Air Quality Monitoring Report for Hydrogen Sulfide, Three Fathom Harbour Wetland Restoration Project

FINAL REPORT

Prepared for:
Nova Scotia Department of Transportation and Infrastructure Renewal
1672 Granville Street
Halifax, NS B3J 2N2Nova Scotia

Prepared by:
Stantec Consulting Ltd.
102-40 Highfield Park Drive
Dartmouth, NS B3A 0A3

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) to conduct ambient air monitoring surrounding the Three Fathom Harbour Tidal Wetland Restoration Project (the Project) located near the Three Fathom Harbour Road in Halifax Regional Municipality (HRM). NSTIR was directed by Nova Scotia Environment (NSE) to implement short term ambient air monitoring for hydrogen sulfide (H_2S) because of recent odour complaints. The objective of the ambient air monitoring was to obtain a better understanding of the levels of H_2S present in the ambient air surrounding the Project and determine if such levels exceed ambient air quality standards.

Stantec used handheld H_2S analyzers to determine the concentration of H_2S in the ambient air during four monitoring events, at both upwind and downwind monitoring locations. To support the handheld monitoring, the approved monitoring plan proposed additional ambient air monitoring using using Summa™ Canisters. Samples were collected using this method, however the laboratory, Maxxam Analytics in Mississauga, Ontario, did not achieve a detection level as low as the ambient air quality standards, via Gas-Chromatography (GC).

The results of the short term monitoring program were compared to the Nova Scotia ambient air quality standards, as well as Canadian occupational exposure limits, for H_2S.

The results of the short term ambient air monitoring program for the Three Fathom Harbour Wetland Restoration Project, indicate above background levels of H_2S downwind of the Project. On one occasion, at one of two sites sampled during the evening of August 31-September 1, the closest site to the Project (monitoring site 6) had a concentration at the Nova Scotia 1-hour Maximum Permissible Ground Level Concentration for H_2S of 0.03 ppm. The 1-hour concentrations of H_2S at the other monitoring sites were well below the provincial standard. The one high value corroborated with the comments received from the nearest residents to the Project site during the communication plan, regarding the timeframe of worst odours (i.e., at night during calm conditions and low tides).

There were no exceedances of the Canadian occupational exposure limits for H_2S, which are adopted from those published by the American Conference of Governmental Industrial Hygienists (ACGIH).

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) to conduct ambient air monitoring surrounding the Three Fathom Harbour Tidal Wetland Restoration Project (the Project) located near the Three Fathom Harbour Road in Halifax Regional Municipality (HRM).

The objective of the ambient air monitoring was to obtain a better understanding of the levels of hydrogen sulfide (H_2S) present in the ambient air surrounding the Project, and determine if such levels exceed ambient air quality standards.

This report is presented in eight sections. Section 1 contains an introduction to the Project and provides background information. Details pertaining to the communication plan and monitoring plan are presented in Section 2. Regulatory criteria pertaining to this monitoring program is presented in Section 3 and the results of the monitoring are included in Section 4. A discussion of the results is contained in Section 5 and conclusions are presented in Section 6. Closing remarks are presented in Section 6 and references cited in Section 8. Appendices A through D contain supporting information.

1.1 BACKGROUND

The Three Fathom Harbour Tidal Wetland Restoration Project site (refer to Figure 1) is a former tidal wetland that was altered due to the construction of three transportation routes (*i.e.*, former Musquodoboit Railway, Highway 207, and Three Fathom Harbour Road). This construction significantly altered the local salt marsh. In the summer of 2015, work to restore the (essentially freshwater) wetland was initiated and included the replacement of an undersized culvert on Three Fathom Harbour Road and upgrades to the causeway, thereby improving the hydrology of the site and enabling unrestricted flow of tidal waters.

In May 2016, Nova Scotia Environment (NSE) began to receive complaints from residents living near the Project. The residents reported that the newly forming salt marsh was emitting strong odours of "rotten eggs" (suspected to be H_2S) into the air around their homes. In March 2017, additional odour complaints were received by NSE and concern was expressed over the potential for health effects due to long-term exposure to hydrogen sulfide.

