
Meeting: GENERAL PURPOSE AND ADMINISTRATION COMMITTEE
Date: MONDAY FEBRUARY 25, 2008 **Resolution #:** _____
Report #: ADDENDUM TO FND-002-08 **File #:** _____ **By-law #:** _____

Subject: EFW - Peer Review & Economic Studies Costs to Date

Recommendations:

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

1. THAT the ADDENDUM to Report FND-002-08 be received; and
2. THAT Staff provide a further report to Committee at such time as the resolution raised at the Region of Durham Finance Committee of February 5, 2008 regarding Clarington's due diligence/peer review funding is determined by Regional Council.

Submitted by: Nancy Taylor
Nancy Taylor, B.B.A., C.A.,
Director of Finance/Treasurer.

Reviewed by: Franklin Wu
Franklin Wu,
Chief Administrative Officer.

David J. Crome
David J. Crome, M.C.I.P., R.P.P.
Director of Planning Services.

BACKGROUND:

1.0 For the General Purpose and Administration Committee meeting of Monday, January 21, 2008, a finance report FND-002-08 entitled EFW- Peer Review and Economic Studies Costs to Date (Attachment #1) was brought before Committee.

1.1 At a meeting held on January 28, 2008, the Council of the Municipality of Clarington passed the following resolution #GPA-077-08:

“THAT Report FND-002-08 be referred back to Staff; and

THAT Staff report back at the February 25th, 2008 GPA meeting on the following to ensure openness, transparency and accountability:

- Direction regarding item 2.11 of Report FND-002-08; and
- Details regarding items 1.2, 1.3, and 1.4 of Report FND-002-08, particularly who is going to pay what, when and how.”

2.0 REPLACEMENT OF AMEC

2.1 AMEC consultants have withdrawn their services from the Municipality of Clarington and, as such, another consulting firm is required to take over the air quality aspects of the scope of work outlined in Report PSD-070-07. SENES Consultants, who have also been retained on the EFW project, can provide this area of expertise, albeit with a combination of professionals rather than one individual, under the direction of Dr. Doug Chambers.

2.2 Dr. Chambers and SENES are familiar with the EFW project due to their existing contract with the Municipality. In addition the air quality peer review work that remains is specifically related to the site specific human health and ecological risk assessment which is part of the existing scope of work for SENES.

2.3 Council passed By-law 2007-150 to engage the services of SENES for the scope of work set out in Report PSD-070-07 and SENES' proposal which was attached as Schedule 'A' to the By-law. The additional work that remains to be carried out by AMEC can be added to the scope of work of SENES at such time that Council determines to proceed with future peer review work.

3.0 REGIONAL FUNDING

3.1 With respect to items 1.2, 1.3, and 1.4, this was the subject of a Regional Finance Report 2008-F-19 entitled “Durham Region Energy From Waste (EFW)- Expenditure Report for the Regional Funding of the Municipality of Clarington's Due Diligence/Peer Review Studies dated February 5, 2008 (Attachment #2).

This report corroborated FND-002-08 for the payment of the \$300,000 in accordance with the Regional Council Resolution.

- 3.2 The Report was approved by the Region and in discussions with the Regional Commissioner of Finance; the balance of the \$300,000 will be forthcoming in short order.
- 3.3 At the same Regional Finance and Administration Committee meeting of February 5, 2008, the following resolution was carried and subsequently ratified by Regional Council:
- “THAT the request from Councillor Abernethy to increase the funding to Clarington’s original request of \$500,000 to complete it’s due diligence/peer review in connection with the proposed Energy From Waste (EFW) project be referred to Regional staff to meet with staff of the Municipality of Clarington and bring back a report to the Finance & Administration Committee which outlines the additional funding required, a breakdown of the work to be completed, the expenditure management procedures in place in the Municipality of Clarington, and an assessment of the invoices from Clarington for the recovery of costs to date.”
- 3.4 Due to Regional Budget timing commitments, it is the intention of the Commissioner of Finance for the Region to report regarding the above resolution to the Regional Finance and Administration Committee on March 18th. It is therefore not known at this time either the contents of that report or the decision of Regional Council.

CONCLUSION:

- 4.0 Report FND-002-08 recommended how to finance Clarington’s cost to date in excess of the Region of Durham funding. Due to the resolution before the Region of Durham Finance and Administration Committee it is recommended that no action be taken at this time regarding the financing recommendation in FND-002-08.
- 4.1 It is therefore recommended that staff bring back a further report to Clarington’s General Purpose and Administration Committee at such time as the Region of Durham Council address the resolution regarding additional funding to the Municipality of Clarington.

Attachments:

Attachment #1 - FND-002-08 EFW – Peer Review & Economic Studies Costs to Date

Attachment #2 - Regional Finance Report 2008-F-19, Durham Region Energy From Waste (EFW)-Expenditure Report for the Regional Funding of the Municipality of Clarington's Due Diligence/Peer Review Studies

Attachment #3 – Resumes (SENES) Dr. Douglas Chambers, Dr. James Young and Chris Marson



REPORT

FINANCE DEPARTMENT

Meeting: GENERAL PURPOSE AND ADMINISTRATION COMMITTEE
Date: Monday January 21, 2008 **Resolution #:** _____
Report #: FND-002-08 **File #:** _____ **By-law #:** _____

Subject: EFW – Peer Review & Economic Studies Costs to Date

Recommendations:

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


1. THAT Report FND-002-08 be received; and
2. THAT the estimated funding of \$100,000 required for Energy From Waste Studies in excess of the Region of Durham funding of \$300,000 be financed from the Impact/Escrow Reserve Fund.

Submitted by:


Nancy Taylor, B.B.A., C.A.,
Director of Finance/Treasurer


David J. Crome, M.C.I.P., R.P.P.
Director of Planning Services

Reviewed by:


Franklin Wu,
Chief Administrative Officer.

NT/DC/LB/FL/hjl

BACKGROUND AND COMMENT:

1.0 When Clarington was short-listed as a potential site for the Region of Durham's proposed Energy from Waste (EFW) facility, Council approved Report PSD-070-07 to provide direction to Municipal staff for work to be undertaken on peer reviews as part of the Environmental Assessment process and economic studies as part of a host community negotiation process.

