the emission level of such identified constituent was below the lowest value that could be detected by the test equipment used during the test (the detection limit) for at least some of the test runs.
Values are adjusted to 7% oxygen concentration to correct for dilution by excess combustion air.
Test results for NOx, CO and SOx represent average emission concentrations throughout the year as measured by the Facility's continuous emissions monitoring systems.

MEMORANDUM

TO: Charter Municipalities
FROM: Greg Lounder, Municipal Review Committee, Inc.
RE: Environmental Performance of the PERC Facility
DATE: 5 March 2012

This memorandum presents our annual update on the key aspects of the PERC facility's record of environmental performance in 2011. The memorandum also presents an estimate of the impact of the Facility to avoid greenhouse gas emissions by diverting waste from landfills. A key part of the MRC's mission is to ensure the long-term disposal of solid waste via methods that are environmentally sound. Thus, this information is being shared to enable the Charter Municipalities to understand the superb performance of the PERC facility in achieving this aspect of the MRC's mission, and to be able to present accurate information to those with interest in the PERC facility's record.

Air Emission Test Results

Every year PERC conducts tests to assess whether the facility complies with the emissions limits and operating conditions that are specified in its air emissions license from the Maine DEP. The tests are intended to ensure that the level of various constituents emitted by the PERC facility avoid significant impacts on public health and the environment. Some constituents are measured around the clock using devices known as continuous emissions monitoring systems, or CEMS. For other constituents, PERC hires an independent third-party testing firm to conduct special tests known as "stack tests" to measure what is being emitted. Tests are conducted for the following:

Type	*Measured constituent*
Ozone precursors	Nitrogen oxides (NOx) [measured by CEMS] Carbon monoxide (CO) [measured by CEMS]
Acid gases	Sulfur dioxides (SOx) [measured by CEMS] Hydrogen chloride (HCl)
Particulate matter	Total particulates
Trace metals	Arsenic, beryllium, cadmium, chromium, lead, mercury, nickel
Trace organics	Dioxins and furans
Fugitive emissions	Dust from the ash management system

The most recent stack tests were conducted on September 13-14, 2011. To ensure objectivity, the tests are conducted by an independent contractor in accordance with strict protocols and standards, and the conduct of the tests can be witnessed by representatives of the Maine DEP.

Yet again, we have reason to be proud of the results of these tests. As presented in Exhibit A, not only did the PERC facility comply with all of the standards in its air emissions license, but it performed significantly better than the license requirements – often by a wide margin.

Specific results can be summarized as follows:

- Emissions of total particulates were at 47 percent of the permitted level.
- Emissions of all trace metals were very low. Emissions of cadmium, lead and mercury were at small fractions of the permitted levels.
- Emissions of dioxins and furans were very low. In fact, emissions of dioxins and furans together were at 1.3 percent of the permitted level.
- Emissions of HCl (a contributor to acid rain), which are controlled by the facility's dry scrubbers, were well below the allowable limits. HCl emissions were at only 4.8 percent of the permitted level.
- No fugitive emissions were observed from the facility's ash handling system.

General Environmental Performance

The Charter Municipalities should be aware of the following information regarding the performance of the PERC facility in 2011:

- For the three pollutants that are monitored continuously (NOx, CO and SOx), average emission levels for each constituent throughout the year were below the permit limits. Average emissions of NOx and CO (the contributors to smog), which are controlled through good combustion practices, were at 78 percent and 54 percent of the allowable limits. Emissions of SO_2 (which contributes to acid rain), were at only 8.3 percent of the allowable limit. The Facility recorded only one occasion on which average emissions levels exceeded applicable daily limits for these pollutants – a compliance record through the year of 99.9 percent. This outstanding record for 2011 represents a significant improvement in performance that has been sustained since the facility was retrofitted with a new boiler fuel feed system in 2000.

- The PERC facility generated and delivered to the grid 160,669 MWh of electricity in 2011. This represents enough electricity to power more than 16,000 homes. By using solid waste as fuel, the PERC facility avoided the need to combust the equivalent of 1200 billion cubic feet of natural gas or nearly 14 million gallons of #2 fuel oil in order to generate electricity. In that context, the PERC facility also avoided the emissions of greenhouse gases and other constituents that are associated with the production, importation and combustion of fossil fuels to generate electricity.

- The PERC facility received 313,945 tons of solid waste, but did not bypass any processible solid waste to landfills for disposal in 2011. Accounting for residuals materials such as ash and front-end process residue, the PERC facility reduced the volume of material going to landfills by nearly 630,000 cubic yards, which is approximately 84 percent of the volume that would have been required for landfill disposal of the solid waste delivered to the PERC facility.

- The PERC facility continued to implement its supplementary grinding program to convert waste elements previously considered "non-processible" into fuel. In 2011, only 164 tons of the waste received by the PERC facility were sent to a landfill for disposal as non-processible material.

