

Report on the Final Review of Assessment Methods for the Durham York Energy Centre Spring 2017 Voluntary Emissions Testing

Project J17083

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Introduction

This project was commissioned by the Regional Municipality of Durham to provide independent audits of procedures related to source sampling and assessment of the Durham York Energy Centre (DYEC) during the Spring 2017 Voluntary Source Testing campaign. The source testing was undertaken by ORTECH Consulting Inc. (Ortech), using source sampling methods described below and generally following the Ontario Source Testing Code. Media and materials for the sampling were provided by ALS Environmental (ALS) and samples were processed at the ALS laboratories in Burlington. ALS has various accreditations, including the Canadian Association for Laboratory Accreditation Inc. (CALA) accreditation in Canada, which follows the ISO 17025 operational protocols for the laboratory and the methods of processing. This level of accreditation requires validation of methods, evidence for the training and proficiency of analysts and includes producing evidence that procedures are followed as documented at every stage of processing including tracking of samples, tracking of batches of sampling materials, standard reference compounds, surrogate materials and procedures. Levels of documentation include the methods for processing samples and their validation in the laboratory and the data processing and quality assurance/quality control (QA/QC) procedures used to qualify the data. The compliance modelling was conducted by Golder Associates Ltd. (Golder) using methods and guidance outlined in Ontario Regulation 419/05 (O. Reg. 419/05), as well as the facility's Environmental Compliance Approval (ECA No. 7306-8FDKNX).

The field sampling audits were undertaken by Adomait Environmental Solutions Inc. (Adomait). Adomait has over 20 years of experience in undertaking source testing and has conducted hundreds of source testing projects in various environments since 1996. The laboratory audits were undertaken by Airzone One Ltd. (Airzone). Airzone and predecessor companies have specialized in air monitoring and analysis and modeling of atmospheric processes since 1979. Airzone has a CALA-certified laboratory headed by Phil Fellin, M.Sc. (45 years of experience with Ontario Ministry of the Environment and Climate Change (MOECC), Environment Canada, Airzone and predecessor companies). The laboratory audit was undertaken by Dr. Lucas Neil, who has 14 years of experience in air monitoring and analysis of environmental samples and proficiency in the modeling of airborne compounds required for this project. The modeling audit was conducted by Airzone and was headed by Dr. Neil, with assistance from Dr. Franco DiGiovanni (20 years of experience with Environment Canada, Airzone and predecessor companies).

Source Sampling Audit

Adomait Environmental Solutions Inc. (Adomait) observed the sampling of two stack trains at the Durham York Energy Centre, focusing specifically on the sampling of semi-volatile organic compounds (SVOC) that was conducted on May 26th, 2017. Mr. Derek Ottens of Adomait was responsible for observing the stack samplers throughout the process. Mr. Ottens' observations focused primarily on the stack sampling methods and implementation procedures. The observations included the pre-sampling preparation, sampling, and post-sampling activities. As requested by the Regional Municipality of

Durham, no observations were made of the instrumentation or operators in the process control room during the sample collection periods.

Source Sampling Methods

SVOC samples were collected following the procedures in EPS 1/RM/3 and US EPA Method 23. Figure 1 shows a diagram of the sampling train required for sampling the stack gas at isokinetic flows. The gas was drawn through a filter, followed by a condenser and XAD trap, then through a condensate trap, and finally a set of three impingers; the first empty, the second filled with ethylene glycol, and the third with silica gel. The empty first impinger captured the condensate due to the 16% moisture content of the flue gas.

Upon completion of each test, the sampling train is recovered as per the Environment Canada protocol, as shown in Figure 2. Any moisture collected in the U-tubes behind the condenser/XAD filter was transferred to the first impinger before moving the glassware to the recovery area. Pre-cleaned amber jars were used to store the liquid samples and cleaned tinfoil was used to store the filter. Ortech's sampling train differs from that shown in Figure 1 since the condenser and XAD tube are fused into one continuous piece to minimize leaks. Therefore, the condenser could not be soaked for five minutes with acetone and hexane, as recommended in the method. The condenser/XAD trap instead had both ends capped and wrapped in tin foil and the cleaning was conducted by the laboratory. This change does not compromise the performance of the method for collection of SVOCs.