1.1 On May 28, 2007 Council approved the following resolution (excerpts):

THAT Staff be instructed to carry out the requirements of Resolution #C-211-07 by preparing studies in accordance with the scope of work set out in Report PSD-070-07;

THAT Mr. Steven Rowe be retained to undertake the scope of work as outlined in Section 4.2 (Site Selection) and Section 4.4 (Gap Analysis) of Report PSD-070-07, and further to advise on the scope of work set out in Section 5.1 (Oversight of Technology Procurement Process) and 5.2 (Potential Environmental Effects) of Report PSD-070-07;

THAT SENES Consultants Limited be retained to undertake the scope of work as outlined in Section 5.1 (Oversight of Technology Procurement Process) of Report PSD-070-07, and further to assist with the scope of work set out in Section 5.2 (Potential Environmental Effects) of Report PSD-070-07;

THAT AMEC E&C Services Ltd. Be retained to undertake the scope of work as outlined in Section 5.2 (Potential Environmental Effects) of Report PSD-070-07;

THAT C.B. Richard Ellis Ltd. Be retained to undertake the scope of work set out in Section 6.1 (Impact on Clarington Energy Business Park) and Section 6.2 (Impact on Assessment Base) of Report PSD-070-07 and further to assist with the scope of work set out in Section 6.3 (Community Stigma);

THAT the Director of Finance be authorized to retain a multi-disciplinary accounting firm to undertake the scope of work set out in Section 6.3 (Community Stigma) and Section 6.4 (Host Community Agreement) of Report PSD-070-07;

THAT the Municipal Solicitor and Consulting Engineer (Totten Sims Hubicki) provide information, professional opinion, estimates and advice as deemed appropriate.

THAT the Directors of Finance and Planning Services be instructed to strike a committee comprised of Clarington staff and consultants similar in composition to the Region of Durham's committee in order to facilitate discussions related to the Host Community Agreement on a without prejudice basis to the Municipality's decision on whether to be a willing host;

THAT the Directors of Finance and Planning Services be instructed to take any additional actions or retain any additional consultants deemed necessary to ensure the Municipality has carried out its due diligence;

THAT the peer reviews and studies referenced in Report PSD-070-07 be deemed to be part of the "necessary studies" to complete due diligence as referenced in the motion approved by Durham Region Council on April 18, 2007, and that the Director of Finance

be directed to recover these due diligence costs from the Region of Durham as set out in their motion.

- 1.2 On April 18, 2007, Council for the Regional Municipality of Durham adopted the following:

"That each respective Region shall provide adequate funding to any of the potential host communities located within their respective Region. And further, that such adequate funding shall include the costs of all necessary studies and legal advice incurred by the potential host community to investigate and complete its due diligence in arriving at its decision whether or not it will become a host community for the EFW facility. And further, the total of such costs shall be deducted from the combined royalty fee, if any and not otherwise."

- 1.3 On June 20, 2007 Council for the Regional Municipality of Durham limited their approval of funding of the Municipality of Clarington's necessary due diligence studies with the following motion:

"THAT the maximum amount of \$200,000 for peer review, with an additional amount of up to \$100,000 contingent upon Clarington finalization of terms of reference for local impact studies. With disbursement of the Regional funding subject to approval of the Regional Treasurer, with concurrence from the Commissioner of Works and regular reporting of the expenditures to the Regional Council through the Finance & Administration Committee."

- 1.4 Staff proceeded on the direction of Clarington council as set out in PSD-070-07 and provided an estimate that due to the nature of the work involved, costs could reach \$500,000. It is difficult to determine costs for peer reviews as it is a responsive process not a pre-defined project or specific study. Fee based contracts were entered into based on the approved bylaws with minimum estimates for Mr. Rowe, SENES and AMEC. Stipulated price contracts were let for the portions of work set out under the economic studies as specific definable parameters could be detailed and they were not part of the evolving EA process. The professional opinion and advice required from TSH and the Municipal Solicitor form part of their overall contract with the Municipality so no estimate was obtained for these services, especially since it was difficult at the time to determine what would be required.

- 1.5 The purpose of this report is to update council on the financial costs of the studies to date. A summary is attached as Schedule "A".

REVIEW OF FINANCIAL STATUS

Peer Review Studies

- 2.0 Peer Review is the process by which professional work is reviewed by the author's peers (i.e. other experts in the same field). The peer review process is intended to improve the quality of the author's work and ensure that it meets the standards and expectations of their discipline. The contracts entered into with the peer review consultants contained a minimum estimate of the work that would have to be performed and hourly rates. At the time the estimates were obtained, it was not anticipated that the peer review consultants would be needed to provide input on the emission standards for the host community discussions.

- 2.1 Mr. Steven Rowe was retained to undertake the scope of work as outlined in above.
- 2.2 The original contract with Mr. Rowe was for a minimum of \$21,000 plus disbursements. To date the Municipality has paid \$24,420 in fees and \$334.25 in disbursements.
- 2.3 These billings are to the end of December 2007 including attendance and presentation at the General Purpose and Administration Committee meeting in December. The work remaining for Mr. Rowe will occur based on PSD-070-07 when the EA document is to be submitted to the Ministry, at which time it should be reviewed to ensure that it has addressed the concerns identified to date.
- 2.4 SENES Consultants Limited was retained to undertake the scope of work as outlined above.
- 2.5 The original contract with SENES was for a minimum of \$47,000 plus disbursements for peer review. To date the Municipality has paid \$35,607.50 in fees and \$437.97 in disbursements.
- 2.6 These billings are to the end of November 2007 and relate to both peer review and Host Community Agreement discussions. The invoice for the month of December, 2007 has not yet been received. At this point an additional \$11,392.50 is shown as committed based on the original contract value. Some of SENES work and fees to date are for setting out the emissions standards and criteria as detailed by Council Resolution GPA 632-07 and C-592-07 (Schedule B) for inclusion in a Host Community Agreement. The work remaining for SENES to complete is with regard to the Site specific Human Health and Ecological Risk Assessment (HHERA) which will be released by the Region in fall 2008.
- 2.7 AMEC E&C Services Ltd was retained to undertake the scope of work as outlined above.
- 2.8 The original contract with AMEC was for a minimum of \$20,000 plus disbursements for the peer review. To date the Municipality has paid \$13,875.00 in fees and \$258.20 in disbursements.
- 2.9 These billings are to the end of November 2007 and relate to both peer review and Host Community Agreement discussions. At this point an additional \$6,125.00 is shown as committed based on the original contract value. The invoice to the end of December 2007 has been requested. Some of AMEC's work and fees to date are for setting out the emission standards and criteria as detailed by Council Resolution CPA 632-07 and C-592-07 for inclusion in a Host Community Agreement.
- 2.10 The remaining peer review work for AMEC are review of the air quality issues that relate to the site specific Human Health and Ecological Risk Assessment (HHERA) and professional advice on how the proposed emissions could be better addressed within the context of the air shed.
- 2.11 As indicated in the Addendum Report to PSD-141-07, AMEC was included as a sub-consultant along with Black and MacDonald on the Veolia Environmental Services Waste to Energy Inc. team one of the bidders on the EFW project. We have received a letter from AMEC that they will cease to perform Air Quality Peer Review services for Clarington effective January 30, 2008. AMEC has chosen to terminate their contract with Clarington to avoid the potential of conflict of interest.