- The PERC facility recovered 9,227 tons of ferrous material from incoming solid waste in 2011, making it one of the largest recycling facilities in Maine. The ferrous material was transported to a processing facility in southern New England for beneficiation and marketing for re-use as scrap metal. Moreover, by recovering the ferrous materials, the PERC facility avoided the emissions that would have been incurred during the course of mining and manufacturing a similar amount of ferrous material from natural sources.

Avoided greenhouse gas emissions

The PERC Facility combusts MSW that might otherwise be accepted for disposal at landfills. The Facility thereby avoids the creation of methane that would otherwise have been created by the degradation of MSW in a landfill through the anaerobic decomposition process. In particular:

1. In 2011, PERC processed 313,645 tons of MSW at the Facility, of which 60,724 tons were glass and grit with an organic content approximately half that of the MSW.

2. If all of the 313,645 tons of MSW had been disposed of in a landfill, such MSW would generate 22,721 additional tons of methane over the time of its active decomposition (at least 30 years). Adjusting for methane generation from PERC's glass and grit stream, on a net basis, PERC's MSW processing activities in 2011 avoided the generation and emission of approximately 18,321 tons of methane.

3. Taking into account the global warming potential of methane and other factors, by avoiding such methane generation in 2011, PERC avoided emitting the equivalent of 334,000 metric tons of carbon dioxide.

Exhibit A
Summary Results of Air Emissions Testing at the PERC Facility in 2011
Sources: Final Report, Stack Emissions Compliance Test Program, PERC Facility, 2011;PERC CEM data

Constituent	*Allowable limit*	*Average of test results*	*Test result value as percent of allowable limit*
Nitrogen oxides (NOx)	230 ppmdv @ 7% O2	179.1 ppmdv @ 7% O2	78% of limit
Carbon monoxide (CO)	200 ppmdv @ 7% O2	107.8 ppmdv @ 7% O2	54% of limit
Sulfur dioxides (SOx)	29 ppmdv @ 7% O2	2.4 ppmdv @ 7% O2	8.3% of limit
Hydrogen chloride (HCl)	29 ppm @ 7% O2	1.38 ppm @ 7% O2	4.8% of limit
Particulate matter	22.9 mg/dscm @ 7% O2	10.8 mg/dscm @ 7% O2	47% of limit
Trace metals			
• Arsenic	• No limit in permit	• 0.0015 mg/dscm @ 7% O2	No permit limit
• Beryllium	• No limit in permit	• < 0.00012 mg/dscm @ 7% O2	No permit limit
• Cadmium	• 0.03500 mg/dscm @ 7% O2	• 0.0019 mg/dscm @ 7% O2	5.4%.of limit
• Chromium	• No limit in permit	• 0.0067 mg/dscm @ 7% O2	No permit limit
• Lead	• 0.400 mg/dscm @ 7% O2	• 0.024 mg/dscm @ 7% O2	6.0% of limit
• Mercury	• 0.0280 mg/dscm @ 7% O2	• < 0.0010 mg/dscm @ 7% O2	< 3.6% of limit
• Nickel	• No limit in permit	• 0.0072 mg/dscm @ 7% O2	No permit limit
Dioxins/furans	25 ng/dscm @ 7% O2	0.33 ng/dscm @ 7% O2	1.3% of limit
Fugitive emissions, ash system	< 5% of observation period	0% of observation period	0% of limit

Abbreviations
- ppmdv = parts per million dry volume
- mg/dscm = milligrams per dry standard cubic meter
- ng/dscm = nanograms per dry standard cubic meter

Values with < (a "less than" sign) are the detection limits, which are provided for tests when the identified constituent was not detected. In such cases, the emission level of such identified constituent was below the lowest value that could be detected by the test equipment used during the test (the detection limit) for at least some of the test runs.
Values are adjusted to 7% oxygen concentration to correct for dilution by excess combustion air.
Test results for NOx, CO and SOx represent average emission concentrations throughout the year as measured by the Facility's continuous emissions monitoring systems.

MEMORANDUM

TO: Charter Municipalities
FROM: Greg Lounder, Municipal Review Committee, Inc.
RE: Environmental Performance of the PERC Facility
DATE: 28 January 2013

This memorandum presents our annual update on the key aspects of the PERC facility's record of environmental performance in 2012. The memorandum also presents an estimate of the impact of the Facility to avoid greenhouse gas emissions by diverting waste from landfills. A key part of the MRC's mission is to ensure the long-term disposal of solid waste via methods that are environmentally sound. This information is being shared to enable the Charter Municipalities to understand the performance of the PERC facility in achieving this aspect of the MRC's mission, and to be able to present accurate information to those with interest in the PERC facility's record.