Figure 1: SVOC Sampling Train

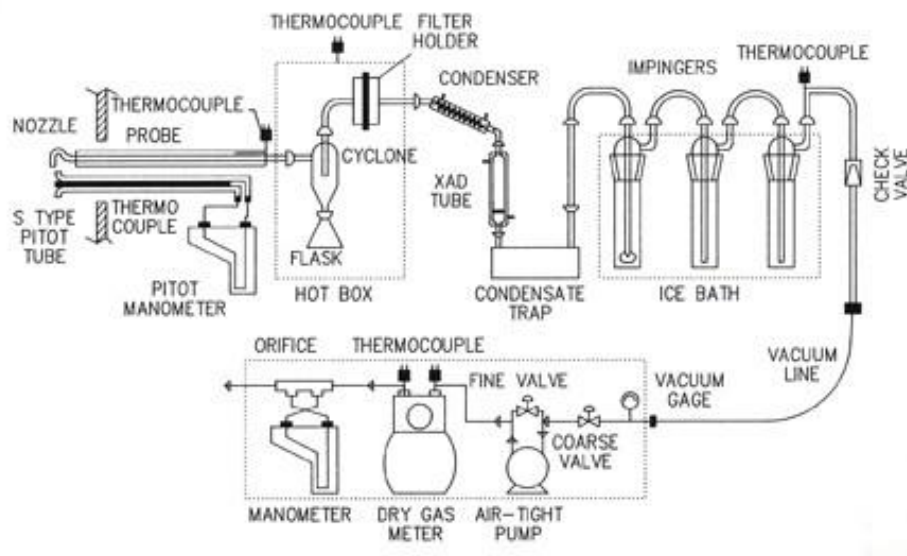
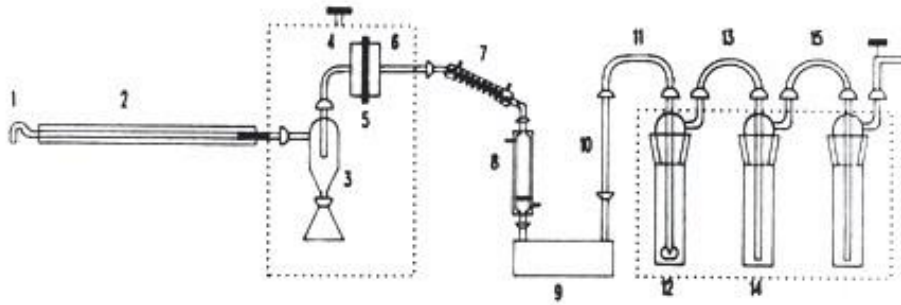


Figure 2: SVOC Sampling Train Recovery



Container or Sample	Component(s)	Recovery Procedure
1	1, 2, 3, 4	Wash and brush 3 times each with hexane (H) and acetone (A). Rinse 3 times each with H and A.
2	5	Remove carefully from holder. Place on pre-cleaned foil. Fold in half. Place in pre-cleaned glass petri dish.
3	6, 7	Soak 5 minutes each with H and A. Rinse 3 times each with H and A.
4	8	Cap ends and wrap in foil.
5	9, 12	Empty contents into container and rinse each 3 times with HPLC water.
6	6 to 15 except 8	Rinse 3 times each with H and A.

Mark liquid levels on all bottles.
All sample containers are pre-cleaned amber glass bottles with pre-cleaned Teflon lid liners.

The sampling and recovery procedures followed the protocols specified by the methods to maintain the integrity of the samples. Ortech had adequate staff to collect samples and transfer the sampling media to the on-site lab for recovery and clean-up. Communications with the control room were maintained continuously to ensure that samples were collected during representative operating conditions.

Observations During Sample Collection

In general, the procedures detailed in the Environment Canada methods were followed. Since not all procedures are clearly described in the method, some practices may differ slightly. These minor changes do not impact the integrity of the samples. The following are some of the procedures that were observed:

- Sampler Setup:
 - Several clean sets of glassware were prepared beforehand. When system upsets occur, the extra glassware makes it possible to restart sampling without delay.
 - The probe liner was equipped with a molded glass nozzle. This one-piece apparatus is difficult to transport to the laboratory for cleaning, but has the advantage of making a leak-free joint between the nozzle and liner. The combined probe and nozzle were cleaned in the field and the rinse collected. The probe rinse was observed by Adomait.

