

File No. 1621232-01

June 1, 2017

Ms. Mary Quintana
The University of Western Ontario
1151 Richmond Street,
London, ON
CAN, N6A 3K7

Dear Ms. Quintana

**SUBJECT: Verification of 'MOECC Report (2016).pdf' (2016 SWM GHG Emissions Report)
under the O.Reg.452/09 - Draft**

Please find attached the Draft Verification Report raised as a result of our EVER+GHG Verification of your assertion conducted in your London facility on May 25-26, 2017.

We thank you and your organization for the support and co-operation given during the verification.

Sincerely,



Sandra C. Tavares, *B.Sc., M.Sc., EP(EMSLA), EP-Sustainability*
SAI Global Lead Verifier
Contact Information

Encls.

EVER+GHG VERIFICATION REPORT

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REPORT DISTRIBUTION

- Company: The University of Western Ontario
- SAI Global, 20 Carlson Court, Suite 100, Toronto, Ontario, M9W 7K6, Canada
- Verification Team

Statement of Confidentiality:

The information contained in this report is privileged and confidential and intended only for the use of the organisation to whom it is addressed. If you are not the intended recipient, you are hereby notified that any distribution, copying, disclosure or taking of any action in reliance on the contents of this transmission is strictly prohibited and review by any individual other than the intended recipient shall not constitute waiver of privilege. If you have received this report in error, please notify us immediately and return it to us.

SECTION 1 –SUMMARY INFORMATION

Company Information	
SAI Global File No.:	1621232-01
Company:	The University of Western Ontario
Address:	1151 Richmond Street, London, Ontario CAN, N6A 3K7
Primary Contact:	Ms. Mary Quintana
Email/Phone Number:	mary.quintana@uwo.ca / 519-661-2111
Verification Information	
Level of Assurance:	Reasonable Assurance
Verification Objective:	To verify the Greenhouse (GHG) emissions reported in the 2016 SWIM Report for O.Reg.452/09 in order to express a reasonable level of assurance conclusion on its accuracy, completeness, consistency, relevance and transparency.
Verification Standard:	ISO 14064-3:2006
Verification Criteria:	
• Program	O.Reg.452/09
• Regulation	O.Reg.452/09
• Guidance Document(s)	Guideline for Greenhouse Gas Emissions Reporting (Dec. 2015)
Verification Scope:	mary.quintana@uwo.ca
• Organizational Boundary	As defined in the Boundary letter dated 30-Jan-2017 by the University of Western Ontario Associate Secretary & Legal Advisor
• Activities/Processes	Educational Institution
• GHG Sources	Power plant, satellite boilers, heaters, kitchens, stand-by Generators
• GHG Types	CO ₂ , CH ₄ , N ₂ O
• Time Period	2016
Materiality:	5%
Assertion Information	
GHG CO₂e Assertion	
• Total	49486 tonnes
• Attributable to combustion of biomass / biofuels:	0 tonnes
Assertion Title:	MOECC Report (2016).pdf
Assertion Version/Date:	7 April 2017
Intended Users:	The University of Western Ontario / Ministry of the Environment and Climate Change (MoECC)
Verification Team Information	
Team Leader	Sandra Tavares
Team Member	Not applicable
Technical Expert	Not applicable
Peer Reviewer	John Fraser
Verification Summary	
Stage 1 Date	4/5 May 2017
Stage 2 Onsite Date	25/26 May 2017
Summary of Findings	1 OFI

SECTION 2 – VERIFICATION DETAILS

2.1 Introduction

The University of Western Ontario located in London, Ontario maintains campus facilities for educational purposes. Key processes include general stationary combustion at the Power Plant and satellite boilers and stand-by generators, which result in emissions of CO₂, CH₄, and N₂O.

Total reported CO₂e emissions, excluding CO₂ captured and CO₂ from biomass, are 49486 tonnes.

Changes to the facility since the last assertion included continuing energy conservation Measures and review and registration of existing generators.

2.2 Verification Objective

To verify the Greenhouse Gas emissions reported in the 2016 MoECC GHG Submission document for O.Reg.452/09 in order to express a reasonable level of assurance conclusion on its accuracy, completeness, consistency, relevance and transparency.