Air Emission Test Results

Every year PERC conducts tests to assess whether the facility complies with the emissions limits and operating conditions that are specified in its air emissions license from the Maine DEP. The tests are intended to ensure that the level of various constituents emitted by the PERC facility avoid significant impacts on public health and the environment. Some constituents are measured around the clock using devices known as continuous emissions monitoring systems, or CEMS. For other constituents, PERC hires an independent third-party testing firm to conduct special tests known as "stack tests" to measure what is being emitted. Tests are conducted for the following:

Type	*Measured constituent*
Ozone precursors	Nitrogen oxides (NOx) [measured by CEMS] Carbon monoxide (CO) [measured by CEMS]
Acid gases	Sulfur dioxides (SOx) [measured by CEMS] Hydrogen chloride (HCl)
Particulate matter	Total particulates
Trace metals	Arsenic, beryllium, cadmium, chromium, lead, mercury, nickel
Trace organics	Dioxins and furans
Fugitive emissions	Dust from the ash management system

The most recent stack tests were conducted on September 18-19, 2012. To ensure objectivity, the tests are conducted by an independent contractor in accordance with strict protocols and standards, and the conduct of the tests can be witnessed by representatives of the Maine DEP.

Yet again, we have reason to be proud of the results of these tests. As presented in Exhibit A, not only did the PERC facility comply with all of the standards in its air emissions license, but it performed significantly better than the license requirements – often by a wide margin.

Specific results can be summarized as follows:

- Emissions of total particulates were at 17.6 percent of the permitted level.
- Emissions of all trace metals were very low. Emissions of cadmium, lead and mercury were at small fractions of the permitted levels. In fact, emissions of cadmium and mercury were too low to be detected during the test.
- Emissions of dioxins and furans were very low. In fact, emissions of dioxins and furans together were at 1.9 percent of the permitted level.
- Emissions of HCl (a contributor to acid rain), which are controlled by the facility's dry scrubbers, were well below the allowable limits. HCl emissions were at only 6.7 percent of the permitted level.
- No fugitive emissions were observed from the facility's ash handling system.

General Environmental Performance

The Charter Municipalities should be aware of the following information regarding the performance of the PERC facility in 2012:

- For the three pollutants that are monitored continuously (NOx, CO and SOx), average emission levels for each constituent throughout the year were below the permit limits. Average emissions of NOx and CO (the contributors to smog), which are controlled through good combustion practices, were at 79 percent and 50 percent of the allowable limits. Emissions of SO_2 (which contributes to acid rain), were at only 8.6 percent of the allowable limit. The Facility recorded only two occasion on which average emissions levels exceeded applicable daily limits for CO, and none for the other these pollutants – a compliance record through the year of 99.5 percent for CO emissions and 100 percent for NOx and SOx emissions. This outstanding record for 2012 represents a significant improvement in performance that has been sustained since the facility was retrofitted with a new boiler fuel feed system in 2000.

- The PERC facility generated and delivered to the grid 166,261 MWh of electricity in 2012. This represents enough electricity to power more than 16,600 homes. By using solid waste as fuel, the PERC facility avoided the need to combust the equivalent of 1,232 billion cubic feet of natural gas or 14.2 million gallons of #2 fuel oil in order to generate electricity. In that context, the PERC facility also avoided the emissions of greenhouse gases and other constituents that are associated with the production, importation and combustion of fossil fuels to generate electricity.

- The PERC facility processed 311,931 tons of solid waste, but did not bypass any processible solid waste to landfills for disposal in 2012 Accounting for residuals materials such as ash and front-end process residue, the PERC facility reduced the volume of material going to landfills by more than 636,000 cubic yards, which is a reduction of approximately 85 percent of the volume that would have been required for landfill disposal of the solid waste delivered to the PERC facility.

- The PERC facility continued to implement its supplementary grinding program to convert waste elements previously considered "non-processible" into fuel. In 2012, only 44 tons of the waste received by the PERC facility were sent to a landfill for disposal as non-processible material.

- The PERC facility recovered 8,708 tons of ferrous material from incoming solid waste in 2012, making it one of the largest recycling facilities in Maine. The ferrous material was transported to a processing facility in southern New England for beneficiation and marketing for re-use as scrap metal. Moreover, by recovering the ferrous materials, the PERC facility avoided the emissions that would have been incurred during the course of mining and manufacturing a similar amount of ferrous material from natural sources.

Avoided greenhouse gas emissions

The PERC Facility combusts MSW that might otherwise be accepted for disposal at landfills. The Facility thereby avoids the creation of methane that would otherwise have been created by the degradation of MSW in a landfill through the anaerobic decomposition process. In particular:

1. In 2012, PERC processed 313,931 tons of MSW at the Facility, of which 56,667 tons were glass and grit with an organic content approximately half that of the MSW.

2. If all of the 313,931 tons of MSW had been disposed of in a landfill, such MSW would generate 22,485 additional tons of methane over the time of its active decomposition (at least 30 years). Adjusting for methane generation from PERC's glass and grit stream, on a net basis, PERC's MSW processing activities in 2012 avoided the generation and emission of approximately 18,400 tons of methane.

3. Taking into account the global warming potential of methane and other factors, by avoiding such methane generation in 2012, PERC avoided emitting the equivalent of 335,800 metric tons of carbon dioxide.

