DIRECTION MEMORANDUM

TO: C. Curtis, Commissioner of Works
FROM: P.M. Madill, Regional Clerk
DATE: June 29, 2011
RE: Direction as per minutes of the Regional Council meeting held on June 29, 2011

REPORT OF: Works Committee

ITEM #2

ENERGY FROM WASTE – WASTE MANAGEMENT ADVISORY COMMITTEE (EFW-WMAC) (2011-WR-8)

RECOMMENDATION TO COUNCIL

THAT the Terms of Reference for the Energy from Waste – Waste Management Advisory Committee (EFW-WMAC), as agreed upon by The Regional Municipality of Durham and the Municipality of Clarington, be approved.

P.M. Madill, A.M.C.T., C.M.M III
Regional Clerk

M. Gaskell, Commissioner of Corporate Services

"Service Excellence for our Communities"
The Regional Municipality of Durham  
To: The Works Committee  
From: Commissioner of Works  
Report: 2011-WR-8  
Date: June 15, 2011

SUBJECT:

Energy from Waste - Waste Management Advisory Committee (EFW-WMAC)

RECOMMENDATION:

THAT the Works Committee recommends to Regional Council that Regional Council approves the Terms of Reference of the Energy from Waste - Waste Management Advisory Committee (EFW-WMAC) as agreed upon by the Regional Municipality of Durham and the Municipality of Clarington.

REPORT:

Attachment No. 1: EFW-WMAC Draft Terms of Reference  
Attachment No. 2: Host Community Agreement  
Attachment No. 3: Committee of the Whole Report 2009-COW-01  
Attachment No. 4: Municipality of Clarington Report PSD-033-11  
Attachment No. 5: Joint Finance and Administration and Works Committee Report 2011-J-15

1. PURPOSE

The purpose of this report is to obtain approval of the attached draft Terms of Reference (ToR) (Attachment No.1) in order to establish a public advisory committee: Energy from Waste - Waste Management Advisory Committee (EFW-WMAC). The establishment of this committee is required to ensure the Regional Municipality of Durham (Region) meets all requirements set out in the following:

a) Host Community Agreement (HCA) (Attachment No. 2)  
b) Committee of the Whole Report 2009-COW-01 (Attachment No. 3)
2. **BACKGROUND**

Condition 2 of the Environmental Assessment Notice of Approval states the Regional Municipalities of Durham and York must comply with any commitments made during the environmental assessment or other approvals issued for the undertaking. This includes meeting the commitments made in Committee of the Whole Report 2009-COW-01 (Attachment No. 3), and the HCA (Attachment No. 2) to establish a public liaison committee to oversee the EFW project. As such, the Region must form a committee to satisfy both the Regional Council directive and the HCA (Attachment No. 2) as per Committee of the Whole Report 2009-COW-01 (Attachment No. 3):

"...should be independent, appointed by and accountable to the Regional Council, comprised of Clarington and Durham residents, representatives of the facility, MOE and the Region." (Attachment No. 1)

3. **DISCUSSION**

On February 3, 2011, Report 2011-J-15 (Attachment No. 5) was presented to the Joint Finance and Administration and Works Committee. This report included a draft ToR for an Integrated Waste Management Committee developed by the Region. A recommendation was made to forward the draft ToR to Clarington for input, as per Section 2.2 of the HCA (Attachment No. 2).

Clarington Report PSD-033-11 (Attachment No. 4) was presented to Clarington Council on April 4, 2011. The report details suggested changes to the draft ToR from those which were initially proposed. Regional and Clarington staff met to discuss potential concerns and revised the draft. The following changes were incorporated:

- clarify membership compositions and who will make the appointments
- reporting relationship
- length of appointments to the committee
- election of the committee officers
- timing of the publication of the draft minutes
- name of the committee

The proposed EFW-WMAC will be comprised of residents from the Region in keeping with the above commitment.

As per section 2.2 of the HCA, the ToR for this committee have been developed in a collaborative effort with Clarington and endorsed by Clarington Council in Report PSD-033-11 (Attachment No. 4).
The purpose for this committee will be to provide a forum for public and other stakeholders to monitor, review and liaise with the Region on the EFW facility, including the management of waste prior to delivery to the EFW facility. The committee will act in an advisory role to the Regional Works Committee on matters pertaining to the integrated waste management system and EFW.

4. **NEXT STEPS**

Upon Regional Council approval of the Terms of Reference, the Regional Municipality of Durham and Municipality of Clarington will advertise in local area newspapers for membership. Interested residents will be evaluated based on the eligibility criteria outlined in Section 6 of the draft Terms of Reference. Five of the nine members will be selected by Regional staff and their appointment will be brought back to Regional Council for formal approval and appointment of membership.

As per the revised draft Terms of Reference, the Municipality of Clarington will advertise and select four members to sit on the committee using the Municipality of Clarington's appointment process.

This report has been reviewed by Legal Department staff.

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

Recommended for Presentation to Committee

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

WM/ms
Energy from Waste-Waste Management Advisory Committee (EFW-WMAC)

Terms of Reference

1. **Purpose**

The Energy from Waste-Waste Management Advisory Committee (EFW-WMAC) is established to provide a forum for public and other stakeholders to monitor, review and liaise with the Regional Municipality of Durham (Durham) on the EFW facility including how the waste is being sorted prior to arriving on-site. The success of the EFW facility will depend on the diversion measures and waste separation (waste management) that happens at the transfer stations and curb-side collection. The EFW-WMAC (Committee) is being established to satisfy the Host Community Agreement (HCA) with the Municipality of Clarington (Clarington) and the Commissioner & Medical Officer of Health’s Report 2009-COW-01 obligations.

2. **Mandate**

The EFW-WMAC will act in an advisory role to the Durham Works Committee on issues or concerns which arise with waste diversion, waste management, environmental performance and monitoring of the EFW facility, including the construction and operational phases.

The EFW-WMAC will be comprised of volunteers from Durham appointed by Durham Regional Council and Clarington Council in accordance with these Terms of Reference.

3. **Scope of Activities**

The scope of activities that the EFW-WMAC may undertake include, but are not limited to:

a) Review, discuss and improve understanding of waste diversion and management that occurs before the waste arrives at the EFW facility.

b) Review, discuss, summarize and/or provide opinions about available information, environmental surveillance programs, independent environmental testing, public reporting of environmental surveillance data, environmental performance for the EFW facility (as outlined in the Commissioner & Medical Officer of Health’s Report 2009-COW-01).

c) Identify, assess and study specific issues/concerns which may be related to or associated with the EFW facility or feeder waste management.
system, including issues referred to the EFW-WMAC by the public, local
governments, health professionals, etc., or that otherwise come to the
EFW-WMAC’s attention and to relay findings to Durham’s Works
Committee.

d) Advise on the development and implementation of community outreach
activities which support the growth and environmental awareness and
appreciation in Durham co-operation with other organizations where
appropriate. This may include public information sessions, educational
workshops and participating in some community events.

e) Review and discuss matters of public interest regarding the EFW facility
and its processes, policies and operation. Advise on emerging issues
that may be associated with environmental and human health.

f) Facilitate communication between stakeholders.

g) Provide a forum for the residents to bring their concerns/questions or
suggestions pertaining to the EFW facility.

4. Composition

The EFW-WMAC will be comprised of volunteers selected at large from Durham
in accordance with these Terms of Reference.

The EFW-WMAC will be comprised of nine members. Members shall not hold an
elected office (municipal, provincial or federal).

All members are regarded as individuals and do not represent their respective
employers or advocacy group in their capacity as an EFW-WMAC member.

Members will be appointed for a two year term to a maximum of three
consecutive terms. Appointments will be staggered to provide continuity for the
committee.

5. Membership

Membership shall consist of nine residents from Durham.

Five residents will be appointed by Durham Regional Council.

Four residents will be appointed by Clarington Council.

The EFW-WMAC will notify Durham’s Works Committee or Clarington Council,
as the case may be, of the need to seek replacement members. Members will
be replaced in accordance with the membership selection process outlined in
Sections 5 and 6 of these Terms of Reference.
Non-attendance for three consecutive meetings will be considered grounds for replacement.

Invitations to attend EFW-WMAC meetings will be provided to the following non-voting members:

- Staff representative from Durham’s Works Department.
- Staff representative from Durham’s Health Department.
- Staff representative from The Regional Municipality of York.
- Staff representative from Clarington.
- Staff representative from the Ministry of the Environment.
- Senior staff representative of the facility’s design, build, operate (DBO) contractor and operator.
- Ward 1 Local and Regional members of Clarington Council.

6. **Call for Membership**

Durham will advertise the opportunity to participate in the EFW-WMAC using local newspaper(s) within the boundary of Durham. Responses will be evaluated by Durham’s Senior Waste Management staff and recommended for appointment by Durham’s Works Committee and Durham Regional Council for five members.

Clarington will advertise the opportunity to participate in the EFW-WMAC as a representative of Clarington, using Clarington’s process for committee appointments for four members.

7. **Eligibility Criteria/Evaluation**

Interested residents from Durham must provide a detailed resume with a covering letter outlining their interest and their qualifications in being appointed to this Committee. The submission of additional information on why they should be selected for membership, detailing their knowledge of the EFW facility and the Environmental Assessment process and project will be considered.

Previous participation or experience with committees/working groups will be considered an asset.
Every potential appointee must disclose any obligation, commitment, relationship or interest that could conflict or may be perceived to conflict with his or her duties as part of the EFW-WMAC. A conflict of interest could arise in relation to personal matters including:

- Directorships or other employment.
- Interests in business enterprises or professional practices.
- Share ownership.
- Existing professional or personal associations.
- Professional associations or relationships with other organizations.
- Personal associations with other groups or organizations, or family relationships.

8. Officers

The Chair will be elected by the Committee and serve for a two year term.

The Vice Chair will be elected by the Committee and serve for a two year term.

If a vacancy of any of the key roles occurs, a replacement will be elected by the Committee.

Chair

- Shall manage and provide leadership to the committee.
- Shall chair meetings, maintaining order, while allowing for discussion and input from committee members and staff representatives.
- Shall establish and maintain a positive meeting environment.
- Shall make presentations as requested, including at least one presentation annually to Clarington Council and Durham Regional Council.
- Shall co-ordinate any exchange of information (advise, request for information, etc.) through the EFW-WMAC to Durham's Works Committee.

Vice Chair

- Shall act on behalf of the Chair in his/her absence.

Durham Staff Liaison

- Shall prepare all meeting agendas and take minutes.
- Shall keep a current and accurate statement of all expenses.
9. **Support Services**

The Waste Management division of Durham’s Works Department will appoint a staff liaison to the EFW-WMAC to provide administrative, procedural and technical support to the EFW-WMAC.

The staff liaison will co-ordinate all requests for advice from the EFW-WMAC through meeting agendas with Durham’s Works Committee and/or Joint Works Committees.

An annual budget of $20,000 will be administered to cover operational expenses of the Committee.

EFW-WMAC members will be reimbursed for mileage expenses for attendance at EFW-WMAC meetings upon submission of an expense sheet in accordance with Regional policy. Any other funding requests must be submitted, in advance to the Durham Works Department for consideration.

Durham will provide space on its website to post information such as meeting minutes and other relevant information.

Upon request, the representatives of the Regions, contractors and governmental/regulatory bodies shall ensure that all studies and other information relevant to the Committee’s mandate are made available to the EFW-WMAC.

10. **Meetings/Resolutions**

The EFW-WMAC shall meet quarterly throughout the year. Meeting dates must be determined such that they are synchronized with other committees. The meeting location may be subject to change once the EFW facility is operational and providing space is available. The EFW-WMAC will establish a meeting schedule at its inaugural meeting. The Committee may choose to adjust the schedule, however, must ensure that one meeting will be held per quarter. Additional meetings may be held at the request of the EFW-WMAC Chair. All meetings will be advertised, and any changes to the dates must be published two weeks in advance of the proposed meeting.

All meetings will be open to the public.

All decisions made by the EFW-WMAC will be based on a majority vote.
Quorum will be established by 50 per cent plus one of the members.

11. **Delegations to Meetings**

Any person wishing to appear as a delegate to the EFW-WMAC must submit a written request two weeks prior to the EFW-WMAC staff liaison advising of the topic on which they wish to speak for inclusion in the agenda. The staff liaison will forward information to the EFW-WMAC Chair. If the relevance of the delegation appears to be outside the mandate of the Committee, then the Chair will seek input from the Committee as to whether a delegation should be heard. Materials to be presented by a delegate shall be provided one week in advance of the meeting.

12. **Minutes and Agendas**

Agendas should be prepared and circulated one week in advance of upcoming meetings.

Following the meeting, minutes will be circulated by e-mail. Members will have a specified time period to comment. The minutes will then be submitted as "final draft" to Durham's Works Committee and posted on Durham's website. The minutes will be adopted at the next meeting of the Committee.

The "final draft" minutes will be received as correspondence at the Durham Works Committee.

13. **Annual Reports**

An annual report summarizing the activities of the previous year shall be prepared by the EFW-WMAC and the staff liaison, and forwarded to Durham’s Works Committee and Clarington Council. The report should include any suggested revisions to the Terms of Reference.

The Chair of the EFW-WMAC will present their annual report, and any additional reports as requested to Durham’s Works Committee/Regional Council and to Clarington Council.

An annual review of the EFW-WMAC will be completed by Durham’s Works Committee to determine the effectiveness of the EFW-WMAC and ensure continued improvement.

Clarington Council will be consulted on any changes to the Terms of Reference.
14. **EFW-WMAC Dissolution**

The Committee can be dissolved at any time by Durham Regional Council, in consultation with Clarington Council and the members, providing that the requirements of Durham Report 2009-COW-01 and Host Community Agreement have been fulfilled or upon the decommissioning of the facility.
This Host Community Agreement dated the 18th, day of February, 2010 is made,

BETWEEN:

THE REGIONAL MUNICIPALITY OF DURHAM

("Durham")

-and-

THE CORPORATION OF THE MUNICIPALITY OF CLARINGTON

("Clarington")

WHEREAS:

(a) Durham jointly with The Regional Municipality of York, is in the midst of a procurement process designed to identify a preferred vendor capable of designing, building and operating an energy from waste ("EFW Facility") sufficient to meet their needs, as identified through an individual environmental assessment (the "EA") undertaken to identify a preferred method of processing post-diversion waste;

(b) The EA process has resulted in the approval by Durham Regional Council of a preferred site for the EFW Facility within the Municipality of Clarington ("Clarington"), more particularly described in Schedule "A" hereto.

(c) Durham is completing its requirements to finalize the EA for submission to the Minister of the Environment and to make application under the Environmental Protection Act for one or more Certificates of Approval.

(d) Clarington will be the host community of the EFW Facility to the benefit of communities in Durham, York, the industrial/commercial/institutional sector, and potentially municipal waste from other municipalities identified in the EA.

(e) Durham and Clarington wish to enter into this agreement in order to set forth their respective rights, duties, obligations and commitments regarding the development, construction and operation of the EFW Facility.

NOW THEREFORE the parties agree as follows:

1. Term

1.1 This agreement shall commence upon the date that it is last signed and shall last for the operational lifespan of the EFW Facility.

1.2 In the event that the facility is expanded beyond 400,000 tonnes per year and the expanded portions of the EFW Facility have a twenty-five (25) year operating period, Durham and Clarington either shall extend the term of this agreement or enter into a new Host Community Agreement.
2. **Community Consultation and Communications**

2.1 Durham shall support the development and operation of an EFW Site Liaison Committee (SLC) for the purpose of facilitating input from the community and the distribution of relevant information in regards to the construction, operation and monitoring of the EFW facility.

2.2 The scope for a Terms of Reference for a new SLC shall be agreed upon by Durham and Clarington at the conclusion of the mandate of the initial SLC, which terms shall otherwise be generally analogous to the current committee.

2.3 Durham shall present to Clarington Council and hold one community information meeting prior to the submission of the final EA documentation to the Ministry of the Environment for approval. In addition, Durham shall make a presentation to Clarington Council and shall hold one community information meeting before the Site Liaison Committee regarding the terms of the Certificate of Approval for the EFW Facility subsequent to its issuance.

3. **Protection of Human Health and the Environment**

3.1 Durham shall ensure that the EFW Facility incorporates and utilizes modern, state of the art, emission control technologies that meet or exceed the Ontario A7 air emission guidelines and European Union standards as identified below:
### THE REGIONS' AIR EMISSION CRITERIA BASED UPON THE PROVINCE OF ONTARIO AND EUROPEAN UNION AIR EMISSION REQUIREMENTS

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**NOTES:**

1. All units corrected to 11% O₂ and adjusted to Reference Temperature and Pressure.
2. mg/Rm3 = Milligrams per Reference Cubic Metre (25°C, 101.3 kPa)
3. pg/Rm3 = Picograms per Reference Cubic Metre (25°C, 101.3 kPa)
4. Calculated as the arithmetic average of 3 stack tests conducted in accordance with standard methods.
5. Calculated as the geometric average of 24 hours of data from a continuous emission monitoring system.
6. Calculated as the arithmetic average of 24 hours of data from a continuous emission monitoring system.

(1) = All units corrected to 11% O₂ and adjusted to Reference Temperature and Pressure.

mg/Rm3 = Milligrams per Reference Cubic Metre (25°C, 101.3 kPa)

pg/Rm3 = Picograms per Reference Cubic Metre (25°C, 101.3 kPa)
3.2 Durham shall ensure that the EFW Facility utilizes maximum achievable control technology (MACT) for emissions control and monitoring systems. Durham and the operator shall seek to achieve normal operating levels significantly better than the emission limits identified in Section 3.1.

3.3 Durham shall ensure that, where technically possible, the EFW Facility utilizes 24/7 monitoring systems for such parameters as are deemed appropriate by the Ministry of the Environment. The results of such monitoring systems shall be made accessible to the public on a website or programmable display board designed for such purpose. In addition, Durham shall ensure that the operator monitors the ambient air in the immediate vicinity of the EFW Facility for a three year term commencing upon the commencement of operations.

4. Facility Size

4.1 Durham is seeking approval from the Ministry of the Environment to construct and operate an EFW Facility with a total processing capacity of up to 400,000 tonnes per year of municipal solid waste.

4.2 The parties hereto acknowledge and agree that EFW Facility will not immediately be constructed to the ultimate capacity. Durham will be seeking an initial Certificate of Approval for the construction and operation of a facility for approximately 140,000 tonnes per year. The capacity of the EFW Facility may be expanded, as required by Durham and York, up to the maximum permissible capacity set forth by the Ministry of the Environment in the Certificate of Approval which may be amended from time to time. The EFW Facility may not be expanded in excess of 400,000 tonnes per year.

4.3 At the time of any expansion, Durham will give consideration to improvements to the emission control system to meet the then current MACT standards and shall apply for a new or amended Certificate of Approval if required by the Province of Ontario.

4.4 Durham will not construct a transfer station for ICI waste in Clarington without the agreement of Clarington.

5. Architectural/Site Plan Considerations

5.1 Clarington shall be consulted with respect to the architectural and site plan requirements section(s) of the Request for Proposals.

5.2 Clarington and Durham shall negotiate in good faith the terms of a site plan agreement for the development of the EFW Facility site which shall include the lands required for the private truck access lane referred to in paragraph 9.5. Durham shall comply with normal site plan and building code permit requirements and shall construct Energy Drive through their lands identified on Schedule “A”.

5.3 Durham shall incorporate a cash allowance of no less than Nine Million Dollars ($9,000,000) in the Request for Proposals ("RFP") for the provision of architectural treatments and upgrades to the EFW Facility. Durham shall consult with Clarington on the proposed architectural treatments received from the preferred bidder and prior to submitting their site plan application to Clarington for approval.
5.4 At the time of any expansion, Durham will include similar and consistent architectural treatments and upgrades to any new portions of the EFW Facility. Durham shall consult with Clarington on the proposed architectural treatments during the finalization of the arrangements with the Operator for the expansion and prior to submitting their site plan application to Clarington for approval of the expansion.

6. Commitment to a Comprehensive Waste Management Strategy

6.1 Durham shall continue to implement and support an aggressive residual waste diversion and recycling program to achieve and/or exceed a 70% diversion recycling rate for the entire Region.

6.2 Durham shall establish a hazardous waste depot to serve the residents of Clarington within one (1) year of commissioning of the EFW Facility.

7. EFW Facility Waste Sources

7.1 Durham shall ensure that the source of the waste processed at the EFW Facility is consistent with that identified in the EA Terms of Reference and supporting documentation.

7.2 The Parties agree that Industrial, Commercial and Institutional ("ICI") Waste, with a similar composition to municipal solid waste, may be processed at the EFW Facility provided that said ICI Waste is first screened at a transfer station to ensure the removal of any undesirable and hazardous materials.

7.3 The EFW Facility may be utilized to process biosolid wastes generated from water pollution control plants located within Durham Region on an emergency basis in order to support Durham's other operations provided that biosolid wastes do not comprise more than 10% of the total annual tonnage of waste processed at the EFW Facility in a calendar year.

7.4 Notwithstanding the provisions of 7.1 hereof, in the event that the source of waste processed at the EFW Facility at any subsequent time includes the City of Toronto, then Clarington shall be paid the sum of Ten Dollars ($10.00) per tonne for each tonne of waste from that source.

8. Payments in Lieu of Taxes

8.1 Durham shall not structure the ownership of the EFW Facility in any way designed to attain tax exempt status or to avoid the Payments in Lieu of Taxes (PIL's).

8.2 Durham acknowledges that the PIL will be in the vicinity of $550,000 per year. However Durham cannot guarantee the exact amount as that is a matter outside of its direct control.

9. Economic Development

9.1 Durham shall acquire title by way of agreement or expropriation to the properties described in Schedule "B". Upon the properties described in Schedule "B" being determined by Durham Regional Council to be surplus to the present or future requirements of the Regional Municipality of Durham, then Durham shall convey, at nominal consideration, some part of the lands described in Schedule "B" to The Municipality of Clarington.

9.2 Prior to the commissioning of the EFW Facility, Durham shall complete construction of Energy Drive from Courice Road to Osbourne Road as a Type "C" Arterial road, complete with
all applicable services including: sanitary sewerage, watermains, storm drainage, district heating, and street lighting and shall dedicate Energy Drive to Clarington as a public highway.

9.3 Durham shall construct a storm water management facility of a sufficient size to accommodate development of the Energy Park and Clarington shall execute a front-ending agreement in order to receive and reimburse Durham for the proportional costs of same from any benefiting landowners within the Energy Park. Provided approval to cross the CN Railway line with the necessary drainage works can be reasonably obtained from the Canadian National Railway, then Durham shall construct the storm water management facility on the lands described in 9.7 hereof.

9.4 Durham shall commence an environmental assessment process to support the provision of municipal services to the east Bowmanville science park which is located north of Highway 401.

9.5 Durham shall construct a private truck access lane with landscaping or other screening on its lands on the north side of the Canadian National Railway line connecting with Courtice Road to be utilized, where possible, for all deliveries of waste to the EFW Facility.

9.7 Durham shall convey to Clarington at a nominal cost the lands on the west side of Courtice Road identified in Schedule "C".

9.8 Concurrent with the construction of the EFW Facility, Durham shall construct a segment of a paved asphalt waterfront trail on a mutually agreed upon alignment from Courtice Road to the eastern limits of Durham's lands south of the Courtice Water Pollution Control Plant.

10. Operational Issues

10.1 Durham shall require the operator of the EFW Facility (the "Operator") to have the EFW Facility compliant with the International Standards Organization 14001:2004 Environmental Management Standard (ISO 14001) within thirty six (36) months of its commencing operations and to maintain such compliance thereafter.

