

MEMORANDUM

TO: Charter Municipalities
FROM: Greg Louder, 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:

<i>Type</i>	<i>Measured constituent</i>
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 (NO_x, CO and SO_x), average emission levels for each constituent throughout the year were below the permit limits. Average emissions of NO_x 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 SO₂ (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 NO_x, CO or SO_x – 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

<i>Constituent</i>	<i>Allowable limit</i>	<i>Average of test results</i>	<i>Test result value as percent of allowable limit</i>
Hydrogen chloride (HCl)	29 ppm @ 7% O ₂	3.03 ppm @ 7% O ₂	10.5% of limit
Particulate matter	22.9 mg/dscm @ 7% O ₂	0.084 mg/dscm @ 7% O ₂	0.37% of limit
Trace metals			
• Arsenic	• No limit in permit	• <0.00040 mg/dscm @ 7% O ₂	No permit limit
• Beryllium	• No limit in permit	• < 0.00010 mg/dscm @ 7% O ₂	No permit limit
• Cadmium	• 0.03500 mg/dscm @ 7% O ₂	• <0.00010 mg/dscm @ 7% O ₂	< 0.3% .of limit
• Chromium	• No limit in permit	• 0.01247 mg/dscm @ 7% O ₂	No permit limit
• Lead	• 0.400 mg/dscm @ 7% O ₂	• 0.0077 mg/dscm @ 7% O ₂	1.9% of limit
• Mercury	• 0.0280 mg/dscm @ 7% O ₂	• < 0.00058 mg/dscm @ 7% O ₂	< 2.1% of limit
• Nickel	• No limit in permit	• 0.013 mg/dscm @ 7% O ₂	No permit limit
Dioxins/furans	25 ng/dscm @ 7% O ₂	0.28 ng/dscm @ 7% O ₂	1.1% of limit
Fugitive emissions, ash system	< 5% of observation period	0% of observation period	0% of limit

Nitrogen oxides (NO _x)	230 ppm _{dv} @ 7% O ₂	ppm _{dv} @ 7% O ₂ (average per CEM data)	% of limit
Carbon monoxide (CO)	200 ppm _{dv} @ 7% O ₂	ppm _{dv} @ 7% O ₂ (average per CEM data)	% of limit
Sulfur dioxides (SO _x)	29 ppm _{dv} @ 7% O ₂	ppm _{dv} @ 7% O ₂ (average per CEM data)	% of limit

Abbreviations

- ppm_{dv} = 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 NO_x, CO and SO_x represent average emission concentrations throughout the year as measured by the Facility’s continuous emissions monitoring systems.