

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

Project J17083

**Prepared for:
Giuseppe Anello
Manager of Waste Planning & Technical Services
Region of Durham, Works Department
605 Rossland Road East
Whitby, Ontario
L1N 6A3**

**Prepared by:
Airzone One Ltd.
222 Matheson Boulevard East
Mississauga, Ontario
L4Z 1X1**

&

**Adomait Environmental Solutions Inc.
160 Cyprus Drive
Kitchener, Ontario
N2M 4R5**

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Contents

Introduction 2

Source Sampling Audit 2

 Process Control Room Operations Review 3

 Source Sampling Methods 4

 Observations During Sample Collection 5

Laboratory Processing Audit 6

Laboratory Results 7

Modelling Results..... 8

Conclusions 9

LIST OF FIGURES

Figure 1: SVOC Sampling Train..... 4

Figure 2: SVOC Sampling Train Recovery 5

LIST OF APPENDICES

(Following Text)

Appendix 1: Airzone Modelling Memo (December 11th, 2017)

Appendix 2: Ortech/Golder Responses (January 24th, 2017)

Appendix 3: MOECC Correspondence re: Method 29

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 Fall 2017 Compliance 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 results were reviewed 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 review of laboratory results 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 October 12th & 13th, 2017. Mr. Martin Adomait of Adomait was responsible for observing the stack samplers throughout the process. Mr. Adomait's observations focused primarily on the stack sampling methods and implementation procedures. The observations

included the pre-sampling preparation, sampling, and post-sampling activities. Ms. Janice Tessman observed the instrumentation in the process control room during the sample collection periods.

Process Control Room Operations Review

In the Process Operations Center, observations were made on one minute readings as they appeared on the system monitors. Readings were manually recorded every 10 minutes, although deviations were identified when they occurred.

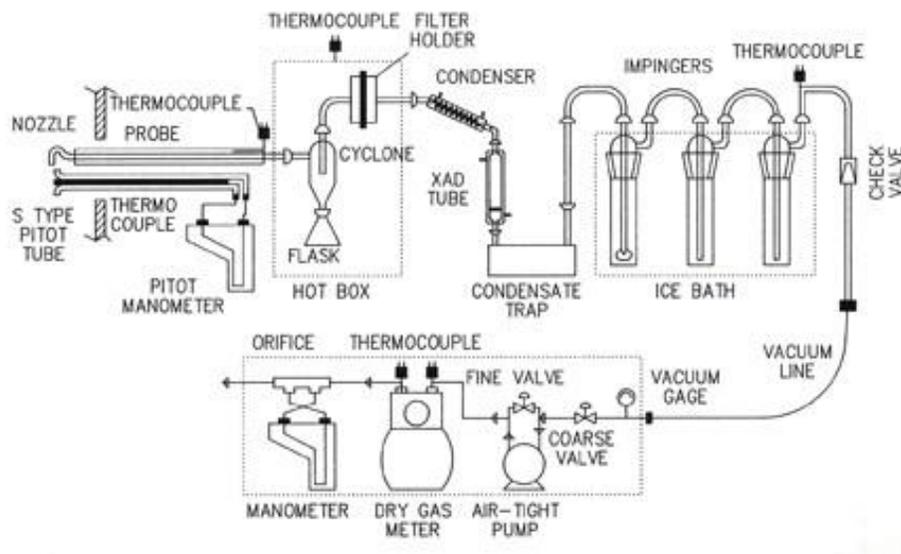
1. Oxygen concentrations were maintained > 6% at all times and generally ranged from 6.9 - 9.5%. The ECA compliance requirement is > 6%.
2. CO spikes occurred very infrequently with no spikes lasting more than 10 minutes. At times, there may have been one minute readings that exceeded the 40 mg/m³ number set by the MOECC for a 4-hour average; however, these were not frequent. When readings greater than 40 mg/m³ only occur occasionally, the chance of exceeding the criteria is low. As observed on previous audit visits, minimization of the CO spikes was achieved through the use of improved process logic control and attentiveness from the operators.
3. The quench tower inlet and outlet temperatures were consistent throughout both monitoring days. The inlet temperatures remained consistent at 151 - 153°C. Previously, evaporator inlet temperatures could be expected to increase during the day; however, this time this did not occur. The outlet temperatures remained steady regardless of the inlet temperatures. This is a design feature of the system, which was observed.
4. As a result of consistent outlet temperatures from the Quench tower, the baghouse inlet temperatures remained at ~ 144°C. The ECA performance requirement is 120 - 185°C. These readings were consistent with other stack tests of 138 - 140°C (September 2016), and 142 - 145°C (November 2016). Consistent temperatures in the baghouse allow for comparison between data sets at different times. It is also important when considering the volatilization of various dioxins and furans that may exist in particulate form in the baghouse. Increased temperatures would likely lead to volatilization of the captured dioxins within the baghouse, especially the lighter molecular weight compounds.
5. Production at the plant is often evaluated in terms of steam flow. Steam flow was in the range of 30,000 m³/hour. This was similar to levels observed during other stack testing campaigns at this plant. Similar production also makes the comparison between different stack tests possible.
6. Carbon and lime dosage were consistent with the previous testing campaigns. Carbon doses of ~5 kg/hour were necessary to keep the dioxins in check.
7. Occasional anomalies in the one minute data were observed in the flowrate and moisture numbers. The calculated moisture at times was reduced to zero. Similar to other testing campaigns when this was observed, it is speculated that this is related to the problems that occur during the reading of dry verses wet oxygen monitors. Typically this anomaly would only last for one minute.