2.3 Verification Criteria

The verification evaluated the 'MOECC Report (2016).pdf' assertion against a number of criteria to ensure that it provides a true and fair account of actual emissions performance over the period January 1 to December 31, 2016. The assertion was assessed against five criteria based on the key principles to be followed in the quantification of GHG emissions under ISO 14064:

- Accuracy: Reduce bias, uncertainties and errors in calculation as far as is practical;
- Completeness: Include all relevant emissions and production information;
- Consistence: Enable meaningful comparisons in emissions and production information;
- Relevance: Select the emissions and production information appropriate to the needs of the intended user; and
- Transparency: Disclose sufficient and appropriate emissions and input data as well as the associated calculations to allow intended users to make decisions with reasonable confidence.

In addition, the following documents were referenced:

- O.Reg.452/09
- Guidelines for Greenhouse Gas Emissions Reporting (December 2015)

2.4 Verification Scope

2.4.1 Organizational Boundary

OR 452/09 defines a facility as all buildings, equipment, structures and stationary items, such as surfaces and storage piles that,

- (a) are owned or operated by the same person, and
- (b) are located,
 - (i) on a single site,
 - (ii) on two or more contiguous or adjacent sites that function as a single integrated site, or
 - (iii) on two or more sites that are not contiguous or adjacent, if the activity carried out at the sites is a pipeline transportation system that consists of pipelines that transport processed natural gas and their associated installations, including storage installations but excluding straddle plants or other processing installations;

As such, the facility boundary comprises the entire London, Ontario main campus but not the locations which are separately incorporated entities, neither owned nor operated by the University of Western Ontario, or are not adjacent or contiguous to the main campus.

2.4.2 Activities and Processes

Facilities Management is responsible for the heating and energy requirements of all the buildings on the main campus and the maintenance of the incinerator (although incineration of biomass / non-biomass is no longer carried out onsite). They operate or oversee the supply of fuel to the power plant, incinerator, satellite boilers, heaters and kitchens as well as maintain the emergency stand-by generators.

2.4.3 Data management system and controls

The GHG Information Management System manual outlines data collection processes (including estimation of missing data), data sources, records management, and emissions reporting. It is supported by a series of excel spreadsheets:

- Info Sources - Control 2016
- 'GAS 2015-16 - Mod MQ (March 2016)' & 'GAS 2016-17 - Rev MQ (March 2017)'
- Data Collection - Scope 1 (2016)
- OREG 452-09 GHG Calculator V3 (0317) - 2016 emss

All the data required for GHG emissions calculations is obtained by the Energy & Environment Specialist primarily from sources throughout the site. It is collected, entered into the spreadsheet and assessed for quality concerns. The spreadsheet contains the formulas, HHV and EFs from GHG guideline. Data is then transferred into SWM.

2.4.4 GHG Sources

The verification covered the following GHG source categories that are outlined in the O.Reg.452/09:

Source Category	GHG Sources
General Stationary Combustion	
Annual GHG emissions by fuel type	Power Plant, Satellite Boilers, heaters, incinerator (verified no longer used), etc.
Annual fuel consumption (by fuel type)	Annual fuel consumption (by fuel type) Natural gas, fuel oil no. 2 (no longer biomedical)
Annual weighted average carbon content for each fuel	No longer used within biomedical emission calculations
Annual weighted average high heat value for each fuel	Not used
Annual steam generation (biomass or MSW)	Not applicable

2.4.5 GHG Types

The verification covered all six/seven types of greenhouse gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulphur hexafluoride (SF₆), nitrogen trifluoride (NF₃).

2.4.6 Time Period

The verification covered all activities occurring during the 1 January to 31 December 2016 compliance period.

2.5 Materiality

Materiality is the concept that refers to errors, omissions, or misrepresentations (discrepancies) that would affect the assertion and could influence decisions of intended users. Quantitative materiality refers to discrepancies of a numerical nature. Qualitative materiality refers to discrepancies of a non-numerical nature, such as misleading representations of circumstances. Both quantitative and qualitative materiality were assessed.

The quantitative materiality threshold was set at 5%. The qualitative materiality was assessed using the verifier's best judgement, with a focus on data record-keeping, data handling, and transparency of information.