Exhibit A
Summary Results of Air Emissions Testing at the PERC Facility in 2012
Sources: Final Report, Stack Emissions Compliance Test Program, PERC Facility, 2012;PERC CEM data

Constituent	*Allowable limit*	*Average of test results*	*Test result value as percent of allowable limit*
Nitrogen oxides (NOx)	230 ppmdv @ 7% O2	182.1 ppmdv @ 7% O2	79% of limit
Carbon monoxide (CO)	200 ppmdv @ 7% O2	99.1 ppmdv @ 7% O2	50% of limit
Sulfur dioxides (SOx)	29 ppmdv @ 7% O2	2.5 ppmdv @ 7% O2	8.6% of limit
Hydrogen chloride (HCl)	29 ppm @ 7% O2	1.94 ppm @ 7% O2	6.7% of limit
Particulate matter	22.9 mg/dscm @ 7% O2	4.02 mg/dscm @ 7% O2	17.6% of limit
Trace metals			
• Arsenic	• No limit in permit	• <0.00134 mg/dscm @ 7% O2	No permit limit
• Beryllium	• No limit in permit	• < 0.00034 mg/dscm @ 7% O2	No permit limit
• Cadmium	• 0.03500 mg/dscm @ 7% O2	• <0.00034 mg/dscm @ 7% O2	< 1.0%.of limit
• Chromium	• No limit in permit	• 0.0134 mg/dscm @ 7% O2	No permit limit
• Lead	• 0.400 mg/dscm @ 7% O2	• 0.0030 mg/dscm @ 7% O2	0.8% of limit
• Mercury	• 0.0280 mg/dscm @ 7% O2	• < 0.0012 mg/dscm @ 7% O2	< 4.3% of limit
• Nickel	• No limit in permit	• 0.0095 mg/dscm @ 7% O2	No permit limit
Dioxins/furans	25 ng/dscm @ 7% O2	0.48 ng/dscm @ 7% O2	1.9% of limit
Fugitive emissions, ash system	< 5% of observation period	0% of observation period	0% of limit

Abbreviations
- ppmdv = parts per million dry volume
- mg/dscm = milligrams per dry standard cubic meter
- ng/dscm = nanograms per dry standard cubic meter

Values with < (a "less than" sign) are the detection limits, which are provided for tests when the identified constituent was not detected. In such cases, the emission level of such identified constituent was below the lowest value that could be detected by the test equipment used during the test (the detection limit) for at least some of the test runs.
Values are adjusted to 7% oxygen concentration to correct for dilution by excess combustion air.
Test results for NOx, CO and SOx represent average emission concentrations throughout the year as measured by the Facility's continuous emissions monitoring systems.

MEMORANDUM

TO: Charter Municipalities
FROM: Greg Lounder, Municipal Review Committee, Inc.
RE: Environmental Performance of the PERC Facility
DATE: 29 January 2014

This memorandum presents our annual update on the key aspects of the PERC facility's record of environmental performance in 2013. The memorandum also presents an estimate of the impact of the Facility to avoid greenhouse gas emissions by diverting waste from landfills. A key part of the MRC's mission is to ensure the long-term disposal of solid waste via methods that are environmentally sound. This information is being shared to enable the Charter Municipalities to understand the performance of the PERC facility in achieving this aspect of the MRC's mission, and to be able to present accurate information to those with interest in the PERC facility's record.

Air Emission Test Results

Every year PERC conducts tests to assess whether the facility complies with the emissions limits and operating conditions that are specified in its air emissions license from the Maine DEP. The tests are intended to ensure that the level of various constituents emitted by the PERC facility avoid significant impacts on public health and the environment. Some constituents are measured around the clock using devices known as continuous emissions monitoring systems, or CEMS. For other constituents, PERC hires an independent third-party testing firm to conduct special tests known as "stack tests" to measure what is being emitted. Tests are conducted for the following:

Type	*Measured constituent*
Ozone precursors	Nitrogen oxides (NOx) [measured by CEMS] Carbon monoxide (CO) [measured by CEMS]
Acid gases	Sulfur dioxides (SOx) [measured by CEMS] Hydrogen chloride (HCl)
Particulate matter	Total particulates
Trace metals	Arsenic, beryllium, cadmium, chromium, lead, mercury, nickel
Trace organics	Dioxins and furans
Fugitive emissions	Dust from the ash management system

The most recent stack tests were conducted on August 20-21, 2013. To ensure objectivity, the tests are conducted by an independent contractor in accordance with strict protocols and standards, and the conduct of the tests can be witnessed by representatives of the Maine DEP.

Yet again, we have reason to be proud of the results of these tests. As presented in Exhibit A, not only did the PERC facility comply with all of the standards in its air emissions license, but it performed significantly better than the license requirements – often by a wide margin.