10.2 Durham shall ensure that the Operator prepares, maintains and adheres to an Emergency Management Plan (including spills) for the EFW Facility which Plan shall be reviewed and approved by the Clarington Emergency and Fire Services Department.

10.3 Deleted

10.4 Durham shall ensure that the bottom and fly ash generated at the EFW Facility are dealt with in a manner which complies with all applicable legal and regulatory requirements and approvals. Bottom ash can be stored outside if fully screened. Fly ash shall be stored internally in a building until the time of transfer to a disposal site. No bottom ash or fly ash shall be disposed of in a landfill site in Clarington.

10.5 Durham will require the Operator of the EFW Facility to provide a certificate of insurance showing the Municipality of Clarington as an additional insured thereon.

10.6 Durham hereby agrees to indemnify and hold Clarington harmless from all manner of actions, causes of action, suits, demands, and claims whatsoever in connection with any and all injuries up to and including death, or damages to its property, which may occur as a result of the design, construction or operation of the EFW Facility save and except when such injury, loss or
damage is occasioned by the negligent acts or omissions or willful misconduct of Clarington, or those for whom it is at law responsible.

10.7 Durham shall ensure that all waste haulage vehicles accessing and egressing the EFW Facility site will use the truck access routes.

10.8 In addition to all public information, the Operator shall on or before March 31st in each calendar year provide the Clerk of Clarington with a report related to the emissions output from the EFW Facility for the previous calendar year.

11. End Use Plan

11.1 Durham shall decommission and dismantle the EFW Facility within five (5) years of its ceasing of operations to a standard suitable for re-use as an industrial/commercial site.

12. Issue Resolution

12.1 In the event of any dispute, disagreement, or claim arising under or in connection with this Agreement, then the parties hereto shall, upon written notice from either party, meet as soon as reasonably possible in order to resolve said dispute.

12.2 In the event that informal discussions are not effective in resolving any disputes or differences of opinion arising between the parties which concern or touch upon the validity, construction, meaning, performance or effect of this Agreement, then said dispute shall first be mediated within a sixty (60) day time period prior to any dispute proceeding to arbitration. The parties shall determine a mutually agreeable location for the mediation to occur. The parties shall make all reasonable efforts to resolve their disputes by amicable negotiations and agree to provide, without prejudice, frank, candid, and timely disclosure of relevant facts, information, and documents to facilitate these negotiations. Any resolution of the dispute in mediation shall be kept confidential by all parties.

12.3 By giving a notice in writing to the other party, not later than ten (10) working days after the date of termination of the mediated negotiations, all matters remaining in difference between the parties in relation to this Agreement shall then be referred to the arbitration of a single arbitrator, if the parties agree upon one, otherwise to three arbitrators, one to be appointed by each party and a third to be chosen by the first two named before they enter upon the business of arbitration. The award and determination of the arbitrator or arbitrators or two of the three arbitrators shall be binding upon the parties and their respective heirs, executors, successors, administrators and assigns.

13. Clarington’s Commitments

13.1 Clarington agrees, in consideration of the aforementioned commitments on the part of Durham, to be a willing host to the EFW Facility and to acknowledge that willingness as follows:

.1 It shall not oppose the development or operation of the EFW Facility;

.2 It acknowledges that, provided that there is public ownership of the EFW Facility and the site by one or more municipalities, it will be considered a “public use” for the purposes of the Zoning By-law and that is not necessary to amend the Clarington Official Plan or Zoning By-law;
3. It shall expedite the review of all applications for approval submitted by, or on behalf of, the Operator or Durham related to the construction, maintenance and operation of the EFW Facility; and,

4. Should the existing South Service Road ever be deemed to be surplus due to the construction of Energy Park Drive, the South Service Road shall be closed and conveyed to Durham for nominal consideration; and,

5. It shall strongly encourage and promote development within the Clarington Energy Business Park and other areas of Clarington to utilize district heating and cooling provided by the EFW Facility.

14. Miscellaneous

14.1 This agreement is entered into solely between Durham and Clarington and is not intended or designed, and in fact it explicitly excludes the creation of any rights or beneficial interests in any third party save and except the Regional Municipality of York in so far as its interest exists in the EFW Facility, from time to time.

15. Further Assurances

The parties hereby covenant and agree, after a request in writing by one party to the other parties, to forthwith execute and provide all further documents, instruments and assurances as may be necessary or required in order to carry out (and give effect to) the true intent of this Agreement, and to effect the registration against and release from title to the lands subject to this Agreement of such notices or other instruments in accordance with the provision of this Agreement.

16. Enurement

This Agreement shall enure to the benefit of and bind the parties hereto and their respective successors and assigns.
IN WITNESS WHEREOF Durham and Clarington have executed this Host Community Agreement.

THE REGIONAL MUNICIPALITY OF DURHAM

Per:
Roger Anderson, Regional Chair

Per:
Pat Madill, Regional Clerk

THE CORPORATION OF THE MUNICIPALITY OF CLARINGTON

Per:
Jim Abernethy, Mayor

Per:
Patti L. Barrie, Clerk
Schedule "A"

Legal Description of Proposed Site of EFW Facility

Part of Lot 27, Concession Broken Front, Darlington, designated as Parts 1 and 2 on 40R-19984, save and except Parts 1 and 2 on 40R-20382, Municipality of Clarington, Regional Municipality of Durham, being all of PIN 26605-0082(LT)
Schedule “B”

Legal Description of Lands Proposed to be acquired

FIRSTLY: PT LTS 27 & 28 BROKEN FRONT CONCESSION, DARLINGTON, AS IN N41298 SAVE & EXCEPT PART 1 PL 40R21517 NORTH OF THE CANADIAN NATIONAL RAILWAY; MUNICIPALITY OF CLARINGTON, REGIONAL MUNICIPALITY OF DURHAM, being all of PIN 26605-0085 (LT)

SECONDLY: PT LT 28 BROKEN FRONT CONCESSION, DARLINGTON BEING PTS 2 & 3 on 10R2689; MUNICIPALITY OF CLARINGTON, REGIONAL MUNICIPALITY OF DURHAM, being all of PIN 26605-0030 (LT)

THIRDLY: PT LT 28 BROKEN FRONT CONCESSION, DARLINGTON being PT 1, 10R2689; MUNICIPALITY OF CLARINGTON, REGIONAL MUNICIPALITY OF DURHAM, being all of PIN 26605-0031 (LT)
Schedule "C"

Legal Description of Lands to be Transferred to Clarington

FIRSTLY: PT LT 29 AND 30 BROKEN FRONT CONCESSION, DARLINGTON being
PTS 1, 2, AND 3, 40R20750; MUNICIPALITY OF CLARINGTON, REGIONAL
MUNICIPALITY OF DURHAM, being all of PIN 26604-0017 (LT)

SECONDLY: PT LT 28 BROKEN FRONT CONCESSION, DARLINGTON being PT 1
on 10R571; MUNICIPALITY OF CLARINGTON, REGIONAL MUNICIPALITY OF
DURHAM, being all of PIN 26604-0016 (LT)
Report To: Chair R. Anderson and Members
Committee of the Whole

Report No.: 2009-COW-01
Date: June 16, 2009

SUBJECT: EFW Risk Assessment and Environmental Surveillance

RECOMMENDATION:

That the Committee of the Whole recommends to the Regional Council that:

a) The final Site Specific Human Health Risk Assessment (SSHHRA) for the proposed 140,000 tonnes EFW facility is accepted and submitted to the Ontario Ministry of the Environment for its review, if and when the EFW environmental assessment is approved, subject to it being in concordance with the caveats expressed in Appendix D of this report;

b) That if the EFW environmental assessment is approved and the proposed EFW facility is constructed, once operational, an environmental surveillance program is implemented in accordance with all applicable legislation, policies, guidelines, and instruments and the following guiding principles:

i. That continuous and periodic stack testing of chemical emissions, including dioxins and furans, that meet or exceed the more stringent of the Ontario Guidelines A-7 and EU Directive chemical emissions standards forms the basis of environmental surveillance in accordance with the International Best Practices Review,

ii. That stack testing be supplemented by independent ambient air and soil testing for a minimum of three years at which time its effectiveness will be evaluated,

iii. That independent testing of flora and fauna be considered if in-stack, ambient air and soil test results regularly exceed levels predicted by the SSHHRA,

iv. That stack testing not be supplemented by human biomonitoring,

v. That the environmental surveillance results are communicated to the public in as an accessible, accurate, open, timely, transparent, and understandable a manner as possible,
vi. That a Durham waste diversion and management advisory committee, or similar advisory group, which is appointed by and is accountable to the Regional Council, is in place to act as a forum for, and comprises Clarington and Durham residents and representatives from Clarington, the EFW facility, Ontario Ministry of the Environment (MOE), and the Region of Durham to assess, monitor, review, and advise the Region on the effectiveness of the environmental surveillance program, independent environmental testing, the quality of public reporting of environmental surveillance data, the environmental performance of the facility, and other related strategic waste diversion and management issues,

vii. That the Health Department is consulted by the MOE before it finalizes its requirements for the Region's environmental surveillance program;

c) That the Region continues to pursue the goal of 70% waste diversion and to advocate for amendments to the *Waste Diversion Act, 2002* to be enacted and implemented;

d) That the Region adequately supports the environmental surveillance program, independent environmental testing, the public reporting of environmental surveillance data, and the work of the proposed Durham waste diversion and management advisory committee;

e) That the Minister of the Environment, Durham's MPPs and municipalities, Joint Waste Management Group, Site Liaison Committee, and the Regional Municipality of York are so advised.

REPORT:

A. **BACKGROUND**

1. The Health Department first became involved in the EFW environmental assessment (EA) on June 20, 2007, when the Regional Council requested that the Commissioner & Medical Officer of Health (MOH) comment on the Durham/York Generic Human Health Risk Assessment (GHHRA) and review the health-related chapters of the Halton EFW Business Case.

2. Owing to the Health Department's limited in-house experience and expertise regarding this matter, the MOH commissioned Dr. Lesbia Smith, a well-recognized expert in occupational and environmental health, to review the Halton 4a Report, review the GHHRA, and provide advice on environmental surveillance.
3. Dr. Smith’s main conclusions are summarized in Report #2007-MOH-20 and the Executive Summary of her report to the MOH (Appendices A & B). The key conclusions with respect to this report are as follows:

- In essence, the Halton 4a Report concluded that EFW facilities using modern (thermal) methods and pollution control technology are not expected to pose a significant risk to the public. In addition, the Report stated that any new EFW facility should be subject to a site specific risk assessment to identify local issues and ensure that it will not pose a risk to the public.

- The current epidemiologic literature (2000-2007) is inconclusive and does not demonstrate one way or another that modern incinerators have associated health effects on the people living around them. This conclusion is not materially different from the inference made in the Halton 4a Report.

- Risk assessment is the only procedure that can produce quantitative estimates of predicted health effects. The GHRA was properly carried out. The methods are clearly explained, are reproducible and err on the side of health protection or “conservatism”. Any future site specific risk assessment should apply upset conditions, if situations with upset conditions are relevant to the EFW facility.

- Epidemiology, risk assessment and biological monitoring assist regulatory and public health agencies and improve public understanding of human health and the environment. Because each method can have limits and challenges, a combination best serves public health.

- Environmental quality oversight and health surveillance can promote engagement of communities with industry, regulatory and public health agencies and can be considered part of a responsible program for environmental monitoring.

4. In accordance with additional directions the MOH received from the Regional Council to ensure an independent peer review of the site specific human health risk assessment (SSHHRA) and to provide advice on environmental surveillance, Dr. Smith was also retained by the MOH to provide him with advice with respect to the SSHHRA for the proposed 140,000 tonnes EFW facility and the international environmental surveillance best practices review, both of which are discussed below.
B. SITE SPECIFIC HUMAN HEALTH RISK ASSESSMENT (SSHHRA)

5. The SSHHRA conducted by Jacques Whitford (JW) used the following standard framework: problem formulation, exposure assessment, hazard assessment, and risk characterization. Appendix C is SSHHRA's draft Executive Summary. Overall, the results of the SSHHRA indicate that it is not expected that the proposed EFW will lead to any adverse health risks to local residents, farmers or other receptors in the local risk assessment study area.

6. The SSHHRA was peer reviewed by Dr. Smith and her associate, Mr. Ross Wilson, an experienced risk assessor and certified toxicologist. Appendix D is their report. In summary, they support the findings of the JW SSHHRA, consider the methodology to be sound, and conclude that the proposed EFW facility should not pose unacceptable risks to persons living in the vicinity of the site.

C. ENVIRONMENTAL SURVEILLANCE

7. Environmental surveillance was explored in far more depth in the report "Review of International Best Practices of Environmental Surveillance for Energy-From-Waste Facilities" (Best Practices Review). The focus of this study was to review environmental surveillance programs at similar facilities around the world and to recommend an appropriate level of environmental surveillance for the proposed EFW facility.

8. Appendix E is the report's Executive Summary. In essence, the JW concluded that the most appropriate and scientifically justified option for environmental surveillance of the proposed Durham/York EFW facility would involve continuous and periodic stack testing of chemical emissions (Option 1). This option was found to be the most prevalent method of ensuring public and environmental health protection in Canada, the EU, and the USA. To ensure added protection, JW supported Regional Council's decision to adopt the more stringent of the Ontario Guideline A-7 and EU Directive chemical emissions standards and to implement an in-stack dioxins and furans sampling technology. These measures go beyond any requirements that would be derived from the JW's review.

9. Dr. Smith conducted an independent peer review of this study. Her advice to the MOH is found in Report #2009-J-17 (Appendix F). In essence, Dr. Smith agreed with the JW's conclusion that Option 1 is optimal and derives from the study. In her opinion, the community living outside the point of impingement and the public-at-large would not be at risk from the public health perspective if this surveillance option is chosen. Finally, Council's decision to adopt the more stringent of Guideline A-7 and EU Directive chemical emissions standards and to implement an in-stack dioxins and furans sampling
technology is concordant with a highly protective approach to health and the environment in Durham Region.

10. Both Dr. Smith and JW recommend that an independent environmental oversight committee be struck to ensure public participation in the environmental surveillance program and to evaluate its efficacy in protecting public and environmental health.

D. WASTE DIVERSION

11. During the EFW EA public consultation, considerable attention has focused on waste diversion and the concepts of “zero waste” and “extended producer responsibility.” This has also been an area of intense importance, focus and activity by the Region of Durham and Province of Ontario.

12. For example, locally, on January 23, 2008, the Regional Council passed a resolution that directed the Region of Durham to aggressively pursue at least a 70% diversion rate on or before December 2010, Golder Associates was retained to investigate existing and potential options, including the enhancement of public education and engagement, and to develop a plan that will allow the Region to achieve this goal. The study’s recommendations, which are summarized in Commissioner’s Report #2009-WR-5, are currently being analyzed and the results will be presented in the 2010 Annual Solid Waste Servicing and Financing Study, as is the final evaluation of the Clear Bags Pilot Program that was conducted from January to April 2009 in Clarington and Pickering (Commissioner’s Reports #2008-WR-20, 35, & 38 and #2009-WR-12). Finally, Works staff has prepared, for public consultation, a draft waste management by-law “to help manage the Region’s standardization of solid waste collection services and to guide the service delivery on private roadways as the Region navigates towards [70%] diversion.”

13. Provincecially, Ontario is proposing to adopt a zero waste vision to help reduce waste, increase diversion, and build a greener economy and more sustainable society. In accordance with the Waste Diversion Act’s (WDA’s) mandatory five year review, in October 2008, the MOE released “Toward a Zero Waste Future: Review of Ontario’s Waste Diversion Act, 2002.” In the discussion paper, the MOE proposes that the first steps in striving towards zero waste should be built upon four key building blocks:

- A clear framework built upon the foundation of Extended Producer Responsibility.
- A greater focus on the first and second of the 3Rs – waste reduction, and re-use.
- Increasing reduction and diversion of waste from the industrial, commercial & institutional sectors.
 Greater clarity around roles responsibilities, and accountabilities, to ensure that all players are contributing to a common goal.

In April 2009, the proposed changes to the WDA were endorsed, in principle, by the Regional Council in accordance with Commissioner’s Report #2009-WR-2.

E. DISCUSSION

a) Risk Assessment

14. Risk assessment (RA) is the only procedure that can produce quantitative estimates of predicted health effects. Moreover, RA follows a standard format, is reproducible, and errs on the side of conservatism. JW followed the methodology used in the Generic HHRA, which peer reviewers, including Dr. Smith, deemed acceptable.

15. The key findings of Dr. Smith’s and Mr. Wilson’s review of the JW SSHHRA can be summarized as follows:

- The key receptors, chemicals and exposure pathways have been evaluated.
- The methods used to estimate exposures are considered appropriate.
- The toxicological reference values used are reasonable and drawn from a variety of reliable international sources.
- The risk characterization results are defensible.

In other words, the SSHHRA can be considered to be satisfactory. The proposed EFW facility is not expected to cause any appreciable change in the concentrations of chemicals in air, soil, dust, water or food. If the proposed EFW facility performs as specified and assumed in the SSHHRA, it will not pose an unacceptable risk to persons in the vicinity of the site and, by extension, to residents living beyond the site. Subject to any final revisions to the exposure point concentrations having been made, the SSHHRA is ready to be submitted to the MOE for its review, if and when the EFW EA is approved.

b) Environmental Surveillance

16. In its Best Practices Review, JW was very clear that the most appropriate and scientifically justified option for environmental surveillance of the proposed EFW facility would involve continuous and periodic stack testing of emissions, including in-stack dioxins and furans sampling technology, that meet or exceed stringent chemical emissions standards (Ontario Guideline A-7 v. EU Directive). Dr. Smith concurred with this finding and concluded the community living outside the point of impingement and the public-at-large
would not be at risk from the public health perspective if this surveillance option is chosen.

17. During the EFW EA public consultation, however, a consensus has emerged that it would be beneficial to supplement stack testing with ambient air and soil monitoring, which is independently tested for a minimum period of three years in order to “ground truth” the chemical emissions predicted in the EA. This would be prudent course of action and is supported by Dr. Smith (Appendix D). Moreover, Dr. Smith advises that it would also be prudent to consider adding flora and fauna to the environmental media being independently tested if in-stack, ambient air and soil test results regularly exceed levels predicted by the SSHHRA. Finally, at the end of this three-year period, it would also be prudent to formally evaluate these additional monitoring activities to ascertain whether they are effective, useful, and if continued, what, if any, revisions need to be made. For the reasons outlined in the Best Practices Review coupled with the above supplemental testing being in place, human biomonitoring should not be used to supplement stack testing. This is also supported by Dr. Smith (Appendix D). The Health Department should be consulted prior to finalizing the environmental surveillance program and during any and all subsequent reviews.

18. The environmental performance of the proposed EFW facility should be communicated in as an accessible, accurate, open, timely, transparent, and understandable a manner as possible.

19. The environmental oversight committee recommended by Dr. Smith and JW should be independent, appointed by and accountable to the Regional Council. The Committee should be comprised of Clarington and Durham residents and representatives of the proposed EFW facility, MOE, and the Region. The Committee should assess, monitor, review, and advise the Region on the environmental surveillance program, independent environmental testing, the quality of the public reporting of emissions and environmental surveillance data, and the environmental performance of the facility. The Committee should be empowered to discuss and advise the Region on other related strategic waste diversion and management issues. Given the importance of waste diversion discussed below, consideration should be given to naming the committee the Durham waste diversion and management advisory committee.

20. In developing the proposed advisory committee’s terms of reference, it may be instructive to review the mandate of the Durham Nuclear Health Committee (DNHC) which has been in place for over 12 years (Appendix G) (http://www.durham.ca/health.asp?nr=/departments/health/dnhc/dnhc.htm). Perhaps it should be noted that the concept of a DNHC originated in 1992, when its creation was recommended by the former Environmental Assessment Advisory Committee that reviewed the Ajax Water Treatment
Plant environmental assessment because local residents were concerned about the human health effects of tritiated water emitted by the nearby Pickering Nuclear Generating Station.

d) Waste Diversion

21. During the EFW EA public consultation, another consensus has emerged such that the Region of Durham should embrace and strive towards the concept of “zero waste”. It is acknowledged that the Region has exceeded the long-term waste management strategy’s waste diversion goal of 50%. Accordingly, Council has set a new stretch goal of 70% by December 2010 and Works staff are exploring ways and means of reaching this goal such as by retaining Golder Associates (GA) to prepare the 70% Waste Diversion Study; by implementing the Clear Bags Pilot Study in Clarington and Pickering; and by developing a draft Waste Management By-law for public consultation. Further options will be explored and included in the 2010 Annual Solid Waste Servicing and Financing Study.

22. Given Durham’s ongoing population growth, it is important for the Region and its residents to embrace the concept of zero waste and for the Region to aggressively pursue a waste diversion goal of at least 70%, in accordance with all the measures cited above, with attention being paid to enhanced public education and engagement, in order to reduce the demand for waste disposal however this is managed.

23. The Region cannot achieve zero waste or a waste diversion goals >70% by itself. To this end, for example, it is important for Ontario to complete its deliberations on zero waste, amend the WDA in accordance with the discussion paper and advice received, and to implement and enforce such measures as extended producer responsibility. The Region should closely monitor this file and advocate for the proposed changes as required.

d) Regional Support

24. In order for the environmental surveillance program, independent environmental testing, public reporting of environmental surveillance data, and the work of the proposed Durham waste diversion and management advisory committee to be successful, the Region should ensure that it has sufficient internal capacity and that sufficient financial and human resources are allocated to support these measures. This issue should be addressed in the appropriate Regional business planning and budgeting exercises.

G. CONCLUSION

25. In conclusion, the following recommendations are made:
• That the final SSHHRA for the proposed 140,000 tonnes EFW facility is accepted and submitted to the MOE for its review, subject to it being in concordance with the caveats expressed in Appendix D of this report;

• That once the EFW facility is operational, an environmental surveillance program is implemented in accordance with the above recommendation b);

• That the Region continually pursues the goal of 70% waste diversion and advocates for enactment and implementation of the proposed amendments to the WDA; and

• That the Region adequately supports the environmental surveillance program, independent environmental testing, public reporting of environmental surveillance data, and the work of the proposed Durham waste diversion and management advisory committee.

H. REFERENCES

26. In addition to the reports cited above, the MOH was greatly assisted in increasing his knowledge and understanding of this matter by his reading of the following publications, in whole or in part:


Respectfully submitted,

R.J. Kyle, MD, MHSc, CCFP, FRCPC
Commissioner & Medical Officer of Health
APPENDIX A

Report To: Chair A. Cullen and Members
Health & Social Services Committee

Report No.: 2007-MOH-20

Date: September 6, 2007

SUBJECT: Energy from Waste (EFW) Facilities

RECOMMENDATION:

That the Health & Social Services recommends that the Regional Council receives this report for information.

REPORT:

1. On June 20, 2007, the Regional Council requested that the Commissioner & Medical Officer of Health (MOH) comment on the Durham/York Generic Human Health Risk Assessment (GHHRA) and review the health-related health chapters of the Halton EFW Business Case (Halton 4a Report).

2. Owing to the limited expertise of the Health Department respecting air quality science and toxicology, the MOH commissioned Dr. Lesbia Smith to:

   - Review the Halton 4a Report, including the general conclusions of environmental epidemiologic studies of waste incinerators, and the pitfalls inherent in such studies.

   - Comment on the soundness of the Durham/York GHHRA, including any missing information that may have a bearing on either the generic or site specific HHRA.