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 four impingers; the first empty, the second filled with ethylene glycol, the third empty, and the final impinger charged with silica gel. The empty first impinger captured the condensate due to the 16% moisture content of the flue gas.

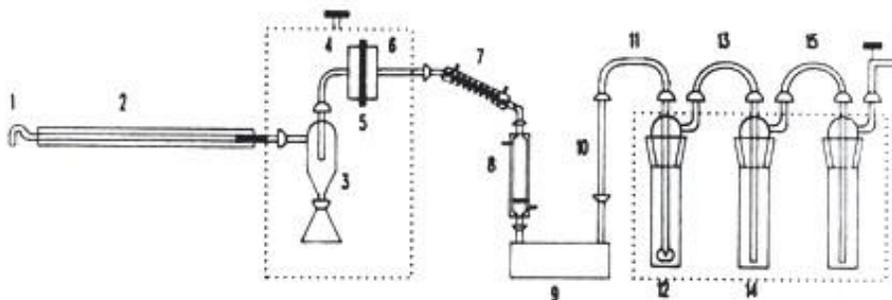
Upon completion of each test, the sampling train is recovered as per the Environment Canada protocol, as shown in Figure 2. Any moisture collected in the U-tubes behind the condenser/XAD filter was transferred to the first impinger before moving the glassware to the recovery area. Pre-cleaned amber jars 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



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.

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.

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 performed 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.
- Where possible, leak checks were observed at both the start and conclusion of all SVOC tests. Leak checks were always performed at the conclusion of tests. When the leak checks were successful, the source sampling tests are valid. Leak checks were always performed in a systematic and non-rushed manner to ensure good QA/QC.
- Stack temperatures reported by the stack testing crew were checked with the auditor in the control room to verify that the temperature was consistent with the in-stack readings. In all cases, temperatures varied by $\pm 2^{\circ}\text{C}$. This level of variance is consistent with expected bias between different temperature probes.
- Quench inlet/outlet temperatures were also verified with the control room numbers.
- Impinger/XAD temperatures were checked periodically at each sampling train. Ortech supplied plenty of ice to the crews. The temperatures were maintained in the 45 - 55°F. These temperatures are critical as it improves adsorption of dioxins/furans on the sampling media.
- Adomait recorded dry gas meter correction and pitot factors for comparison with the final report to be issued by Ortech.
- All trains operating at the baghouse outlet locations were inserted into the stack while the sampling train was running. Given the high negative pressure at these locations, it was important to ensure that the filter was not displaced prior to the start of sampling. This also limits loss of any sample from the train.
- The same procedure of starting the train operating prior to entering the stack at the Quench Inlet locations was not conducted.

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

Laboratory Processing Audit

At the request of the Regional Municipality of Durham, the processing, handling and analysis of laboratory samples was not audited for the Fall 2017 Compliance Source Testing campaign.

Laboratory Results

As previously commented, 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. The potential biases and complications from this deviation have been discussed in the Spring 2017 Voluntary Emissions Testing report (dated October 2017).