Specific results can be summarized as follows:

- Emissions of total particulates were at 7.1 percent of the permitted level.
- Emissions of all trace metals were very low. Emissions of cadmium, lead and mercury were at small fractions of the permitted levels. In fact, emissions of cadmium and mercury were too low to be detected during the test, as were emissions of arsenic and beryllium, meaning that the test failed to detect any emissions of these pollutants.
- Emissions of dioxins and furans were very low. In fact, emissions of dioxins and furans together were at 0.9 percent of the permitted level.
- Emissions of HCl (a contributor to acid rain), which are controlled by the facility's dry scrubbers, were well below the allowable limits. HCl emissions were at only 5.9 percent of the permitted level.
- No fugitive emissions were observed from the facility's ash handling system.

General Environmental Performance

The Charter Municipalities should be aware of the following information regarding the performance of the PERC facility in 2013:

- For the three pollutants that are monitored continuously (NOx, CO and SOx), average emission levels for each constituent throughout the year were below the permit limits. Average emissions of NOx and CO (the contributors to smog), which are controlled through good combustion practices, were at 73.6 percent and 53.9 percent of the allowable limits. Emissions of SO_2 (which contributes to acid rain), were at only 9.7 percent of the allowable limit. The Facility recorded ZERO occasions on which average emissions levels exceeded applicable daily limits for NOx, CO or SOx – a compliance record through the year of 100 percent for these emissions. This outstanding record for 2013 represents a significant improvement in performance that has been sustained since the facility was retrofitted with a new boiler fuel feed system in 2000.

- The PERC facility generated and delivered to the grid 162,520 MWh of electricity in 2013. This represents enough electricity to power more than 16,250 homes. By using solid waste as fuel, the PERC facility avoided the need to combust the equivalent of 1,204 billion cubic feet of natural gas or 13.9 million gallons of #2 fuel oil in order to generate electricity. In that context, the PERC facility also avoided the emissions of greenhouse gases and other constituents that are associated with the production, importation and combustion of fossil fuels to generate electricity.

- The PERC facility received 306,875 tons of municipal solid waste, but bypassed only 7,299 tons of processible municipal solid waste to landfills for disposal in 2013 Accounting for residuals materials such as ash and front-end process residue, the PERC facility reduced the volume of material going to landfills by more than 611,000 cubic yards, which is a reduction of approximately 85 percent of the volume that

would have been required for landfill disposal of the solid waste delivered to the PERC facility.

- The PERC facility continued to implement its supplementary grinding program to convert waste elements previously considered "non-processible" into fuel. In 2013, only 32 tons of the waste received by the PERC facility were sent to a landfill for disposal as non-processible material.

- The PERC facility recovered 8,074 tons of ferrous material from incoming solid waste in 2013, making it one of the largest recycling facilities in Maine. The ferrous material was transported to a processing facility in southern New England for beneficiation and marketing for re-use as scrap metal. Moreover, by recovering the ferrous materials, the PERC facility avoided the emissions that would have been incurred during the course of mining and manufacturing a similar amount of ferrous material from natural sources.

Avoided greenhouse gas emissions

The PERC Facility combusts MSW that might otherwise be accepted for disposal at landfills. The Facility thereby avoids the creation of methane that would otherwise have been created by the degradation of MSW in a landfill through the anaerobic decomposition process. In particular:

1. In 2013, PERC processed 299,382 tons of MSW at the Facility, of which 53,385 tons were glass and grit with an organic content approximately half that of the MSW.

2. If all of the 299,382 tons of MSW processed at the Facility in 2013 had been disposed of in a landfill, such MSW would generate 21,687 additional tons of methane over the time of its active decomposition (at least 30 years). Adjusting for methane generation from PERC's glass and grit stream, on a net basis, PERC's MSW processing activities in 2013 avoided the generation and emission of approximately 17,820 tons of methane.

3. Taking into account the global warming potential of methane and other factors, by avoiding such methane generation in 2013, PERC avoided emitting the equivalent of 325,000 metric tons of carbon dioxide.

Exhibit A
Summary Results of Air Emissions Testing at the PERC Facility in 2012
Sources: Final Report, Stack Emissions Compliance Test Program, PERC Facility, 2013;PERC CEM data

Constituent	*Allowable limit*	*Average of test results*	*Test result value as percent of allowable limit*
Nitrogen oxides (NOx)	230 ppmdv @ 7% O2	169.2 ppmdv @ 7% O2	73.6% of limit
Carbon monoxide (CO)	200 ppmdv @ 7% O2	107.7 ppmdv @ 7% O2	53.9% of limit
Sulfur dioxides (SOx)	29 ppmdv @ 7% O2	2.8 ppmdv @ 7% O2	9.7% of limit
Hydrogen chloride (HCl)	29 ppm @ 7% O2	1.94 ppm @ 7% O2	5.9% of limit
Particulate matter	22.9 mg/dscm @ 7% O2	1.63 mg/dscm @ 7% O2	7.1% of limit
Trace metals			
• Arsenic	• No limit in permit	• <0.00045 mg/dscm @ 7% O2	No permit limit
• Beryllium	• No limit in permit	• < 0.00011 mg/dscm @ 7% O2	No permit limit
• Cadmium	• 0.03500 mg/dscm @ 7% O2	• <0.00039 mg/dscm @ 7% O2	< 1.0%.of limit
• Chromium	• No limit in permit	• 0.0515 mg/dscm @ 7% O2	No permit limit
• Lead	• 0.400 mg/dscm @ 7% O2	• 0.0029 mg/dscm @ 7% O2	0.7% of limit
• Mercury	• 0.0280 mg/dscm @ 7% O2	• < 0.00072 mg/dscm @ 7% O2	< 2.6% of limit
• Nickel	• No limit in permit	• 0.0105 mg/dscm @ 7% O2	No permit limit
Dioxins/furans	25 ng/dscm @ 7% O2	0.23 ng/dscm @ 7% O2	0.9% of limit
Fugitive emissions, ash system	< 5% of observation period	0% of observation period	0% of limit