- All personnel used Tyvek gloves during sample set-up and recoveries.
- All openings were capped prior to sampler relocation, both before and after sample collection.
- Sampling:
 - The sampling team took five-minute stack gas flow readings at twelve different points.
 - The temperature of condenser and impingers (below 70°F) was controlled through use of ice and a water pump.
 - The sampling team preformed leak checks upon completion of each traverse and after moving to the next traverse. The method does not require this procedure; however, it is helpful as it identifies problems early.
- Clean Up/Recovery:
 - Capped all open connections on the probe and impingers using Teflon tape.
 - The sampling team used cleaned amber glass jars for recovery of liquids, cleaned tinfoil for filters and followed Method 23 for sample recovery.

All samples were handled appropriately and in accordance with the procedures outlined in the method.

Changes and Problems During Sampling

The two main operational challenges observed during the previous source testing campaigns were: (i) bridging of the refuse hoppers, and (ii) carbon monoxide (CO) spiking. Bridging of the hoppers was not observed during the testing campaign. This is likely due to the fact that the loading operators have become more adept at controlling the waste as it is loaded into the hoppers. Operations in the control room were not observed during the time of sampling; however, the 1-minute CO data taken during the dioxin/furan testing was reviewed after the fact. Based on this review, occasional CO spikes (> 40 mg/m³) were observed. Nevertheless, the CO spikes were often of short duration, several minutes or less. The highest one minute CO concentration recorded was ~ 90 mg/m³, but subsequently the reading quickly dropped in the next minute to values around 10 mg/m³. The 20 minute average in this time period was 32 mg/m³. In conclusion, although the CO spikes occurred occasionally, the spikes were short lived and CO averages were well within the MOECC ECA provision of 40 mg/m³ over a four hour period. Minimization of the CO spikes was achieved through the use of improved process logic control and attentiveness from the operators.

Laboratory Processing Audit

The laboratory audit included the processing of samples related to measurements of particulate matter emissions, specifically the analysis of the condensable fraction of the particulate matter samples, and the processing of samples for semi-volatile organic compound (SVOC) analysis, specifically the dioxins and furans analysis.

Sample components were separated and labeled by Ortech in the field and hand-delivered to ALS with custody forms identifying each sample. A total of six (6) condensables samples and two (2) field blanks

were delivered, while a total of twelve (12) SVOC samples and two (2) field blanks (constituting two sets of samples before the air pollution control (APC) system and two sets of samples after the APC system) were delivered.

Condensable particulate matter samples were received on the morning of May 25th. Processing of samples was observed and followed ALS Method ID: BU-SP-0261 v13 (Sample Control, Receipt and Login). All of the samples from the sampling trains were organized on a lab bench as received from the field. Samples were labeled as per Ortech labeling and Chain of Custody forms created using the ALS LIMS (Laboratory Information Management System). The ALS and Ortech labels of samples were audited against the chain of custody forms. No errors were identified with the condensable samples. SVOC samples were received on a separate day and administered separately.

Samples were stored as per appropriate method requirements. For example, SVOC samples were stored refrigerated at 4°C according to ALS Method ID: BU-TM-1110 v20. Condensable particulate matter samples were immediately sent to the analyst for processing and analysis. Next, the process of sample recovery from the train components was initiated. Below is a detailed description of the processing of the condensable and SVOCs components of the sampling train.

Particulate Matter Audit

Processing of condensable samples followed ALS Method ID: BU-TP-2004 v02 (US EPA Method 202) and was initiated on the morning of May 25th. Container #1 (Impinger Aqueous Sample) and Container #2 (Organic Train Rinse) of each sample was weighed on a calibrated counter-top balance. The sample weight for each container was then transferred to the appropriate sample sheet. After the samples had been processed, the containers were re-weighed to determine the total volume of sample delivered. Daily calibration of the balance was observed and confirmed during the audit.

Sample filters were folded and placed in pre-labeled vials. During this process, the analyst inspected each filter and noted that a few filters were ripped or torn. The damage was noted by the analyst and samples were then processed as per the method. While transferring sample ID L1931222-15 to the pre-labeled vial, the filter fell on the lab bench, which was covered with a Kimwipe. The filter was recovered and appeared to not be damaged. Furthermore, since a Kimwipe was placed on the lab bench during the transfer, it is not expected that the filter was contaminated. The filters were subsequently sonicated in UltraPure water. The sonicated extract was then placed back into Container #1 (Impinger Aqueous Sample) for the specified sample. This process was repeated two more times with UltraPure water, and then three more times with hexane. Each hexane rinse was placed back into Container #2 (Organic Train Rinse) for each sample. While transferring the final hexane rinse for sample ID L1931222-35, the filter fell into Container #2, containing the hexane rinses. The filter was later retrieved with cleaned tongs. This is not expected to have a significant impact on results as the filter had already been extracted. This is reflected in the fact that this sample, which was a blank for Boiler No. 1, had similar results to the blank for Boiler No. 2.