   - Assess the extent to which Durham/York GHHRA conforms to the basic tenets of risk assessments.

   - Advise regarding best practices for establishing an environmental monitoring program.

Dr. Smith is well-recognized in the public health community and beyond as a medical expert in occupational and environmental health. She was a reviewer of the Durham/York GHHRA. Appendix A is her report. It includes a Précis (p. 4), Executive Summary (p. 6), Main Report (p. 12) and Appendices (p. ii).
3. Dr. Smith's main conclusions are as follows:

- In essence, the Halton 4a Report concluded that EFW facilities using modern (thermal) methods and pollution control technology are not expected to pose a significant risk to the public. In addition, the Report stated that any new EFW facility should be subject to a site specific risk assessment to identify local issues and ensure that it will not pose a risk to the public.

- The current epidemiologic literature (2000-2007) is inconclusive and does not demonstrate one way or another that modern incinerators have associated health effects on the people living around them. This conclusion is not materially different from the inferences made in the Halton 4a Report.

- On the whole, the incinerator-generated contaminant load as measured in blood of residents living near-by is similar or the same as contaminant loads in other populations. The “incinerator literature” alone cannot be used to support or dismiss possible health effects from the measured levels of some of the contaminants in people living around incinerators.

- In general, the epidemiologic method is limited in that it can only indicate statistical associations between exposure and diseases, not a cause and effect relationship. A cause and effect relationship can be inferred only after careful analysis of all studies and applying appropriate criteria.

- Risk assessment is the only procedure that can produce quantitative estimates of predicted health effects. The Durham/York GHHRA was properly carried out. The methods are clearly explained, are reproducible and err on the side of health protection or “conservatism”. Any future site specific risk assessment should apply upset conditions, if situations with upset conditions are relevant to the EFW facility.

- Epidemiology, risk assessment and biological monitoring assist regulatory and public health agencies and improve public understanding of human health and the environment. Because each method can have limits and challenges, a combination best serves public health.

- Environmental quality oversight and health surveillance can promote engagement of communities with industry, regulatory and public health agencies and can be considered part of a responsible program for environmental monitoring.

- Community surveillance can take the form of environmental monitoring and reporting, timely responses to health concerns, and continued community engagement throughout the life of the facility. Community health studies may have a role, but should be carefully considered with respect to objectives and methodology before undertaking them.
The Health Department has reviewed Dr. Smith’s Report and concurs with her findings and conclusions.

Respectfully submitted,

R.J. Kyle/MD, MHSc, CCFP, FRCP
Commissioner & Medical Officer of Health
Energy from Waste Facility in the Region of Durham

Prepared for:

The Medical Officer of Health
Durham Region

Prepared by:

Lesbia F. Smith, MD
Environmental & Occupational Health +Plus
http://www.eohplus.com
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Originally released: August 20, 2007
Amended: September 28, 2007

Environmental & Occupational Health +Plus
Energy from Waste Facility in the Region of Durham

Executive Summary

This work was undertaken at the request of the Medical Officer of Health of Durham Region. Durham Region is currently undergoing a process of choosing a site for an energy-from-waste (EFW) facility within its boundaries. As part of the process of public consultation before the selection of a contractor and a specific technology, a generic risk assessment was carried out for the Region by Jacques Whitford\(^2\). In the course of public consultation, a number of issues arose regarding the integrity of the generic risk assessment which is of a “model” hypothetical facility. The issue of health effects from EFW facilities, formerly called “incinerators”, also came under scrutiny from the review of a report of an assessment of health effects of incineration provided to a nearby jurisdiction (Halton Region). The process and conclusions of the health effects assessment including the assessment of the literature on incineration and health became issues of concern.

The Regional Municipality of Durham had undergone a process of selection which indicated that EFW as their preferred residual waste management option – that is after recycling and composting are optimized. The Region is now undertaking consultation in preparation for the selection of a provider and a technology for the chosen method to handle residual waste.

The Health Department will contribute important information to Council about the public health impacts of the introduction of such a facility into the Region. In order to evaluate current information and gather new information, the Medical Officer of Health requested an assessment of the literature of incineration-related health effects and of the reports from a neighboring health department which generated considerable public concern.

Four objectives are the focus of this report as outlined in correspondence with the Durham Region Medical Officer of Health:

A. Provide advice on Section 4a & b (pages 12-15) of the Halton 4A Report³ (the health assessment, literature search and conclusions arising)
   1. What do environmental epidemiology studies of incinerators generally have to say and the pitfalls inherent in these types of studies?

B. Soundness of the Durham generic risk assessment report
   1. Is there any missing information that needs to be reviewed that may have bearing on either the generic or site specific Human Health Risk Assessment (HHRA) that will be conducted? (Bioaccumulation of dioxins and furans, etc; greenhouse gas emissions, regulatory air quality guidelines / standards, ultra fine particles, etc.)

C. An independent comment on risk assessment in general and to what extent does the draft generic HHRA conform to the basic tenets of risk assessment.

D. What are best practices for establishing an environmental monitoring program?

This report addresses these questions in sequence.

The Halton Report Step 4A - Chapter 5 Health Concerns Related to EFW Systems (“Halton 4A”) examines the peer reviewed epidemiologic literature and grey literature relating incineration and health effects. The authors considered original research, research reviews and governmental reports. The Halton 4A report identifies chemicals of concern. With respect to health effects in communities around incinerators, the Halton 4A authors conclude that there are potential health concerns with incineration but the literature they cited generally involves old incinerators which have higher emissions than retrofitted or new incinerators. The Halton 4a Report agrees with the conclusions of the DEFRA 2004 (governmental) Report and with the conclusions of other review publications that state that EFW facilities using currently available modern (thermal) methods and pollution control technology are not expected to pose a significant risk to the public. In addition, the Halton 4A Report states that any new facility should be subject to a site specific risk assessment to identify local issues and ensure that it will not pose a risk to the public.

This author (Dr. Smith) reviewed the current epidemiologic literature on incineration and health of communities around them. A number of new research publications were added to the body of literature considered in the Halton 4AReport. Some 17 publications were

assessed for validity in developing an opinion about incineration and health effects, including several studies that had not been considered in the Halton 4A report. This author concludes that the current epidemiologic literature on health effects of incinerators on local communities (2000-2007) is inconclusive and does not demonstrate one way or another that modern incinerators have associated health effects on the people living around them.

Some important new information provided greater insight into the assessment of health impacts of the new generation of incinerators. The direct testing for contaminants (biomonitoring) of people living around modern or upgraded incinerators provides a reasonably good baseline estimate of contaminant load. Such testing does not demonstrate an increased load of key contaminants emitted from incinerators. The literature does not provide any insight into the proportion of the contaminant load in people that is attributable to emissions from current modern technology incinerators.

On the whole, the incinerator-generated contaminant load as measured in blood of residents living near-by is similar to the same contaminant load in other populations. Two possible explanations are considered: 1) emissions from incinerators are considered very small for dioxins, furans, and heavy metals; and 2) sources other than incinerators generally provide a higher proportion of the total burden of exposure for these contaminants than incinerators.

The “incinerator literature” alone cannot be used to support or dismiss possible health effects from the measured load of some of the contaminants in people living around incinerators.

There are inherent pitfalls in the epidemiologic method applied to environmental settings especially because it is necessarily observational, that is, exposures are not under the control of the researcher, so that most studies have proxy or indirect measures of exposure. If a single well conducted environmental epidemiology study finds an association, this does not necessarily invoke a causal relationship between an exposure and a health effect.

Making causal links with epidemiology as the tool requires many studies examining a relationship from different perspectives. It is not the number of studies that counts, but rather the methodology and how well they are conducted, what information can be derived from them with relative certainty, and what the weight is of all of the evidence for all studies together. A systematic review of the literature provides a summary of all of the evidence. The net results of a systematic review must then be viewed with yet another lens - application of criteria that consider consistency of associations that make sense. There are various sets of criteria used for that process, but the most commonly used for inferring causality in occupational and environmental settings are the criteria of
Bradford Hill elaborated in Section 6. In summary, the epidemiologic method is limited in that it can only indicate statistical associations between an exposure and an outcome and not a causal relationship. Causality can be inferred after careful systematic analysis of all studies and applying appropriate criteria.

The generic risk assessment for the Durham EFW facility carried out by Jacques Whitford Ltd., used accepted standard methodologies, standard air dispersion and deposition models of incinerator emissions, and calculations of risk measured against current regulatory emissions standards in Ontario or health benchmarks from the literature. The study infers acceptability of risk if the net results are at or below the benchmark regulatory risk of 1 in a million for cancer, and a hazard quotient under one for non cancer health effects. However, the exposure assumptions made were extreme, and provided a conservative estimate of risks, that is, highly protective of health. As one example, the community exposure to dioxins and furans is assumed to occur for the lifetime of the person living in the area and at the concentrations in the environment at the level theoretically attained after 35 years of facility operations. The report makes assumptions of susceptibility by using the health benchmarks applicable to the most vulnerable in the community in the different scenarios. The generic risk assessment did not make calculations of risk during upset conditions. Modern incinerators are unlikely to experience these so-called upset events because the system is shut off if there is a malfunction. Hence, this scenario was not considered relevant. In addition, exposures during upset conditions would tend to be very short term whereas the regulations frame risks on long term exposure to carcinogens and non-carcinogens.

The generic risk assessment of the model community is limited, as are all risk assessments, in that it did not make calculations for complex mixture exposures, unless such mixtures are already regulated as such (i.e., PAHs, dioxins and furans). It did not consider particulate exposure unless the particulate is characterized and regulated (i.e., PM4 and PM2.5). Hence the issue of "nanoparticles" exposure was not and could not be addressed as a regulated toxic exposure; there are no specific risk assessment techniques or sufficient toxicological information available currently to do so. Therefore this is not a failing of the risk assessment methods used or of this report per se. The report does not address upset conditions and any future risk assessment should do so if such scenario applies to the technology and operations used.

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5 The Bradford Hill criteria include strength and direction of an association, dose response, temporal sequence, consistency, theoretical plausibility, biologic coherence, specificity of effect, analogy and experiment.
In summary, the generic risk assessment is properly carried out. The methods used were clearly explained and therefore, the entire exercise can be duplicated by other investigators. As expected, it erred on the side of health protection or “conservatism” despite its failure to assess upset conditions, a scenario which should be applied to any site specific risk assessment of EFW facility chosen for Durham Region in the future. If situations with upset conditions are relevant.

The risk assessment process can calculate health risk during regular and upset conditions, considers pathways of exposure so that interventions can occur, and can put boundaries on actions that lessen exposures to residents around the facility. The methods for conducting a human health risk assessment are reproducible and subject to quantitative checks. With respect to the risk assessment process per se, it is the only procedure that can produce quantitative estimates of predicted health effects.

Epidemiology is a complimentary method to risk assessment in managing environmental risks. Greater precision can be achieved in calculating exposure from environmental contaminants and health effects by using the risk assessment methodology coupled by information from epidemiology, and from direct measurement of exposures (biomonitoring). Biomonitoring is very useful in measuring total exposure (from all sources) and in relating these measures of exposure to health conditions in well executed and controlled epidemiological studies. Epidemiology, risk assessment and biological monitoring methods assist regulatory bodies, support public health activities, and bring a greater understanding of the interaction of humans with their environment. Because each method can have limits and challenges, a combination best serves public health. Health studies in communities have a role, but these studies should be considered carefully before undertaking them.

Environmental quality oversight (surveillance) is the systematic testing and reporting to regulatory bodies and to the community of emissions, upset conditions, environmental concentrations, trends, and regulatory compliance and mitigation. Environmental surveillance can also be complemented by population surveillance which is the systematic collection and evaluation of population health data, including biological measures (biomonitoring). Such surveillance programs have been instituted in Ontario in communities with other types of facilities such as nuclear energy installations or in those facilities whose emissions are of particular community concern (e.g., lead smelters). Community concerns can often be addressed by the industry outside of the regulatory framework. Environmental quality oversight and health surveillance activities constitute engagement of communities with public health agencies (health, environment) and the industry and may be considered part of a responsible program for environmental quality assurance. These surveillance activities can also be coupled with timely responses to community concerns and regular discourse throughout the life of a facility to create a climate of alertness and trust for all parties that can improve facility operations and general well being.
REPORT
Site Specific Human Health and Ecological Risk Assessment - Technical Study Report
DURHAM YORK RESIDUAL WASTE EA STUDY
REPORT NO. 1009497
EXECUTIVE SUMMARY

Durham and York Regions (the Regions) have partnered to undertake a joint Residual Waste Planning Environmental Assessment (EA) study. Both municipalities are in need of a solution to manage the residual solid waste that remains after diversion. The Regions are working together to address the social, economic, and environmental concerns through an Environmental Assessment (EA) Study process to examine potential long-term residual waste management alternatives.

Risk Assessment Framework

People are concerned with potential health and ecological effects that could arise from contact with chemicals released to the environment from a thermal treatment facility. Through many years of study and research, government agencies and scientists around the world have developed a process which allows us to understand the movement of chemicals in the environment and whether they may have an effect on people and the ecosystem. This process is called Human Health and Ecological Risk Assessment (HHERA).

All chemicals have the potential to cause effects in people and the ecosystem, but it is the level (or concentration) and the manner (the route) by which people and the ecosystem come into contact with a particular chemical that determines if it may cause harm to health. In order for there to be a potential health risk:

- people or wildlife (Receptor) must be present;
- Receptors must come into contact with chemicals emitted from a Facility (Exposure); and,
- chemicals must be emitted at a high enough level and must be able to cause some adverse health effect (Hazard).

If any one of these three components is missing then there would not be a risk to either human or ecological health.

The risk assessment framework used in this technical study follows the standard paradigm: problem formulation; exposure assessment, hazard assessment, and risk characterization (Figure 1).
The Facility Risk Assessment

The risk assessment, undertaken as part of the subject EA study, examined the potential for emissions from the Proposed Thermal Treatment Facility (the Facility) to pose an unacceptable risk to human and ecological receptors in the short-term and long-term (i.e., after 30 years of operating the Facility).

The Study Area and Receptor Locations

The "Site" is the area where the Facility would be built. Currently, it is undeveloped land which is owned by the Region of Durham and located south of Highway 401 within the Municipality of Clarington. The highest level of emissions from the Facility would be deposited in the area identified as the Local Risk Assessment Study Area (LRASA). The LRASA extends approximately 10 km in all directions around the Site.

In order to assess the potential risk to humans and the environment, receptor locations (both human and ecological) within the LRASA were selected. There are a variety of land uses within the LRASA, including light industrial, agricultural, rural, urban residential and natural areas. The final list of receptor locations incorporated land use, air modeling results and input from various sources such as open houses, EA studies, official plans and online and government sources.
The primary route of human exposure to Facility-related air emissions would be through inhalation (breathing). These exposures were evaluated in the human health risk assessment at 309 locations within the LRASA.

Additional potential routes of exposure were considered for chemicals which deposit in the environment and move into other environmental media (e.g. soil, water, and food). This process is called a multi-pathway risk assessment which evaluates the potential for humans and wildlife to be exposed to chemicals from soil, water and food. One hundred and thirty-two of the 309 receptor locations were selected for use in the multi-pathway human health risk assessment; in the ecological risk assessment, 22 of the 309 receptor locations were selected for use in the multi-pathway ecological risk assessment.

**Assessment Scenarios**

There were 10 main project scenarios that were assessed in this HHERA as follows:

<table>
<thead>
<tr>
<th>Project Scenarios</th>
<th>Case</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline Case</td>
<td>Evaluation of the Baseline Case involved the quantitative (i.e., measurable) assessment of existing conditions in the assessment area. Health risks were assessed using measured concentrations of chemicals of potential concern (COPC) in air and in other environmental media (e.g., soil, water, food). No Facility-related emissions or exposures were monitored in this assessment case as this completed prior to construction and operation of the Facility.</td>
</tr>
<tr>
<td>Existing conditions</td>
<td>Baseline Traffic Case</td>
<td>Evaluation of the Baseline Traffic Case involved the quantification of existing offsite vehicle traffic emissions prior to the start-up of the Facility.</td>
</tr>
<tr>
<td></td>
<td>Construction Case</td>
<td>Evaluation of the Construction Case involved the qualitative (i.e., based only on qualities not numerical data) assessment of the potential health risks associated with air emissions during construction and commissioning of the Facility.</td>
</tr>
<tr>
<td>Operational Cases</td>
<td>Project Alone Case</td>
<td>Evaluation of the Project Alone Case during operation of the Facility involved the quantitative (i.e., measurable) assessment of COPC emissions from the Facility.</td>
</tr>
<tr>
<td>Project Scenarios</td>
<td>Case</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>Project Case</td>
<td>(Baseline + Project)</td>
<td>Evaluation of the Project Case during operation of the Facility involved the quantitative (i.e., measureable) assessment of COPC emissions from the Facility in combination with existing/baseline conditions.</td>
</tr>
<tr>
<td>Process Upset Case</td>
<td></td>
<td>Evaluation of the Process Upset Case involved the quantitative (i.e., measureable) assessment of COPC emissions from the Facility operating at upset conditions (i.e., facility startup and shutdown) for 20% of the year. For the remaining 80% of the year, the Facility was assumed to be operating at normal conditions.</td>
</tr>
<tr>
<td>Process Upset Project Case</td>
<td>(Baseline+ Upset Conditions)</td>
<td>Evaluation of the Process Upset Project Case involved the quantitative (i.e., measureable) assessment of COPC emissions from the Facility operating at upset conditions for 20% of the year. For the remaining 80% of the year, the Facility was assumed to be operating at normal conditions. These upset conditions were evaluated in combination with existing/baseline conditions.</td>
</tr>
<tr>
<td>Traffic Case</td>
<td></td>
<td>Evaluation of the Traffic Case involved the assessment of emissions from offsite and onsite traffic associated with the Facility and baseline traffic conditions in combination with onsite stationary source emissions for the Facility.</td>
</tr>
<tr>
<td>Future and Existing Conditions Case</td>
<td></td>
<td>Evaluation of the Future and Existing Conditions Case involved the qualitative (i.e., based only on qualities not numerical data) evaluation of the Facility emissions in combination with future or existing sources of air emissions.</td>
</tr>
<tr>
<td>Decommissioning</td>
<td>Decommissioning (Closure Period) Case</td>
<td>Evaluation of the Decommissioning Case involved the qualitative (i.e., based only on qualities not numerical data) assessment of air emissions related to the removal of infrastructure and rehabilitation of the Site.</td>
</tr>
</tbody>
</table>
Potential Chemical Releases from the Project to Air

Eighty-seven chemicals that would be emitted from the Facility were evaluated for their potential to pose a risk to human from inhalation (breathing). Of these, 57 were carried forward to the multi-pathway risk assessment because they can persist (remain in soil) and bioaccumulate (transfer from soils to plants and animals). Following their release to air, these chemicals are deposited into the environment and their concentrations can be predicted in:

- soil;
- surface water;
- garden and farm produce and fruit;
- agricultural products (i.e., beef, chicken, pork, dairy, and eggs);
- wild game;
- fish; and,
- breast milk.

Exposure Assessment

The exposure assessment predicted the degree to which people and the ecosystem would come into contact with chemicals emitted from the Facility. This human health risk assessment examined the exposure of people based on their age and physiology (e.g., body weight, breathing rate and ingestion rates), how they use the land and the behavior of the individual chemicals in the environment.

The following types of receptors were considered in the human health risk assessment:

- local residents;
- local farmer;
- daycare/school staff and pupils;
- recreation user – sport; and,
- recreation user – camping.

Two additional exposure scenarios were evaluated in the human health risk assessment, these are:

- additional exposure from swimming; and
- additional exposure from hunting and fishing.

The following types of receptors were considered in the ecological risk assessment:

- mammalian receptors (e.g., White-tailed Deer);
avian receptors (e.g., American Robin);
terrestrial plants (e.g., plant communities);
soil invertebrates (e.g., earthworm);
aquatic life (e.g., fish); and
benthic invertebrates (e.g., crayfish).

Hazard Assessment

The hazard assessment identifies the level (concentration) at which chemicals have the potential to pose health effects. Safe levels are established by international regulatory agencies and are commonly referred to as toxicity reference values (TRVs). These agencies consider two types of chemicals:

- non-carcinogenic chemicals that have the potential to cause non-cancer effects in people and wildlife; and
- carcinogenic chemicals that have the potential to cause cancer in people.

For non-carcinogenic chemicals, if the exposure amount is less than the safe amount, then the chemical is not considered to pose a risk.

For carcinogenic chemicals, toxicity reference values are based on the chance (probability) that exposure would cause an increased risk of cancer. Risk assessments are conducted using conservative assumptions which overestimate exposure and risk. Government agencies provide conservative benchmarks against which results are compared. Health Canada uses a benchmark that considers exposure to a carcinogen that would result in 1 additional cancer case in 100,000 people to be negligible. In comparison, the Ontario Ministry of the Environment (MOE) uses an even more conservative benchmark of 1 additional cancer case in 1,000,000 people. Both of these benchmarks are based on the idea that this rate of cancer from exposure to environmental chemical concentrations would not tip the balance of the current Canadian cancer incidence rate of approximately 0.4 (or 40%).

In other words, if the Facility’s air emissions were to increase the Canadian cancer incidence rate from 0.4 to 0.4000004, then the MOE would consider the facility to pose an unacceptable risk to the population.

Results of the Human Health Risk Assessment

Inhalation Assessment

The results indicate that no acute (1-hr or 24-hr) or chronic (annual average) exposures at the maximum ground level concentration exceed the regulatory benchmark for any of the 10 evaluated...
cases. Additionally, no carcinogenic COPC exceed the conservative Ontario MOE regulatory cancer
benchmark of 1 in 1,000,000 for all evaluated cases.

In addition to the evaluation of individual COPC, an assessment of chemical mixtures was conducted.
Chemical mixtures represent groups of chemicals that act similarly on the human body (for example, a
mixture of chemicals may irritate the respiratory system). There are currently no regulatory benchmarks
to evaluate chemical mixtures; therefore, the exposures associated with the chemical mixtures could
not be definitively stated. Furthermore, the evaluation of exposure to chemical mixtures is complicated
by the narrow probability of each chemical in the mixture occurring at one specific location at the same
time with a receptor also present at that location and time to be exposed to them. Regardless of these
limitations chemical mixtures were evaluated for information purposes only in the risk assessment.

Multi-Pathway Assessment

The results of the multi-pathway assessment indicate that exposure to Facility-related air emissions will
result in no adverse health effects to human receptors living or visiting the LRASA.

The only exceedences of regulatory benchmarks were from existing conditions in the Baseline Case.
These risks were not unexpected as any urban area in Ontario would produce similar results. Although
some risk was expected from existing conditions, additional exceedences were seen in the Baseline
Case that were directly related to 1) the use of laboratory method detection limits as environmental
media concentrations, and 2) conservative receptor characteristics used to represent toddler receptor
consumption patterns of homegrown produce and agricultural products. The "method detection limit" is
the smallest amount of a chemical that the laboratory instrument is able to detect and is not
representative of the actual media concentration of a chemical in a sample. Using the method detection
limit as an actual media concentration was a conservative assumption because media concentrations
were likely much lower than the method detection limit of the instrument or not present at all. Secondly,
the use of child-specific consumption rates to represent a toddler's consumption rate of homegrown
produce and agricultural products in lieu of toddler-specific rates also lead to an overestimation of
exposure and therefore exceedence of regulatory benchmarks.

Overall, the results of the human health risk assessment indicate that it is not expected the Facility will
lead to any adverse health risks to local residents, farmers or other receptors in the Local Risk
Assessment Study Area (LRASA).