Abbreviations
- ppmdv = parts per million dry volume
- mg/dscm = milligrams per dry standard cubic meter
- ng/dscm = nanograms per dry standard cubic meter

Values with < (a "less than" sign) are the detection limits, which are provided for tests when the identified constituent was not detected. In such cases, the emission level of such identified constituent was below the lowest value that could be detected by the test equipment used during the test (the detection limit) for at least some of the test runs.
Values are adjusted to 7% oxygen concentration to correct for dilution by excess combustion air.
Test results for NOx, CO and SOx represent average emission concentrations throughout the year as measured by the Facility's continuous emissions monitoring systems.

MEMORANDUM

TO: Charter Municipalities
FROM: Greg Lounder, Municipal Review Committee, Inc.
RE: Environmental Performance of the PERC Facility
DATE: 10 December 2014

This memorandum presents our annual update on the key aspects of the PERC facility's record of environmental performance in 2014. The memorandum also presents an estimate of the impact of the Facility to avoid greenhouse gas emissions by diverting waste from landfills. A key part of the MRC's mission is to ensure the long-term disposal of solid waste via methods that are environmentally sound. This information is being shared to enable the Charter Municipalities to understand the performance of the PERC facility in achieving this aspect of the MRC's mission, and to be able to present accurate information to those with interest in the PERC facility's record.

Air Emission Test Results

Every year PERC conducts tests to assess whether the facility complies with the emissions limits and operating conditions that are specified in its air emissions license from the Maine DEP. The tests are intended to ensure that the level of various constituents emitted by the PERC facility avoid significant impacts on public health and the environment. Some constituents are measured around the clock using devices known as continuous emissions monitoring systems, or CEMS. For other constituents, PERC hires an independent third-party testing firm to conduct special tests known as "stack tests" to measure what is being emitted. Tests are conducted for the following:

Type	*Measured constituent*
Ozone precursors	Nitrogen oxides (NOx) [measured by CEMS] Carbon monoxide (CO) [measured by CEMS]
Acid gases	Sulfur dioxides (SOx) [measured by CEMS] Hydrogen chloride (HCl)
Particulate matter	Total particulates
Trace metals	Arsenic, beryllium, cadmium, chromium, lead, mercury, nickel
Trace organics	Dioxins and furans
Fugitive emissions	Dust from the ash management system

The most recent stack tests were conducted on August 20-21, 2013. To ensure objectivity, the tests are conducted by an independent contractor in accordance with strict protocols and standards, and the conduct of the tests can be witnessed by representatives of the Maine DEP.

Yet again, we have reason to be proud of the results of these tests. As presented in Exhibit A, not only did the PERC facility comply with all of the standards in its air emissions license, but it performed significantly better than the license requirements – often by a wide margin.

Specific results can be summarized as follows:

- Emissions of total particulates were at 7.1 percent of the permitted level.
- Emissions of all trace metals were very low. Emissions of cadmium, lead and mercury were at small fractions of the permitted levels. In fact, emissions of cadmium and mercury were too low to be detected during the test, as were emissions of arsenic and beryllium, meaning that the test failed to detect any emissions of these pollutants.
- Emissions of dioxins and furans were very low. In fact, emissions of dioxins and furans together were at 0.9 percent of the permitted level.
- Emissions of HCl (a contributor to acid rain), which are controlled by the facility's dry scrubbers, were well below the allowable limits. HCl emissions were at only 5.9 percent of the permitted level.
- No fugitive emissions were observed from the facility's ash handling system.

General Environmental Performance

The Charter Municipalities should be aware of the following information regarding the performance of the PERC facility in 2013:

- For the three pollutants that are monitored continuously (NOx, CO and SOx), average emission levels for each constituent throughout the year were below the permit limits. Average emissions of NOx and CO (the contributors to smog), which are controlled through good combustion practices, were at 73.6 percent and 53.9 percent of the allowable limits. Emissions of SO_2 (which contributes to acid rain), were at only 9.7 percent of the allowable limit. The Facility recorded ZERO occasions on which average emissions levels exceeded applicable daily limits for NOx, CO or SOx – a compliance record through the year of 100 percent for these emissions. This outstanding record for 2013 represents a significant improvement in performance that has been sustained since the facility was retrofitted with a new boiler fuel feed system in 2000.

