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 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 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 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
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 appropriated 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, FRCPC
Commissioner & Medical Officer of Health