The aqueous portion from Container #1 is added to a separatory funnel with hexane. Each funnel is shaken to ensure complete mixing and extraction of any organic fractions within the aqueous

component. The mixture is allowed to sit to completely separate the aqueous and organic layers. The aqueous layer is then returned to Container #1, while the hexane layer is transferred to Container #2. This process was repeated two more times with hexane layers for each sample combined into the same container. At this stage, a laboratory blank is processed along with the samples to determine blank levels.

The beakers containing the organic fraction of each sample are placed in a fumehood and allowed to evaporate to no less than 10 mL. The remaining portion is transferred to a pre-weighed vial. The organic fractions were then placed in a hotblock, under mild conditions (< 30°C) to evaporate the samples to dryness. Then, samples were placed in a desiccator for at least 24 hours to dry the samples. An initial weight of the dried sample was recorded. Then, samples are re-placed in the desiccator for 6 hours and re-weighed. If the two weights are within 0.5 mg, the sample is considered to be dry and the sample weight can be determined from the vial's pre-weight. This difference is the weight of the organic fraction of the condensable portion of the particulate matter.

Container #1, containing the aqueous fraction, is placed in an oven and evaporated to dryness. This process requires approximately 2 to 3 days and was checked periodically by technicians. 100 mL of UltraPure water was then added to each beaker and the pH of each sample was measured. Each sample was then titrated with 0.1 N ammonium hydroxide (NH₄OH) and brought to a pH of 7.0. Most samples required minimal titration (~0.5 mL of titrant added); however, one sample required more significant titration. Conducting the titration at this stage of the method is a deviation from US EPA Method 202. The potential implications of this will be discussed below.

Once the titration is complete, the aqueous fractions are placed in an oven and allowed to evaporate to less than 40 mL. The remaining portion is transferred to a pre-weighed vial. Then, the vials containing the aqueous fractions were placed in a hot block at 95°C to evaporate the samples to dryness. Then, samples were placed in a desiccator for at least 24 hours to dry the samples. An initial weight of the dried sample was recorded. Then samples are re-placed into the desiccator for 6 hours and re-weighed. The sample is considered to be dry if the two weights are within 0.5 mg and the sample weight can then be determined from the dish's pre-weight. This difference is the weight of the inorganic fraction of the condensable portion of the particulate matter. If the difference in weights of the samples from Container #1 at 24 h and 24 h + 6 h are more than 0.5 mg, then the samples are re-placed in the desiccator and re-weighed after another 6 hours.

The data, including weights and calculations, are first reviewed by the analyst to ensure accuracy, before it is passed on to, and reviewed by, a second analyst. Finally, the data are passed to the project manager for final review of the analysis report and reporting to the client.

In summary, initial processing of documentation for the samples was appropriate and accurate, initial processing (transfer, extraction and drying) were carried out according to the method. At each step in the extraction, the technician used appropriate solvents and other materials for this method of analysis. All glassware and transfer pipettes were segregated to eliminate the possibility of contamination and to ensure the traceability of the entire process. Comprehensive checks were included in the form of field

blanks, and laboratory blanks. A final review of the data handling and calculations by two analysts was undertaken to verify that all steps were executed accurately. All of the procedures as outlined in the ALS method, based on Method 202, were followed.

Semi-Volatile Organic Compound (SVOC) Audit

XAD sorbent from each of the sampling trains and blank samples were transferred to cleaned, Soxhlet extraction apparatus. The Soxhlet extraction vessels were pre-labeled with sample numbers. During the transfer, no problems were encountered. Filter media from each sample were added to the Soxhlets to allow combined extraction of particle and vapour forms of target compounds. The technician observed that moisture was not an issue and that the colour of the XAD did not indicate any issues during sampling.

Next, samples were spiked with an extraction standard containing surrogate compounds for each class of compound (native and Carbon-13 labeled versions of the target compounds). For each of the surrogate spikes, one technician spiked the sample and another technician recorded each spike, to reduce the possibility for errors. The spiked surrogates were added to track the performance of the extraction process for each of the major compound classes in the SVOCs (i.e., PAH, Dioxins & Furans, CB, CP and PCBs, requiring five different analysis methods). During the transfer steps, all pipettes and glassware were properly segregated to eliminate the possibility of contamination between samples.