2.6 Parties and Intended Users

The Responsible Party is The University of Western Ontario.
The Intended User of the verification findings is Ministry of Environment and Climate Change (MoECC).

2.7 Disclaimer

Because of the inherent limitations in any internal control structure, it is possible that fraud, error, or non-compliance with laws and regulations may occur and not be detected. Further, the verification was not designed to detect all weaknesses or errors in internal controls so far as they relate to the requirements set out above as the verification has not been performed continuously throughout the period and the procedures performed on the relevant internal controls were on a test basis. Any projection of the evaluation of control procedures to future periods is subject to the risk that the procedures may become inadequate because of changes in conditions, or that the degree of compliance with them may deteriorate.

2.8 Verification Methodology

The verification was conducted according to the ISO 14064-3 Standard. It followed the main process steps outlined in ISO 14064-3. See Appendix A for the verification and sampling plan, Appendix B for the verification schedule and Appendix C for the verification statement.

For accredited verifications, the methodology also met the requirements of ISO 14065 as demonstrated by SAI Global's ANSI Certificate of Accreditation for Greenhouse Gas Verification #0748 granted on May 13, 2010 (<http://www.ansi.org/>).

2.8.1 Strategic Review and Planning

A desktop review of the 2016 SWM Report and background information provided by The University of Western Ontario was conducted prior to the site visit. A risk assessment was performed to identify areas of higher risk of potential error, considering the following aspects: data sources, number of points of measurement, degree of automation, frequency of monitoring, presence of quality control systems, preliminary data analysis, and selection of emission factors. It also considered the calculation methodology, its implementation and transparency.

2.8.2 Sampling and Verification Plan

A plan was prepared and issued to The University of Western Ontario on 12 May 2017 prior to the site visit. It outlined the scope and the proposed site visit schedule. The sampling plan focused on natural gas and fuel oil combustion, the GHG management system, sources and boundaries natural gas and fuel oil combustion, the GHG management system, sources and boundaries.

2.8.3 Site Visit

The site visit occurred on May 25-26, 2017. The verification team conducted an on-site verification according to the Verification and Sampling Plan. The team toured the facility, observed practices, conducted interviews, reviewed records, reviewed procedures and assessed data in order to determine if the data was accurate, complete, consistent, relevant and transparent. The team interfaced with The University of Western Ontario and conducted introductory and de-briefing meetings attended by persons listed in section 2.10.

The verification was conducted according to the following procedures:

- Review of site operations;
- Review of 2016 MoE GHG submission document and supporting documentation for consistent calculation methodologies;
- Review of previous GHG reports;
- Review of any significant changes to the organization or operational boundaries since the baseline or previously verified period;
- Review of the data sources for the GHG calculations;
- Review of operational and control procedures related to GHG information;
- Review of information management system processes used to collect and store information related to the calculation of GHG emissions;
- Review of calculation methodologies and calculations; and
- Methodologies to verify emissions data including crosschecking, vouching, re-computing, re-tracing and confirmation.

2.8.4 Post Visit Follow-Up

Verification activities outstanding at the conclusion of the site visit were completed off-site.

2.9 Information Resources

The results and findings of the verification were based on information resources, which included the following:

- GHG IMS
- Overview of Quality Assurance.docx
- Boundary letter dated 30-Jan-2017 from Associate Secretary & Legal Advisor detailing campus locations and 'Emissions Map (scan).pdf'
- Data Collection - Scope 1 (2016).xlsx, Data Request Control 2016.xlsx and Info Sources Control 2016.xlsx
- O.Reg. 452-09 GHG Calculator V3 (0317) – 2016 emss
- Gas 2015-2016 and Gas 2016-2017
- Fuel Oil Records
- Natural Gas Invoices
- Generator Certificate of Approvals (CofAs) / EASR registrations
- O.Reg.452/09 (December 2015 Guideline)
- 2016 SWM Report

2.10 Meeting Attendees

Name:	Title:
Ryan Lovell	Project Accountant (<i>opening meeting only</i>)
Mary Quintana	Energy & Environment Specialist
Paulette Rennals	Administrative Assistant (<i>opening meeting only</i>)
Al Niemi	Power Plant Manager
Paul Martin	Director of Business Operations (<i>closing meeting only</i>)

2.11 Internal Peer Review

An internal peer review was undertaken by to provide an evaluation of the verification process and outcomes.