The source of the odour is suspected to be the natural release of H_2S gas during decomposition of seaweed that drifted into the marsh from the adjacent bay due to tidal action. Prior to restoration, this seaweed (also known as wrack) accumulated on the adjacent beach. During the year, wrack is periodically transported into the marsh with the tides to decompose or be flushed out again on higher tidal cycles and storms.

In response to such complaints, NSE issued a Directive to NSTIR on April 28, 2017 to develop a short term air monitoring plan to determine the levels of H_2S in the ambient air surrounding the Project site.

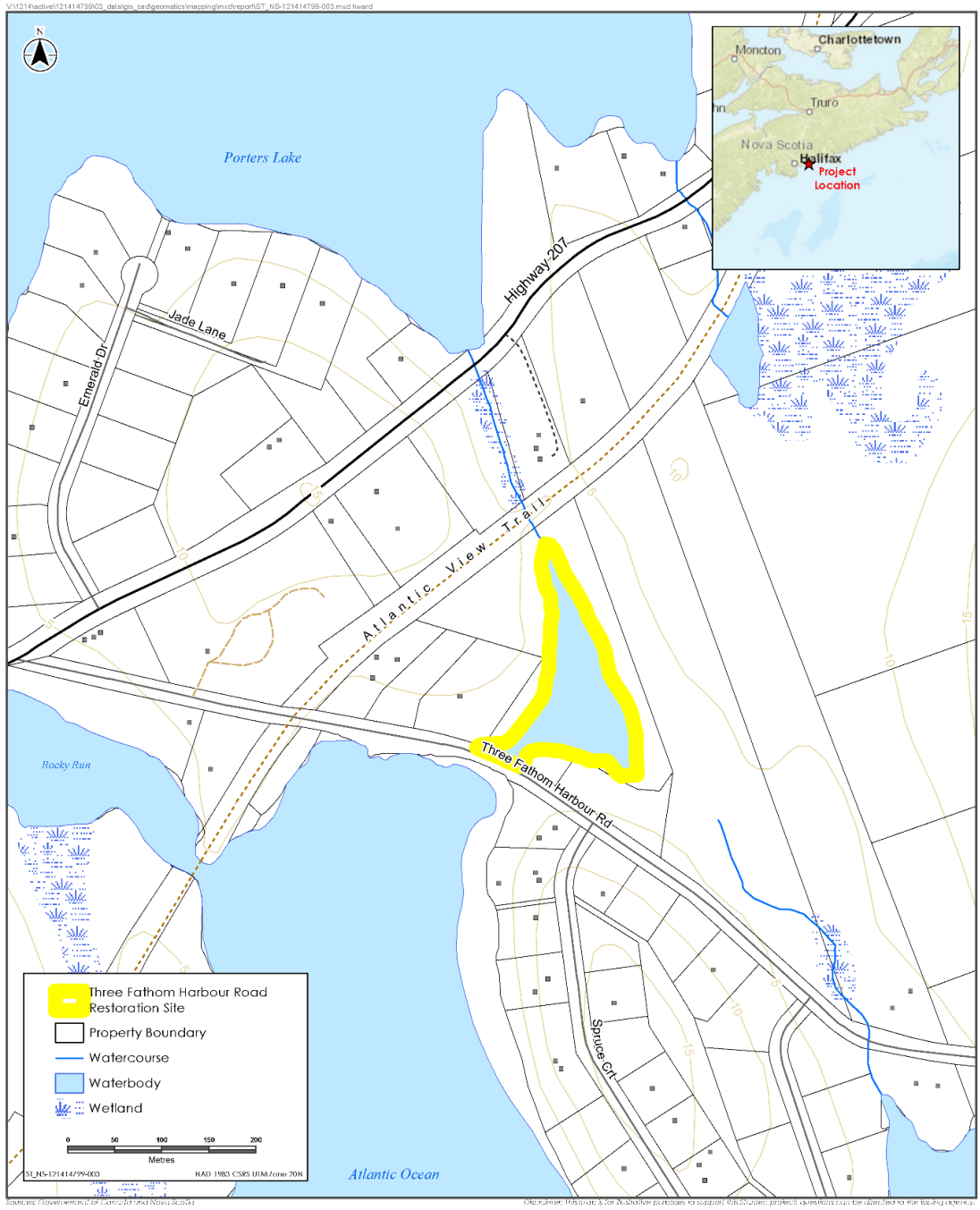

Figure 1 Project Site

2.0 PLANNING

A monitoring plan, titled "Short Term Air Monitoring Plan for Hydrogen Sulfide, Three Fathom Harbour, NS", was developed by Stantec and submitted to NSE for review and approval on June 20, 2017. The monitoring plan is included in Appendix A. NSE approved the monitoring plan on July 31, 2017 based on the following change, "The results of the ambient air monitoring should be compared to the occupational exposure limits (OELs) established by the American Conference of Government Industrial Hygienists (ACGIH), and adopted by Canada (instead of the proposed United States Environmental Protection Agency's Acute Exposure Guideline Levels (US EPA AEGL)), in addition to the Nova Scotia and Ontario ambient air quality standards for H_2S".

The plan consisted of both a communication plan and a monitoring plan. Details pertaining to both of these plans are summarized in the following subsections and the full plan is provided in Appendix A.

2.1 COMMUNICATION PLAN

In the monitoring plan, Stantec identified property owners that were located closest to the Project, and therefore would have the greatest potential for exposure to potential releases of H_2S. These locations (*i.e.*, the ambient air monitoring locations) are identified on Figure 2.

Stantec mailed a letter to each identified property owner to apprise them of the proposed monitoring plan, invite property owners to provide information on their experience with odours from the Project, and request permission to access their property for monitoring purposes. A copy of this letter is included in Appendix B as well as a summary of the comments received.