Then, Soxhlet extraction apparatus for each of the samples was charged with dichloromethane (DCM) solvent and processed for a minimum of 16 hours. Soxhlets were then charged with DCM acidified with trifluoroacetic acid (TFA) and processed again for an additional 16 hours. This process required approximately 2 days and was checked periodically by technicians. The use of DCM for both stages of the extraction is a deviation from US EPA Method 23, where toluene is the solvent of choice. The potential implications of this are discussed below.

The combined extraction solvent was reduced in volume in preparation for the first clean-up step. The combined extraction solvent was then separated into 2 mL samples for each of the compound classes to be analyzed (5 classes of SVOCs as identified above) and one 2 mL sample was archived in case any issues were identified during process of any of the target analyses.

Following extraction, the clean-up steps for the dioxins and furans were initiated. The clean-up steps, removed moisture, acids and bases, PAH, OCs, PCBs, thio-compounds and diphenyl ethers (DPEs), which may interfere with the instrumental analysis, and were carried out manually according to the standard operating procedure (SOP).

The first clean-up step was initiated using acidified silica and Florisil columns. The columns were pre-labeled with sample numbers and conditioned with hexane before addition of each sample. The extracts of samples were added to each column and eluted under gravity feed. Hexane was used to extract Fraction A through the acidified silica and Florisil columns. Once Fraction A finished eluting from the Florisil column, the acidified silica column was removed and Fraction B was eluted from the Florisil column using DCM. Fraction A was archived and Fraction B was processed further to remove the majority of diphenyl ethers (DPEs) that potentially interfere with the furan analysis. All glassware and

transfer pipettes were segregated to eliminate the possibility of contamination. The use of a Florisil column is, strictly speaking, a deviation from US EPA Method 23, where a basic alumina column is the column of choice. The potential implications of this are discussed below.

For the final clean-up step, a carbon column was used to remove DPEs. Individual columns were packed and pre-labeled with packing media, conditioned sequentially with toluene and hexane. The sample was added and then eluted sequentially with DCM/hexane (F1 fraction), and a final toluene rinse was collected (F2 fraction). While this step removes a large fraction of the DPEs, small amounts may remain in the analysis fraction that are captured during data processing, as described later in this report. The F2 fraction vials were brought to dryness, reconstituted to 20 microlitres (μL) and transferred to the analysis laboratory, while the F1 fractions were archived. As with the previous clean up step, all glassware and transfer pipettes were segregated to eliminate the possibility of contamination.

In the analysis laboratory, samples were injected with additional surrogate standards to verify instrument performance with each sample. The reconstituted samples were analyzed with a GC/HRMS (gas chromatograph/high resolution mass spectrometer) instrument. Chromatography is a well-developed analytical technique used to resolve complex mixtures of compounds. Combined with mass spectrometry, which can identify the characteristic mass fragments of individual compounds, this technique provides a powerful analysis system for unambiguous identification and quantification of many organic compounds at trace levels. The instrument used for analysis was programmed with the method to determine dioxins and furans and tested with standards to verify if performance was within acceptance criteria. Then, final calibration and control standards were run. Samples were introduced and the analysis was bracketed with standards to ensure stability of calibration during analysis of the samples.

Manual review requires that each chromatogram and channel (channel refers to masses corresponding to different congeners and isomers of target dioxins and furans) is reviewed to determine the acceptability of baseline selection by the automatic processing software. Adjustments to the data are made at this point to rectify any instrumental overestimate or underestimate of baseline determination and thus recalculate the concentrations. Typically, the adjustments are minor, but can be important. Moreover, additional QA/QC criteria are applied to the data including the following:

- Peaks must be within a 2-second window of the target dioxins and furans.
- Peaks must have appropriate mass ratios ($\pm 15\%$ of theoretical).