SECTION 3 – VERIFICATION FINDINGS

3.1 Statement of Verification

Please refer to Appendix C

3.2 Verification Findings Summary

Section	Status
Accuracy	A
Completeness	A
Consistency	I
Relevance	A
Transparency	I
Other	NA

Legend: A -Acceptable; M -Material Discrepancy; D –Discrepancy; I -Improvement Area; NA -Not Applicable

3.3 Material Discrepancies

In the event of material discrepancies, the organization may request, in writing, within seven days of receiving this report, that the MOE Director review the determination

There were no material discrepancies.

3.4 Non-Material Discrepancies

There were no non-material discrepancies.

3.5 Positive Aspects of the GHG Reporting Program

- Organisation of natural gas and fuel oil data
- Review of internal program to identify discrepancies in data
- Energy & Environment Specialist and Facilities Management’s involvement in new projects for determination of impacts on GHG program

3.6 Opportunities for Improvement

Ensure natural gas usage calculation records are consistent (e.g. ‘Data collection - Scope 1 (2016).xlxs’ and ‘GAS 2015-16 - Mod MQ (March 2016).xlxs’ and ‘GAS 2016-17 - Rev MQ (March 2017).xlxs’).

Next Scheduled Verification:

Stage 1

- Date: 2018
- No. of Persons: To be determined (TBD)
- No. of Verification Days Required: TBD

Stage 2

- Date: 2018
- No. of Persons: TBD
- No. of Verification Days Required: TBD



Sandra C. Tavares, *B.Sc., M.Sc., EP(EMSLA), EP-Sustainability*
SAI Global Team Leader

Date: May 26, 2017

Appendix A – Verification and Sample Plan

Project No. 1621232-01

May 11, 2017

Ms. Mary Quintana
Energy and Environmental Specialist
The University of Western Ontario
1151 Richmond Street,
London, ON
CAN N6A 3K7

SUBJECT: CERTIFICATION PROGRAM

Dear Ms. Quintana,

With reference to our recent conversation, SAI GLOBAL shall conduct a Re-Verification of your facility at **1151 Richmond Street, London, Ontario Canada, N6A 3K7 on May 25-26, 2017**. The verification will take approximately 1.5 day(s) to complete as per the attached plan, which we would ask you to review. The verification team members (and accompanying persons) are detailed below:

<u>Position</u>	<u>Name</u>
Team Leader	Sandra Tavares

If you have any concerns with the composition of the verification team and the verification plan, please contact me within the next 5 days. Would you please inform us if any member of the team will be in an area in which they may be exposed to substances that could cause potential injury or a risk to health, plus any dress code requirements applicable for your organization. Please note that the verifier's time has been specifically reserved for your verification. Any requests for postponements or cancellations of the verification may be subject to charges as outlined in our proposal.

SAI GLOBAL would like to request that you supply a knowledgeable guide to accompany the Team Leader and the verification team members during the verification. Furthermore, we request an opening meeting with you and any other relevant staff members, to explain the scope and method of conducting the verification. On completion of the verification, we would like to meet with yourself and other interested staff to present a verbal report of the verification. The written verification report will follow shortly. The verification findings remain confidential to The University of Western Ontario, the verification team members and any accompanying members, as per the contractual conditions.

Please note that if SAI GLOBAL does not have a P.O.# on file at the time of the verification, we will be requesting that one be provided to me at the conclusion of the verification in order to ensure accurate billing.

I look forward to meeting you on May 25, 2017.