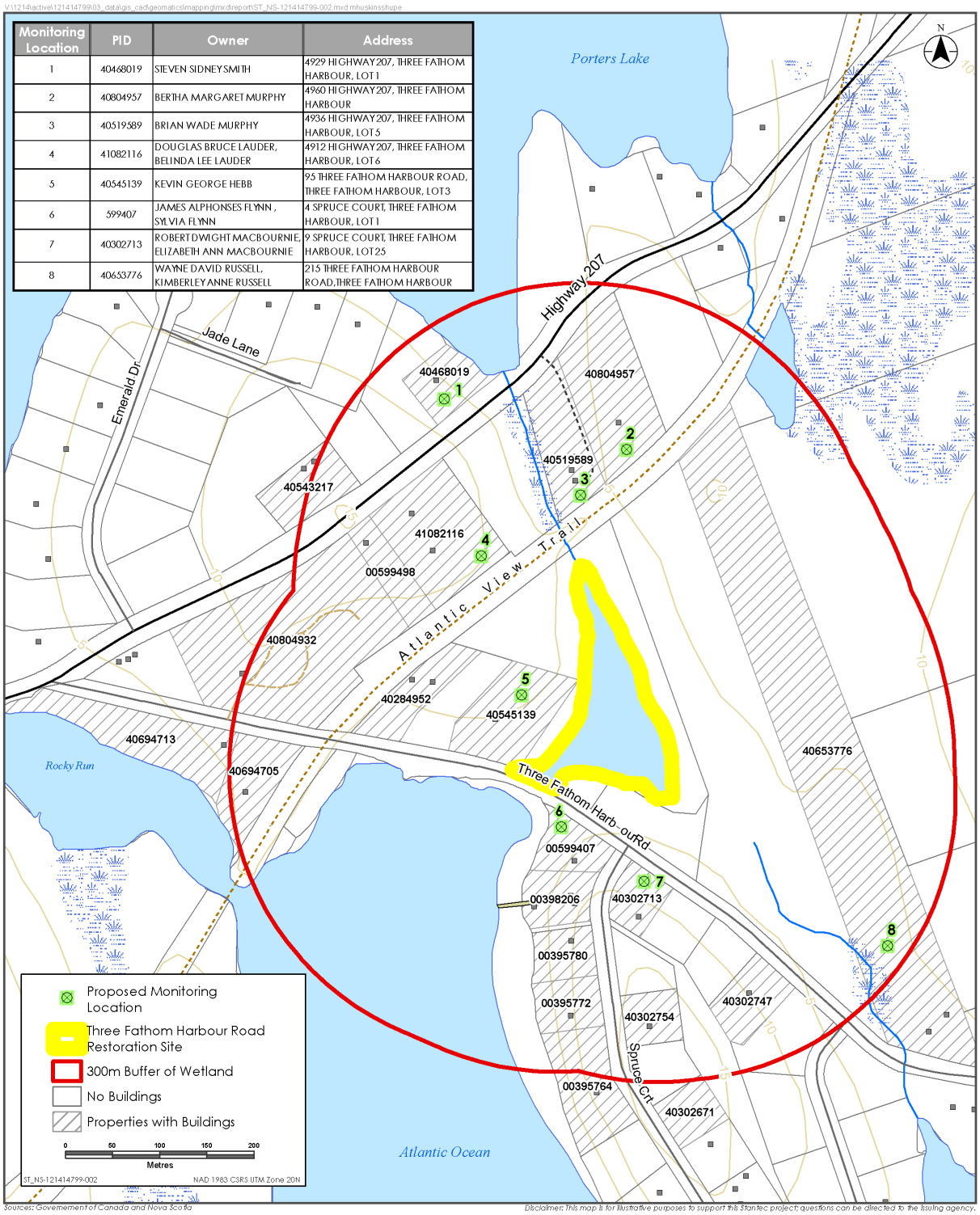

Figure 2 Proposed Monitoring Locations

2.2 MONITORING PLAN

Three monitoring events for hydrogen sulfide were proposed in the monitoring plan and a fourth monitoring event (overnight monitoring) was added based on feedback received through the communication plan. The monitoring was conducted during the week of August 28th at each of the ambient air monitoring locations identified in Figure 2.

Monitoring for H_2S was conducted using two handheld Jerome H_2S analyzers (J605 and J631) with an analysis range of 0.003 - 50 ppm. Each unit was factory calibrated prior to the monitoring (refer to Appendix C for calibration records) and was zeroed in the field by Stantec personnel prior to each measurement period using a zeroing tube. At the start and end of each monitoring event, a sensor regeneration cycle was performed on the analyzers. To support the handheld monitoring, the approved monitoring plan proposed the use of additional ambient air monitoring using using Summa™ Canisters. Samples were collected using this method, however the laboratory, Maxxam Analytics in Mississauga, Ontario, did not achieve a detection level as low as the ambient air quality standards, via Gas-Chromatography (GC) (all samples were less than a 0.5 ppm detection limit).

Depending on the wind direction during each monitoring event, the eight monitoring locations were identified as either downwind or upwind of the Project site. Wind direction was monitored online at Wind Finder (Wind, Waves, and Weather Forecast) for Lawrencetown Beach and was checked frequently while on site using a flag mounted on a flag pole located at Monitoring Site 6. For the downwind monitoring locations, H_2S concentrations were documented every minute for a period of one hour, and for the upwind monitoring locations spot check readings were taken over a period of five to ten minutes. The monitoring events were also scheduled to occur during low tide conditions when wind speeds were low (< 20 km/hr) and air temperatures were warm (> 15°C) as these conditions were expected to provide a worst case situation for H_2S dispersion from the beach.

Details pertaining to each monitoring event are summarized in Table 1.