These criteria are stringently applied to identify and quantify (according to the instrument calibration for the specific batch of analyses) the target dioxin and furan congeners and isomers. Peaks within the channel not meeting the criteria are flagged but not removed from the data report. We reviewed and observed the processing of several samples in which DPEs were found in the furan channels during analysis. The DPEs were clearly outside the target retention time windows of the furan congeners and the data processing technician was easily able to identify and flag the peaks corresponding to DPEs. Thus initially, if flagged, the peak is identified as an interfering compound and quantities of the corresponding furans are reported as estimated maximum possible concentrations (EMPCs). When converted to toxic equivalency (TEQ) for the POI (Point of Impingement) calculations, these peaks are

included and thus yield a more conservative value of the TEQ to determine the acceptability of the results. Finally, the data, baseline determinations, and calculations are reviewed by a second analyst, and passed to the project manager for final review of the analysis report and reporting to the client (Ortech in this case).

In summary, the initial processing of sample documentation was appropriate and accurate, initial processing (transfer, extraction and clean-up steps) were carried out according to the method. At each step in the extraction and clean-up step, all glassware and transfer pipettes were segregated to eliminate the possibility of contamination. This ensures the traceability of the entire process. Comprehensive checks were included in the form of labeled surrogate compounds at each step. Additional verification was undertaken at analysis and data processing steps to ensure that QA/QC criteria, in terms of recoveries of surrogates at each stage, were appropriate. Moreover, a final 2-analyst review of the data handling and calculations was undertaken to verify that all steps were executed accurately. All of the procedures as outlined in the ALS method, based on Method 23, were followed.

Laboratory Results

The ALS method for condensable particulate matter analysis differs from US EPA Method 202 in one regard: ALS conducts a titration of the aqueous portion of the samples prior to final evaporation and drying to neutralize acid in the sample; whereas the US EPA method only calls for this titration if the dried aqueous fraction cannot reach a constant final weight upon drying. This is often required when the sample has a large fraction of inorganic material. The inorganic material (e.g., H_2SO_4) can be highly hygroscopic, making it difficult to dry effectively in a desiccator. Titrating before evaporation and drying can cause complications, particularly for sources that emit hydrogen chloride (HCl).

HCl is a volatile acid that should not be counted as condensable particulate matter. Titrating before evaporation will convert the HCl to ammonium chloride, which is not the result of chemicals in the stack gas, but which would be measured as condensable particulate since it is non-volatile and will not evaporate from the sample during the evaporation and/or drying steps. Method 202 samples with high levels of HCl take considerable time (often more than 8 hours) to evaporate and for samples to come to constant weight. Therefore, conducting the titration before evaporating and drying often saves laboratories time. However, by converting HCl to ammonium chloride, additional, non-condensable, mass is added to the sample that will not evaporate. Consequently, the mass of inorganic condensable particulate matter may be biased high in cases where HCl is present, if the titration is conducted before evaporation and drying of the sample.

Airzone has reviewed the laboratory results provided by Ortech in Report No. 21754. Based on this review, it is not expected that the deviation from US EPA Method 202 has caused any significant question on the data quality for the condensable particulate matter determination. The titrated sample (L1931222-5; TEST#1 #1 APC OUTLET) has similar total collected mass as the other two samples for #1

APC OUTLET. Furthermore, according to the data collected by the facility's continuous emissions monitoring system (CEMS), the HCl levels during all three condensable samples for #1 APC OUTLET are of the same magnitude, further suggesting that the TEST #1 sample would not be biased high with respect to HCl. Lastly, the correction as a result of titration is minimal. The mass was corrected from 7.8 mg to 7.7 mg, representing a 13% correction. It should also be noted, however, that even if this sample did contain a significant amount of HCl, the reported mass would be biased high, which could be considered a conservative estimate of the condensable particulate matter for this sample. Since the facility is compliant with both the in stack standard for particulate matter and the air quality standard for particulate matter, this potential bias does not cause non-compliance.

The ALS method for dioxins and furans analysis differed from US EPA Method 23 in two regards: (i) the lab used DCM for both Soxhlet extraction steps, and (ii) the use of a Florisil column for clean-up of the samples. With regards to item (i), DCM and toluene have been used to extract selected semi-volatile organic compounds from various media, especially when a range of SVOCs are being analyzed from a single sampling train, as is the case here. Following discussions with the US EPA, the EPA have indicated that they are aware that a two stage extraction with DCM followed by toluene is fairly common in laboratories; where the toluene extractions are a polish to ensure that all of the higher molecular weight nonpolar target compounds are extracted. They indicate, however, that as long as standard recoveries are within acceptable limits for Method 23, they would not anticipate any problems/questions regarding the results of the dioxins and furans testing. As indicated on the laboratory reports provided in Ortech Report No. 21754, all standard recoveries were within acceptable limits for US EPA Method 23. Furthermore, ALS has indicated that when auditing this specific method, CALA and Standards Council of Canada (SCC) auditors have not questioned the change in solvent. This method has also been audited and approved by a number of US bodies (e.g., New Jersey Department of Environmental Protection, and the New York State Department of Health).