Economic Studies

- 3.0 The Economic Studies were undertaken as fixed price contracts, as such a maximum upset fee was established. Staff were able at the outset to define the specific tasks, the number of meetings, work schedule and anticipated product. The consultants prepared proposals in response to this detailed work program. While the consultants provided prices for hourly work over and above the contract amounts, it has not been necessary to amend their work program.
- 3.1 C. B. Richard Ellis Ltd. was retained to undertake the scope of work set out in Section 6.1 (Impact on Clarington Energy Business Park) and Section 6.2 (Impact on Assessment Base) of Report PSD-070-07 and further to assist with the scope of work set out in Section 6.3 (Community Stigma).
- 3.2 The original contract with C. B. Richard Ellis was for a maximum including disbursements of \$100,000. Their final billing for the full contract amount was received at the end of December.
- 3.3 The Director of Finance was authorized to retain a multi-disciplinary accounting firm to undertake the scope of work set out in Section 6.3 (community Stigma) and Section 6.4 (Host community Agreement) of Report PSD-070-07. The firm Price Waterhouse Coopers LLP was retained for this purpose.
- 3.4 The original contract with Price Waterhouse Coopers was for a maximum including disbursements of \$90,000. To date the Municipality has paid \$78,863.50 in fees and \$3,320.53 in disbursements. It is the background work prepared by Price Waterhouse Cooper that was the basis for Resolution GPA 632-07 and C-592-07 and thus the basis for the Host Community Agreement discussions.
- 3.5 These billings are to December 20, 2007 and represents completion of all work.

Peer Review and Economic Advice

- 4.0 The Municipal Solicitor and Consulting Engineer (Totten Sims Hubicki) were asked to provide information, professional opinion, estimates and advice as deemed appropriate.
- 4.1 The Municipal Solicitor, Dennis Hefferon is on retainer with the Municipality. Up to the period ending December 13th, the Municipality has paid \$99,791.60 in fees and \$975.00 in disbursements for legal assistance directly related to the Energy From Waste Project. Of this value, approximately \$23,800.70 relates to the environmental assessment process and \$76,965.90 to the host community agreement negotiations and provision of advice. In PSD-070-07, staff was directed to form a committee similar in composition to the Region of Durham's committee in order to facilitate discussions related to the Host Community Agreement. As a solicitor for the Region of Durham was present at all meetings, the Municipal solicitor was also present and actively pursued research and detailed wording for all items outlined in GPA 632-07 and C-592-07. Currently no further legal work is being undertaken.
- 4.2 The firm of Totten Sims Hubicki (TSH) is on retainer with the Municipality to provide engineering services. Up to the period ending November 24th, the Municipality has paid \$20,696.59 in fees and \$738.22 in disbursements for consulting services directly related to the Energy From Waste Project Peer Review. The majority of the work TSH has carried out is the peer review of the traffic studies and site servicing. In addition, TSH

has prepared cost estimates that have been used in the Host Community Agreement discussions.

CONCLUSION

- 5.0 The Municipality of Clarington has incurred to date costs totaling \$379,318.36 and is anticipating additional billings for December 2007 from Totten Sims Hubicki for an estimated \$2,500. SENES and AMEC fees are still to be invoiced but are within the estimated overall costs.
- 5.1 The Municipality has billed \$167,367.07 to the Region of Durham to date and will issue an invoice to the Region for the balance of the \$300,000 in the near future.
- 5.2 As a result, currently \$79,318.36 remains unfunded plus outstanding December invoices for SENES, AMEC, and Totten Sims Hubicki. It is recommended that an estimated total of \$100,000 be financed from the Impact/Escrow Reserve Fund as the funding cap from the Region of Durham has been reached.
- 5.3 Staff has been directed by PSD-070-07 to peer review the entire EA process. This work will not be complete until late in 2008 when the EA is submitted to the Ministry of Environment.
- 5.4 At this time, as Council is aware, the Clarington 01 site has been selected by the Region of Durham Works Committee as the preferred site. Subject to Regional Council concurrence, site specific studies will be undertaken as part of the environmental assessment process, including the site specific Human Health and Ecological Risk Assessment (HHERA). Staff is currently not proceeding with any additional outside consultants until such time as the studies are available. The costs of this work will be subject to a further report to Council for direction.
- 5.5 There will be some additional legal costs incurred pertaining to any potential host community agreement at the direction of the Chief Administrative Officer.

Attachments:

- Schedule "A" – Peer Review and Economic Studies Costs to Date
Schedule "B" – Council Resolution GPA 623-07 and C-592-07

Municipality of Clarington
EFW -CONSULTING - 2007

TO PEER REVIEW THE SCOPE OF WORK FROM PSD-070-07 AS FOLLOWS:	CONSULTANT ENGAGED	BILLING PERIOD	TOTAL FEES/DISBURSMENTS	CONTRACT VALUE	COMMITMENTS
Undertake Section 4.2 Site Selection, 4.4 Gap Analysis, and advise on Section 5.1 Oversight of Technology Procurement Process and 5.2 Potential Environmental Effects	ROWE, STEVEN MCIP RPP	Period ending December 31, 2007	24,754.25	21,000.00	
Undertake Section 5.2 Potential Environmental Effects	AMEC AMERICAS LIMITED	Period ending November 30, 2007	14,133.20	20,000.00	6,125.00
Undertake Section 5.1 Oversight of Technology Procurement Process and assist with Section 5.2 Potential Environmental Effects	SENES CONSULTANTS LIMITED	Period ending November 30, 2007	36,045.47	47,000.00	11,392.50
Undertake Section 6.1 Impact on Clarington Energy Business Park, Section 6.2 Impact on Assessment Base and assist with Section 6.3 Community Sigma	CB RICHARD ELLIS LIMITED	Project Billing	100,000.00	100,000.00	
Undertake Section 6.3 Community Sigma and Section 6.4 Host Community Agreement	PRICE WATERHOUSE COOPERS	Thru to December 20/07	82,184.03	90,000.00	
Provide information, professional opinion, estimates and Legal advice as deemed appropriate - EA Process	HEFFERON, DENNIS C.	Thru December 13/07	23,800.70		
Provide information, professional opinion, estimates and Legal advice as deemed appropriate - Host Community Agreement	HEFFERON, DENNIS C.	Thru May 31/07	76,965.90		
Provide information, professional opinion, estimates and Legal advice as deemed appropriate - Peer Review	TOTTEN SIMS HUBICKI ASSOCIATES	Thru November 24/07	21,434.81		2,476.19
TOTAL ACTUAL EXPENDITURES:			379,318.36	278,000.00	19,993.69