Results of the Ecological Risk Assessment

The results of the ecological risk assessment indicate that exposure to Facility-related air emissions will
result in no adverse health effects to ecological receptors living in the Local Risk Assessment Study Area.

As with the human health multi-pathway risk assessment the only risks in all evaluated cases were from
the existing conditions in the Baseline Case. Most of the time these risks were due to the use of method
detection limits that produced conservative estimates of COPC concentrations in environmental media
samples.
Overall, the results of the ecological health risk assessment indicate that it is not expected the Facility will lead to any adverse health risks to ecological receptors or any species at risk in the Local Risk Assessment Study Area.

**Overall Summary**

Overall, the results of the Human Health and Ecological Risk Assessment indicate that there would be no adverse health effects to either human or ecological receptors exposed to emissions from the Proposed Thermal Treatment Facility.
Environmental & Occupational Health Plus Inc.

Health Impact Evaluation and Issues Management

June 8, 2009

Dr. Robert Kyle
Commissioner & Medical Officer of Health
Durham Region Health Department
605 Rossland Road East, 2nd Floor
P.O. Box 730
Whitby, ON L1N 2B0


Dear Doctor Kyle,

In accordance with your mandate, I am attaching the review of the Draft Jacques Whitford (JW) SSHHRA and recommendations for surveillance of the proposed facility.

The detailed review of the Site Specific Human Health Risk Assessment (SSHHRA) was carried out by Ross Wilson, experienced risk assessor and certified toxicologist of the American Board of Toxicology. Mr. Wilson and I participated in the reviewer discussions with JW staff and with other reviewers providing clarifications and justifications of the JW paper, and anticipated changes. Where specific changes were expected and agreed upon by the reviewers and JW, we assumed that these would be made in the Final SSHHRA and made our comments fit accordingly with the agreed upon changes. We also communicated with JW (Dr. Chris Ollson) on several occasions by e-mail and telephone to request additional data, graphs, and related information not available in the Draft SSHHRA report.

Mr. Wilson and I maintained a separate independent approach in carrying out this review which we believe is reflected in our communications with JW and in this report to you. Neither of us has a stated interest in the success or failure of this undertaking and thus, confirm that we do not have a conflict of interest.

Memo to Dr. Robert Kyle June 8, 2009
Mandate and responses:

1. What are the human health risks? Are the health risks acceptable and if so, according to what standards? If the health risks are acceptable, can the proposed EFW facility be considered "safe"?

Response: Our review supports the findings of the SSHHRA. We find that the key receptors, chemicals and exposure pathways have been evaluated; the methods used to estimate exposures are appropriate; the toxicological reference values used are reasonable and drawn from a variety of reliable international sources; and the risk characterization results are defensible.

We conclude that this SSHHRA is satisfactory. Although it would be possible to use different receptor characteristics, exposure assumptions and toxicological reference values (and, thus, arrive at different Hazard Quotient and Incremental Lifetime Cancer Risk estimates), we consider it unlikely that the conclusions of the SSHHRA would change.

In most cases, we expect the proposed installation will not provide any appreciable change in the concentration of chemicals in air, soil, dust, water or food. For example, the maximum Ground Level Concentration of PM$_{2.5}$ on an annual basis under Normal Operations is expected to be increased by 0.022 µg/m$^3$ versus a current baseline concentration of 9.8 µg/m$^3$. This, in our opinion, is insignificant. Similarly, the projected increases in the concentration of metals, polycyclic aromatic hydrocarbons, dioxins/furans, polychlorinated biphenyls and other chemicals are very minor relative to current concentrations.

It is noted that specific risk estimates will vary from the draft SSHHRA that we reviewed versus the final SSHHRA that JW will issue in the future; however, based on our current information, it is not expected that the overall conclusions of the SSHHRA will change based on the information provided to us.

Overall, this review team holds the opinion that this industrial installation, if it performs as specified and assumed in this SSHHRA, will not pose unacceptable risks to persons in the vicinity of the site, and by extension, to those residents beyond. Said differently, this installation as proposed will not pose an unacceptable public health risk.

2. Is the SSHHRA methodology sound and consistent with accepted standards such as Health Canada's Canadian Handbook on Health Impact Assessments and Environment Canada's Discussion Paper on the Precautionary Principle?

Response: The SSHHRA used methods that are considered to be acceptable and does meet accepted standards. The SSHHRA follows an accepted risk assessment
approach consistent with Health Canada risk assessment guidance provided in various documents that include but are not limited to:


With respect to the precautionary principle, we consider that the SSHIRA meets the requirements of this approach. As noted by Environment Canada (2001)\(^1\), the precautionary principle is "a distinctive approach to managing threats of serious or irreversible harm where there is scientific uncertainty." It represents a regulatory philosophy whereby regulatory action will be taken in the absence of full scientific certainty of risk. Although we don't know with full certainty the actual risks posed by the chemicals released, this uncertainty does not preclude use of risk assessment as part of decision-making process (i.e., it is not a reason to not complete the risk assessment).

Use of the precautionary principle is also inherently found within the methods of the SSHIRA. It can be found through the use of conservative (protective) factors to estimate risks when there is not full certainty of the input parameters (e.g., 95\textsuperscript{th} percentile concentrations, exaggerated time spent at the site, toxicity reference values with uncertainty factors, etc.). The implementation of an environmental surveillance program also is considered to meet the objectives of the precautionary principle.

3. What environmental surveillance program should be recommended to Regional Council and the MOE, taking into account your earliest report to me, the best practices review, and public concern?


Memo to Dr. Robert Kyle June 8, 2009
Response: The surveillance program suitable to this facility is expected to consist of facility operations monitoring, stack measurements, and environmental media measurements to confirm compliance. Specifically, there is great concern among certain members of the general public about chemicals arising from the facility operations themselves, dioxins and furans.

The standards applied for these chemicals should meet or exceed the more stringent of the Ontario Guidelines or EU directive chemical emissions standards in accordance with the JW Best Practices Review.²

In the case of the need for monitoring of environmental media, this is considered to be useful and is recommended. The modelers have predicted that the facility will not appreciably contribute to increased concentrations in the environment. Air and soil monitoring is recommended to ensure compliance. However, if concentrations are found to be greater than those assumed in the SSHHRA, additional flora and fauna monitoring will help to reassure that human health is protected and may also alleviate some of the concern in the general public.

4. Is there any other human health related advice I should be providing Regional Council and the MOE?

Response: This facility is not likely to pose an unacceptable public health risk, if it functions as assumed in the JW SSHHRA Report. In addition, the environmental surveillance which is likely to be in place will ensure compliance with the emissions requirements by providing hard data to support any conclusions on environmental and health impacts.

Notwithstanding, communities may expect that the Medical Officer of Health provide ongoing relevant health information as required by the Ontario Public Health Standards and Protocols. Details of what the public expects may be explored through community consultations or other sources of data gathering about community residents available to local public health agencies in Ontario (i.e., Rapid Surveys).

5. Is there any human health reason that the completed EA shouldn't be forwarded to the MOE to complete the process?

Response: In our opinion, there is no reason relating to the human health impacts forecast by this SSHHRA that precludes forwarding to the MOE to complete the process, provided that the Final Report is in concordance with the caveats expressed in our review.


Memo to Dr. Robert Kyle June 8, 2009
6. Surveillance

Although the act of sampling and chemical analysis of human tissues such as blood or urine is relatively easy, there are more difficult challenges in entertaining human testing. Among these challenges are: 1. the use of humans as sentinels to test exposure hypotheses which are predicted by the SSHHRA to be below a significant signal; 2. The methodological challenges of obtaining large groups to examine given the very low level of exposure forecast; 3. the ethical issues of selective participation, individual interpretation and potential demand of the use of results for diagnostic, prognostic or therapeutic purposes. Interpretation of the significance of individual results is available for a limited number of substances and not for the vast majority of chemicals of concern. For these important reasons, ethical and medical, human biological monitoring is not recommended as a facility surveillance tool in this circumstance.

The above constitutes our team deliberations and is a summary of our report to you, attached.

ORIGINAL
SIGNED BY

Lesbia F. Smith, MD
Ross Wilson, MSc, DABT
Review of JW Site Specific Human Health Risk Assessment, May 2009 and Environmental Surveillance

08 June 2009

Prepared by:
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Table of Contents

Introduction .................................................................................................................. 5
Mandate ......................................................................................................................... 5
Review of the Site Specific Human Health Risk Assessment ........................................ 6
  Scope of the Review .................................................................................................... 6
  Review Comments ...................................................................................................... 6
  Key Findings ............................................................................................................... 10
  Summary .................................................................................................................... 10
  Conclusions ............................................................................................................... 11
Surveillance Issues and Recommendations ................................................................... 11
Introduction

Dr. Lesbia F. Smith (Environmental & Occupational Health Plus Inc.) has been retained as consultant to Dr. Robert Kyle, Commissioner & Medical Officer of Health of the Region of Durham, to review documents arising from the Environmental Assessment process for an energy from waste (EFW) facility to be sited in the Region of Durham. The site selected for the facility is in Clarington. The team undertaking the current Review and development of environmental surveillance advice are Lesbia F. Smith, medical doctor and environmental health specialist, and Ross Wilson, risk assessor and diplomate of the American Board of Toxicology. The team draws its experience for this project from involvement throughout the process as external reviewer for the Generic Risk Assessment¹ (Dr. Smith), authoring the report on health effects of EFW facilities² (Dr. Smith), reviewing the methodology report on JW Report on Best Practices³ (Dr. Smith), Reviewer of the JW DRAFT Best Practices Report⁴ (Dr. Smith), numerous risk assessments and standard setting documents in support of risk assessment (Mr. Wilson) and public health protection (Mr. Wilson and Dr. Smith). Details of these activities are highlighted in our Curricula Vitae.

The purpose of this report is to provide Dr. Kyle with an assessment of the Draft JW Site Specific Human Health Risk Assessment, May 2009, and to update advice on environmental surveillance for the proposed facility in consideration of the various reports and public concerns.

Mandate

The specific questions posed of the review team are as follows:

1. What are the human health risks? Are the health risks acceptable and if so, according to what standards? If the health risks are acceptable, can the proposed EFW facility be considered "safe"?

2. Is the SSHERIA methodology sound and consistent with accepted standards such as Health Canada’s Canadian Handbook on Health Impact Assessments and Environment Canada’s Discussion Paper on the Precautionary Principle?

3. What environmental surveillance program should be recommended to Regional Council and the MOE, taking into account your earliest report to me, the best practices review, and public concern?

4. Is there any other human health related advice I should be providing Regional Council and the MOE?

5. Is there any human health reason that the completed EA shouldn't be forwarded to the MOE to complete the process?

The responses to these questions arise from the review of the SSSHRA and consideration of surveillance approaches from the Best Practices Review, and relevant literature.

**Review of the Site Specific Human Health Risk Assessment**

**Scope of the Review**

The focus of the review is to examine the conclusions of the Jacques Whitford Environment Limited (JW) site specific human health risk assessment (SSHHRA) and to determine if they are scientifically-defensible and accurate. The main document considered in this review was JW. 2009. *Site Specific Human Health and Ecological Risk Assessment – Technical Study Report. May 2009, Draft report.*

To supplement the above report, JW provided additional information on various aspects of the SSSHRA through email and telephone correspondence with the review team. This review of the SSSHRA has considered all of the above information available to June 5, 2009.

Validation of exposure point concentrations is considered to be outside of the mandate of this review. We note that this review of the SSSHRA has not evaluated the accuracy of the exposure point concentrations (from the air modelling of emissions) and thus, all of the exposure point concentrations assumed in the SSSHRA are assumed to be accurate.

**Review Comments**

Review comments are organized within the SSSHRA framework, by responding to a series of review questions, as provided below.

**Does the SSSHRA follow the generally accepted SSSHRA framework?**

The JW SSSHRA generally follows the accepted framework. The SSSHRA is presented in a straightforward and easy to follow manner. The SSSHRA is based on guidance that is consistent with Health Canada (HC), the World Health Organization (WHO) and the US Environmental Protection Agency (US EPA). These agencies provide a number of guidance documents that are useful for evaluation of health risks from such a facility. Overall, the approach used by JW is considered to follow an acceptable framework for SSSHRA.

**Does the SSSHRA problem formulation identify the appropriate chemicals, receptors and exposure pathways?**

The SSSHRA has identified the appropriate chemicals, receptors and exposure pathways of concern that are likely to drive human health risks and, thus, require evaluation in the risk assessment. The problem formulation identified the following chemicals requiring evaluation due to their inherent toxic potential and presence in stack emissions and other sources of release:

- Criteria pollutants (sulphur dioxide [SO₂], hydrogen chloride, hydrogen fluoride, nitrogen dioxide [NO₂], carbon monoxide [CO], particulate matter [as total, PM₁₀ and PM₂.5] and ammonia);
- Metals and other inorganic elements;
- Polycyclic aromatic hydrocarbons (PAHs);
- Polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs);
- Polychlorinated biphenyls (PCBs);
- Chlorinated monocyclic aromatics; and
- Volatile organic compounds (VOCs).

Although other chemicals may be released from the facility, the chemicals evaluated in the JW SSHHRA represent the substances of greater concern from a toxicological perspective and are typically evaluated in such an assessment. Consequently, if there are acceptable risks\(^5\) from these chemicals, we can conclude with reasonable confidence that there will be no unacceptable risks from other chemicals not formally evaluated in the JW SSHHRA because risks would be even lower.

During our discussions with the JW team, we noted that a number of extended explanations would be required in order to fully justify the conclusions. JW committed to provide additional information in their final report on their rationale for not including ozone, dioxin-like PCBs and acrolein in the SSHHRA. In the case of ozone, JW has noted that the exclusion of ozone from such a facility is commonly accepted by air dispersion modelers at the Ontario Ministry of Environment (MOE). In the case of dioxin-like PCBs and acrolein, JW has indicated that they do not consider these chemicals to be key drivers in the SSHHRA and they will provide the justification for this conclusion.

The receptors of concern evaluated in the SSHHRA were persons living, working, going to school/daycare, recreating or consuming food from the area. These notional persons or receptors are considered to be representative of the maximum exposed persons. It is noted that Figure 3-4 (showing specific receptor locations) was omitted from the original JW SSHHRA report and was subsequently provided to the review team. Persons of all ages were considered in the SSHHRA. It is noted that pregnant women are inherently included in the assessment (i.e., TRVs are developed for protection of all receptors with special emphasis on pregnant women and their fetuses).

The exposure pathways evaluated in the SSHHRA are consistent with HC and US EPA guidance. The JW SSHHRA represented a multi-pathway analysis where the following exposures routes were considered (depending upon the receptor (person) of concern):

- Inhalation of air;
- Incidental ingestion and skin contact with soil/dust;
- Ingestion and skin contact with surface water;
- Consumption of plants, livestock (including beef, poultry, pork, milk and eggs), wild game and fish.

Does the SSHHRA exposure assessment accurately estimate exposures from the site?

The exposure assessment has been completed according to available guidance and has used appropriate input parameters and equations to estimate exposure. We consider that the approach used in the JW SSHHRA provides a reasonable estimate of anticipated exposures for the specific receptors. The JW SSHHRA is based on receptor characteristics and exposure equations that are consistent with HC guidance for estimation of exposures.

\(^5\) Acceptable risks from substances emitted refer to their regulatory level of risk as calculated using methods from Health Canada, US EPA, and WHO guidance documents.
Certain issues were identified in the review of the exposure assessment as follows:

- The assumed air concentrations were not provided in the JW SSHHRA. In subsequent correspondence with JW, the assumed air concentrations for Normal Operations and Upset conditions were provided for our consideration. These were absolutely necessary to determine the integrity of the resulting calculations.

- The assumed exposure point concentrations for certain chemicals were not provided in the JW SSHHRA (e.g., many of the PAHs). In subsequent correspondence with JW, the assumed exposure point concentrations were forwarded to our team. These were absolutely necessary to determine the integrity of the resulting calculations.

- Our initial assessment of the rates of fish and wild game consumption was that they were too low. In subsequent correspondence with JW, we were informed that these have been revised and greater consumption rate has now been assumed that is more representative of upper bound consumption. JW has indicated that it is unlikely that such a revision of intake from this pathway will result in any change in conclusions about risk (i.e., risks will still be well below the acceptable level).

- Communications with JW has indicated that the potential for additional chemicals in breast milk will be discussed in the final SSHHRA.

- Communications with JW has indicated that the significance of slightly higher soil ingestion rates will be discussed in the final SSHHRA.

We note that the expected increase in the concentration of chemicals of concern in air, soil, plants and animals attributable to the proposed facility is very small and is not likely not be detectable from current background conditions. This is of particular importance when considering environmental measurements of chemicals of concern as a form of facility operations surveillance.

Overall, it appears that exposure assessment was appropriately completed and is unlikely to underestimate exposures that persons would experience from the facility. We note again that the methods used to estimate exposure point concentrations were not part of the current review. We have assumed, therefore, that the exposure point concentrations presented provide reasonable estimates of environmental concentrations. If other reviewers identify issues with the predicted exposure point concentrations, our conclusions on the adequacy of the exposure assessment would need to be re-visited.

Does the SSHHRA toxicity assessment accurately estimate the potency of the substances?

The toxicity assessment provides a reasonable estimate of the toxicological potency of the substances of concern. Many agencies provide toxicological reference values (TRVs) and for all chemicals of concern, TRVs were identified from MOE, HC, Environment Canada, Alberta Environment, US EPA, WHO, California EPA and Texas Commission on Environmental Quality, Agency for Toxic Substances and Disease Registry (ATSDR) and the Netherlands Institute of Public Health and the Environment (RIVM).
No pre-defined toxicological hierarchy was used to identify toxicological reference values (i.e., the SSHRA was not based on any predetermined rules that one health agency was preferable to another). Instead, TRVs were selected on a chemical-by-chemical basis. Where appropriate, TRVs were identified for short-term (1 hour and 24 hour exposures) and long-term (continuous exposure for a lifetime).

Emphasis was placed on use of inhalation TRVs to evaluate inhalation routes and oral TRVs to evaluate oral and dermal exposures. This is considered to be consistent with health agency guidance. We consider the approach used by JW acceptable. Although any number of TRVs is available for the same substance, we are not aware of any other values that should have been used and that could have changed the overall conclusions. Notwithstanding the above, certain issues were identified in the review of the toxicity assessment:

- The toxicological reference value for benzene in Table 7-3 was 100 times lower than reported in the Appendix H. However, the correct value (value cited in Appendix H) was used in the JW SSHHRA calculations.
- For criteria pollutants PM$_{2.5}$, SO$_2$, NO$_3$ and CO, Health Canada (2004)$^6$ provides an approach for estimation of mortality effects rather than toxicity effects beyond a straight comparison to criteria. In subsequent correspondence, JW stated that consideration of mortality effects would not impact the SSHHRA and has indicated that the rationale for lack of consideration of such effects will be provided in a revised report.
- In some cases, acute toxicity reference values were found to be lower than chronic values (e.g., mercury); however, this was mostly due to variations in approaches by different health agencies and will not influence the SSHHRA results significantly.
- Communications with JW has indicated that the significance of the MOE reference dose for lead (1.8 μg/kg bw/day) will be discussed in the final SSHHRA; however, the conclusions of the SSHRA are not expected to change with this revision. It is also noted that the TRV for lead is currently under review by HC but to date, there is no official position from HC on this. In addition, the exposure that persons in the vicinity of the proposed facility are predicted to be very minor compared to typical non-facility sources of exposure.

Overall, we are not aware of any other TRVs that should have been used and which would have resulted in distinctly contradictory conclusions from those presented in the SSHHRA.

Does the SSHHRA risk characterization accurately represent health risks?

The results of the SSHHRA are considered to accurately represent health risks. Health risks for evaluation of non-carcinogens were presented as Hazard Quotient (HQ) values (acceptable HQ = 0.2 for most chemicals) while risks for carcinogens were provided as Incremental Lifetime Cancer Risks (acceptable Incremental Lifetime Cancer Risk of 1 x 10$^{-6}$). This is the usual technical nomenclature to express risks in SSHHRAs.

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Key Findings

These are the key findings of this review:

- Risk estimates appear to be accurately estimated.
- Although certain changes to certain exposure assumptions are planned for the final HHRA (e.g., rate of fish/wild game consumption) and will alter the risk estimates provided, we consider it unlikely that these changes would alter the overall conclusions of the SSHHRA.
- Although certain risk estimates in Tables 7-15 and 16 are termed “acute”, JW provides some of these risk estimates for chronic exposure durations. Communications with JW indicate that these risk estimates will be revised accordingly for the final SSHHRA.
- Communication with JW indicates that the management of “upsets” (facility upset conditions) will be further discussed. We have no criticism of the resulting risks as presented.
- Communications with JW indicate that the risks from mixtures will be further discussed.
- Although baseline risks are elevated above HQ values of 1 and Lifetime Cancer Risk estimates of $1 \times 10^{-6}$, the increased risks that are estimated from the proposed facility are considered to be acceptable and much lower than these values. In all cases, the concentrations attributed to the project alone and the upset conditions situations scenarios forecast that exposures will be well below acceptable toxicological reference values, and therefore present no unacceptable risks.
- In some cases, HQ values from background sources are greater than 1 and Lifetime Cancer Risks are greater than $1 \times 10^{-6}$. However, such scenarios do not mean that absolutely no additional exposures can occur (at least from a regulatory perspective). Instead, health agencies and scientists tend to evaluate issues on a chemical specific “case-by-case” basis. In the case of PCDD/Fs and PCBs, these are the chemicals contributing the greatest background risks; however, the increased exposure from the facility for these chemicals is quite minor by comparison (on the order of 0.5% increase of total exposures - see Table 7-34) and such values do not increase risk significantly. From the scientific perspective, these small increased risks are considered trivial because the greatest component of risk is from non-facility sources (i.e., food).

Summary

Overall, our review supports the findings of the SSHHRA. Our key findings are highlighted below:

- The key receptors, chemicals and exposure pathways have been evaluated.
- The methods used to estimate exposures are considered appropriate.
- The toxicological reference values used are reasonable and drawn from a variety of reliable international sources.
- The risk characterization results are defensible.
Conclusions

We consider this SSHHRA satisfactory. Although it would be possible to use different receptor characteristics, exposure assumptions and toxicological reference values, we consider it unlikely that the overall conclusions of the SSHHRA would change.

In most cases, we expect the proposed installation will not provide any appreciable change in the concentration of chemicals in air, soil, dust, water or food. For example, the maximum Ground Level Concentration of PM$_{2.5}$ on an annual basis is expected to be increased by 0.022 µg/m$^3$ versus a current baseline concentration of 9.8 µg/m$^3$. This, in our opinion, is insignificant from a health risk perspective. Similarly, the projected increases in the concentration of metals, PAHs, PCDD/Fs, PCBs and other chemicals are very minor relative to current concentrations and would not result in unacceptable health risks.

In the case of the need for monitoring of environmental media, this is considered to be useful and is recommended under some circumstances. The modelers have predicted that the facility will not appreciably contribute to increased concentrations in the environment. Air and soil monitoring is recommended to ensure compliance. However, if concentrations are found to be greater than those assumed in the HHRA, additional flora and fauna monitoring will help to reassure that human health is protected and may also alleviate some of the concern in the general public.

Overall, this review team holds the opinion that this industrial installation, if it performs as specified and assumed in this SSHHRA, will not pose unacceptable risks to persons in the vicinity of the site, and by extension, to those residents beyond. Said differently, this installation as proposed is not likely to pose a public health risk.