Best Regards,



Sandra Tavares, *B.Sc., M.Sc., EP(EMSLA), EP-Sustainability*
SAI GLOBAL Team Leader
Encls.
cc: SAI GLOBAL File

SAI GLOBAL VERIFICATION PLAN – DAILY PROGRAM SCHEDULE

Assertion Document:	MOECC Report (2016).pdf
Objective:	To verify the Assertion Document according to the defined criteria and materiality threshold for the defined scope.
Scope:	1151 Richmond Street, London ON,
Criteria:	EVER+GHG Standard, ISO 14064-3 Methodology, O.Reg.452/09 Program/Legal
Level of Assurance:	Reasonable
Materiality Threshold:	5%
Date(s):	May 25 - 26, 2017

As of: 5 May 2017

Level of Verification Assurance	Reasonable	Materiality Threshold:	5%	Requirements of any of the criteria	Guideline for GHG Emission Reporting (December 2015)
Planned Verification Sample					
Line Item				Facilities	Activity Data
Boundary				Alumni House, FIMS & Nursing Building Parking Lot and DSB L3 Dental Science Level 3 loading dock 2016 generator installations	generator nameplates and natural gas meter tags
NG GSC at Boilerhouse / Satellite Locations				Power Plant / Satellite Boilers	2016 Natural Gas invoices (Jan, Feb, Oct and Dec), meters, boundaries
Fuel Oil GSC at Boilerhouse / Satellite Locations				Power Plant	Fuel oil metering (Jan-Mar 2016, 2016 calibration for boiler #2)
.				GHG Management System	Review reporting and QA practices, including record control
.					

Date: May 25, 2017	
Auditor: Sandra Tavares - Team Leader	
Time	Processes to be Audited / Scheduled Meetings
8:30 am	Opening Meeting <ul style="list-style-type: none"> • Operations Overview • Data and Systems Overview
9:00 am	Review of Stage 1 Findings Assessment of Organizational Boundaries, Sources and GHGMS <ul style="list-style-type: none"> • 2016 Emissions Report review • Review of boundaries, sources, exemptions, etc. • Review of GHGMS against Program Criteria, including review of Master Capital Projects List • Follow-up on last year's findings
11:00 am	Tour - Alumni House, Alumni House, FIMS & Nursing Building Parking Lot and DSB L3 Dental Science Level 3 loading dock (<i>generators and gas meter tags</i>), finishing at Powerhouse (<i>review of fuel oil usage and calibration</i>)
12:00 pm	Lunch
12:30 pm	Assessment of GHG Data and Information <ul style="list-style-type: none"> - Areas of greatest potential of material discrepancy, as per sample plan (natural gas / fuel oil use)
4:30 pm	Verification Debriefing Meeting

Date: May 26, 2017	
Auditor: Sandra Tavares - Team Leader	
Time	Processes to be Audited / Scheduled Meetings
8:00 am	Assessment of Information System and Controls <ul style="list-style-type: none"> • Areas of greatest potential of material discrepancy, as per sample plan (<i>boundary, projects and data quality management</i>)
10:00 am	Assessment of Data against Criteria <ul style="list-style-type: none"> • Accuracy • Completeness • Consistency • Relevance • Transparency
11:00 am	Evaluation of the GHG Assertion
11:30 am	Verification Closing Meeting

Note: Areas of greatest potential of material discrepancy will be verified, as per the attached sample plan.

Appendix B – Verification Schedule

Activity	Date
Initiation of data request from customer	6-Apr-2017
Data received for review	21-Apr-2017
Stage 1 strategic review and planning	5-6 May-2017
Issuance of verification plan	12-May-2017
Site visit	25-26 May-2017
Follow-up activities	29-31 May-2017
Draft verification report	1-Jun-2017
Peer review of verification	To be determined (TBD)
Verification report issuance	TBD

Appendix C – Verification Statement

The verification statement will be provided separately with the final verification report.

In order to reduce our environmental footprint, we will not automatically provide a hard copy of your verification statement. If you require a hard copy of your original statement, provide a request by return e-mail. If hard copies are not received within 10 days, please contact the undersigned to determine the status of your request.

Your verification provides an invaluable edge in the marketplace. Please download our Marketing Guidelines and the electronic versions of our StandardsMark® at www.qmi-saiglobal.com/ghgmark so that you can begin promoting your verification. If you have any questions regarding QMI-SAI Global’s Marketing Guidelines, please contact us at 1-800-247-0802, or e-mail marketing.services@qmi-saiglobal.com.

Appendix D – Facilities within Scope

List all facilities within the scope of the verification.

The University of Western Ontario
1151 Richmond St.
London, Ontario
CAN, N6A 3K7