GPA 632-07 and C-592-07 (Council Resolution)

WHEREAS the Consultants retained by the Regions of Durham/York (Proponent) to oversee an Environmental Assessment (EA) to site an Energy From Waste (EFW) facility have identified a property located in the Municipality of Clarington as the preferred site for said EFW facility;

WHEREAS such EFW facility is to be developed and operating on a date that appropriately relates with the scheduled closure of the U.S./State of Michigan border to all Canadian Municipal residual waste shipments;

WHEREAS the Municipality of Clarington believes that the Proponent of the EFW facility shall be fully responsible for all costs and risks associated with the development and operation of the EFW facility;

Whereas the Ontario Ministry of Environment must approve the Environmental Assessment process which includes a site specific Human Health and Environmental Risk Assessment, and issue to the Proponent a license to operate the EFW facility;

WHEREAS it is standard practice in North America that a Host Community Impact Agreement be entered into between the Proponent and the Host Community for any type of Municipal residual waste processing facility;

NOW THEREFORE, the Municipality of Clarington resolves that staff is authorized to undertake without prejudice negotiations with Durham Region and that the Regions of York and Durham are requested to:

1. Agree to protect the health and safety of the residents of Clarington and Durham by incorporating into the design and installation of the EFW facility the most modern and state of the art emission control technologies that meet or exceed the European Union (EU) monitoring and measurement standards.
2. Agree to continue to support an aggressive residual waste diversion and recycling program(s) in order to achieve and exceed, on or before December 2010, a 70 % diversion/recycling rate for the entire Region and such aggressive program(s) shall continue beyond 2010.
3. The Host Community Impact Agreement shall address, but not be limited to, the following major areas of concern and requirements:
 - Provide 24/7 emission monitoring systems easily accessible by the public.
 - Restrict the quantities, types and sources of waste, ie no City of Toronto waste will be allowed.
 - Establish a Community Liaison Committee including local Physicians.
 - Provide infrastructures to facilitate economic development in Clarington.
 - Absorb all Clarington costs that are related to the development and operations of the EFW facility.

- Compensate Clarington for any detrimental costs, if any, associated to an EFW facility sited within Clarington borders.
 - Assume all risks and liabilities associated with the EFW facility.
 - Provide a royalty and/or revenue sharing arrangement to Clarington for the life of the EFW facility in appropriate amounts and suitably indexed.
 - The project shall have no adverse impacts on payments in lieu of taxes.
 - No ash from the facility shall be deposited in any landfill site located within Clarington borders.
4. To alleviate the concerns of the people of Clarington and Durham by acknowledging the foregoing and agreeing to negotiate with Clarington in good faith,
 5. Staff is directed to forward this resolution to the Regions of York and Durham;
FORTHWITH.



The Regional Municipality of Durham
Report to: The Finance & Administration Committees
From: R.J. Clapp, Commissioner of Finance
Report No.: 2008-F-19
Date: February 5, 2008

SUBJECT:

Durham Region Energy From Waste (EFW) – Expenditure Report for the Regional Funding of the Municipality of Clarington's Due Diligence/Peer Review Studies

RECOMMENDATIONS:

THAT the Finance and Administration Committee recommend to Regional Council that the following report be received for information.

REPORT

1.0 BACKGROUND

- On April 18, 2007 Regional Council passed the following resolution:

"That each respective Region shall provide adequate funding to any of the potential host communities located within their respective Region...

And further, that such adequate funding shall include the costs of all necessary studies and legal advice incurred by the potential host community to investigate and complete its due diligence in arriving at its decision whether or not it will become a host community for the EFW facility...

And, further, the total of such costs shall be deducted from the combined royalty fee, if any, and not otherwise."

- On May 28, 2007, the Municipality of Clarington Council approved carrying out the requirements of Clarington Resolution #C-211-07, by preparing studies in accordance with the work set out in Municipality of Clarington Report PSD-070-07, including:
 - Retaining Mr. Steven Rowe to undertake work on EFW 'site selection,' 'gap analysis,' and to advise on 'oversight of technology procurement process' and 'potential environmental effects;'
 - Retaining SENES Consultants Limited to review 'oversight of technology procurement process' and assist with 'potential environmental effects;'
 - Retaining AMEC E&C Services Ltd. to conduct work in the area of 'potential environmental effects;'

- Retaining C.B. Richard Ellis Ltd. to undertake work on 'impact on Clarington Energy Business Park,' 'impact on assessment base' and assist with scope of work on 'community stigma;'
 - Retaining a multi-disciplinary accounting firm to work on 'community stigma' and 'host community agreement;'
 - Retaining a municipal solicitor and consulting engineer Totten Sims Hubicki to provide information, professional opinion, estimates and advice as deemed appropriate;
 - Striking a Committee comprised of Clarington staff and consultants similar in composition to the Region of Durham's Committee to facilitate discussions related to the Host Community Agreement; and,
 - Through the Directors of Finance and Planning Services, taking any additional actions or retain any additional consultants deemed necessary to ensure the Municipality has carried out its due diligence.
- On May 30, 2007 Regional Council passed the following resolution:

"THAT the intent of the Region of Durham, as it relates to the funding allocation to the Municipality of Clarington for review of studies independently from the Region in connection with the EFW project, is that such allocation shall not exceed \$200,000, and any amount exceeding this limit will require the approval of Regional Council;

AND FURTHER THAT staff of both municipalities (Durham and Clarington) meet and that Regional Works staff prepare a presentation for the next Regional Council meeting as it relates to the studies that need to be done and the costs associated with these studies."
- At the June 20, 2007 Regional Council meeting, the Commissioners of Works and Finance made a presentation regarding peer review costs, and the Municipality of Clarington intent to go beyond peer review, to include economic and financial impact analyses and legal and other impacts.
 - On June 20, 2007 Regional Council passed the following resolution to clarify Regional funding of Clarington's proposed studies:

"THAT the maximum amount of \$200,000 for peer review, with an additional amount of up to \$100,000, contingent upon Clarington finalization of terms of reference for local impact studies. With disbursement of the regional funding subject to approval of the Regional Treasurer, with concurrence from the Commissioner of Works and regular reporting of the expenditures to Regional Council through the Finance and Administration Committee."