- The PERC facility generated and delivered to the grid 162,520 MWh of electricity in 2013. This represents enough electricity to power more than 16,250 homes. By using solid waste as fuel, the PERC facility avoided the need to combust the equivalent of 1,204 billion cubic feet of natural gas or 13.9 million gallons of #2 fuel oil in order to generate electricity. In that context, the PERC facility also avoided the emissions of greenhouse gases and other constituents that are associated with the production, importation and combustion of fossil fuels to generate electricity.

- The PERC facility received 306,875 tons of municipal solid waste, but bypassed only 7,299 tons of processible municipal solid waste to landfills for disposal in 2013 Accounting for residuals materials such as ash and front-end process residue, the PERC facility reduced the volume of material going to landfills by more than 611,000 cubic yards, which is a reduction of approximately 85 percent of the volume that

would have been required for landfill disposal of the solid waste delivered to the PERC facility.

- The PERC facility continued to implement its supplementary grinding program to convert waste elements previously considered "non-processible" into fuel. In 2013, only 32 tons of the waste received by the PERC facility were sent to a landfill for disposal as non-processible material.

- The PERC facility recovered 8,074 tons of ferrous material from incoming solid waste in 2013, making it one of the largest recycling facilities in Maine. The ferrous material was transported to a processing facility in southern New England for beneficiation and marketing for re-use as scrap metal. Moreover, by recovering the ferrous materials, the PERC facility avoided the emissions that would have been incurred during the course of mining and manufacturing a similar amount of ferrous material from natural sources.

Avoided greenhouse gas emissions

The PERC Facility combusts MSW that might otherwise be accepted for disposal at landfills. The Facility thereby avoids the creation of methane that would otherwise have been created by the degradation of MSW in a landfill through the anaerobic decomposition process. In particular:

1. In 2013, PERC processed 299,382 tons of MSW at the Facility, of which 53,385 tons were glass and grit with an organic content approximately half that of the MSW.

2. If all of the 299,382 tons of MSW processed at the Facility in 2013 had been disposed of in a landfill, such MSW would generate 21,687 additional tons of methane over the time of its active decomposition (at least 30 years). Adjusting for methane generation from PERC's glass and grit stream, on a net basis, PERC's MSW processing activities in 2013 avoided the generation and emission of approximately 17,820 tons of methane.

3. Taking into account the global warming potential of methane and other factors, by avoiding such methane generation in 2013, PERC avoided emitting the equivalent of 325,000 metric tons of carbon dioxide.

Exhibit A. Summary Results of Air Emissions Testing at the PERC Facility in 2014
Sources: Final Report, Stack Emissions Compliance Test Program, PERC Facility, 2014;PERC CEM data

Constituent	*Allowable limit*	*Average of test results*	*Test result value as percent of allowable limit*
Hydrogen chloride (HCl)	29 ppm @ 7% O2	3.03 ppm @ 7% O2	10.5% of limit
Particulate matter	22.9 mg/dscm @ 7% O2	0.084 mg/dscm @ 7% O2	0.37% of limit
Trace metals			
• Arsenic	• No limit in permit	• <0.00040 mg/dscm @ 7% O2	No permit limit
• Beryllium	• No limit in permit	• < 0.00010 mg/dscm @ 7% O2	No permit limit
• Cadmium	• 0.03500 mg/dscm @ 7% O2	• <0.00010 mg/dscm @ 7% O2	< 0.3%.of limit
• Chromium	• No limit in permit	• 0.01247 mg/dscm @ 7% O2	No permit limit
• Lead	• 0.400 mg/dscm @ 7% O2	• 0.0077 mg/dscm @ 7% O2	1.9% of limit
• Mercury	• 0.0280 mg/dscm @ 7% O2	• < 0.00058 mg/dscm @ 7% O2	< 2.1% of limit
• Nickel	• No limit in permit	• 0.013 mg/dscm @ 7% O2	No permit limit
Dioxins/furans	25 ng/dscm @ 7% O2	0.28 ng/dscm @ 7% O2	1.1% of limit
Fugitive emissions, ash system	< 5% of observation period	0% of observation period	0% of limit

Nitrogen oxides (NOx)	230 ppmdv @ 7% O2	ppmdv @ 7% O2 (average per CEM data)	% of limit
Carbon monoxide (CO)	200 ppmdv @ 7% O2	ppmdv @ 7% O2 (average per CEM data)	% of limit
Sulfur dioxides (SOx)	29 ppmdv @ 7% O2	ppmdv @ 7% O2 (average per CEM data)	% of limit

Abbreviations

- ppmdv = parts per million dry volume
- mg/dscm = milligrams per dry standard cubic meter
- ng/dscm = nanograms per dry standard cubic meter

Values with < (a "less than" sign) are the detection limits, which are provided for tests when the identified constituent was not detected. In such cases, the emission level of such identified constituent was below the lowest value that could be detected by the test equipment used during the test (the detection limit) for at least some of the test runs.