With regards to item (ii), while technically a deviation from Method 23, Florisil is a generally accepted clean up column to replace the basic alumina column prescribed by the method. It should be noted that a Florisil column is an acceptable clean up column under US EPA Method 1613B, which is used to analyze for dioxins/furans in water, soil, sediment, sludge, tissue, and other sample matrices. Furthermore, as stated above, all standard recoveries were within acceptable limits for US EPA Method 23.

Consequently, we are not concerned that either deviation from US EPA Method 23 should cause concerns about the validity of the results.

Modelling Results

The peer review included an assessment of the dispersion modelling conducted by Golder Associates as outlined in Ortech Report No. 21754. Airzone's review was based on the understanding that, as part of the source testing program, a modelling assessment is required as outlined in Schedule "E" of the DYEC's

ECA (ECA No. 7306-8FDKNX). As indicated in Schedule “E”, the dispersion modelling must be in accordance with Ontario Regulation 419/05 (O. Reg. 419/05). Furthermore, the facility’s approved Emission Summary and Dispersion Modelling (ESDM) report, dated March 2011, was used as guidance regarding all modelling options that were approved by the MOECC during the review process of the facility’s ECA.

Minor clarifications on some aspects of the modelling were required during the review (e.g., building inputs, emission rate calculations). These communications were made via email with Golder and Ortech, with Covanta and Durham personnel copied on the communication.

Based on the information provided in the source testing report and communications with Golder, Airzone was able to confirm that the dispersion modelling for DYEC sources was conducted in accordance with the requirements set out in O. Reg. 419/05, as required by the facility’s ECA. To confirm these requirements, Airzone reviewed the modelling input files provided by Golder and verified that the appropriate default and MOECC approved model switches were selected. This was done by comparing the modelling input files with the facility’s ESDM report, and associated modelling input files, as well as consultation with the MOECC.

We were also able to confirm the results of the modelling by reviewing the model output files provided by Golder and the emission rates provided by Ortech. Airzone also ran the dispersion model separately and compared our model output results to those provided by Golder. Via this exercise, we were able to reproduce the results provided by Golder, further confirming their results. Our review verifies that the facility’s Point of Impingement (POI) values, as a result of the facility’s emissions, are within acceptable MOECC POI standards, guidelines and other reference values.

There is one minor comment with regards to the model results as presented in Appendix B of Golder’s Technical Memorandum. The POI results for PM_{2.5} (Condensable and Filterable) are listed as 0.43 µg/m³ and reported as < 1% of the MOECC POI Limit of 30 µg/m³. However, 0.43 is actually 1.43% of 30. All other “Percentage of MOECC Limit” values appear to be correctly reported. Future reports should ensure that the correct percentages are listed in the Emission Summary Table (Appendix B).

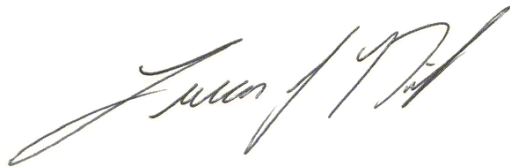
In our audit report for the Fall 2016 Compliance Emissions Testing (dated August 2017), we made a few comments with regards to the modelling report provided by Golder. These comments may not have been made available to Golder prior to their report for the modelling of the Spring 2017 Voluntary Source Test. These comments should be considered for inclusion in future modelling reports for future source testing campaigns.

Conclusions

Based on the observations made, both during field sampling and laboratory analysis, Adomait and Airzone are satisfied that both Ortech and ALS collected and analyzed all samples according to standard operating procedures and approved methods. Therefore, at this time, there are no concerns about the validity of the source testing data reported by Ortech.

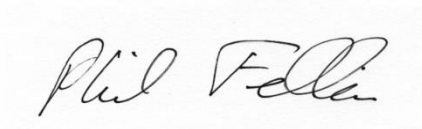
With regards to the dispersion modelling, Airzone is satisfied that Golder conducted the modelling in accordance with O. Reg. 419/05 and the facility's ECA. The assessment confirms that the facility's Point of Impingement (POI) values are within the specified MOECC standards as utilized under O. Reg. 419/05.

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