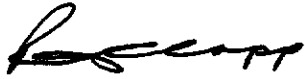
2.0 EXPENDITURE REPORT: FUNDING FOR MUNICIPALITY OF CLARINGTON'S DUE DILIGENCE/PEER REVIEW STUDIES

- The Region has to date received two invoices from Clarington for the recovery of costs associated with the above noted due diligence studies as outlined below.

Municipality of Clarington 2007 Due Diligence Studies regarding Energy From Waste (EFW)

Description	Total Cost (\$)
<u>Peer Review Studies</u>	
Steven Rowe MCIP, RPP, Environmental Planner	24,754.25
AMEC America's Limited	14,133.20
SENES Consultants Limited	36,045.47
	74,932.92
<u>Economic and Financial Impacts Studies</u>	
Price Waterhouse Coopers	82,184.03
CB Richard Ellis Ltd.	100,000.00
	182,184.03
<u>Legal and Other Services</u>	
Totten Sims Hubicki Associates	21,434.81
Dennis C. Hefferon, Barrister and Solicitor	100,766.60
	122,201.41
<u>Clarington staff expenses</u>	
	118.54
Sub-total	379,436.90
Clarington Billing Adjustment to Maximum as Per Regional Council Resolution	(79,436.90)
Total Invoices for Clarington Due Diligence Studies	300,000.00

- Based upon the two invoices from the Municipality of Clarington, the Region will provide funding to Clarington totaling \$300,000, for EFW due diligence studies as per Regional Council direction.



R.J. Clapp, CA
Commissioner of Finance

Recommended for Presentation to Committee



G.H. Cubitt, MSW
Chief Administrative Officer

DOUGLAS B. CHAMBERS, Ph.D.***Vice-President, Director of Radioactivity and Risk Studies*****EDUCATION**

B.Sc. (Honours), Physics, 1968, University of Waterloo (University of Waterloo Tuition Scholarship)
 Ph.D., Physics, 1973, McMaster University (National Research Council Science Scholarship)
 Two Sessions at the Advanced School for Statistical Mechanics and Thermodynamics, University of Texas, Austin, 1970 and 1971
 Air Pollution Diffusion, U.S. EPA, Research Triangle Park, 1974
 Annual Health Physics Course, Chalk River Nuclear Laboratories, 1974
 Observations on Human Populations, School of Hygiene, University of Toronto, 1979

PROFESSIONAL AFFILIATIONS

Advisory Committee on Radiation Protection (1993 to 2002 - committee advised the Canadian Nuclear Safety Commission on matters concerning radiation protection)
 American Nuclear Society
 Canadian Standards Association, Member of Technical Committee on Environmental Radiation Protection (1978 to 1994, Chairman 1987 to 1994); Member of Technical Committee on Risk Analysis (1989) 2006 Member CSA N288 AND CSA N292
 Canadian Radiation Protection Association
 Health Physics Society (U.S.)
 Society for Risk Analysis (U.S.)
 U.S. National Council on Radiation Protection and Measurements, Scientific Committee 85 on Risk of Lung Cancer from Radon (1991 to date)
 United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), Member 1998 to date, Canadian delegation
 Consultant to UNSCEAR for preparation of "Sources-to-Effect Assessment of Radon in Homes and Workplaces".
 Consultant to UNSCEAR for Preparation of "a report on "Effects of Ionizing Radiation on Non-Human Biota".

AWARDS

1997 W.B. Lewis Award (Canadian Nuclear Association) for achievements in environmental radioactivity.
 2002 Health Physics Society - Morgan Lecturer
 "Perspectives on Radioactive Waste Management in Canada. Joint Midyear Meeting. Orlando, February 2002.

EXPERIENCE

1980 to date - SENES Consultants Limited
 Executive Vice-President and Director of Risk and Radioactivity Studies. Technical responsibilities

include management and technical direction of multi-disciplinary studies including: human health risk assessments; environmental pathways and dose assessments; environmental impact assessments; uncertainty analysis; dose reconstruction and epidemiological investigations; ecological risk assessments; mine waste management; geochemical modelling; low-level radioactive waste management; and risk (cost) - benefit analyses. Dr. Chambers also provides direction to air dispersion modelling studies involving dense gases, urban airsheds and long range transport. Many of Dr. Chambers' projects involve working with multiple stakeholders to design studies and in communicating risks to the public at large.

Radioactivity - Director or senior health physics advisor for numerous studies pertaining to radiation protection including: dose reconstruction and epidemiologic analyses of both miners and people at home exposed to elevated radon concentrations. He has evaluated environmental exposures and doses from radioactive contaminated sites, decommissioning of uranium and thorium facilities; review of thorium metabolism data; and uranium biokinetic models; development of decommissioning criteria and guidelines; assessment of the potential risks from naturally occurring radioactivity (NORM); dose assessment and the development of health and safety practices for uranium mine workers; and the application of the ALARA optimization principal.

Northern Experience - Dr. Chamber has had the opportunity to direct or participate in several studies in the north. For example, as part of an evaluation of epidemiology of miners exposed to radon. Dr. Chambers has evaluated past radon exposures in two iron mines in northern Sweden and uranium mines in Northern Canada. Dr. Chambers provided an internal review function for the team of scientists who carried out surveys in the NWT to find pieces of the Cosmos 954 satellite that came down in the NWT. Dr. Chambers directed a screening level risk assessment for former asbestos mine (Clinton Creek) in the Yukon. Dr. Chambers directed a dose-reconstruction for Deline who worked as ore carriers in support of the Port Radium mine, and subsequently directed an epidemiological feasibility study of the same ore carriers. He is also currently involved in a study of dust emissions and dispersion at a large base metal mine in northern Alaska. Dr. Chambers has also participated in public workshops discussing potential environmental and health risks associated with uranium development in the north on behalf of government agencies in NWT, Nunavut and Nunatsiavut.

Human Health Risk Assessment - Numerous risk assessments including: contaminated sites; incineration of municipal wastes and sewage sludge; accidental release of chlorine from waste water

treatment facilities; developed risk informed decision support for drinking water supplies. Evaluation of risks from naturally occurring radioactivity in phosphogypsum arising from use in agriculture and road construction; investigations into harmonization of cancer and non-cancer risk; integrating quality of life issues in cost-benefit analyses; studies of the effect of uncertainty in exposure (dose) on the feasibility of epidemiological investigations, pharmacokinetic modelling and toxicological assessments of uranium, arsenic and other toxins. Dr. Chamber is currently a participant in the re-evaluation of Ontario uranium miner epidemiology.

