



The Regional Municipality of Durham
To: The Works Committee
From: Commissioner of Works
Report: 2008-WR-16
Date: April 23, 2008

SUBJECT:

Approval of Energy From Waste Air Emissions Criteria

RECOMMENDATIONS:

THAT the Works Committee recommends to Regional Council that the Joint Waste Management Group proposed emissions criteria outlined in Attachment No. 1 be approved.

REPORT:

**Attachment No. 1: Memorandum to Joint Waste Management Group,
April 15, 2008**

1. BACKGROUND

Regional Council requested the Joint Waste Management Group (JWVG) to consider the adoption of air emission limits that would meet or exceed those prescribed under the European Union. Generally, the European emission limits are more stringent than those outlined by the Ontario Ministry of Environment (MOE) A-7 Guidelines with the exception of two (2) regulated compounds, Dioxins and Furans and Mercury. As well, the European Union standards do not monitor cadmium, or lead independently, but lump them into combined categories.

Recognizing that allowable limits will be defined in a Certificate of Approval (C of A) from the MOE, staff met with senior MOE staff on March 14, 2008, to open discussions around acceptable operating limits. Following the meeting, a letter was sent to Doris Dumais, Director, Environmental Assessment and Approvals Branch, requesting feedback on the emission and operating limits proposed in the letter (see Attachment 1).

2. DISCUSSION

The intent of Council's direction to staff was to ensure a state-of-the-art Energy From Waste (EFW) facility with Maximum Acceptable Control Technology (MACT). In Ontario, MOE A-7 guidelines represent the maximum regulatory emission limits. However, operational limits have been proposed by the JWMG that meet or exceed the more stringent of either Ontario A-7 or EU Directive 2000/76/EC, with the exception of Hydrogen Chloride (a short-lived smog precursor).

Strict application of operational limits for Hydrogen Chloride at the EU Directive level may preclude some of the pre-qualified vendors from competing. To compensate, the operational limits on Sulphur Dioxide and Nitrogen Oxide will be substantially below the EU Directive so the cumulative Acid Gas emissions will be below both Ontario A7 and the EU Directive.

The RFP will require vendors to ultimately guarantee to meet EFW emission limits set by the MOE under the Certificate of Approval. In addition, extra consideration will be given for vendors providing even more stringent emission limits.

3. CONCLUSION

The proposed operational limits are aggressive and a blend of the best of the European and Ontario guidelines. The Joint Waste Management Group has recommended these proposed limits.

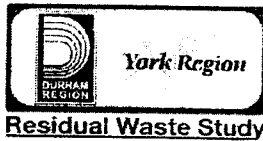
The actual emission requirements will be set by the Ministry of the Environment in the subsequent Certificate of Approval (CofA), but staff have requested feedback from MOE on potential emission requirements for inclusion in the RFP document.

Clifford Curtis, P. Eng., MBA,
Commissioner of Works

Recommended for Presentation to Committee

G. H. Cūbitt, M.S.W.,
Chief Administrative Officer

WM1/rw/al



Durham/York Residual Waste Study

MEMORANDUM

TO: Joint Waste Management Group

FROM:

Andrew Campbell, Director
Solid Waste Management & Administration
Environmental Services Department
The Regional Municipality of York

and

Mirka Januszkiewicz, Director
Waste Management Services
Works Department
The Regional Municipality of Durham

DATE: April 15, 2008

RE: **Response to Durham Regional Council Direction on EFW Facility Air Emission Control System**

At its meeting of January 23, 2008 Durham Regional Council passed the following two resolutions:

- i) THAT the Joint Waste Management Group of the Regions of York and Durham be requested to agree to protect the health and safety of the residents of Clarington and Durham by incorporating into the design and installation of the EFW facility the most modern and state of the art emission control technologies that meet or exceed the European Union (EU) monitoring and measurement standards.
- ii) THAT the Joint Waste Management Group of the Regions of York and Durham be requested to commit to including in the Request for Proposals and Certificate of Approval, Maximum Achievable Control Technology (MACT) for the emission standards and monitoring of the EFW facility.

In response to these requests, it is proposed that the RFP for the EFW facility require vendors to guarantee the Operational Limits (i.e. time weighted averages) presented in the attached Table 1 for the specified contaminants of concern. This table also lists the corresponding limits specified in Ontario's Guideline A-7 and in the appropriate EU standards.

Staff and Consultants met with key MOE Directors on March 14th and presented the proposed Operational Limits. The Directors suggested that MOE would expect "something better than A-7" for limits, but requested the opportunity to formally review our proposed emission criteria. The project team considered the MOE recommendations and prepared final emissions criteria that, in our opinion, considerably improve upon the MOE benchmark by incorporating

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considerations from the more stringent European Union (EU) criteria. Following the March 14th meeting, a letter (copy attached) was sent to Ms. Doris Dumais, Director, Director, Certificates of Approvals Section, Environmental Assessment and Approvals Branch requesting formal review of our Proposed Operational Limits.