Surveillance Issues and Recommendations

Stakeholders have different knowledge, perspectives, professional and lay opinions about what constitutes the proper oversight for an EFW facility as proposed for Durham Region and to be located in Clarington. The calls for public health surveillance once focused on “human biological monitoring”. Two reports were commissioned. The first$^7$ was a review of health studies and potential health effects associated with energy from waste facilities derived from the published literature of studies of communities around energy from waste facilities. Results indicated that there was no evidence for or against actual impacts. The second$^8$ examined the surveillance practices around the world related to energy from waste facilities, and the role of biological monitoring as a surveillance tool for these facilities. Results indicated that best practices pointed to stack monitoring as the most prevalent practice, followed by environmental monitoring (air, soil), and less frequently on flora or fauna monitoring. Only one country had engaged in human biological monitoring, with some ambiguity as to

$^7$ Smith LF. Energy from Waste Facility in the Region of Durham September 28, 2007
whether the objective of the human-focused programs was specifically for facility monitoring, research, or to satisfy public concern.

Regional stakeholders continue to press for additional reassurances about the health and environmental impacts of this facility. A number of environmental surveillance options have been discussed, including "ground truth" measurements of stack emissions at the pathway level (i.e., soil, air concentrations) for three years, and fauna and flora monitoring. The results of the JW Best Practices Review indicates that the most prevalent practices involve upstream monitoring of facility operations (stack and air emissions), supplemented by air, soil, and rarely, fauna and flora monitoring under some circumstances.

All considered, for this EFW facility, the recommended monitoring of stack, air, soil and environmental monitoring will provide sufficient sentinel signals to protect public health. The addition of a three year period of environmental monitoring will indicate whether new approaches should be taken for additional surveillance or for additional restrictions on the facility. As part of this additional monitoring, further checking of emissions impacts at the receptor level (i.e., flora and fauna) will not add value to the pathway level measurements unless there is evidence of repeated excursions in emissions above what the SSHHRA and the facility operator predict. The biological monitoring of fauna is the wild animal version of testing human "receptors" for chemicals emitted by the facility. If this is done as part of a planned early monitoring, then it means that there may be an expected failure of upstream monitoring of the facility itself. In similar fashion, the use of humans as sentinel monitors of facility operations represents an acceptance of failure of upstream emissions and operations monitoring. Flora and fauna, and human testing are not good sentinels of current operations.

Notwithstanding, monitoring environmental media is considered useful and is recommended under circumstances as follows. The modelers have predicted that the facility will not appreciably contribute to increased concentrations in the environment. However, if concentrations are found to be greater than those assumed in the HHRA, flora and fauna monitoring will help to reassure that human health is protected and may also alleviate some of the concern in the general public.

Although the act of sampling and chemical analysis of human tissues such as blood or urine is relatively easy, there are more difficult challenges in entertaining human testing. Among these challenges are: 1. the use of humans as sentinels to test exposure hypothesis which are predicted by the SSHHRA to be below a significant signal; 2. The methodological challenges of obtaining large groups to examine given the very low level of exposure forecast; 3. the ethical issues of selective participation, individual interpretation and potential demand of the use of results for diagnostic, prognostic or therapeutic purposes. Interpretation of the significance of individual results is available for a limited number of substances and not for the vast majority of chemicals of concern. For these important reasons, ethical and medical, human biological monitoring is not recommended as a facility surveillance tool in this circumstance.

Communities may expect the Medical Officer of Health to provide ongoing relevant health information as required by the Ontario Public Health Standards and Protocols. Details of what the public expects outside the Standards may be explored through community consultations or other sources of data gathering about community residents accessible to local public health agencies or as considered appropriate by the Medical Officer of Health.

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9 Health Protection and Promotion Act, RSO 1990, c. H. 7
FINAL REPORT

Review of International Best Practices of Environmental Surveillance for Energy-From-Waste Facilities

PROJECT NO. 1009497.05
PROJECT NO. 1009497.06

ON 

Final Report
Review of International Best Practices of Environmental Surveillance for Energy-From-Waste Facilities

February 16, 2009

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STUDY SUMMARY

INTRODUCTION

Jacques Whitford Limited was retained by Durham Region to conduct a review of international best practices of environmental surveillance being undertaken at Energy-From-Waste (EFW) facilities. This study was specifically designed to address a motion made at the Durham Regional Council meeting on Wednesday, May 28th, 2008, which was carried and states in part:

"g) i) THAT staff review the best practices of environmental monitoring programs which include environmental surveillance, health surveys, biological monitoring, health studies, and any other pertinent studies as determined through the review and consultation regarding environmental monitoring programs; and

ii) THAT an environmental monitoring program be developed based on best practices which will provide baseline information and ongoing studies during the life cycle of the facility";

This project was completed in conjunction with the Durham/York Residual Waste Study, which is being completed to obtain approval to construct an EFW facility in the Municipality of Clarington, Ontario.

The focus of this study was to review environmental surveillance programs at similar facilities around the world and to recommend an appropriate level of environmental surveillance for the proposed EFW facility. This was achieved through a three pillar study approach involving - a systematic review of the scientific literature, a grey literature review and by interviewing international experts in the field of incineration environmental surveillance. The findings of each stage of the process were documented and then summarized by Country.

The objective of the Study Team is as follows:

"The consultant's recommended option for an environmental surveillance program for the proposed Durham/York Residual EFW facility will be based on the fundamental tenant that the program must ensure the protection of public and environmental health."

A multidisciplinary team of professionals were assembled to undertake this study and an independent peer review of the study by Dr. Lesbia Smith was commissioned by the Region of Durham.

The consultant's recommended environmental surveillance program will ensure the protection of human and environmental health during the operation of the proposed EFW facility. In addition, recommendations for what would trigger a more resource intensive surveillance program have been included.

KEY STUDY TERMINOLOGY

Surveillance is a continuous and systematic process of collection, analysis, interpretation, and dissemination of descriptive information for monitoring health problems (Rothman and Greenland, 1998). Monitoring is the intermittent performance and analysis of routine measurements, aimed at detecting changes in the environment or health status of the population (Last, 2009). Surveillance is distinguished from monitoring by the fact that it is continuous and ongoing, whereas monitoring is intermittent or episodic. The hierarchy of environmental surveillance is provided in Figure 1.
The following are brief descriptions of the key study terminology:

**Environmental surveillance** is a broad topic under which a wide range of information can be collected on emissions data, dispersion modeling, and the monitoring of air, water, soil, vegetation, wildlife and humans.

**Environmental survey** is an observational study of the ecosystem and its physical components to evaluate potential stressors on the environment (UN FAO, 1996). These surveys are also often referred as biophysical surveys and do not involve sampling or sacrificing flora or fauna, rather they are observational.

**Health surveys** collect information from participants about their health, habits and life circumstances through a variety of means, including through interviews (conducted in person or over the phone), or by self-administered questionnaires (WHO, 2008). They are often used to provide information on the health status of communities and estimates of health determinants.

**Health studies** differ from surveillance and monitoring programs in that they seek to identify the relationship between individual characteristics and the occurrence of disease or outcome.

**Environmental monitoring** involves the testing of media of ecosystem components such as soil, water, air, vegetation and fauna (e.g., fish, small mammals, and birds). Stack testing of facilities emissions (whether periodic or continuous) is also considered environmental monitoring.

**Human biological monitoring**, more commonly known as human biomonitoring (HBM), is the measurement of specific substances in the human body, usually through the analysis of blood, urine, breast milk and tissue samples.

This study reviews best practices of environmental surveillance related to EFW facilities. However, the scientific literature on environmental surveillance options does not always distinguish between EFW and non-EFW facilities; therefore the search was appropriately widened to include all manner of incineration facilities. The Study Team distinguished between the types of incineration facilities that were studied by the researchers (e.g., municipal solid waste, hazardous waste or medical waste) throughout the report. The importance of this distinction is that the feedstock (material going into the process) contains different levels of chemicals in the material that was being incinerated.
In addition, the Study Team felt that it was important to distinguish between facilities that were built and operated with modern pollution control technology, from older facilities that may have emitted higher concentrations of chemicals than would be allowed by regulation in Ontario today.

Those facilities that were operating prior to the late 1990s were considered "older" facilities in this review as they generally emitted higher concentrations of chemicals (e.g. dioxins and furans), into the environment than would currently be allowed. It was also noted that several studies published after the late 1990s included an assessment of older facilities. The environmental surveillance programs in place for these facilities were deemed relevant to this study, but caution was applied when interpreting their findings and their applicability to the type of pollution control technology and emission standards that would be adopted for the Durham/York EFW facility.

**SYSTEMATIC SCIENTIFIC LITERATURE REVIEW**

The objective of the systematic scientific literature review was to identify relevant English-language literature on the current practices employed in EFW related environmental surveillance programs around the world, with a publication date of January 1, 1990 or later.

The systematic literature review was modelled after the Cochrane Handbook for Systematic Reviews of Interventions (Cochrane Collaboration, 2008). Cochrane reviews adhere to the principle that "science is cumulative" and by considering the available evidence, decisions can be made that reflect the best science available.

**Articles Retrieved in the Systematic Literature Review**

The literature search identified a total of 4,491 citations. After duplicates were removed, and screening was completed, 189 articles were retained for data abstraction and quality assessment. Sixty-six articles were categorized as human biomonitoring studies, and 119 as environmental monitoring studies. An additional 5 were categorized as "Other" because the study focus was not necessarily the description of a specific monitoring program, but the content was nevertheless relevant to the review. After the quality assessment framework was applied, 25 human biomonitoring articles of residential exposure and 59 environmental monitoring articles remained for inclusion in the study (Figure 2).
Results of the Systematic Literature Review

Baseline Studies Conducted Prior to Operation of an Incineration Facility

Eleven of the scientific articles retrieved and included in this study were environmental baseline programs, conducted prior to an incineration facility becoming operational. These environmental baseline programs typically involved the sampling of a number of chemicals in various environmental media. The sample locations were selected through review of atmospheric dispersion modelling results, which provide the predicted zone of influence of a facility's emissions (typically within 1 km of the facility). Baseline sample media included ambient air, soil, vegetation, and bovine milk. The authors emphasized the importance of collection of an environmental baseline, so that samples collected and analyzed in the future could be benchmarked against pre-operational conditions.

Study Team Finding

"These studies illustrate the importance of conducting chemical baseline investigations prior to commissioning of an EFW facility. It forms the benchmark against which any samples collected during the facility's operation would be evaluated."

Durham and York Regions are in the process of finalizing an environmental baseline study, similar to those reported in the literature.

Ambient Air Monitoring Studies

In general, high volume air samplers were sited downwind of a facility and within its modelled chemical depositional range. In many studies, a control location was set up in an area predicted to be outside of the zone of influence of the Incinerator. This allowed the researchers to compare the ground level concentrations of chemicals within the zone of influence of the facility to background conditions. Dioxins and furans, trace metals and volatile organic compounds (VOCs) were the most commonly measured chemicals.

Study Team Finding

"It is concluded from the scientific literature that an ongoing ambient air monitoring program would not be required for the proposed Durham/York EFW facility to ensure the protection of human or environmental health."

This conclusion was reached on the basis that no correlation was found between chemical concentrations in ambient air and stack emissions from facilities that employ modern pollution control technology.

The literature review determined that facilities that had upgraded or modern pollution control technology do not appear to be a significant source of chemicals detected in ambient air surrounding the Incineration facility. However, older MWI facilities or hazardous waste facilities appear to in some cases have been a significant contributor to ambient levels of chemicals in the air surrounding these facilities.

The zone of potential influence of the facilities studied appears to be no greater than 2 km from the stack, with the majority of research focused in areas less than 0.5 km from the facilities. Baseline or control locations formed a critical part in all of the studies.
Soil Quality Monitoring Studies

The soil monitoring programs included the analysis of chemicals in multiple samples, predominately located within the depositional zones of a waste incinerator and a comparison to either baseline or background samples. In general, soil was usually collected from the upper 5 centimetres of the soil column. The most common chemicals analyzed were dioxin and furans and metals.

**Study Team Finding**

It is concluded from the scientific literature that an ongoing soil monitoring program would not be required for the proposed Durham/York EFW facility to ensure the protection of human or environmental health. This conclusion was reached on the basis that a modern incineration facility that employs current pollution control technology should not impact local soil quality.

A number of articles published on older facilities, without modern pollution control technologies, reported a significant distance-decay effect associated with soil chemical concentrations and incineration facilities. However, in most cases influences by other man-made sources as contributors to could not be ruled out. There were also a number of scientific papers that showed no impact to local soil quality as a result of incinerator emissions.

Perhaps the most significant finding was that soil sampling programs surrounding older facilities were most effective when samples were collected within close proximity (<1km) of facilities. While a soil monitoring program may be beneficial in addressing public concern related to EFW facility emissions, a modern EFW facility equipped with the latest pollution control devices would be unlikely to have measurable changes in chemical concentrations in soils surrounding the facility. This is also supported by the deposition modeling that was completed in the Durham/York Residual Waste Study Generic Risk Assessment, where soil loading concentrations at the maximum deposition location were predicted to be less than 1% of background levels.

Vegetation Monitoring Programs

In general, the vegetation monitoring programs included the analysis of chemicals in multiple samples, predominately located within the depositional zones of an incinerator and a comparison to either baseline or background samples. The type of vegetation sampled varied from study to study and was heavily dependent on the type of vegetation around the site. The most common chemical concentrations quantified in vegetation samples were metals, dioxin and furans, and PCBs.

In summary, vegetation monitoring programs further support the hypothesis that incinerators with poor pollution abatement technologies tend to have a more significant effect on chemical concentrations in environmental media. In addition, the vegetation monitoring programs also found that there is a distance decay effect associated with chemical concentrations. It was also determined that samples, if collected, should be taken within 1 km of a facility and only provide a good indicator of short-term chemical deposition from an EFW facility.

**Study Team Finding**

It is concluded from the scientific literature that an ongoing vegetation monitoring program would not be required for the proposed Durham/York EFW facility to ensure the protection of human or environmental health.

This conclusion was reached on the basis that a modern incinerator that employs current pollution control technology should not impact local vegetation quality.
Agricultural Products Monitoring Programs

There were a limited number of studies in the scientific literature that attempted to study the relationship between incineration facilities and the potential effects on agricultural products (e.g., beef, dairy, eggs, and pork). The most common chemical concentrations quantified in samples were metals and dioxins and furans.

The agricultural product studies were conducted on facilities with older pollution control technology and may not be representative of levels that may be found surrounding facilities built after the late 1990s. The media sampled were agricultural meat (poultry or beef), dairy products, and chicken. In one study, duck eggs were collected from close proximity to an incinerator. Meat, dairy, and egg samples were collected directly from farms located within the depositional ranges of waste incinerator and directly transported to the laboratory for chemical analysis.

The majority of the research studies were unable to find significant chemical concentrations in agricultural samples at levels that would adversely affect human health, consumption of the products) and ecological health. In the studies that reported significantly elevated chemical concentrations in agricultural products, the age of the incinerator and insufficient pollution control technologies were factors, which is a reoccurring trend in the environmental monitoring programs reviewed.

Human Biomonitoring of Residents

Twenty-five articles that involved human biomonitoring of residents living in the vicinity of an incineration facility passed the quality assurance check and were included in the study. Where multiple articles related to the same study, they were grouped and discussed as a comprehensive study.

In summary, the results of the systematic review of the scientific published literature indicate that there is not a significant relationship between exposure to chemical emissions from incinerator and measured chemical levels in human media such as blood, urine, breast milk and hair. With regard to dioxins and furans, the most commonly referenced chemicals assessed in the studies, authors noted occasional differences in individual dioxin and furan congeners and measured samples. Congener analysis can be important as it may be possible to correlate a particular individual congener emitted from an EFW facility to those found in exposed residents. However, no two congeners are the same, and some are more or less toxic than others. The toxic equivalent (TEQ) is thus a useful measure, as it provides a single, cumulative number based on the relative toxicity of each congener.

The only study to identify significantly elevated dioxin and furan TEQ levels in humans were Fierens et al., 2003; Fierens et al., 2007, which identified this trend in residents of a rural area containing an older municipal waste incinerator, which for nearly 20 years emitted dioxins at levels 500 times greater than the current emissions limit in the European Union or the Ontario Guideline A-7 allowable limits. These emissions levels resulted in high levels of dioxins and furans in the local environment, which was then transferred to the local residents in the form of dietary intake, as this rural population ingested a large amount of local dairy and livestock.
GREY LITERATURE REVIEW

While the scientific literature review brought forth considerable information, most of which originates in the academic community, it was anticipated that a full and complete review of the topic would necessitate a review of the grey literature – that is, literature not produced by bodies whose sole objective is publishing or that is not indexed in a scientific database. Findings included technical reports, government publications, regulations and legislation, conference proceedings, presentations, or unfinished “working reports”.

Seven documents had information that directly pertained to environmental monitoring programs. Of these, five documents described programs that were in the vicinity of a waste incineration facility. The most common environmental sample was ambient air followed by soil and vegetation and finally fauna. The chemicals of concern that were frequently studied were dioxin and furan concentrations, PCBs, and metals.

Five grey literature articles that reported on the results of human biomonitoring surrounding incineration facilities were included in this study. Age groups studied ranged from newborns to the elderly (up to age 65). Sample tissues collected included urine, blood, serum and hair. In the studies that assessed newborns and expectant mothers, breast milk and umbilical cord blood were collected. Chemicals varied by study, but included dioxins and furans, metals, PAHs, and PCBs.

The results of the grey literature review were consistent with the findings of the systematic review of the scientific published literature. The fact that both the findings of the published and unpublished literature were similar is an encouraging result. The Study Team believes it is unlikely that additional information may have been missed during this review, which would alter our findings or conclusions.

Grey Literature on National Human Biomonitoring Programs

Throughout the grey literature and external contact review, it was observed by the review team that many countries have implemented a national human biomonitoring program. These programs are aimed at understanding chemical concentrations in the general human population. This is not particularly associated with any one industry, but rather to examine the overall population level of exposure to environmental contaminants.

Studies reviewed included the Canadian Health Measures Survey (CHMS), the Canadian Maternal-Infant Research on Environmental Chemicals (MIREC) study, the United States National Health and Nutrition Examination Survey (NHANES), and the European Union Expert Team to Support Biomonitoring in Europe (ESBIO).

EXTERNAL CONTACT INTERVIEWS

Many governmental or legislated environmental surveillance programs are not published in the scientific literature, relying instead on internal or external governmental websites and documents with limited dissemination. In order to obtain a more holistic view of the practices of environmental surveillance programs associated with the energy-from-waste industry, it was essential to contact individuals in this field of work, who are directly involved with these programs.

Although many valuable contacts were made, and interviews conducted during this phase of the project, unfortunately not all of those who were contacted by the reviewers responded to our repeated inquiries. However, the reviewers believe that the information gained from respondents was sufficient to support the study findings and conclusions.

The Study Team was fortunate to be able to interview four academic/ experts in the field of EFW environmental surveillance, five government employees, and two owners/operators of European Union EFW facilities. The discussions and responses to questionnaires served to reiterate the various practices of environmental surveillance surrounding incineration facilities around the world.
With the exception of Portugal, the majority of countries and regulatory bodies mandate stack testing and monitoring of chemical parameters at incineration facilities. The primary driver behind this being the belief that air dispersion modeling and human health risk assessment, in combination with stack testing/monitoring are sufficient to ensure the protection of human and environmental health. Portugal appears to be the only country that commonly mandates a more resource-intensive environmental surveillance program, often in the form of human and environmental biomonitoring.

SUMMARY OF GLOBAL ENVIRONMENTAL SURVEILLANCE REQUIREMENTS FOR INCINERATION FACILITIES

Though it is difficult to make generalized worldwide claims as to the practices of environmental surveillance around incineration facilities, some notable trends are apparent.

- Most countries were identified to govern incineration facilities similarly to the Canadian approach – at the regional/provincial/state level.
- In almost all cases, prior to project approval an environmental assessment is required to determine whether the facility could adversely impact air quality, human and environmental health.
- The majority of facilities around the world conduct only stack monitoring programs, with the exception of Portugal where environmental monitoring and human biomonitoring programs may be mandated under the operating permits of individual facilities (Table 1).

This review found that older incineration facilities and/or those with less advanced or no air pollution control technology may have impacted the environment immediately surrounding the facility. The study results indicate that a modern incineration facility, such as the one being proposed by the Regions of Durham and York, that employ best available control technology for air pollution, would be unlikely to impact the health of local residents or the environment.

Table 1. Summary of environmental surveillance practices on a country-by-country basis for incineration. An X was used to denote a government requirement – either legislated or as part of individual facility operating requirements.

<table>
<thead>
<tr>
<th>Country</th>
<th>Continuous Stack Monitoring</th>
<th>Periodic Stack Testing</th>
<th>Periodic Ambient Air Monitoring</th>
<th>Municipal Waste Incinerators Monitoring</th>
<th>Soil Monitoring</th>
<th>Vegetation Monitoring</th>
<th>Agricultural Product Monitoring</th>
<th>Human Biomonitoring</th>
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</table>
STUDY TEAM RECOMMENDATIONS FOR ENVIRONMENTAL SURVEILLANCE OF THE DURHAM/YORK EFW FACILITY

Globally the government legislative requirement for environmental surveillance of incineration facilities is continuous and periodic testing of chemical emissions at the stack. The adoption of this level of surveillance for a modern incineration facility, that would incorporate best available pollution control technology (BACT), was deemed by the Study Team to be scientifically justified to ensure the protection of both human and environmental health. Continuous stack monitoring of a limited number of chemicals (e.g., NOx and SO2) are used as surrogates for other chemical parameters between periodic manual stack testing events. This level of environmental surveillance ensures that the facility is operating within its purported emissions control limits for all chemicals.

In the event that continuous stack monitoring highlights an issue with the facility emissions in real-time, the source of the problem is identified. If the problem is combustion related, the operators adjust combustion parameters to correct the issue in real-time. If the problem is not combustion related, then it is possible that the unit where the problem lies can be shut-down until the problem is rectified. Exceedances of emissions limits would be required to be reported to the Ontario Ministry of the Environment (MOE). It would be the responsibility of the MOE to verify that proper steps have been taken to rectify the issue with facility operators.

The Study Team originally envisioned the inclusion of an initial cost estimate for each of the environmental surveillance options. However, it became apparent during the review process that inclusion of costs could potentially bias the selection of a scientifically-based optimal option for the protection of public and environmental health. Therefore, costs were excluded from consideration in this review and can be provided once a preferred option is adopted by Durham Regional Council.

Through the grey literature review and external contact survey, another key component to environmental surveillance of incineration facilities was reported to be the establishment of an independent facility-specific oversight committee. In 2008, as part of the Durham/York Residual Waste Study a Site Liaison Committee (SLC) was established to review and provide input on site-specific studies related to the study of the proposed EFW facility. A new committee will be established once the facility is operational.

Regardless of which environmental surveillance option is ultimately put in place, it is proposed by the Study Team that this committee be charged, in part, with review of any environmental surveillance program being undertaken for the Durham/York EFW facility. This would ensure public participation in the environmental surveillance program and evaluation of its efficacy in protecting public and environmental health.