Ecological Risk Assessment - Dr. Chambers has played a key role in the development of ecological risk assessment methodologies for mining regions in northern Saskatchewan and northern Ontario, and in support of decontamination planning for contaminated industrial sites. Dr. Chambers recently completed a comprehensive ecological risk assessment for marine discharge from the La Hague used nuclear fuel processing facility. Dr. Chambers also completed an ecological risk assessment for the use of slag from refining operations as construction fill. He has directed numerous risk assessments for industrial contaminated sites.

Environmental Assessment - Numerous, assessments including: the preparation of several environmental impact statements for the decommissioning of uranium tailings facilities in Canada, the United States and elsewhere; and for siting of new nuclear facilities in Canada and the United States. Dr. Chambers has also contributed to environmental assessments of nuclear power plants, thermal power plants and other industrial and mining facilities both in Canada and internationally. Dr. Chambers provided peer review for the IAEA's SIMPACTS and NUPACTS programs for evaluating direct and indirect effects from nuclear reactors and fossil fuel generating stations.

Facility Risk Assessment - Dr. Chambers has been involved in numerous facility risk assessments involving petrochemicals, ammonia, uranium hexafluoride, and chlorine amongst others. He has supervised a number of transportation risk studies involving petrochemicals, acids, radioactive waste, sludge and ore slurry. He has also been involved in a health and safety risk analysis for oxygen and nitrogen pipelines. Dr. Chambers carried out a formal risk assessment for a large existing LNG storage facility and has participated in evaluation of proposed LNG facilities. These projects have been conducted across Canada, in the U.S. and internationally.

Geochemical Modelling and Assessment - Dr. Chambers has been active in the development and application of geochemical models for evaluation of management options for mine waste rock and tailings. He was a senior scientist in a multi-disciplinary study team assisting the Federal German Environment Ministry with the decommissioning of

uranium mining and processing sites in Saxonia and Thüringia. Other assessments include evaluation of alternatives for reducing acid generation of mine waste heaps in South Africa and characterization of releases from uranium mining facilities.

Remedial Actions and Decommissioning - Directed and participated in numerous decommissioning and remedial action programs for NORM (naturally occurring radioactive material) wastes and low-level radioactive waste (LLRW) management sites, uranium mining and mill tailings facilities in Canada, United States and overseas. Amongst other studies, Dr. Chambers directed conceptual design studies for disposal of LLRW in near-surface facilities and engineered underground caverns. He also directed a regulatory risk assessment of deep geological repository of low and intermediate level waste at the Western Waste Management Facility. Directed SENES activities in decommissioning of Wismut facilities in Saxony and Thüringia.

Air Quality Assessment - In addition, provides direction to complex air dispersion modelling studies including long-range transport, urban airsheds and complex terrain. Provides technical direction to dispersion studies involving dense/reactive gases such as ammonia, chlorine, anhydrous hydrogen fluoride and N_2/O_2 and uranium hexafluoride. He has carried out numerous site-specific modelling studies of thermal power stations, numerical air quality modelling for complex terrain, calibration/verification studies, and development of long-range transport models.

1973-1980 - James F. MacLaren Limited

General Manager, Nuclear Projects Division from 1977 to 1980. Responsible for the development of the firm's capabilities in environmental radioactivity and radiation protection. Project Manager for the Air Environment Division from 1973 to 1977.

Environmental specialist on matters pertaining to the air environment and/or radioactivity on numerous environmental impact assessments across Canada and internationally.

Specialist input to the development, implementation and interpretation of results from air quality and meteorological surveys, air dispersion analyses and noise assessments at several types of industrial projects at locations across Canada. Developed a meteorological control system for large oil fired power plant in New Brunswick.

Project scientists for the development of national inventory of sources, emissions and environmental fate of mercury, lead and beryllium and asbestos.

TECHNICAL PAPERS AND PRESENTATIONS

More than 100 technical papers, reports publications and presentations (list available upon request). He has also presented seminars and workshops on a variety of topics, in Canada, the United States, Europe, South America and Africa.

JAMES W.S. YOUNG, PH.D.

Manager SENES Kincardine

EDUCATION

Ph.D. Fluid Mechanics, University of Waterloo, 1973
M.Sc. Mech. Eng., Queen's University, 1969
B.Sc. Mech. Eng., Queen's University, 1967

PROFESSIONAL AFFILIATIONS

Director Air and Waste Management Association
(Ontario Section, 1988 – 1990)
Past President of Canadian Meteorological and
Oceanographic Society (1988)
Co-founder of the Canadian Institute for Research in
Atmospheric Chemistry
Canadian Co-Chairman International Joint
Commission Air Quality Advisory Board (1985 –
1996)

Association of Professional Engineers of Ontario

AWARDS

1984 Government of Canada Merit Award
1989 Environment Canada Citation of Excellence
1991 Citation of Appreciation - Acid Rain

LANGUAGES

English (good); French (fair); Spanish (some)

EXPERIENCE

**2005 – date: Jim Young Atmospheric Services
Inc.**

President. Responsibilities include delivering
specialized air quality and weather services.

**2005 – date: Manager SENES Kincardine
Office and Senior Air Quality Advisor**

1990 – 2005: SENES Consultants Limited

**Vice President and Senior Air Quality
Specialist (2003 – 2005)**

Responsibilities included being part of Executive
Committee, business development, mentoring and
senior level advice and guidance in air quality.

**Director, Atmospheric Environmental Services
(1990 – 2003)** - Responsibilities include
environmental studies, climate change analyses, air
quality, noise, expert review, hearing testimony, and
research and development.