Values are adjusted to 7% oxygen concentration to correct for dilution by excess combustion air.

Test results for NOx, CO and SOx represent average emission concentrations throughout the year as measured by the Facility's continuous emissions monitoring systems.

MEMORANDUM

TO: Charter Municipalities
FROM: Greg Lounder, Municipal Review Committee, Inc.
RE: Environmental Performance of the PERC Facility
DATE: 31 October 2016

Executive Summary

In August 2016, an independent third-party testing firm performed the annual test of air emissions from the exhaust stack of the PERC. All emissions tested were demonstrated to comply with the limits in PERC's air emissions license from the Maine Department of Environmental Protection (Maine DEP). An important part of the MRC's mission is to ensure that waste disposal by its membership is environmentally sound. This memorandum presents the summary results of the stack emissions tests as part of the MRC's efforts to fulfill its mission by providing information to enable the Charter Municipalities to understand the environmental performance of the PERC facility, and by presenting accurate information to those with interest in the PERC facility's record.

Air Emission Test Results

Every year PERC conducts tests to assess whether the facility complies with the emissions limits and operating conditions that are specified in its air emissions license from the Maine DEP. The tests are intended to ensure that the level of various constituents emitted by the PERC facility avoid significant impacts on public health and the environment. Some constituents are measured around the clock using devices known as continuous emissions monitoring systems, or CEMS. For other constituents, PERC hires an independent third-party testing firm to conduct special tests known as "stack tests" to measure what is being emitted. Tests are conducted for the following:

Type	*Measured constituent*
Acid gases	Hydrogen chloride (HCl)
Particulate matter	Total particulates, opacity
Trace metals	Arsenic, beryllium, cadmium, chromium, lead, mercury, nickel
Trace organics	Dioxins and furans

The most recent stack tests were conducted on August 9-11, 2016. To ensure objectivity, the tests are conducted by an independent contractor in accordance with strict protocols and standards, and the conduct of the tests can be witnessed by representatives of the Maine DEP.

All involved have reason to be proud of the results of these tests. As presented in Exhibit A, not only did the PERC facility comply with all of the standards in its air emissions license, but it performed significantly better than the license requirements – often by a wide margin. Specific results can be summarized as follows:

- Emissions of total particulates were at 15.1 percent of the permitted level.

- Emissions of all trace metals were very low. Emissions of cadmium, chromium, lead, mercury and nickel were at small fractions of the permitted levels. Emissions of arsenic and beryllium were too low to be detected during the test.
- Emissions of dioxins and furans were very low. In fact, emissions of dioxins and furans together were at 1.7 percent of the permitted level.
- Emissions of HCl (a contributor to acid rain), which are controlled by the facility's dry scrubbers, were at only 24.1 percent of the permitted level.

Exhibit A. Summary Results of Air Emissions Testing at the PERC Facility in 2016

Constituent	*Allowable limit*	*Average of test results*	*Test result value as percent of allowable limit*
Dioxins/furans	25 ng/dscm @ 7% O2	0.43 ng/dscm @ 7% O2	1.7% of limit
Particulate matter	22.9 mg/dscm @ 7% O2	3.45 mg/dscm @ 7% O2	15.1% of limit
Trace metals			
• Arsenic	• No limit in permit	• <0.00007 mg/dscm @ 7% O2	No permit limit
• Beryllium	• No limit in permit	• < 0.00006 mg/dscm @ 7% O2	No permit limit
• Cadmium	• 0.03500 mg/dscm @ 7% O2	• <0.00005 mg/dscm @ 7% O2	0.1%.of limit
• Chromium	• No limit in permit	• 0.0138 mg/dscm @ 7% O2	No permit limit
• Lead	• 0.400 mg/dscm @ 7% O2	• 0.0014 mg/dscm @ 7% O2	0.4% of limit
• Mercury	• 0.0280 mg/dscm @ 7% O2	• 0.0004 mg/dscm @ 7% O2	1.4% of limit
• Nickel	• No limit in permit	• 0.014 mg/dscm @ 7% O2	No permit limit
Hydrogen chloride (HCl)	29 ppm @ 7% O2	7.00 ppm @ 7% O2	24.1% of limit
Opacity	• <10.0% Unit A • <10.0% Unit B	• 0.7 on Unit A • 1.3 on Unit B	of limit of limit

Abbreviations

- ppmdv = parts per million dry volume
- mg/dscm = milligrams per dry standard cubic meter
- ng/dscm = nanograms per dry standard cubic meter

Values with < (a "less than" sign) are the detection limits, which are provided for tests when the identified constituent was not detected. In such cases, emission of such identified constituent was below the lowest value that could be detected by test equipment used during the test (the detection limit) for some test runs. Values are adjusted to 7% oxygen concentration to correct for dilution by excess combustion air.