Supported by the scientific findings of our review, the Study Team recommends that the following three environmental surveillance options be considered for implementation by the Regions of Durham and York for their proposed EFW facility.
Option 1 – Chemical Emissions Stack Monitoring and Testing

Option 1 a) Compliance with Ontario Guideline A-7 Combustion and Air Pollution Control Requirements for New Municipal Waste Incinerators

This represents the minimum level of environmental surveillance and monitoring to which the EFW facility must commit. This will ensure the protection of the surrounding environment and conform to the regulatory requirements associated with the operation of such a facility in Ontario. Guideline A-7 stipulates the combustion and air pollution emissions and monitoring requirements for municipal waste incinerators operating in Ontario and forms the basis of issuing the Certificate of Approval (CoA) by the MOE.

Guideline A-7 sets out fixed emission limits for nine (9) parameters: particulate matter, cadmium, lead, mercury, dioxins and furans, hydrochloric acid, sulphur dioxide, nitrogen oxides and organic material. The facility is required to prove compliance with the standards within six months of start-up under maximum operating feed rates, and thereafter, at a minimum of once a year. This is accomplished via annual emissions sampling at the stack, under maximum operating feed rates, in accordance with the methods and procedures documented in the Ontario Source Testing Code (Procedure A-1-1).

Continuous stack monitoring of the combustion gases CO, O₂, NOₓ, HCl and SO₂ should be considered, with at a minimum annual source testing of additional contaminants such as dioxins and furans, VOCs, particulate matter, metals and PAHs. These requirements would be negotiated with the MOE and implemented through inclusion of conditions in the facility's CoA (Air).

This level of environmental surveillance allows for early detection of any potential upset conditions, which can be corrected by facility operators or result in shut-down if stack emissions are above those permitted in the CoA. A robust, continuous stack monitoring of combustion gases, in combination with annual source testing would ensure that chemical concentrations used in the risk assessment are being achieved. This level of environmental surveillance was found to be in place at all incineration facilities in the EU, US and Canada.

Option 1b) Establishment of More Stringent Stack Chemical Emissions Standards than Provided in Guideline A-7

Based on a motion passed at Durham Regional Council, the Request for Proposal (RFP) for vendors stipulates that the lower of the Ontario Guideline A-7 or EU Directive chemical emissions standards will form the basis for the proposed CoA governing emissions limits for the facility (Table 2). This level of environmental surveillance would provide an additional level of protection for humans and the environment surrounding the proposed facility.

Table 2. The Regions' air emissions criteria based upon the MOE and EU air emissions requirements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units (1)</th>
<th>YD EFW Stack Emission Limits</th>
<th>Measurement Basis (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Particulate Matter</td>
<td>mg/Fm³⁴</td>
<td>9</td>
<td>(2)</td>
</tr>
<tr>
<td>Sulphur Dioxide (SO₂)</td>
<td>mg/Fm³⁴</td>
<td>35</td>
<td>(3)</td>
</tr>
<tr>
<td>Hydrogen Chloride (HCl)</td>
<td>mg/Fm³⁴</td>
<td>9</td>
<td>(4)</td>
</tr>
<tr>
<td>Hydrogen Fluoride (HF)</td>
<td>mg/Fm³⁴</td>
<td>0.92</td>
<td>(4)</td>
</tr>
<tr>
<td>Nitrogen Oxides (NOₓ)</td>
<td>mg/Fm³⁴</td>
<td>150</td>
<td>(4)</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>mg/Fm³⁴</td>
<td>45</td>
<td>(4)</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>µg/Fm³⁴</td>
<td>15</td>
<td>(2)</td>
</tr>
<tr>
<td>Cadmium (Cd)</td>
<td>µg/Fm³⁴</td>
<td>7</td>
<td>(2)</td>
</tr>
<tr>
<td>Cesium + Thallium (Cs + Th)</td>
<td>µg/Fm³⁴</td>
<td>46</td>
<td>(2)</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>µg/Fm³⁴</td>
<td>50</td>
<td>(2)</td>
</tr>
<tr>
<td>Selenium (Se, Te, Mo, Pb, Cr, Cu, V, Mn, Sn)</td>
<td>µg/Fm³⁴</td>
<td>400</td>
<td>(2)</td>
</tr>
<tr>
<td>Dioxins</td>
<td>µg/Fm³⁴</td>
<td>50</td>
<td>(2)</td>
</tr>
<tr>
<td>Organic Matter (as CH₄)</td>
<td>mg/Fm³⁴</td>
<td>48</td>
<td>(2)</td>
</tr>
</tbody>
</table>

NOTES:

(1) *= All units are corrected to 11% O₂ and adjusted to Reference Temperature and Pressure. mg/Fm³⁴ = Milligrams per Reference Cubic Metre (25°C, 101.3 kPa), µg/Fm³⁴ = Micrograms per Reference Cubic Metre (25°C, 101.3 kPa), µg/Fm³⁴ = Micromegagrams per Reference Cubic Metre (25°C, 101.3 kPa). (2) Calculated as the arithmetic average of 3 stack tests conducted in accordance with standard methods. (3) Calculated as the geometric average of 24 hours of data from a continuous emission monitoring system. (4) Calculated as the arithmetic average of 24 hours of data from a continuous emission monitoring system.
Option 1c) Inclusion of New Stack Sampling Technology for Dioxins and Furans not Routinely Implemented in Ontario EFW or Incineration Facilities

Stack emissions of dioxins and furans have historically been measured by periodic stack testing (along with other contaminants of concern). Since there is a heightened public awareness of dioxin and furan emissions from EFW facilities, a considerable amount of research has been focused on development of methods for more frequent sample collection and analysis of stack emissions of dioxins and furans.

Technology now exists for continuous sampling (not monitoring) of dioxins and furans in stacks. In-stack dioxins and furans concentrations are sampled for a period of time at regular intervals (e.g., once a month, quarterly, or semi-annually). The sample media is removed, sent for laboratory analysis of dioxins and furans and replaced in the stack. The advantage of this technology is that more frequent sampling of dioxins and furans can be achieved for an EFW facility.

Based on a motion passed at Durham Regional Council, the Request for Proposal (RFP) for vendors stipulates that some form of continuous dioxins and furans sampling and periodic analysis must be included in the design and operation of the proposed EFW facility.

Although this technology was not included as part of this review, the Study Team believes that it would provide additional information to ensure that dioxins and furans concentrations used in the risk assessment are being achieved.

ADDITIONAL LEVELS OF ENVIRONMENTAL SURVEILLANCE NOT RECOMMENDED BY THE STUDY TEAM

Although the Study Team concluded that the most scientifically defensible environmental surveillance option to ensure the protection of public and environmental health was stack monitoring and testing (Option 1), there are additional environmental surveillance options being employed around the world at individual incineration facilities.

These options include:

- Option 2: ambient air monitoring;
- Option 3: environmental monitoring (soil, vegetation, agricultural products); and,
- Option 4: human biomonitoring.

During the review, the Study Team concluded that a modern municipal waste incinerator that would employ the best available pollution control technology (BACT), would not significantly increase contaminant levels in the environment. This was supported by the scientific literature, the grey literature and the external contact interview process.

Studies that reported significant increases of pollutants in environmental media were predominantly conducted on older incineration facilities, and in many cases on those facilities that had different feedstock (e.g., hazardous waste) than would be permitted for the municipal waste incinerator proposed for Durham/York. To date, human biomonitoring studies have not reported a statistical increase in human tissue chemical concentrations as a result of exposure to a municipal waste incinerator.

The impetus for these environmental surveillance programs was reported to be a combination of academic interest and/or a heightened level of public concern surrounding an individual facility. Scientific methods used to gauge public concern surrounding these facilities were not reported, and did not appear to have been carried out by the authors or government officials. The Study Team acknowledges that these are indeed valid societal reasons for policy makers to trigger additional levels of environmental surveillance. However, we believe that it
was not appropriate for the Study Team to presuppose or gauge the level of public concern surrounding the Durham/York proposed EFW facility.

If based on perceived public concern, policy makers believe that an additional level of environmental surveillance is warranted, we recommend that this be supported through scientific means such as a polling exercise. Experts in this area of study should be retained by the Regions to develop an appropriate tool for such an assignment.

Although not recommended for implementation, the Study Team has provided a range of additional surveillance options, with each successive level also intended to include all preceding options. Recommendations for what would trigger a more resource intensive surveillance program have been also been included for consideration.

CONCLUSIONS OF THE STUDY

A considerable amount of information on best practices in environmental surveillance for incineration facilities from around the world was obtained through a systematic literature review (Section 3), grey literature search (Section 4) and external contact interview process (Section 5). The legislated or government mandated requirements of environmental surveillance were summarized in Section 6.

Overall, there was a great deal of consistency between the environmental surveillance options (Figure 2-1) reported in the scientific literature, the grey literature and through external contact interviews with experts in the field. On this basis, the Study Team believes that it is unlikely that additional information may have been missed during this review, which would alter our findings, conclusions or recommendations.

Ultimately the review determined that a modern municipal waste incinerator that would employ the best available pollution control technology (BACT) would not significantly increase contaminant levels in the environment. This was supported by the scientific literature, the grey literature and the external contact interview process.

Therefore, the most appropriate and scientifically justified option for environmental surveillance of an EFW facility to be located in the Region of Durham would involve continuous and periodic stack testing of chemical emissions (Option 1). This environmental surveillance option was also found to be the most prevalent method of ensuring public and environmental health protection in Canada, countries of the European Union, and the United States.

In addition to meeting the minimum stack emissions requirements laid out in Guideline A-7, the Study Team supports the decision of Durham Regional Council to:

- Adopt the more stringent of the Guideline A-7 and EU Directive chemical emissions standards; and,
- Implement an in-stack dioxins and furans sampling technology.

These measures go beyond any requirements that would have been derived from our review.

Another key component to environmental surveillance of incineration facilities was reported to be the establishment of an independent facility-specific oversight committee. It is proposed by the Study Team that such a committee be formed and charged, in part, with review of any environmental surveillance program being undertaken for the Durham/York EFW facility. This would in no way remove the onus of facility regulation from the Ontario Ministry of the Environment. Rather, it would ensure public participation in the environmental surveillance program and evaluation of its efficacy in protecting public and environmental health.

The findings of the review do not justify implementation of ambient air monitoring (Option 2) or environmental monitoring (soil, vegetation, agricultural products) (Option 3). In addition, we would strongly recommend that human biomonitoring (Option 4) not be adopted for the proposed Durham/York EFW facility. The Study Team does not believe that there would be any trigger that would justify the need for this level of environmental surveillance.
Environmental & Occupational Health Plus Inc.

Health Impact Evaluation and Issues Management

March 1, 2009

Dr. Robert Kyle  
Commissioner and Medical Officer of Health  
Durham Region  
605 Rossland Road  
Whitby, ON L1N 6A3

Dear Doctor Kyle,


My detailed comments and annotations within the report were provided in January 2009. My current review (a reexamination of the amended report) is more focused on the changes made to accommodate my comments and on any additional analysis or new material which may have affected the final conclusions.

I found the current report a great improvement over the Draft in focus, organization and clarity. The executive summary reflects faithfully the work presented within the report. Its visual presentation is highly effective in that the insets provide a crisp summary finding of the chapter. The report now excludes redundant information which does not derive from the searches and interviews. It separates “findings” from “inferences”.

It was clear to me upon reading the Draft Report (and selected references) that the literature supports that Option 1 reflects the appropriate and most prevalently practiced surveillance that protects humans and the environment. It is also concordant with Ontario regulatory requirements.
I agree with a choice of option 1 as optimal and deriving from the Jacques Whitford review. The community living around this facility and public at large would not be at risk from the public health perspective if this surveillance option were chosen.

The decision of Durham Regional Council to adopt the more stringent of the Guideline A-7 and EU Directive chemical emissions standards and to implement an in-stack PCDD/F sampling technology is concordant with a highly protective approach to health and environment in the region.

In conclusion, I agree with the final recommendations provided in this report. They are strongly supported by this comprehensive literature review, wide consultation, and by the scientific framework used in this project to ensure that humans and the environment are protected while in coexistence with a state of the art energy from waste facility such as is planned for Durham region.

Sincerely yours,

Signed copy to be sent by mail

Lesbia F. Smith, MD
Health Consultant
Environmental & Occupational Health Plus Inc.
Comments from Lesbia F. Smith, Peer Reviewer

Introduction

This narrative comprises my review of the Final report: Review of International Practices of Environmental Surveillance for Energy-From-Waste Facilities by Jacques Whitford. A previous review of the Draft Report provided extensive comments which were incorporated into this Final Report. As they were incorporated, this review is therefore shorter and focused exclusively on this final product.

My overall reading found a few minor errors of language and spelling which are outlined at the end. These are trivial and do not take away from this report content and quality which are overall a great improvement on the draft with respect to focus, organization and clarity.

The focus was entirely the reporting of the search, analysis, and findings with selection of a preferred option that derives from the processes undertaken. The objective was to see what was done elsewhere and to find out what is the best option that is both supported by practices and state of the art science. The objective was achieved.

Structure/Organization

The organization was improved considerably with the tightening up of the options discussion and the presentation of the results of each search, interviews and supplementary information.

Report clarity, precision, language and brevity

I thought the report is very clear. Language is now precise and has been tightened considerably. The graphical presentation of summaries in a box within each section provides easy access to the content and conclusion. The presentation of tables summarizing findings is also very useful in understanding the large amount of information gathered.

Content

Methodologies

Peer review of the report by Jacques Whitford
Review of International Practices of Environmental Surveillance for Energy-From-Waste Facilities - Project no. 1009497.06
1/28/2009
The contractors have made a colossal effort to gather information relevant to surveillance of energy from waste facilities. The authors cast a wide net in their search of the literature. The methodology is carefully outlined and followed. Search terms are used accurately and reflect the objectives and tasks. The “output” of the searches is very well documented. The use of material on facilities operating after 1998 is justified, but comments on the experience of older facilities were also useful.

The assessment frameworks for each of the publications are clear.

The search for grey literature and the verification of certificates of approval and compliance for potentially relevant Ontario facilities added a measure of completeness of the literature examination.

The contact procedures - methods of seeking, contacting, and following up on contacts for interview were thorough. It is not surprising that some people did not respond despite persistent attempts to contact them. This is not a failure of the authors and it is commonly the case. The authors were able to contact the most prolific contributors to the literature, as well as those involved with grey literature, so I consider this effort successful.

The use of a standard to assess each of the reports ensured that evidence could be classified into good quality and poor quality. Therefore, recommendations (or options) coming forward from the stronger evidence can provide a higher level of confidence that the action will do what it is supposed to do.

The evaluation of different types of studies, purely environmental, or purely human, were evaluated within a credible and well organized published framework (GRADE and the evaluation framework used in the September 2008 report).

Studies were examined carefully, and conclusions from the author, additional comments, and implications for this (Durham) facility were very well incorporated.

Their final evaluation of epidemiological studies of health of communities around EFW facilities now includes a weight of evidence approach that supported options about surveillance.

As for clarity, the authors did well to consolidate the results of several publications which were relevant to one facility and to assess the overall results, rather than single publications in isolation. This resulted in synthesized information relevant to one facility or singular programs that better supports the options.

This level of completeness and thoroughness of assessment should be reassuring to the clients that as much literature was found as possible to shed light on the question of what

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Peer review of the report by Jacques Whitford
Review of International Practices of Environmental Surveillance for Energy-From-Waste Facilities - Project no. 1009497.06
1/28/2009
is the most appropriate surveillance for EFW facilities from the technical and public health perspective.

Options deriving from the review

The options offered arise from the literature and informant review. The options provided are an orderly progression from the regulatory basic requirements to more complex approaches applied to specific circumstances where public concern was a driving force.

Preferred option 1 derives clearly from the experience published in the literature presented, and is concordant with the framework of emissions and operations surveillance.

The regulatory basic option, Option 1a - Compliance with Ontario Guideline A-7 Combustion and Air Pollution Control Requirements for New Municipal Waste Incinerators is sound and is concordant with the literature and Ontario requirements. That is, those EFW facilities must conform to the country's regulations (e.g., Spain, Belgium, Germany, Italy-- usually EU standards).

Option 1b - An enhanced option 1 - Establishment of More Stringent Stack Chemical Emissions Standards than Provided in Guideline A-7; the specific chemicals that differ from the A-7 guideline. These may be of particular environmental concern such as mercury. This may be consideration if there is a possibility that these substances are potentially present in the waste.

Option 1c - Inclusion of New Stack Sampling Technology for Dioxin and Furans not Routinely Sampled in Ontario EFW or Incineration Facilities - is also concordant with the literature and with state of the art technology. This represents and added level of surveillance (of operations).

The added programming continuous (sampling of) stack emissions resonates with both state of the art technology and with the public's need for constant oversight. The public must understand that continuous monitoring means continuous sampling and periodic analysis, not continuous analysis and reporting.

The role of human biomonitoring is placed in perspective for its application as a research tool with stated research objectives, planning and oversight.

Some selected typos and errors:

Page 1 main report “tenant” should be “tenet”

In the summary boxes, several incidents of the word “establishing” should be “establish”. All the boxes should be checked for spelling before printing.

Peer review of the report by Jacques Whitford

Review of International Practices of Environmental Surveillance for Energy-From-Waste Facilities - Project no. 1009497.06

1/28/2009
A multidisciplinary team of professionals WAS assembled to undertake this study and an independent peer review of the study by Dr. Lesbia Smith was commissioned by the Region of Durham.

P 46 Relevance to Current Study This study did not ESTABLISH a causal link between emissions of PCDD/F from incinerators and monitored human breast milk levels.

P 49 Relevance to Current Study This study did not ESTABLISH a causal link between emissions of PCDD/F from a modern hazardous waste incineration facility and monitored human blood serum levels.

P 52 Relevance to Current Study This study shows that although PCDD/F concentrations were measurable in air after start-up of the MWI facility, the levels were not statistically significant THIS NEEDS .....different from what?

3.2.3.4 Overall Summary of Human Biomonitoring Studies
In summary, the results of the systematic review of the scientific published literature indicate that there is not a significant relationship between exposure to chemical emissions from incinerator and measured chemical levels in human media such as blood, urine, breast milk and hair. With regard to PCDD/Fs, the most commonly referenced chemical assessed in the studies, authors noted occasional differences in individual PCDD/F congeners and measured samples. Congener analysis can be important as it may be possible to correlate a particular individual congener emitted from an EFW facility to those found in exposed residents. However, no two congeners are the same, and some are more or less toxic than others. The toxic equivalent (TEQ) is thus a useful measure, as it provides a single, cumulative number based on the relative toxicity of each congener.

P 49-50 and others where fingerprint mention is made

We use the total TEQ to determine the total toxic impact. However, when a target fingerprint is the same is the fingerprint from a facility emissions and different from other target fingerprints, it has to be inferred that the impact is actually from the facility even though the total toxicity impact may be the same. The logical inference when two fingerprints match is that the source of the exposure is the facility but the total toxicity impact is null. This should be made very clear if in future there should be a request for such efforts as fingerprinting as a form of additional spot surveillance.
DURHAM NUCLEAR HEALTH COMMITTEE (DNHC)

REVISED TERMS OF REFERENCE

SCOPE

The DNHC shall act as a forum for primarily discussing and addressing radiological emissions from nuclear facilities in Durham Region to assess the potential environmental human health impacts and may include, from time to time, other related topics of mutual interest.

MANDATE

1. To review, discuss, and improve DNHC’s understanding of the radiological environmental performance of nuclear facilities and nuclear waste disposal sites in Durham Region and the issues which govern them.

2. To collect, monitor, analyze, discuss, summarize and/or form opinions about available information, including that pertaining to environmental assessments, regarding the possible environmental and human health effects of the radiological emissions from the local nuclear facilities, nuclear waste disposal sites and transportation of nuclear waste and to disseminate the results of this work to the public.

3. To identify deficiencies in information about radiation and human health and to advocate for appropriate research to be conducted in order to effectively address these deficiencies.

4. To review and discuss unusual incidents at local nuclear facilities or other facilities using, generating or storing radioactive material that may have adverse environmental and human health consequences.

5. To address and resolve specific issues and concerns which may be related to, associated with, or caused by radiological emissions from the nuclear facilities and nuclear waste disposal sites that are referred to the DNHC by the public, including local governments, health professionals, etc. or otherwise comes to the DNHC’s attention.

6. To maintain an awareness of new or refurbished nuclear facilities in Durham Region and their potential environmental and health effects.

7. To review, discuss, and, if necessary, advise about emerging issues that may be associated with environmental and human health.

8. To review the status of the Regional Nuclear Emergency Plan annually.
9. The following subjects shall not be components of the DNHC’s mandate:

   a) Occupational health and safety
   b) Nuclear power as an energy option
   c) Major nuclear accidents

ACCOUNTABILITY

1. The DNHC shall report through the Commissioner & Medical Officer of Health to the Health & Social Services Committee and the Regional Council.

2. The Regional Council shall advocate on behalf of the DNHC and shall forward information and recommendations to other local governments, the Government of Ontario, Ontario Power Generation, and the Government of Canada (including the Canadian Nuclear Safety Commission), and other related and/or interested persons and bodies.

COMPOSITION

The DNHC shall be composed of the following representatives (or designates):

1. From the Regional Municipality of Durham:

   a) Commissioner & Medical Officer of Health
   b) Director, Environmental Health
   c) Epidemiologist

2. From Ontario Power Generation:

   Two representatives familiar with environmental and health issues at Darlington and Pickering Nuclear Generating Stations

3. From the public:

   Nine public members who reside in either Ajax, Clarington, Oshawa, Pickering, or Whitby, and, if possible, two of whom each reside in Ajax, Clarington, and Pickering.

4. From the Government of Ontario:

   One representative from the Ontario Ministry of the Environment

5. From the University of Ontario Institute of Technology

   One representative from the School of Energy Engineering and Nuclear Science
The DNHC shall also invite individuals and representatives from bodies to attend and/or participate in its meetings, including representatives from:

a) Atomic Energy of Canada Limited – Low Level Radioactive Waste Management Office
b) Canadian Nuclear Safety Commission
c) City of Pickering
d) Durham Region Emergency Management Office
e) Greenpeace Canada
f) Health Canada
g) Nuclear Waste Management Organization
h) Municipality of Clarington
i) Ontario Power Generation
j) Ontario Ministry of Energy and Infrastructure
k) Ontario Ministry of Health and Long-Term Care
l) Ontario Power Authority
m) Public Health Agency of Canada
n) Town of Ajax

MEETINGS

1. Meetings shall be chaired by the Commissioner & Medical Officer of Health or designate.

2. A quorum shall consist of nine members.

3. The DNHC shall reach decisions normally by consensus.

4. The DNHC shall establish the dates, times, and places of subsequent meetings, normally at the conclusion of each meeting. Meetings shall normally be held at least five times per year.

5. The Commissioner & Medical Officer of Health shall appoint a Secretary to the DNHC to be responsible for ensuring that agendas and minutes are recorded and distributed, a suitable meeting place is secured and speakers/presenters are confirmed.

TECHNICAL SUPPORT

1. When appropriate, the representatives of Ontario Power Generation and governmental/regulatory bodies shall ensure that all studies and other information relevant to the DNHC’s mandate are made available to the DNHC.

2. When appropriate, the representatives of Ontario Power Generation shall ensure that all relevant technical reference material (e.g., nuclear and environmental performance and radiological emission data) is presented to the DNHC using a readily understandable format.
EVALUATION

The DNHC shall review its Terms of Reference and shall evaluate its effectiveness at least biennially.