Experience at SENES included the **aggregate industry**
(Certificates of Approval, air quality studies, advice &

guidance, expert testimony), **air quality advice and
training** (Colombia, Peru, Environment Canada, World
Bank (Mexico), International Joint Commission, UNDP
(Viet Nam), CIRAC Newsletter, Toyota, Chihuahua,
Juárez); **air quality assessments** (Gardiner Expressway
Revitalization, Voisey's Bay Nickel Smelter/Refinery,
City of Windsor Waterfront, Chrysler Canada, GO
Transit, Innisfil Landfill, Keele Valley Landfill, Leslie
Street Extension, Peel Landfill Search, Richmond
Landfill Expansion, Jordan - Petcoke); **air quality
standards** (Chile, Viet Nam, British Columbia);
certificates of approval (automotive, manufacturing);
climate change (climate variability impact on air
quality issues, GhG Inventories, International
Guidelines and Workbooks, capacity building); **control
technology** (AERCoSt, equipment options, costing,
databases, advice/guidance, mercury control); **criteria
development** (GTA Candidate Site Selection,
Sustainability Index); **environmental management**
(SIMON, Irving Oil Refinery Co-Gen Project, City of
Toronto); **emission inventories** (direct, fugitive,
Colombia, Mexico); **expert reviews or testimony**
(impact of aggregate processing, U.S. and Canada
response on Toxic Chemicals, OWMC Air and Dust,
Niagara Falls Upgrade, Woburn Superfund Site, Swan
Hills Incinerator, Mountain Road Landfill Site);
meteorology (weather model for Macedonia, FReSH
Air, FReSH-4 concept, mixing height climatology,
building design criteria); **mining** (Slovakia, Chile);
modelling (CALMET/CALPUFF, ISC3, FDM, SDM,
Reg. 346); **monitoring** (network design, analysis,
model calibration, dust and gases, Trinidad);
municipalities (water supply pipeline, sludge
management, zoning, developments); **noise
assessments** (Honda Alliston, TransCanada Pipelines,
City of Toronto Material Recovery Facility, IWA
Landfill Search); **odour** (impacts, health assessment);
project management (Lennox TGS Dual Fuel
Assessment, Electrotechnology Energy Use
Assessment, GhG Inventory for the Province of
Ontario, Acid Rain Strategy for Ontario, Air Quality
Compliance Plan); and **R&D** (FReSH-4, Continental
Pollutant Pathways in North America, Acid Rain
Modelling, Development of a Sustainability Index,
Technology & Economics of Control Strategies).

1978-1990: Atmospheric Environment Service

Acting Director General Research (1989-1990) -
Managed a staff of 180 people (70 research scientists)
with an annual budget of \$14 million and a facility
worth \$20 million; responsible for the health of the
atmospheric sciences community in Canada; prepared
Research Strategic Plan; member Steering Committee
for Crombie Commission on the Toronto Waterfront;
member Joint Working Group Canada-PRC, member

Senior Management Committee; successfully negotiated a doubling (to \$1.6 million) of the Grants in Aid of Atmospheric Research with NSERC; Delegate to the WMO Commission on Atmospheric Sciences (CAS); lecturer at course on Atmospheric Chemistry (CIRAC) and meteorologist training course (AES).

Director, Air Quality and Inter-environmental Research Branch (1983-1989) - Advised senior service and departmental managers on viability of research programs or related policy; managed a staff of 86 people (40 research scientists, 17 other professionals and 29 technical and administrative support staff) and research facility worth \$11.5 million with an annual budget of \$8 million; liaised with other government departments, other levels of government, other nations, international organizations as well as university and private sector scientific community; developed an optimized science-based acid rain control strategy; encouraged development of a heavy gas dispersion model in the private sector; advisor to Canadian Electrical Association to ensure development of acid rain modelling expertise in the Canadian private sector; delivered York Chair in Atmospheric Chemistry with spin-off benefits of the creation of the Canadian Institute for Research in Atmospheric Chemistry and the donation of a privately funded second chair; successfully replaced the Station for Atmospheric Experiments with a new research facility and headquarters expansion with a net decrease of resources; prepared strategic plan for Air Quality Services area; tripled research output (Journal publications); improved monitoring data quality from 67 to 94% and served on international science and technology committees. Revitalized International Air Quality Advisory Board of the International Joint Commission, as Canadian Co-Chairman, by broadening their thinking about today's issues to the right time/space scales.

Chief, Air Quality Monitoring and Assessment Division (1981-1983) - Successfully defended the atmospheric sector during Royal Society of Canada review of acid rain program; developed first strategy for acid rain abatement; maintained responsibility for six bilateral MOI documents (successfully completed); established and upgraded Canadian Air and Precipitation Network (CAPMoN) to state of the art and made the Environmental Emergency Modelling Package operational.

Senior Scientist (1978-1981) - Chaired NRC Panel on Particulate Matter in the Canadian Atmosphere; developed a methodology for Criteria Digests; developed effects diagrams for nitrogen oxides which for the first time clearly outlined for decision makers health and ecosystem effects of options for standards; carried out research in air pollution, fugitive dust and acid rain modelling; Technical Co-ordinator for Work Group 2 (Modelling) under Canada/USA Memorandum

of Intent (MOI) and during 1981 was Atmospheric Sector Co-ordinator for Acid Rain (with a budget of about \$2M).

1989: Canadian Institute for Research in Atmospheric Chemistry (CIRAC)

Executive Director - Six-month development leave. Responsible for the day-to-day activities including 4 major multi-partner research projects; planned for a \$7 million Endowment Fund for CIRAC's on-going support.

1977-1978: Beak Consultants

Director of Air Quality Engineering, Eastern Operations - Overall project manager for environmental impact of the Teller Scrubber installation, including liaison with Federal, Provincial and Mill officials as well as a full technical evaluation; responsible for atmospheric impact assessment of a uranium refinery, an iron ore mine, various pulp and paper mills, an iron and titanium mill, a thermal power station, a uranium mine and preconcentrator, and climate impact on uranium tailings disposal over 100,000 years; and expert testimony to the Ontario Municipal Board and expert review of guidelines for impact assessment.

1975-1977: Environment New Brunswick

Chief of the Air Quality Section, Pollution Control Branch - Responsible for policy direction, long-term planning and management of air quality for Province of New Brunswick; procured/installed a multiple use air pollution monitoring system and telemetry package for City of St. John; initiated joint research studies in acid rain effects on forests with the University of New Brunswick; developed provincial air quality standards and specific emission standards for asphalt paving plants, pulp and paper industry and the Irving Oil refinery; negotiated first Canadian operational installation of a Teller Scrubber for odour removal from a pulp and paper plant; and was responsible for development of Canadian short- and long-term Air Quality Indices (in use in five provinces today).

1973-1975: Atmospheric Environment Service

Research Scientist, in Air Pollution Meteorology - Planned, organized and co-ordinated field studies; carried out basic research in atmospheric science; delivered a real time pollution abatement model for the City of St. John and the Electric Power Commission; and lectured in Air Pollution Meteorology.

PAPERS AND PRESENTATIONS

Author or co-author of over 100 technical papers and presentations. (List available upon request).

CHRIS C. MARSON, B.Sc., P.Eng.