Airzone has reviewed the laboratory results provided by Ortech in Report No. 21800. Based on this review, it is not expected that the deviation from US EPA Method 202 has caused any significant question about the data quality for the condensable particulate matter determination. One sample required significant titration (L2006117-15; TEST#3 #1 APC OUTLET) and does show a higher collected mass than the other two samples for #1 APC OUTLET. However, 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 #3 sample would not be biased high with respect to HCl. Furthermore, the HCl levels monitored by the CEMS on #2 APC OUTLET actually had higher observed levels, but the condensable samples did not require significant titration. It should also be noted 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.

As previously reported, 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. The potential biases and complications from this deviation have been discussed in the Spring 2017 Voluntary Emissions Testing report (dated October 2017). As indicated on the laboratory reports for dioxins and furans provided in Ortech Report No. 21800, all standard recoveries for compliance samples 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.

It should be noted that for one of the Quench Inlet samples (TEST#3 #2 QUENCH INLET) the recoveries of two of the extraction standards were outside the allowable recovery ranges. This suggests the error associated with the determined concentrations for this sample may be larger than the standard error associated with the method. This sample, however, is not a compliance sample and is only used for diagnostic purposes. Therefore, caution should be taken when using these results for diagnostic purposes.

Modelling Results

The peer review included an assessment of the dispersion modelling conducted by Golder Associates as outlined in Ortech Report No. 21800. 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.

Airzone conducted an initial review of the modelling data provided by Ortech and Golder and provided comments to the Region of Durham in a memo dated December 11th, 2017 (see Appendix 1). These comments were supplied to Ortech and Golder, who provided a response to the inquiries via memo, through Covanta and the Region of Durham, which was received January 24th, 2017 (see Appendix 2).

Based on the information provided in the source testing report, and responses by Ortech/Golder, there still remain a number of outstanding items. First, the letter provided by Ortech in their comments with regards to Item #1 seems to contradict more recent advice provided by the MOECC with regards to the use of detection limits for estimating emissions from results obtained from Method 29 (see Appendix 3). Second, with regards to Item #3, after reviewing the particulate matter data multiple times, it does appear that Golder has miscalculated the POI values for all particulate matter species (Total Particulate Matter, PM₁₀ and PM_{2.5}). Golder appears to have overestimated particulate concentrations in the Emission Summary Table provided in Appendix B of their Technical Memorandum (provided in Appendix 29 of Ortech Report No. 21800).

Corrections to both items are not expected to cause an exceedance of MOECC standards and, consequently, a compliance issue; however, they should be addressed in future reports. With regards to Item #1, Ortech should consult with the MOECC to confirm the appropriate method for estimating emissions when both sample media provide non-detect values.

Lastly, with regards to Hexavalent Chromium, Golder compares the model output to the MOECC's *de minimus* value of 0.1 µg/m³. However, the MOECC does have an annual standard value for Hexavalent Chromium, as well as a Daily Assessment Value and Annual Assessment Value, which should be used when assessing compliance for Hexavalent Chromium. Based on the emission rate provided, Hexavalent Chromium would be compliant with these values and standard. Consequently, at this time, we are not concerned about compliance for Hexavalent Chromium. This omission, however, should be addressed in future reports.

With regards to the dispersion model, Airzone was able to confirm that for DYEC sources it was implemented 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.

With the exception of metals and particulate matter (as a result of the issues outlined above), 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.

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.

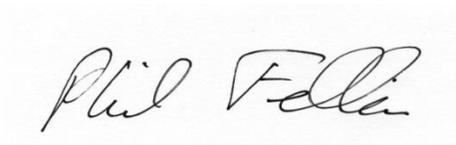
With regards to the dispersion modelling, Airzone is satisfied that Golder conducted the modelling in accordance with O. Reg. 419/05 and the facility's ECA. The assessment confirms that the facility's Point of Impingement (POI) values are within the specified MOECC standards as utilized under O. Reg.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

Prepared by:



Lucas Neil, Ph.D.
Air Quality Scientist
Airzone One Ltd.

Reviewed by:



Phil Fellin, M.Sc.
Manager, Air Monitoring & Analysis
Airzone One Ltd.



Franco DiGiovanni, Ph.D.
Senior Air Quality Modeller
Airzone One Ltd.