Proposed Operational Limits in Table 1 present superior emissions levels to both the EU and Ontario A-7 criteria for Total Acid Gasses; heavy metals, dioxins, carbon monoxide and particulate. The proposed limits focus on the critical persistent acid forming emissions, Sulphur Dioxide (SO₂) and Nitrogen Oxides (NO_x) and suggest an emission level for Hydrochloric Acid that blends the EU and A-7 criteria providing necessary flexibility to deal with normal variations in input quality. Actual operation of the facility will result in longer term average emissions considerably below these limits.

To assure optimal performance, monitoring and sampling requirements proposed exceed the expectations of both standards. Continual stack monitoring of Acid Gasses, carbon monoxide, temperature and opacity as well as process monitoring of temperature and oxygen content will assure continued optimal performance and allow rapid process adjustments. Quarterly or Semi-annual stack tests will provide feedback on the continued effectiveness of heavy metal and dioxin removal technologies.

It is expected that the Operational Limits specified in Table 1 can be met with the following emission control technology.

- Combustion controls and aqueous urea or ammonia injection via a selective non-catalytic reduction (SNCR) to control the formation of thermal Nitrogen Oxides (NO_x) in the furnace;
- Semi dry (or semi wet) lime injection to control other acid gases (e.g., SO₂, Hydrogen Fluoride (HF) and HCl);
- Carbon injection to control mercury, dioxins and furans; and
- A fabric filter (bag house) to remove particulate matter and heavy metals (e.g., lead and cadmium).

This combination of control technologies has proven effective at many state of the art energy from waste (EFW) facilities in the EU and the U.S. The exact combination and arrangement of emission control technologies for the EFW facility may vary depending on the final proposals provided by each pre-qualified vendor. However, the RFP will require each vendor to guarantee compliance with the Operational Limits in Table 1 regardless of what technology they propose. In addition to guaranteeing to meet these limits, the RFP Evaluation Principles will be structured to provide additional consideration to vendors who guarantee lower emission limits.

The MOE and other regulators including the EU and USEPA recognize that the combination of optimum emission control technologies with the continuous improvement of emission level criteria, such as those proposed in Table 1, constitute "Maximum Achievable Control Technology".

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Recommendation

It is recommended that the project team be instructed to continue to work with the Ontario Ministry of the Environment to establish emission criteria and monitoring for the proposed Durham York energy from waste facility generally as illustrated in Table 1 and discussed herein, subject to additional refinements as may be required. The final emission criteria arrived at with the MOE will be incorporated into the RFP, issuance of which is subject to approval of the business case by Regional Councils.

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Response to Durham Regional Council Direction on EFW Facility Air Emission Control System

Table 1

Pollutant	Units	Ontario A-7	EU Direct 2000/76/EU	Proposed Operational Limits
Particulate Matter	mg/m ³	17	9	9
Carbon Monoxide (CO)	mg/m ³	not specified	46	45
Sulphur Dioxide (SO ₂)	mg/m ³	56	46	35
Hydrogen Chloride (HCl)	mg/m ³	27	9	20
Hydrogen Fluoride (HF)	mg/m ³	1	1	1
Nitrogen Oxides (NO _x)	mg/m ³	107	18	18
Total Acid Gases (not specified as single limit)	mg/m ³	290	239	236
Mercury (Hg)	µg/m ³	20	not specified	15
Cadmium (Cd)	µg/m ³	14	not specified	7
Lead (Pb)	µg/m ³	142	not specified	70
Dioxins/Furans (ITEQ)	ng/m ³	0.08	0.092	0.06
Organic Matter (as methane)	mg/m ³	66	not specified	49

NOTES:
 mg/m³ = Milligrams per cubic metre at Standard Temperature and Pressure.
 µg/m³ = Micrograms per cubic metre at Standard Temperature and Pressure.
 ng/m³ = Nanograms per cubic metre at Standard Temperature and Pressure.



Durham/York Residual Waste Study

March 25, 2008

Ms. Doris Dumais
Director
Environmental Assessment and Approvals Branch
Ontario Ministry of the Environment
2 St. Clair Avenue West
Floor 12A
Toronto, Ontario M4V 1L5

Re: Request for Consideration of Proposed EFW Air Emission Limits

Dear Ms. Dumais:

Further to York and Durham's meeting with Mr. George Rocoski, Acting Director of Central Region, Ms. Agatha Garcia-Wright, Director of Environmental Assessment & Approvals Branch, Mr. Dale Henry, Director of Standards Development Branch and Mr. Allan Jenkins, Senior Policy Specialist, Renewable Energy Division, Ministry of Energy, we would like to request an indication from the Ministry on the suitability of the proposed air emission limits, contained in the attached table, for the Durham York Energy from Waste (EFW) Facility.