NOVEMBER 2008
Meeting: GENERAL PURPOSE AND ADMINISTRATION COMMITTEE
Date: April 4, 2011
Resolution #: GPA-297-11 By-law #: N/A
Report #: PSD-033-11
File #: PLN 33.3.10
Subject: DURHAM/YORK RESIDUAL WASTE PROJECT
INTEGRATED WASTE MANAGEMENT COMMITTEE

RECOMMENDATIONS:

It is respectfully recommended that the General Purpose and Administration Committee recommend to Council the following:

1. THAT Report PSD-033-11 be received;

2. THAT a copy of Report PSD-033-11 and Council's decision be forwarded to the Region of Durham, the Region of York, and the Ministry of Environment;

3. THAT Attachment 2 the revised terms of reference for the EFW Waste Management Advisory Committee be endorsed as Clarington's comments and suggestions for the terms of reference; and

4. THAT all interested parties listed in Report PSD-033-11 and any delegations be advised of Council's decision.

Submitted by: 
David J. Crome, MCIP, RPP
Director of Planning Services

Reviewed by: 
Franklin Wu,
Chief Administrative Officer

FL/sn/df
28 March 2011
1.0 BACKGROUND

1.1 At the February 3, 2011 meeting Regional staff presented 2011-J-15 to the Joint Finance and Administration and Works Committee. One of the recommendations of the report was that the terms of reference for the Integrated Waste Management Committee (Attachment 1) be forwarded to the Municipality of Clarington for input prior to consideration by Regional Council. Report 2011-J-15 was tabled; however, Regional and local staff met with regard to the terms of reference to discuss the issues and work towards an agreed upon terms of reference.

2.0 ISSUES WITH THE TERMS OF REFERENCE

2.1 Clarington Staff have suggested a number of changes to the terms of reference including:
   - clarify the mandate and purpose of this committee,
   - membership composition (e.g. who would make appointments),
   - the reporting relationship,
   - length of appointments to the committee,
   - election of the committee officers,
   - timing of the publication of the draft minutes, and
   - the name of the committee.

2.2 Attachment 2 to this report is a revised terms of reference that Regional Staff and Clarington Staff are for the most part in agreement on.

2.3 The one item of contention between the Regional and local staff is the appropriate name for the committee, Clarington is suggesting EFW-WMAC which would be Energy From Waste – Waste Management Advisory Committee. Clarington staff believe it is important to relate the committee and its mandate to the EFW and not just as a committee to address all manner of issues related to the waste management system operated by the Region.

3.0 REPRESENTATION ON EFW-WMAC

3.1 Once the terms of reference for the committee are approved by Regional Council, Clarington will advertise and appoint the public members that will represent Clarington on this Committee. In addition to the public members, Clarington Ward 1 local and regional Councillors are non-voting members as is a Clarington Staff representative.

3.2 At this time, it can be assumed that the staff representative will either be the Manager or Senior Planner for the Special Projects Branch in Planning Services. However, given the mandate of the committee and the items that may be brought forward, other staff members from Operations and/or Engineering Services may be more
appropriate, this can be evaluated and adjusted over time. As the Staff position is a non-voting member it does not require formal appointment by Council.

4.0 OTHER EFW RELATED COMMITTEES

4.1 The EA Approval for the EFW facility contained a number of requirements with regard to Committees and working groups. Some of these working groups will be staff driven, the meetings would be held during the day and not be open to the public. For instance, staff have been asked to sit on the Ambient Air Monitoring and Report Plan Working Group which will be developing the plan for monitoring and reporting. The actual monitoring and reporting is part of the role of the EFWAC.

4.2 The Site Plan application requires a number of meetings, again they are staff driven, held during the day and not open to the public. A number of meetings have taken place and will continue to until work on details of the site plan are satisfactory. When the plans have reached a stage of finalization they will be presented to Council.

5.0 CONCLUSIONS

5.1 The clarification to the mandate and purpose of the EFW-WMAC committee has been agreed to by Regional and local staff. The draft in Attachment 2 is more closely aligned with the purpose, as envisioned in the Host Community Agreement.

5.2 The revised terms of reference (Attachment 2) are similar to the terms of reference for the previous EFW Site Liaison Committee, which it is intended to replace, with regard to reporting relationship and membership composition.

5.3 The other revisions to the terms of reference will assist with the functioning of the committee.

5.4 Staff are recommending Council adopt the terms of reference with the understanding that Regional Council has yet to adopt the terms of reference and is the ultimate approval agency for the terms of reference.

Staff Contact: Faye Langmaid

Attachments:
Attachment 1: IWMC terms of reference from 2011-J-15
Attachment 2: Revised EFW-WMAC Terms of Reference
Attachment 3: Report 2009-COW-01 (referred to in Attachment 1 and Attachment 2)

List of interested parties to be notified of Council’s decision:
Mirka Januszkiewicz - EFW Project Team
Gavin Battarino, Ministry of the Environment
Wendy Bracken
Tracey Ali

Kerry Meydan
Doug Anderson
Linda Gasser
1. **Purpose**

The Integrated Waste Management Committee (IWMC) is established to provide a forum for public and other stakeholders to monitor, review and liaise with the Regional Municipality of Durham (Durham) on the Integrated Waste Management System with a focus on Energy from Waste (EFW). The IWMC will satisfy the HCA and the Medical Officer of Health's report 2009-COW-01 obligations. Integrated Waste is a holistic approach to managing and understanding all materials in the waste stream and their place in the four R's regime: reduce, reuse, recycle, and recover.

**Mandate**

The IWMC will act in an advisory role to the Joint Regions-Contractor Committee on issues or concerns which arise with waste diversion, waste management and environmental performance and monitoring of the EFW Facility, including the design, construction and operational phases, and other related strategic waste diversion and management issues.

The IWMC will be comprised of volunteers recommended by the Joint Regions-Contractor Committee, reporting to the Works Committee and appointed by Regional Council in accordance with the following Terms of Reference.

2. **Scope of Activities**

The issues that the IWMC may discuss and address information relevant to Durham's waste diversion programs, EFW Facility and disposal include, but are not limited to:

a) Review, discuss and improve IWMC's understanding of the environmental performance of the waste diversion, waste management and EFW facilities, and the requirements which govern them.

b) Review, discuss, summarize and/or provide opinions about available information, including that pertaining to diversion objectives, environmental surveillance programs, independent environmental testing, public reporting of environmental surveillance data, environmental performance of the EFW Facility, and other related strategic waste management issues.
c) Identify and assess/study specific issues and concerns which may be related to or associated with the EFW or other waste management facilities, which are referred to the IWMC by the public, local governments, health professionals, etc., or otherwise comes to the IWMC’s attention and to relay findings to the Joint Regions-Contractor Committee.

d) Assist with the development and implementation of community outreach activities which support the growth and environmental awareness and appreciation in Durham in co-operation with other organizations where appropriate. This may include holding public information sessions, educational workshops and participating in some community events.

e) Review and discuss matters of public interest in Solid Waste Management and advice about emerging issues that may be associated with environmental and human health.

f) Facilitate communication between stakeholders, and the Joint Regions-Contractor Committee.

g) Provide forum for the residents to bring their concerns/questions or suggestions pertaining to the waste diversion programs and waste management facilities.

3. Composition

The IWMC will be comprised of volunteers selected at large from Durham reporting to the Joint Regions-Contractor Committee in accordance with the following Terms of Reference, until its dissolution.

The IWMC will be comprised of nine members. Members shall not hold elected office (municipal, provincial or federal) and will be selected from Durham.

All members are regarded as individuals and do not represent their respective employers or advocacy group in their capacity as an IWMC member.

4. Membership

Membership shall consist of nine (9) residents from Durham.

The IWMC must notify the Joint Regions-Contractor Committee of the need to seek replacement members. Members will be replaced in accordance with membership selection process outlined in Section 5 and/or 6 of these Terms of Reference.

Non-attendance for three consecutive meetings will be considered grounds for replacement.
Invitations to attend IWMC meetings will be provided to the following:

- Staff representative from Durham's Works Department
- Staff representative from Durham's Health Department
- Staff representative from the Municipality of Clarington
- Staff representative from the Ministry of the Environment
- Senior staff representative of the Facility's DBO contractor and operator

5. Call for Membership

Durham will advertise the opportunity to participate in the IWMC using local newspaper advertisement within boundary of Durham. Responses will be evaluated by Durham's senior Waste Management staff and recommended for appointment by Durham's Works Committee and Durham Regional Council.

6. Eligibility Criteria/Evaluation

Interested residents from Durham must provide a detailed resume with a covering letter outlining their interest and their qualifications in being appointed on this Committee in addition to an essay of no more than 500 words as to why they should be selected for membership, and detailing their knowledge of the project.

Previous participation or experience with committees/working groups will be considered an asset.

Every potential appointee must disclose any obligation, commitment, relationship or interest that could conflict or may be perceived to conflict with his or her duties to or interests of the IWMC to which the potential appointee is seeking appointment. A conflict of interest could arise in relation to personal matters including:

- Directorships or other employment.
- Interests in business enterprises or professional practices.
- Share ownership.
- Existing professional or personal associations.
- Professional associations or relationships with other organizations.
- Personal associations with other groups or organizations, or family relationships.
7. Officers

One Chair to be appointed by the Committee within the first quarter.

One Vice Chair to be appointed by the Committee within the first quarter.

If a vacancy of any of the key roles occurs, a replacement will be appointed by the Committee.

Roles

Chair

- Shall manage and provide leadership.
- Establish and maintain a positive meeting environment.
- Make presentations as requested.
- Co-ordinate any exchange of information (advise, request for information, etc.) through the Waste Management Committee up to the Works Committee.

Vice Chair

- Shall play role of chair in his/her absence.

Durham Staff Liaison

- Shall prepare all meeting agendas, take minutes and provide to all members one week prior to the next regularly scheduled meeting.
- Shall keep a current and accurate statement of all expenses.
- Shall advertise each meeting in Durham area newspapers and update the website by posting approved minutes, annual reports and any other important meeting correspondence.

8. Support Services

The Waste Management division of Durham's Works Department will appoint a staff liaison to the IWMC to provide administrative, procedural and technical support to the IWMC.

The liaison will co-ordinate all requests for advice from the IWMC through meeting agendas with Works Committee and/or Joint Works Committees.
An annual budget of $20,000 will be administered to cover operational expenses of the Committee.

IWMC members will be reimbursed for mileage expenses for attendance at IWMC meetings upon submission of an expense sheet. Any other funding requests must be submitted to the Joint Regions-Contractor Committee for consideration.

Durham will provide space on its website to post information such as meeting minutes and other information which is deemed important.

Upon request, the representatives of the Regions, Contractors and governmental/regulatory bodies shall ensure that all studies and other information relevant to the IWMC's mandate are made available to the IWMC.

9. Meetings/Resolutions

The IWMC shall meet quarterly throughout the year and run concurrently with Durham Regional Council. Meeting dates must be determined such that they are synchronized with other committees. The meeting location may be subject to change once the EFW Facility is operational and providing space is available. The IWMC will establish a meeting schedule at its inaugural meeting. The IWMC shall provide the Joint Regions-Contractor Committee with a meeting schedule once times and dates have been established. The Committee may choose to adjust the schedule, however, must ensure that one meeting will be held per quarter. Additional meetings may be held at the request of the IWMC Chair. All meetings will be advertised and any changes to the dates must be published two weeks in advance of the proposed meeting.

All meetings will be open to the public and are subject to the Regional Procedural By-law # 20-2009.

All decisions made by the IWMC will be based on a majority vote and a quorum must consist of 50 per cent plus one of the members.

10. Delegations to Meetings

Any person wishing to appear as a delegate to the IWMC must submit a written request two weeks prior to the IWMC staff liaison advising of the topic on which they wish to speak to be included in the agenda. The staff liaison will forward information to the IWMC Chair. The Chair may determine if the delegation is relevant or ask the members to vote to hear or refuse a delegation which is considered non-relevant. Materials presented for any delegation must be provided one week beforehand.
11. Minutes and Agendas

Minutes from any prior IWMC meeting will be reviewed and approved at the subsequent meeting.

Agendas should be prepared and amended in advance of upcoming meetings to enable input from other members. Once the minutes have been reviewed and approved by the members, they should be forwarded to the Joint Regions-Contractor Committee and posted on the designated website for public information.

Minutes will be received as correspondence at the Durham Works Committee.

12. Annual Reports

An annual report summarizing the activities completed in the previous year shall be prepared by the IWMC and the staff liaison and forwarded to the Joint Regions-Contractor Committee. The report should include any suggested revisions to the Terms of Reference.

The Chair of the IWMC will present their annual report, and any additional reports as requested to the Joint Regions-Contractor Committee.

An annual review of the IWMC will be completed by the Joint Regions-Contractor Committee to determine the effectiveness of the Committee and ensure continued improvement.

13. IWMC Dissolution

The Committee can be dissolved at any time by the members in recognition that the requirements of Durham Report 2009-COW-01 and Host Community Agreement have been fulfilled and there is no need to continue or upon the decommissioning of the Facility.
1. Purpose

The EFW-Waste Management Advisory Committee (EFW-WMAC) is established to provide a forum for public and other stakeholders to monitor, review and liaise with the Regional Municipality of Durham (Durham) on the Energy from Waste (EFW) facility including the how the waste is being sorted prior to arriving on-site. The success of the EFW facility will depend on the diversion measures and waste separation (waste management) that happens at the transfer stations and curb-side. The EFW-WMAC is being established to satisfy the Host Community Agreement (HCA) with the Municipality of Clarington and the Medical Officer of Health's Report 2009-COW-01 obligations (attached).

Mandate

The EFW-WMAC will act in an advisory role to the Durham Works Committee on issues or concerns which arise with waste diversion, waste management, environmental performance and monitoring of the EFW Facility, including the construction and operational phases.

The EFW-WMAC will be comprised of volunteers from the Region of Durham appointed by Regional Council and Clarington Council in accordance with the following Terms of Reference.

2. Scope of Activities

The scope of activities that the EFW-WMAC may undertake include, but are not limited to:

a) Review, discuss and improve understanding of waste diversion and management that occurs before the waste arrives at the EFW facility.

b) Review, discuss, summarize and/or provide opinions about available information, environmental surveillance programs, independent environmental testing, public reporting of environmental surveillance data, environmental performance for the EFW facility (as outlined in the Medical Officer of Health’s Report 2009-COW-01).

c) Identify, assess and study specific issues/concerns which may be related to or associated with the EFW facility or feeder waste management.
system, including issues referred to the EFW-WMAC by the public, local
governments, health professionals, etc., or that otherwise come to the
EFW-WMAC's attention and to relay findings to the Works Committee.

d) Advise on the development and implementation of community outreach
activities which support the growth and environmental awareness and
appreciation in Durham in co-operation with other organizations where
appropriate. This may include public information sessions, educational
workshops and participating in some community events.

e) Review and discuss matters of public interest regarding the EFW facility
and its processes, policies and operation. Advise on emerging issues
that may be associated with environmental and human health.

f) Facilitate communication between stakeholders.

g) Provide a forum for the residents to bring their concerns/questions or
suggestions pertaining to the EFW facility.

3. Composition

The EFW-WMAC will be comprised of volunteers selected at large from Durham
in accordance with these Terms of Reference.

The EFW-WMAC will be comprised of nine members. Members shall not hold
elected office (municipal, provincial or federal).

All members are regarded as individuals and do not represent their respective
employers or advocacy group in their capacity as an EFW-WMAC member.

Members will be appointed for a two (2) year term and can be for a maximum of
three (3) consecutive terms. Appointments will be staggered to provide
continuity for the committee.

4. Membership

Membership shall consist of nine (9) residents from Durham.

Five (5) residents will be appointed by Durham Regional Council.

Four (4) residents will be appointed by Clarington Council.

The EFW-WMAC will notify the Works Committee or Clarington, as the case may
be, of the need to seek replacement members. Members will be replaced in
accordance with membership selection process outlined in Section 5 and 6 of
these Terms of Reference.
Non-attendance for three consecutive meetings will be considered grounds for replacement.

Invitations to attend EFW-WMAC meetings will be provided to the following non-voting members:

- Staff representative from Durham’s Works Department
- Staff representative from Durham’s Health Department
- Staff representative from York Region
- Staff representative from the Municipality of Clarington
- Staff representative from the Ministry of the Environment
- Senior staff representative of the Facility’s DBO contractor and operator
- The Ward 1 local and regional members of Clarington Council

5. Call for Membership

Durham will advertise the opportunity to participate in the EFW-WMAC using local newspaper(s) within the boundary of Durham. Responses will be evaluated by Durham’s Senior Waste Management staff and recommended for appointment by Durham’s Works Committee and Durham Regional Council for five (5) members.

Clarington will advertise the opportunity to participate in the EFW-WMAC as a representative of Clarington, using Clarington’s process for committee appointments for four (4) members.

6. Eligibility Criteria/Evaluation

Interested residents from Durham must provide a detailed resume with a covering letter outlining their interest and their qualifications in being appointed on this Committee. The submission of additional information on why they should be selected for membership, detailing their knowledge of the EFW facility and the Environmental Assessment process and project will be considered.

Previous participation or experience with committees/working groups will be considered an asset.

Every potential appointee must disclose any obligation, commitment, relationship or interest that could conflict or may be perceived to conflict with his or her duties as part of the EFW-WMAC. A conflict of interest could arise in relation to personal matters including:

- Directorships or other employment.
7. Officers

The Chair will be elected by the Committee and serve for a two (2) year term.

The Vice Chair will be elected by the Committee and serve for a two (2) year term.

If a vacancy of any of the key roles occurs, a replacement will be elected by the Committee.

Chair
- Shall manage and provide leadership to the committee.
- Shall Chair meetings, maintaining order, while allowing for discussion and input from committee members and staff representatives.
- Shall establish and maintain a positive meeting environment.
- Shall make presentations as requested, including at least one presentation annually to Clarington Council and Durham Council.
- Shall co-ordinate any exchange of information (advice, request for information, etc.) through the EFW-WMAC to the Works Committee.

Vice Chair
- Shall act on behalf of Chair in his/her absence.

Durham Staff Liaison
- Shall prepare all meeting agendas and take minutes.
- Shall keep a current and accurate statement of all expenses.
- Shall advertise each meeting in Durham area newspapers and update the website by posting minutes, annual reports and any other important meeting correspondence.
would not be at risk from the public health perspective if this surveillance option is chosen.

17. During the EFW EA public consultation, however, a consensus has emerged that it would be beneficial to supplement stack testing with ambient air and soil monitoring, which is independently tested for a minimum period of three years in order to "ground truth" the chemical emissions predicted in the EA. This would be prudent course of action and is supported by Dr. Smith (Appendix D). Moreover, Dr. Smith advises that it would also be prudent to consider adding flora and fauna to the environmental media being independently tested if in-stack, ambient air and soil test results regularly exceed levels predicted by the SSHHRA. Finally, at the end of this three-year period, it would also be prudent to formally evaluate these additional monitoring activities to ascertain whether they are effective, useful, and if continued, what, if any, revisions need to be made. For the reasons outlined in the Best Practices Review coupled with the above supplemental testing being in place, human biomonitoring should not be used to supplement stack testing. This is also supported by Dr. Smith (Appendix D). The Health Department should be consulted prior to finalizing the environmental surveillance program and during any and all subsequent reviews.

18. The environmental performance of the proposed EFW facility should be communicated in as an accessible, accurate, open, timely, transparent, and understandable a manner as possible.

19. The environmental oversight committee recommended by Dr. Smith and JW should be independent, appointed by and accountable to the Regional Council. The Committee should be comprised of Clarington and Durham residents and representatives of the proposed EFW facility, MOE, and the Region. The Committee should assess, monitor, review, and advise the Region on the environmental surveillance program, independent environmental testing, the quality of the public reporting of emissions and environmental surveillance data, and the environmental performance of the facility. The Committee should be empowered to discuss and advise the Region on other related strategic waste diversion and management issues. Given the importance of waste diversion discussed below, consideration should be given to naming the committee the Durham waste diversion and management advisory committee.

20. In developing the proposed advisory committee's terms of reference, it may be instructive to review the mandate of the Durham Nuclear Health Committee (DNHC) which has been in place for over 12 years (Appendix G) (http://www.durham.ca/health.asp?nr=departments/health/dnhc/dnhc.htm). Perhaps it should be noted that the concept of a DNHC originated in 1992, when its creation was recommended by the former Environmental Assessment Advisory Committee that reviewed the Ajax Water Treatment
Plant environmental assessment because local residents were concerned about the human health effects of tritiated water emitted by the nearby Pickering Nuclear Generating Station.

d) Waste Diversion

21. During the EFW EA public consultation, another consensus has emerged such that the Region of Durham should embrace and strive towards the concept of “zero waste”. It is acknowledged that the Region has exceeded the long-term waste management strategy’s waste diversion goal of 50%. Accordingly, Council has set a new stretch goal of 70% by December 2010 and Works staff are exploring ways and means of reaching this goal such as by retaining Golder Associates (GA) to prepare the 70% Waste Diversion Study; by Implementing the Clear Bags Pilot Study in Clarington and Pickering; and by developing a draft Waste Management By-law for public consultation. Further options will be explored and included in the 2010 Annual Solid Waste Servicing and Financing Study.

22. Given Durham’s ongoing population growth, it is important for the Region and its residents to embrace the concept of zero waste and for the Region to aggressively pursue a waste diversion goal of at least 70%. In accordance with all the measures cited above, with attention being paid to enhanced public education and engagement, in order to reduce the demand for waste disposal however this is managed.

23. The Region cannot achieve zero waste or a waste diversion goals >70% by itself. To this end, for example, it is important for Ontario to complete its deliberations on zero waste, amend the WDA in accordance with the discussion paper and advice received, and to implement and enforce such measures as extended producer responsibility. The Region should closely monitor this file and advocate for the proposed changes as required.

d) Regional Support

24. In order for the environmental surveillance program, independent environmental testing, public reporting of environmental surveillance data, and the work of the proposed Durham waste diversion and management advisory committee to be successful, the Region should ensure that it has sufficient internal capacity and that sufficient financial and human resources are allocated to support these measures. This issue should be addressed in the appropriate Regional business planning and budgeting exercises.

G. CONCLUSION

25. In conclusion, the following recommendations are made:
That the final SSHHRA for the proposed 140,000 tonnes EFW facility is accepted and submitted to the MOE for its review, subject to it being in concordance with the caveats expressed in Appendix D of this report;

That once the EFW facility is operational, an environmental surveillance program is implemented in accordance with the above recommendation b);

That the Region continually pursues the goal of 70% waste diversion and advocates for enactment and implementation of the proposed amendments to the WDA; and

That the Region adequately supports the environmental surveillance program, independent environmental testing, public reporting of environmental surveillance data, and the work of the proposed Durham waste diversion and management advisory committee.