Appendix 1: Airzone Modelling Memo (December 11th, 2017)



Gioseph Anello, MEng PEng PMP
Manager of Waste Planning & Technical Services
Region of Durham, Works Department
605 Rossland Road East, Box 623
Whitby, Ontario, L1N 6A3
Tel: (905) 668-4113 ext.3445
Email: Gioseph.Anello@Durham.ca

December 11, 2017

RE: Initial Review of Modelling Conducted for the Durham York Energy Centre (DYEC) in conjunction with Fall 2017 Compliance Emissions Testing

To Mr. Anello,

We have conducted an initial review of the dispersion modelling provided prepared by Golder Associates Ltd (Golder), on behalf of ORTECH Consulting Inc (Ortech), in connection to the emission testing program at the Durham York Energy Centre (DYEC) located in Courtice, Ontario. Our 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 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 Ministry of the Environment and Climate Change (MOECC) during the review process of the facility's ECA.

Based on an initial review of all modelling files provided by Golder, we have identified the following questions/comments. We are providing these questions and comments to you so that Golder and/or Ortech can review these questions and provide feedback. Note that further comments or questions may arise upon further review of the modelling files and report.

- 1) When estimating emission rates for metals, Ortech has indicated the following:

"In instances where all analyses were reported to be below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, and the remaining fraction was assigned a value of zero. In instances where any given fraction was detected that value was used to calculate emission data, and the remaining undetected fraction were assigned a value of zero." – Section 7.7 (pg. 43)

This runs contrary to both MOECC and US EPA guidance. Both governing bodies indicate that the conservative approach is add the detection limit for the front and back half of the Method 29 train results as the total detection limitation when both halves show results below the detection limit. The rationale for this approach is that the distribution of metals between front half and back half samples will be dependent on the source being tested. Consequently, without substantiated proof of the distribution of the metals, assuming the overall detection limit is the sum of both detection

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limits provides a conservative estimate of facility emissions. Consequently, the approach taken by Ortech/Golder will not provide a conservative estimate of Point of Impingement (POI) values for all metals modeled. We recommend that Ortech/Golder update the emission estimates using the conservative approach of adding the detection limit for the front and back half of the Method 29 train results.

- 2) For the modelling of dioxins/furans, Ortech indicates the following:

“Per the MOECC standards and guidelines referenced above, dioxin, furan and dioxin-like PCB toxicity equivalent emission data calculated using the WHO toxicity equivalence factors and half the detection limit are used for dispersion modelling analysis for comparison with the point of impingement criteria discussed in Section 8.” – Section 7.9.1 (pg. 48)

This approach is consistent with previous source testing campaigns at DYEC. However, upon review of Golder’s Technical Memorandum (provided in Appendix 29 of Ortech Report No. 21800), Golder has calculated an emission rate that uses the full detection limit for dioxins and furans. Both approaches are acceptable according to MOECC guidance and our only comment here is to highlight the inconsistency between the two reports. This inconsistency should be resolved in future reports, so as to avoid potential confusion.

- 3) Golder appears to have miscalculated the POI values for all particulate matter species (Total Particulate Matter, PM₁₀ and PM_{2.5}). Golder appears to have overestimated particulate concentrations in the Emission Summary Table provided in Appendix B of their Technical Memorandum (provided in Appendix 29 of Ortech Report No. 21800). Golder should review the POI values for all particulate matter species and update the Emission Summary Table accordingly.

The above observations are not likely to cause an exceedance of MOECC standards and, consequently, a compliance issue. However, they should be addressed as a matter of process, particularly Item 1, which under predicts the off property concentrations of metal contaminants.

At this time we are unable to complete our review of the modelling exercise as a result of the outstanding issues provided above.

Sincerely,



Lucas Neil, Ph.D.
Air Quality Scientist
lneil@airzoneone.com
(905) 890-6957 ext. 111

Appendix 2: Ortech/Golder Responses (January 24th, 2017)

Responses to Airzone One Ltd Correspondence of December 11, 2017

Airzone Comment #1:

When estimating emission rates for metals, Ortech has indicated the following:

“In instances where all analyses were reported to be below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, and the remaining fraction was assigned a value of zero. In instances where any given fraction was detected that value was used to calculate emission data, and the remaining undetected fraction were assigned a value of zero.” – Section 7.7 (pg. 43)

This runs contrary to both MOECC and US EPA guidance. Both governing bodies indicate that the conservative approach is add the detection limit for the front and back half of the Method 29 train results as the total detection limitation when both halves show results below the detection limit. The rationale for this approach is that the distribution of metals between front half and back half samples will be dependent on the source being tested. Consequently, without substantiated proof of the distribution of the metals, assuming the overall detection limit is the sum of both detection limits provides a conservative estimate of facility emissions. Consequently, the approach taken by Ortech/Golder will not provide a conservative estimate of Point of Impingement (POI) values for all metals modeled. We recommend that Ortech/Golder update the emission estimates using the conservative approach of adding the detection limit for the front and back half of the Method 29 train results.