Senior Environmental Engineer

EDUCATION

B.Sc., Chemistry, McMaster University, 1976

PROFESSIONAL AFFILIATIONS

P.Eng., Chemical Engineering, APEO, 1985
Professional Engineers of Ontario

LANGUAGE CAPABILITIES

English, some French

EXPERIENCE

2001 to present - SENES Consultants Limited

Senior Environmental Engineer involved in environmental licence applications, air quality assessments, environmental impact assessments, emission inventories, air dispersion modelling studies and other related projects.

Air Quality Assessments - Project Manager for the air quality impact section of environmental impact assessments for several natural gas-fired combined cycle electrical power generation facilities including a facility in downtown Toronto. Participated in public meetings and meetings with regulatory agencies.

Project Manager for the preparation of air quality impact assessments using CALPUFF for many large complex industrial facilities in complex terrain. Facilities include mine sites, pilot testing projects, pulp and paper facilities, gypsum facilities and fossil fuel-fired electrical power generation facilities. Three dimensional meteorology was generated where no suitable data existed using FReSH meso-scale forecasting model and an in-house developed coupling program. In some cases, various mitigation scenarios were modelled to ensure compliance before submission to regulatory authorities.

Project Manager for the assessment of short-range and long-range transport and deposition of acid gases from industrial operations. Predictions were compared to monitored data from Canada and United States.

Project Manager for the application of the SENES FReSH Air pollutant concentration forecasting system (a meso-scale meteorological forecasting system coupled to CALPUFF) to a large industrial facility. This system predicted contaminant

concentrations up to three days in advance so that emission cutbacks could be made to protect sensitive receptors allowing for improved production planning. Project Manager for air quality impact assessments for several highway modification projects. Compared impacts of the proposed projects with the "do nothing" case for several dates in the future based on projected growth and MOBILE 6.2C predicted vehicle emissions.

Project manager for several projects for a wood products manufacturing company at multiple locations. AERMOD modelling was undertaken to determine the contributions from the various sources to the maximum predicted concentrations to aid in selecting optimal sources for control.

Provided expert review of many air dispersion modelling reports for various government agencies and First Nations in Canada and other countries. Projects reviewed included site remediation of contaminated soils, a petroleum refinery and a liquefied natural gas project.

Presented expert evidence at an Ontario Municipal Board hearing for the proposed expansion of a licensed aggregate quarry.

Certificates of Approval - Project Manager for the preparation of Comprehensive (flexible) Certificates of Approval (Air).

Participant in an Air Dispersion Modelling Practitioners Group that worked with the Ontario Ministry of the Environment on the development of modelling guidelines for revised air regulations (O.Reg. 419/05).

Odour Assessment - Project Manager for studies on the impact of odour emissions from industrial operations and public works including sewage treatment plants and combined sewer overflow tanks.

Pollution Reduction Costing - Project manager for two large projects for the Ontario Ministry of the Environment for the documentation and costing of various options to reduce VOCs from the Automobile OEM and glass manufacturing sectors.

2006-2007 - Ontario Ministry of the Environment

Took 18 month sabbatical leave to join Standards Development Branch. Prepared guidance material for applications for alternative air standards. Prepared internal document on the review of advanced air models and trained Ministry staff on

review techniques. Reviewed industrial client submissions for alternative air standards. Represented Ministry at Air Dispersion Modelling Practitioners Group meetings. Presented information to public groups on proposed amendments to air regulations.

1998-2001 – Rhoditech, Rhodia S.A. (France)

Involved in many projects in the fields of environmental and industrial hygiene, introducing many methods from North America to France. Air dispersion modelling was undertaken in support of many health impact studies prepared by Rhoditech for industrial operating permit applications.

1990-1998 - SENES Consultants Limited

Environmental Licence Applications - Project Manager for the preparation of over 200 applications for Certificates of Approval (Air) and their supporting documentation. Projects have included many types of operations ranging from small laboratory fume hoods up to a new \$600 million automobile assembly plant. In all cases, the original application was approved.

Air Quality Assessments - Project Manager for many air quality assessments that involved the evaluation of potential impacts of air and odour emissions from various types of industrial facilities (petrochemical, cement manufacturing, painting operations etc.) on proposed residential and other developments.

Project Manager for a study for the Ontario Ministry of the Environment Standards Development Branch that evaluated control options and associated costs for Total Reduced Sulphur (TRS) emissions from pulp mills, steel mills and an abrasives manufacturer. Possible controls were identified based on experience at industrial facilities, and estimated sector-wide capital costs for the controls were reported.

Project Manager for a study for Health Canada that involved air dispersion modelling to calculate ambient annual air concentrations of toxic materials emitted from over 50 facilities in three industrial sectors. Population data from Statistics Canada was used to determine the population that could be exposed to various concentrations of the modelled toxics.

Environmental Impact Assessments - Project Coordinator for two environmental impact assessments of coal-fired thermal generating stations. These multi-disciplinary projects included

assessment of air, water, waste handling, terrestrial and socio-economic impacts of future operations. A screening level risk assessment of the impact of air emissions on the nearby residents was included.

Prepared a chapter of the Greenhouse Gas Inventory Workbook for the Intergovernmental Panel on Climate Change (IPCC) for Environment Canada. The workbook chapter focused on industrial emissions of greenhouse gases and ozone and aerosol precursors.

Project Manager for the preliminary environmental assessment of a proposed gas turbine cogeneration facility. The study assessed the net benefit of replacing older, less efficient gas-fired steam generating facilities with the proposed facility.

Emission Inventories - Project Manager for the preparation of air emission inventories requested by government agencies or industrial clients. Emissions were calculated from both client supplied data as well as by using accepted emission factors.

Project Manager for fugitive emissions testing of valves, seals, flanges, pumps, agitators and other components at a major polystyrene manufacturing facility using U.S. EPA Method 21.

Assisted in preparation and evaluation of a province-wide emission inventory for sulphur dioxide, nitrogen oxide and volatile organic compounds. The project involved investigation of applicable technologies to control emissions and the use of cost functions to prepare a computer model for evaluating various regulatory control strategies.

1979-1989 - Fiberglas Canada Inc.

Supervisor of Environmental Services at the Research and Insulation Development Division, involved in providing environmental services to operating facilities and conducting environmental research. Responsible for the operation of all environmental sampling and analytical activities. Directed research and development projects in support of pollution control or elimination at source including initiation, development and demonstration stages.

Company representative on Technical Committee and chairman of Land Sub-Committee for the Sarnia-Lambton Environmental Association, an environment-based collective of industries in the Sarnia area.