H. REFERENCES

26. In addition to the reports cited above, the MOH was greatly assisted in increasing his knowledge and understanding of this matter by his reading of the following publications, in whole or in part:


Respectfully submitted,

R.J. Ky, MD, MHSc, CCFP, FRCPC
Commissioner & Medical Officer of Health
The Regional Municipality of Durham
To: Joint Finance and Administration and Works Committee
From: R. J. Clapp, Commissioner of Finance
C. R. Curtis, Commissioner of Works
Date: February 3, 2011

SUBJECT:
Durham/York Energy from Waste Project

RECOMMENDATIONS:
THAT the Finance and Administration and Works Committee recommends to Regional Council that:

a) The Durham York Covanta Project Agreement be received and forwarded to Regional Council for information;

b) The Notice of Approval to Proceed with the Undertaking for The Amended Environmental Assessment for Durham and York Residual Waste Study, November 19, 2010 be received for information;

c) Consistent with the current Energy from Waste (EFW) Memorandum of Understanding (MOU) executed in 2009 by both The Regional Municipality of Durham (Durham) and The Regional Municipality of York (York), the Regional Chair and Clerk be authorized to execute the Co-owners’ Agreement with York, including the sale of a 50 per cent interest in EFW facility lands to York at fair market value;

d) The communication outreach for the Certificate of Approval Phase, as detailed in this report, be received and forwarded to Regional Council for information;

e) The attached architectural concepts of design for the facility be received and forwarded to Regional Council for information; and

f) The Joint Waste Management Group Committee and Energy from Waste Site Liaison Committee previously established for the Environmental Assessment portion of the project be dissolved and the Integrated Waste Management Committee Terms of Reference included as Attachment 4 be forwarded to the Municipality of Clarington for input prior to consideration by Regional Council.
REPORT:

Attachment No. 1  Conditions of Environmental Assessment Approval and Project Agreement
Attachment No. 2  Architectural Concepts of Design
Attachment No. 3:  Ministry of the Environment's Notice of Approval to Proceed with the Undertaking regarding the Amended Environmental Assessment for Durham and York Residual Waste Study
Attachment No. 4  Draft Terms of Reference for Integrated Waste Management Committee (IWMC)

1. BACKGROUND

In June 2005, The Regional Municipalities of Durham and York (Regions) established a partnership to seek local solutions to responsibly manage residual municipal solid waste not captured by the Regions’ province-leading recycling and diversion programs. Over the past five and a half years, The Regional Municipality of Durham (Durham) and The Regional Municipality of York (York) have invested considerable time, money and resources to advance the project through technology selection, site selection, environmental assessment (EA) and impact studies, public consultation and a competitive procurement process.

The EA and procurement processes ran concurrently:

- Province approves EA Terms of Reference ......................... March 31, 2006
- Energy from Waste (EFW) selected as preferred method .. June 22, 2006
- Request for Qualification (RFQ) issued ..............................July 12, 2007
- Request for Proposal (RFP) issued to five pre-qualified vendors .................................................................August 22, 2008
- Selection of Preferred Vendor ......................................... April 22, 2009
- EA submitted to Ministry of the Environment ....................July 31, 2009
- Revised EA submitted to Ministry of the Environment November 27, 2009
- Notification of EA approval from Ministry of the Environment .................................................................November 19, 2010
- Execution of Project Agreement .......................................November 25, 2010

Extensive public consultations were undertaken throughout the process to ensure that the values and priorities of the public and stakeholders were reflected
in the preferred alternative. Regional Council approvals were obtained at all major milestones such as technology selection, site selection, vendor selection, and submission of the EA study documentation. Based on the detailed evaluation of environmental, social and economic considerations, the study identified the mass burn incinerator as the most environmentally sustainable disposal option for residual municipal solid waste in the Regions.

The EFW project technical requirements contained within the Project Agreement have rigorously fulfilled the direction provided by Durham's Regional Committees and Council.

2. PROJECT AGREEMENT

Consistent with the direction of Regional Council, a two staged procurement process consisting of a Request For Qualifications (RFQ) and Request for Proposals (RFP) was issued, based upon a public ownership model and a long-term contract with the private sector for the design, construction and operation of an Energy from Waste (EFW) facility. Contract terms detailed in the draft Project Agreement formed part of RFP-604-2008, including legal, commercial and technical specifications. The draft Project Agreement issued within the RFP formed the basis for the final Project Agreement negotiated between the Regions and the preferred proponent, Covanta Energy Corporation (Covanta).

The salient commercial terms in the executed Project Agreement are consistent with Regional Council direction and with RFP-604-2008, as confirmed by legal consultant and external counsel Borden Ladner Gervais prior to execution of the Project Agreement.

3. ENVIRONMENTAL ASSESSMENT APPROVAL

On November 19, 2010, the Regions received notice of approval from the Ministry of the Environment (MOE) (Attachment No. 3). As expected, that approval came with several Conditions of Approval (Conditions) that must be followed under the EA Act. Some of those conditions are directly associated with the facility and will require efforts jointly from the Regions and Covanta. Others are more broadly connected to the Regions' larger integrated waste management systems and will require actions from both Durham and York.

Staff and the project team consultants performed a complete review of the conditions and based on currently available information, determined that none of the conditions affect the overall project capital cost or annual operating fee to be paid to Covanta. The Project Agreement also satisfies the relevant EA Conditions as indicated in Attachment No. 1.
4. **EFW PROJECT CO-OWNERS' AGREEMENT BETWEEN DURHAM AND YORK**

Based upon the previously approved MOU, the Regions now need to finalize and execute a project co-owner’s agreement. As part of that agreement York Region will purchase at fair market value, a 50 per cent ownership interest in EFW facility lands currently wholly owned by Durham Region. This partnership in facility lands does not increase York’s ownership share of the facility beyond 21.4 per cent, which is based upon each Regions’ respective share of processing capacity for the 140,000 tonne facility.

5. **DURHAM REGIONAL COUNCIL RESOLUTION AND HEALTH DEPARTMENT ROLE**

Throughout the EA process, various commitments and Durham Regional Council resolutions were imposed for the facility ranging from ongoing public consultation to specific monitoring requirements. Endorsed Durham Regional Council resolutions affecting the EFW facility operation have been incorporated into the EA and Project Agreement documents.

Key resolutions regarding air emission criteria (CEMS, Dioxin & Furan cartridges) were built directly into the Project Agreement. This facility is entirely publicly owned by the Regions who will retain control over the critical operating principles, specifically those related to environmental safety and compliance.

Other Durham Regional Council resolutions specific to environmental surveillance of air, water and soil surrounding the facility were captured either within the Project Agreement, staff obligations or by the EA Conditions. Resolutions from the Medical Officer of Health’s report 2009-COW-01 for off-site environmental monitoring will be incorporated into Durham Region’s annual operating budget. The Health Department will play an active role in both the Certificate of Approval process and the monitoring programs.

6. **COMMUNICATIONS FOR CERTIFICATE OF APPROVAL PHASE**

The Regions, as part of their obligations to fulfill the EA approval Conditions, must develop and implement a communications plan. Several initiatives are currently being advanced by staff. Staff will migrate the Durham York Residual Waste Study website to Regional ownership, and will notify the identified stakeholders once it is activated. The Certificate of Approval application will be posted on the website along with other EFW documentation. Multimedia communications will continue at milestone events. Public meetings will be held as specified in the EA Conditions prior to construction, receipt of waste and during initial operation. In addition, a waste fair will be held in the Municipality of Clarington (Clarington) on March 5, 2011 and a presentation will be made to Clarington Council and the Integrated Waste Management Committee (IWMC).
(Attachment No. 4) regarding the terms of the Certificate of Approval subsequent to its issuance.

7. **ARCHITECTURAL CONCEPTS OF DESIGN (ATTACHMENT NO. 2)**

The RFP required proponents to propose a basic facility design and provides a cash allowance of up to $9 million to develop architectural enhancements to their basic design to accommodate local requirements. Under the tasks outlined in the approved Early Works Agreement, the following activities are to be completed:

a) Preparation and submission of renderings illustrating three alternate proposed designs for the Facility (sequential development).

b) Review of these designs with the Owner and local stakeholders and formulation of a preferred architectural design.

c) Preparation of a final set of drawings and a three dimensional (computer) model illustrating the preferred architectural design of the Facility.

d) Based on the preferred architectural design, complete a visual assessment and submit as a package forming part of the Environmental Protection Act application.

Utilizing a sequential methodology consisting of the evolutionary development of the Covanta base bid proposal, the attached conceptual architectural design (Attachment No. 2) for the facility has been recommended by staff. Consultation has been undertaken with Regional Councillors from Clarington and staff on several occasions. The preferred conceptual design has been evaluated by Regional staff and accessed to meet the EFW facility design guidelines provided by Clarington in April 2008.

The conceptual architectural design will be posted on the EFW website and will be presented to the public through the advisory committees and during the spring 2011 waste fair in Clarington.

8. **EFW COMMITTEE REQUIREMENTS**

The proposed public Integrated Waste Management Committee (IWMC) along with the MOE mandated EFW Advisory Committee will provide the opportunity for involvement from every municipality within Durham and York, the general public and interested stakeholders. The Draft IWMC Terms of Reference (Attachment No. 4) will be submitted to Clarington for comment and will subsequently be brought to Regional Council for approval. The IWMC membership will be approved by Regional Council.
These two committees will replace the former Joint Waste Management Group and the EFW Site Liaison Committee which have fulfilled their respective mandates.

9. CONCLUSION AND NEXT STEPS

The energy from waste project received final approval from the Ministry of the Environment under the Environmental Assessment Act on November 19, 2010. After five and a half years of detailed study, review and public processes, the approval reinforces the development of an energy from waste facility as a safe and sustainable local solution to the Regional Municipalities of Durham and York's long term waste management strategy.

As authorized by Regional Municipality of Durham Council in June 2009, the Project Agreement was successfully negotiated with Covanta Energy Corporation within the framework approved by Committee of the Whole Report 2009-COW-03, and was executed on November 25, 2010. The Project Agreement sets the terms and conditions for the design, build and operation of the Regionally-owned facility for a minimum of 20 years of operations.

Next steps include the following key elements and estimated dates:

Execution of the Co-Owners' Agreement ......................... February 2011
Approval of the Certificate of Approval under the Environmental Protection Act ........................................ May 2011
Complete Detailed Design ............................................. July 2012
Complete Construction ............................................... December 2013
Facility Commissioning .............................................. January to May 2014
Commercial Operation ............................................... June 2014

As outlined above, after obtaining the Certificate of Approval from the Ministry of the Environment, Covanta Energy Corporation will start phase two of the project which is the construction of the energy from waste facility.
Staff will continue to proceed with the project within the framework approved by the Regional Municipalities of Durham and York.

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

R. J. Clapp, CA
Commissioner of Finance

Recommended for Presentation to Committee

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

WM1/WM3/ms
8. Support Services

The Waste Management division of Durham’s Works Department will appoint a
staff liaison to the EFW-WMAC to provide administrative, procedural and
technical support to the EFW-WMAC.

The staff liaison will co-ordinate all requests for advice from the EFW-WMAC
through meeting agendas with Works Committee and/or Joint Works
Committees.

An annual budget of $20,000 will be administered to cover operational expenses
of the Committee.

EFW-WMAC members will be reimbursed for mileage expenses for attendance
at EFW-WMAC meetings upon submission of an expense sheet. Any other
funding requests must be submitted, in advance to the Durham Works
Department for consideration.

Durham will provide space on its website to post information such as meeting
minutes and other relevant information.

Upon request, the representatives of the Regions, Contractors and
governmental/regulatory bodies shall ensure that all studies and other
information relevant to the committee’s mandate are made available to the EFW-
WMAC.

9. Meetings/Resolutions

The EFW-WMAC shall meet quarterly throughout the year. Meeting dates must
be determined such that they are synchronized with other committees. The
meeting location may be subject to change once the EFW Facility is operational
and providing space is available. The EFW-WMAC will establish a meeting
schedule at its inaugural meeting. The Committee may choose to adjust the
schedule, however, must ensure that one meeting will be held per quarter.
Additional meetings may be held at the request of the EFW-WMAC Chair. All
meetings will be advertised and any changes to the dates must be published two
weeks in advance of the proposed meeting.

All meetings will be open to the public.

All decisions made by the EFW-WMAC will be based on a majority vote.

Quorum will be established by 50 per cent plus one of the members.
10. Delegations to Meetings

Any person wishing to appear as a delegate to the EFW-WMAC must submit a
written request two weeks prior to the EFW-WMAC staff liaison advising of the
topic on which they wish to speak for inclusion in the agenda. The staff liaison
will forward information to the EFW-WMAC Chair. The Chair will seek input from
the committee, as to whether a delegation should be heard, if the relevance of
the delegation appears to be outside the mandate of the committee. Materials to
be presented by a delegate shall be provided one week in advance of the
meeting.

11. Minutes and Agendas

Agendas should be prepared and circulated one week in advance of upcoming
meetings.

Following the meeting, minutes will be circulated by e-mail. Members will have a
specified time period to comment. The minutes will then be submitted as “final
draft” to the Works Committee and posted on the Regional website. The minutes
will be adopted at the next meeting of the committee.

The “final draft” minutes will be received as correspondence at the Durham
Works Committee.

12. Annual Reports

An annual report summarizing the activities of the previous year shall be
prepared by the EFW-WMAC and the staff liaison and forwarded to the Works
Committee and Clarington Council. The report should include any suggested
revisions to the Terms of Reference.

The Chair of the EFW-WMAC will present their annual report, and any additional
reports as requested to the Works Committee/Regional Council and to Clarington
Council.

An annual review of the EFW-WMAC will be completed by the Works Committee
to determine the effectiveness of the EFW-WMAC and ensure continued
improvement.

Clarington will be consulted on any changes to the terms of reference.
13. **EFW-WMAC Dissolution**

The Committee can be dissolved at any time by Regional Council, in consultation with Clarington Council and the members providing that the requirements of Durham Report 2009-COW-01 and Host Community Agreement have been fulfilled or upon the decommissioning of the Facility.
SUBJECT: EFW Risk Assessment and Environmental Surveillance

RECOMMENDATION:

That the Committee of the Whole recommends to the Regional Council that:

a) The final Site Specific Human Health Risk Assessment (SSHHRA) for the proposed 140,000 tonnes EFW facility is accepted and submitted to the Ontario Ministry of the Environment for its review, if and when the EFW environmental assessment is approved, subject to it being in concordance with the caveats expressed in Appendix D of this report;

b) That if the EFW environmental assessment is approved and the proposed EFW facility is constructed, once operational, an environmental surveillance program is implemented in accordance with all applicable legislation, policies, guidelines, and instruments and the following guiding principles:

i. That continuous and periodic stack testing of chemical emissions, including dioxins and furans, that meet or exceed the more stringent of the Ontario Guidelines A-7 and EU Directive chemical emissions standards forms the basis of environmental surveillance in accordance with the International Best Practices Review,

ii. That stack testing be supplemented by independent ambient air and soil testing for a minimum of three years at which time its effectiveness will be evaluated,

iii. That independent testing of flora and fauna be considered if in-stack, ambient air and soil test results regularly exceed levels predicted by the SSHHRA,

iv. That stack testing not be supplemented by human biomonitoring,

v. That the environmental surveillance results are communicated to the public in an accessible, accurate, open, timely, transparent, and understandable a manner as possible,
vi. That a Durham waste diversion and management advisory committee, or similar advisory group, which is appointed by and is accountable to the Regional Council, is in place to act as a forum for, and comprises Clarington and Durham residents and representatives from Clarington, the EFW facility, Ontario Ministry of the Environment (MOE), and the Region of Durham to assess, monitor, review, and advise the Region on the effectiveness of the environmental surveillance program, independent environmental testing, the quality of public reporting of environmental surveillance data, the environmental performance of the facility, and other related strategic waste diversion and management issues.

vii. That the Health Department is consulted by the MOE before it finalizes its requirements for the Region’s environmental surveillance program;

c) That the Region continues to pursue the goal of 70% waste diversion and to advocate for amendments to the Waste Diversion Act, 2002 to be enacted and implemented;

d) That the Region adequately supports the environmental surveillance program, independent environmental testing, the public reporting of environmental surveillance data, and the work of the proposed Durham waste diversion and management advisory committee;

e) That the Minister of the Environment, Durham’s MPPs and municipalities, Joint Waste Management Group, Site Liaison Committee, and the Regional Municipality of York are so advised.

REPORT:

A. BACKGROUND

1. The Health Department first became involved in the EFW environmental assessment (EA) on June 20, 2007, when the Regional Council requested that the Commissioner & Medical Officer of Health (MOH) comment on the Durham/York Generic Human Health Risk Assessment (GHRHA) and review the health-related chapters of the Halton EFW Business Case.

2. Owing to the Health Department’s limited in-house experience and expertise regarding this matter, the MOH commissioned Dr. Lesbia Smith, a well-recognized expert in occupational and environmental health, to review the Halton 4a Report, review the GHRHA, and provide advice on environmental surveillance.
3. Dr. Smith's main conclusions are summarized in Report #2007-MOH-20 and the Executive Summary of her report to the MOH (Appendices A & B). The key conclusions with respect to this report are as follows:

- In essence, the Halton 4a Report concluded that EFW facilities using modern (thermal) methods and pollution control technology are not expected to pose a significant risk to the public. In addition, the Report stated that any new EFW facility should be subject to a site specific risk assessment to identify local issues and ensure that it will not pose a risk to the public.

- The current epidemiologic literature (2000-2007) is inconclusive and does not demonstrate one way or another that modern incinerators have associated health effects on the people living around them. This conclusion is not materially different from the inference made in the Halton 4a Report.

- Risk assessment is the only procedure that can produce quantitative estimates of predicted health effects. The GHHRA was properly carried out. The methods are clearly explained, are reproducible and err on the side of health protection or "conservatism". Any future site specific risk assessment should apply upset conditions, if situations with upset conditions are relevant to the EFW facility.

- Epidemiology, risk assessment and biological monitoring assist regulatory and public health agencies and improve public understanding of human health and the environment. Because each method can have limits and challenges, a combination best serves public health.

- Environmental quality oversight and health surveillance can promote engagement of communities with industry, regulatory and public health agencies and can be considered part of a responsible program for environmental monitoring.

4. In accordance with additional directions the MOH received from the Regional Council to ensure an independent peer review of the site specific human health risk assessment (SSHHRA) and to provide advice on environmental surveillance, Dr. Smith was also retained by the MOH to provide him with advice with respect to the SSHHRA for the proposed 140,000 tonnes EFW facility and the international environmental surveillance best practices review, both of which are discussed below.
B. **SITE SPECIFIC HUMAN HEALTH RISK ASSESSMENT (SSHHRA)**

5. The SSHHRA conducted by Jacques Whitford (JW) used the following standard framework: problem formulation, exposure assessment, hazard assessment, and risk characterization. Appendix C is SSHHRA's draft Executive Summary. Overall, the results of the SSHHRA indicate that it is not expected that the proposed EFW will lead to any adverse health risks to local residents, farmers or other receptors in the local risk assessment study area.

6. The SSHHRA was peer reviewed by Dr. Smith and her associate, Mr. Ross Wilson, an experienced risk assessor and certified toxicologist. Appendix D is their report. In summary, they support the findings of the JW SSHHRA, consider the methodology to be sound, and conclude that the proposed EFW facility should not pose unacceptable risks to persons living in the vicinity of the site.

C. **ENVIRONMENTAL SURVEILLANCE**

7. Environmental surveillance was explored in far more depth in the report “Review of International Best Practices of Environmental Surveillance for Energy-From-Waste Facilities” (Best Practices Review). The focus of this study was to review environmental surveillance programs at similar facilities around the world and to recommend an appropriate level of environmental surveillance for the proposed EFW facility.

8. Appendix E is the report’s Executive Summary. In essence, the JW concluded that the most appropriate and scientifically justified option for environmental surveillance of the proposed Durham/York EFW facility would involve continuous and periodic stack testing of chemical emissions (Option 1). This option was found to be the most prevalent method of ensuring public and environmental health protection in Canada, the EU, and the USA. To ensure added protection, JW supported Regional Council’s decision to adopt the more stringent of the Ontario Guideline A-7 and EU Directive chemical emissions standards and to implement an in-stack dioxins and furans sampling technology. These measures go beyond any requirements that would be derived from the JW’s review.

9. Dr. Smith conducted an independent peer review of this study. Her advice to the MOH is found in Report #2009-J-17 (Appendix F). In essence, Dr. Smith agreed with the JW’s conclusion that Option 1 is optimal and derives from the study. In her opinion, the community living outside the point of impingement and the public-at-large would not be at risk from the public health perspective if this surveillance option is chosen. Finally, Council’s decision to adopt the more stringent of Guideline A-7 and EU Directive chemical emissions standards and to implement an in-stack dioxins and furans sampling
technology is concordant with a highly protective approach to health and the environment in Durham Region.

10. Both Dr. Smith and JW recommend that an independent environmental oversight committee be struck to ensure public participation in the environmental surveillance program and to evaluate its efficacy in protecting public and environmental health.

D. WASTE DIVERSION

11. During the EFW EA public consultation, considerable attention has focused on waste diversion and the concepts of “zero waste” and “extended producer responsibility.” This has also been an area of intense importance, focus and activity by the Region of Durham and Province of Ontario.

12. For example, locally, on January 23, 2008, the Regional Council passed a resolution that directed the Region of Durham to aggressively pursue at least a 70% diversion rate on or before December 2010, Golder Associates was retained to investigate existing and potential options, including the enhancement of public education and engagement, and to develop a plan that will allow the Region to achieve this goal. The study’s recommendations, which are summarized in Commissioner’s Report #2009-WR-5, are currently being analyzed and the results will be presented in the 2010 Annual Solid Waste Servicing and Financing Study, as is the final evaluation of the Clear Bags Pilot Program that was conducted from January to April 2009 in Clarington and Pickering (Commissioner’s Reports #2008-WR-20, 35, & 38 and #2009-WR-12). Finally, Works staff has prepared, for public consultation, a draft waste management by-law “to help manage the Region’s standardization of solid waste collection services and to guide the service delivery on private roadways as the Region navigates towards [70%] diversion.”

13. Provincially, Ontario is proposing to adopt a zero waste vision to help reduce waste, increase diversion, and build a greener economy and more sustainable society. In accordance with the Waste Diversion Act’s (WDA’s) mandatory five year review, in October 2008, the MOE released “Toward a Zero Waste Future: Review of Ontario’s Waste Diversion Act, 2002.” In the discussion paper, the MOE proposes that the first steps in striving towards zero waste should be built upon four key building blocks:

- A clear framework built upon the foundation of Extended Producer Responsibility.
- A greater focus on the first and second of the 3Rs – waste reduction, and re-use.
- Increasing reduction and diversion of waste from the industrial, commercial & Institutional sectors.
Greater clarity around roles responsibilities, and accountabilities, to ensure that all players are contributing to a common goal.

In April 2009, the proposed changes to the WDA were endorsed, in principle, by the Regional Council in accordance with Commissioner's Report #2009-WR-2.

E. DISCUSSION

a) Risk Assessment

14. Risk assessment (RA) is the only procedure that can produce quantitative estimates of predicted health effects. Moreover, RA follows a standard format, is reproducible, and err on the side of conservatism. JW followed the methodology used in the Generic HHRA, which peer reviewers, including Dr. Smith, deemed acceptable.

15. The key findings of Dr. Smith's and Mr. Wilson's review of the JW SSHHRA can be summarized as follows:

- The key receptors, chemicals and exposure pathways have been evaluated.
- The methods used to estimate exposures are considered appropriate.
- The toxicological reference values used are reasonable and drawn from a variety of reliable international sources.
- The risk characterization results are defensible.

In other words, the SSHHRA can be considered to be satisfactory. The proposed EFW facility is not expected to cause any appreciable change in the concentrations of chemicals in air, soil, dust, water or food. If the proposed EFW facility performs as specified and assumed in the SSHHRA, it will not pose an unacceptable risk to persons in the vicinity of the site and, by extension, to residents living beyond the site. Subject to any final revisions to the exposure point concentrations having been made, the SSHHRA is ready to be submitted to the MOE for its review, if and when the EFW EA is approved.

b) Environmental Surveillance

16. In its Best Practices Review, JW was very clear that the most appropriate and scientifically justified option for environmental surveillance of the proposed EFW facility would involve continuous and periodic stack testing of emissions, including in-stack dioxins and furans sampling technology, that meet or exceed stringent chemical emissions standards (Ontario Guideline A-7 v. EU Directive). Dr. Smith concurred with this finding and concluded the community living outside the point of impingement and the public-at-large