Response #1: Please see the attached letter from Mr. Guillermo Azocar of the MOECC dated May 28, 2002. The letter provides guidance on how to calculate source testing emission data when the results are less than the analytical reporting limit (i.e. less than detect). ORTECH has calculated the metals emissions for all test programs since 2002 using the following convention:

“The metals analysis of the Method 29 test trains was performed on two separate analytical fractions, the probe and filter hydrofluoric acid digest and analysis of the train impingers and associated rinses. In instances where all analyses were reported to be below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, and the remaining fraction was assigned a value of zero. In instances where any given fraction was detected that value was used to calculate emission data, and the remaining undetected fraction were assigned a value of zero.”

This is consistent with the calculation methodology used for the initial DYEC compliance source testing program conducted in September/October 2015, the voluntary test program conducted in May 2016, the second compliance test program conducted in October/November 2016, and the voluntary test program was conducted in May 2017.

Also, it is important to note that US EPA Method 29 allows the data to be blank corrected. However, the MOECC does not allow for blank correction when calculating compliance emission data.

Comment #2: For the modelling of dioxins/furans, Ortech indicates the following:

“Per the MOECC standards and guidelines referenced above, dioxin, furan and dioxin-like PCB toxicity equivalent emission data calculated using the WHO toxicity equivalence factors and half the detection limit are used for dispersion modelling analysis for comparison with the point of impingement criteria discussed in Section 8.” – Section 7.9.1 (pg. 48)

This approach is consistent with previous source testing campaigns at DYEC. However, upon review of Golder’s Technical Memorandum (provided in Appendix 29 of Ortech Report No. 21800), Golder has calculated an emission rate that uses the full detection limit for dioxins and furans. Both approaches are acceptable according to MOECC guidance and our only comment here is to highlight the inconsistency between the two reports. This inconsistency should be resolved in future reports, so as to avoid potential confusion.

Response #2: In response to previous Airzone comments of June 24, 2016 the more conservative approach to modelling the dioxins and furans emission rate was conducted by Golder utilizing the full detection limit for those isomers not detected in quantities greater than the reportable detection limit. As Airzone now concurs that using the WHO toxicity equivalence factors and half the detection limit for dispersion modelling analysis for comparison with the point of impingement (POI) criteria is acceptable, Golder will return to utilizing that methodology, and as such, the noted inconsistency will be eliminated from future reports.

Comment #3: Golder appears to have miscalculated the POI values for all particulate matter species (Total Particulate Matter, PM10 and PM2.5). Golder appears to have overestimated particulate concentrations in the Emission Summary Table provided in Appendix B of their Technical Memorandum (provided in Appendix 29 of Ortech Report No. 21800). Golder should review the POI values for all particulate matter species and update the Emission Summary Table accordingly.

Response #3: Golder has reviewed and confirmed the predicted concentrations of each particulate matter species in the report. As noted in the modelling memorandum, secondary particulate formation was modelled and added to the maximum POI concentration taken from the modelling of inert particulate matter from the stack. This is consistent with the methodology used in previous years and the ESDM report. Additionally, it should also be noted that the maximum concentration of each type of particulate matter species is less than 5% of the relevant criteria.

Ministry
of the
Environment and Energy

Standards Development Branch

40 St. Clair Avenue West
Toronto ON M4V 1M2

Ministère
de
l'Environnement et de l'Énergie

Direction de l'élaboration des normes

40, avenue St. Clair ouest
Toronto, ON M4V 1M2



Via Facsimile: 905-855-0406

28 May 2002

Mr. Jim Craigmile
Canadian Ortech Environmental Inc.
2395 Speakman Dr.
Mississauga, Ontario
L5K 1B3

Dear Mr. Craigmile:

Re.: **Source testing reporting of emissions when non-detected by the analytical method used.**

As per our telephone conversation yesterday (27 May 2002), you indicated the need for guidance in reporting emissions when the target pollutant in the sample is not detected by the analytical method used.

My comments regarding the use of method detection limits (to report non-detected concentrations on samples of target pollutants) pertain to emissions reported in source testing reports, and that do not have a specific reporting requirement by way of a legal instruments or by the MOEE agreement with other jurisdictions.