It is our hope that timely Ministry feedback on the proposed air emission thresholds will enable the Regions to properly conduct the EFW business case to be finalized in April, and will also allow the Regions to ensure that emissions requirements will be adequately addressed by the Request for Proposals to be issued as early as May 2008, subject to approval by the Regional Councils.

EA Process to Date

In support of the Province of Ontario's commitment to end waste shipments to Michigan by 2010, Durham and York are completing an Environmental Assessment (EA) on the development of an EFW facility to recover energy from the thermal treatment of the residual waste stream. Both municipalities have already achieved over 50 % diversion and have 2010 diversion targets of between 65 % and 70 % based on continuous improvements to their already aggressive and successful diversion programs.

Durham/York Residual Waste Study
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The EA identified Thermal Treatment as the preferred "Alternative To", and selected an industrial site in the Clarington Energy Park, east of Courtice Road and south of the 401, for the facility. These planning activities have been conducted in accordance with the Approved EA Terms of Reference.

Procurement Process to Date

Durham and York Councils agreed to an arrangement involving a municipally owned facility, designed, built and operated by a qualified private sector vendor. A request for qualifications process identified five vendors as qualified to receive detailed requests for proposals (RFP). All five vendors propose technologies recovering electrical and steam energy from single stage combustion of the waste on a grate and extensive flue gas cleaning prior to discharge to the atmosphere.

Facility Size

Initially the facility will process approximately 140,000 tonnes of waste annually and produce approximately 12 MW of electricity for sale to the grid. Up to an additional 20-25 MW of heat could be available for future industrial and commercial district heating, offering additional environmental benefits by reducing the need for heating with fossil fuels. The facility has the potential to expand to 250,000 tonnes per year to provide flexibility for York Region to manage its waste following the termination of its contract with the Green Lane landfill in 2022. Ultimately the facility may be expanded to 400,000 tonnes per year, if required, to accommodate growth.

RFP & Proposed Maximum and Operating Limits

The RFP will specify proposed operating limits (i.e. expected operational averages) for air emissions of regulated contaminants and will require vendors to provide guarantees that they will meet these time-averaged operating limits. As part of the scored evaluation criteria vendors will also be encouraged to offer lower guaranteed operating limits, for consideration within the overall evaluation of the RFP submissions. The proposed operating limits for all contaminants are below those specified in Guideline A-7 and are comparable with US and EU Standards.

Table 1 shows our proposed maximum limits based on Durham's and York's stated desire to incorporate more rigorous standards for several parameters than proposed by the current provincial guideline and on our discussions with staff from the Ministries of the Environment and Energy last week.

Ms. Dumais
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To ensure the facility performance specified in the RFP is generally acceptable to your Ministry and the Province, we respectfully request that you provide an opinion on the suitability of these proposed maximum and operating limits. We recognize that once we have selected a vendor with specific guaranteed emission limits, a formal application will be submitted to the Ministry for a Certificate of Approval (Air).

We look forward to receiving your prompt response to this request.

Yours truly,

Clifford Curtis, M.Sc., P. Eng., MBA
Commissioner of Works
Regional Municipality of Durham

Erin Mahoney, M. Eng. ✓
Commissioner of Environmental Services
Regional Municipality of York

Attachment: Table 1

Cc: Mr. George Rocoski, Acting Director, Central Region, Ministry of the Environment
5775 Yonge Street, 8th Floor, Toronto, ON M2M 4J1



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Table 1

Durham York Regions Energy From Waste Facility

Pollutant	Units ⁽¹⁾	Ontario Guideline A-1	Proposed Maximum Limits	Proposed Operational Limits
Particulate Matter	mg/Rm ³	17	12	9
Sulfur Dioxide (SO ₂)	mg/Rm ³	56	45	35
Hydrogen Chloride (HCl)	mg/Rm ³	27	20	20
Nitrogen Oxides (NOx)	mg/Rm ³	207	200	180
	ppmv	110	108	98
Carbon Monoxide (CO)	mg/Rm ³	NS	NS	45
Mercury (Hg)	µg/Rm ³	20	20	15
Cadmium (Cd)	µg/Rm ³	14	14	7
Lead (Pb)	µg/Rm ³	142	142	70
Dioxins/Furans (ITEQ)	ng/Rm ³	0.08	0.08	0.06
Organic Matter (as Methane)	ppmv	100	100	75
	mg/Rm ³	66	66	49

NOTES:

mg/Rm³ = Milligrams per regular cubic meter.
 µg/Rm³ = Micrograms per regular cubic meter.
 ng/Rm³ = Nanograms per regular cubic meter.
 ppmv = Parts per million on a dry volume basis.

⁽¹⁾ = All concentrations corrected to 11% O₂
 NS = Not specified.