The emissions of non-detected pollutants should be calculated using the method detection limit obtained by the laboratory (analytical facility) in charge of analysing the samples.

In many instances, a sample may be comprised of more than one fraction, with each sample fraction displaying a method detection limit. In this cases, the method detection limit (MDL) to be used for calculating non-detected concentrations should be the one that pertains to the major collecting medium/media for the pollutant of interest (e.g. for mercury KmnO4, for particulate matter the filter, for metals the highest fraction: HNO₃ sol. if gaseous and filter if particulate matter, or both if both fraction are reported separately, etc.).

The intent of reporting non-detected concentrations based on MDL is to indicate the potential that the target pollutant may be present at concentrations slightly below the MDL. If we add the MDL for all the sample fractions, we may end up with a unrealistic/significant inflated emission concentration.

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Normally, only one or two fractions contain the principal collecting medium/media for a target pollutant with the other fractions being residual sampling media, resulting from the use of multipollutant sampling trains. These residual sampling media are likely to catch very low (residual) concentrations of the targeted pollutant and therefore are likely to exhibit very high detection limits when compared to the principal collecting medium/media.

It should be noted that when the concentration of any target pollutant is detected by any fraction of a sample, the sample is considered to have been identified positively as containing that pollutant and, as such, it should be reported as actual concentration. In this case, only the catch from the identified fraction is reported and no other MDL figure is added.

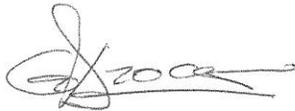
For averaging the emission results from the three (or more) test-runs, if the emission results of any of the non-detected concentration test is higher than the test-run with a detected emission; then, the emission results should be reported as an emission based on MDL; otherwise, it should be reported as actual concentration.

Normally, emissions based on MDL are reported with the sign less than "<" at the front of the calculated emission result.

I hope that this information clearly outlines our expectations with regards to reporting non-detected emission results in source testing reports.

If you have any question, please call me at (416) 327-6403.

Sincerely yours,



Guillermo Azocar
Source Assessment Officer
Technology Standards Section

cc. B. Adcock - Halton-Peel District Office
J. Mayes - SDB
File TAP-01 (General)
File TAP-01 (KMS Peel Inc.)

(Doc.Mgmt # 5L050066)

Appendix 3: MOECC Correspondence re: Method 29

Lucas Neil

From: Azocar, Guillermo (MOECC) <Guillermo.Azocar@ontario.ca>
Sent: November 30, 2017 11:47 AM
To: Lucas Neil
Cc: Ruddy, Caitlyn (MOECC); Alexan Gorgy, Tamer (MOECC)
Subject: RE: estimating emission values from Method 29

Good morning Lucas,

You add them together to be conservative and consistent.

When only one of the two halves of the sample is detected, you add to the emission estimate both the detected fraction and the non-detected fraction.

Suppose that only one of the three test-runs did not have one of the two halves detected. Unless you use the same approach for the three test-runs, you will create a state of disarray on the estimation approach, as you will not have the same referential frame to estimate the emissions. Irrespective on the detection outcome combination of the sample two halves, the same referential frame approach needs to be used for consistency.

In a regulatory environment, consistency will always be defined based on the premise of supporting a balanced conservatism on the level of the emissions being estimated.

Regards,

Guillermo Azocar
Source Assessment Specialist

From: Lucas Neil [<mailto:lneil@airzoneone.com>]
Sent: November-30-17 11:06 AM
To: Azocar, Guillermo (MOECC)
Cc: Ruddy, Caitlyn (MOECC); Alexan Gorgy, Tamer (MOECC)
Subject: estimating emission values from Method 29

Hi Guillermo,

I have a question regarding estimating emission estimates from laboratory data obtained from US EPA Method 29. What is the MOECC's recommendation on estimating emission rates if one of the metals is listed as below detection limit for both the front and back half analysis? Should we use the higher of the two detection limits, or add them together to be conservative? Or does the MOECC recommend in which half each metal is most likely to appear?

Thanks.

--
Lucas Neil, PhD
Air Quality Scientist

Airzone One Ltd.
222 Matheson Boulevard East
Mississauga, Ontario L4Z 1X1

Canada

Tel: 905-890-6957 ext. 111

Cell: 519-500-7395

Fax: 905-890-8629

email: lneil@airzoneone.com

web: www.airzoneone.com

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