Table 1 Ambient Air Monitoring Sampling Details

Date	Location	Start Time
Upwind Monitoring – Handheld Monitor		
August 29, 2017	1	11:05 AM
	2/3*	10:17 AM
	4	10:06 AM
August 30, 2017	1	10:46 AM
	2/3*	10:39 AM
	4	10:33 AM
August 31, 2017	1	1:06 PM
	2/3*	12:58 PM
	4	12:51 PM
Downwind Monitoring – Handheld Monitor		
August 29, 2017	6	12:47 PM
	7	12:47 PM
August 30, 2017	5	11:30 PM
	6	10:43 AM
	7	11:50 AM
	8	1:26 PM
August 31, 2017	5	12:54 PM
	6	10:43 AM
	7	11:14 AM
	8	12:54 PM
August 31, 2017 – September 1, 2017 (overnight monitoring)	6	11:38 PM
	7	11:40 PM
Summa™ Canister Monitoring		
August 30, 2017	6	11:03 AM
August 31, 2017	6	10:24 AM
August 31, 2017	7	12:05 PM
* Monitoring locations 2 and 3 shared a common driveway and monitoring was conducted there.		

Measurements at locations 5 and 8 were not conducted on August 29, 2017 as these locations were not located downwind of the Project based on the wind direction when monitoring was taking place.

The data collected in the field was subsequently averaged over varying time periods for comparison to regulatory criteria (see Section 3.0).

3.0 AIR QUALITY CRITERIA FOR HYDROGEN SULFIDE

Ambient air quality in Nova Scotia is regulated under the Air Quality Regulations (N.S. Reg. 28/2005, as amended to O.I.C. 2014-469 (Nov 21, 2014, effective Jan 1, 2015), N.S. Reg. 179/2014). Ambient air quality regulations for criteria air contaminants (CAC), including H_2S, are presented in Schedule A of the Regulation as Maximum Permissible Ground Level Concentrations. The 1-hour Maximum Permissible Ground Level Concentration criteria for H_2S in Nova Scotia is 42 µg/m^3 (0.03 ppm or 30 ppb).

For shorter time averaging periods (i.e., 10-minute, 15-minute and 30-minute) requested by NSE in the Directive, the results of the ambient air monitoring can be compared against standards of other governmental bodies. Ontario has developed ambient air quality standards pertaining to H_2S, as published in Ontario Regulation 419/05 (O. Reg. 419/05: Air Pollution – Local Air Quality) (2017). These standards are not recognized in the province of Nova Scotia and are therefore presented in this section for guidance purposes only. These standards, along with the Nova Scotia criteria, are presented in Table 2.

Table 2 Ambient Air Quality Standards for H_2S in Nova Scotia and Ontario.

Averaging Period	µg/m^3	ppm	Basis
Nova Scotia Air Quality Regulations (Maximum Permissible Ground Level Concentrations)			
1-hour	42	0.03	-
Ontario Regulation 419/05: Air Pollution - Local Air Quality			
10-minute	13	0.009	Odour
30-minute	10	0.007	Health
Notes: µg/m^3 - micrograms per cubic metre ppm - parts per million			

With regards to exposure, the province of Nova Scotia has adopted the occupational exposure limits (OELS) established by the American Conference of Governmental Industrial Hygienists (ACGIH). Although the ACGIH limits can provide useful guidance in the interpretation of air quality exposures, they are not directly equivalent to ambient air quality regulations. There are some key differences between the two types of standards. First, the ambient air quality regulations are designed to be protective of the general population – any age or state of health – and protective over different time periods, typically as short as 0.5 hours, but extending to a lifetime in the case of national objectives. Occupational limits are designed to be protective of normal, healthy adult workers who are exposed for a defined term, typically 40 hours of the 168 hours in each week, with the assumption that the time that the workers are not exposed provides time for full recovery from exposure effects. Therefore, they have been provided here for guidance purposes only. The ACGIH occupational exposure limits for H_2S are presented in Table 3.

Table 3 Occupational Exposure Limits for H_2S

Averaging Period	µg/m³	ppm
15-minute TWA-STEL	6,970	5
8-hour TWA	1,400	1
Note: TWA – Time Weighted Average STEL – Short Term Exposure Limit		

The results of the ambient air monitoring program are compared against the ambient air quality criteria in Nova Scotia and Canadian occupational exposure limits (OELs; as adopted by the American Conference of Governmental Industrial Hygienists (ACGIH)) (refer to Section 4).

4.0 AMBIENT AIR MONITORING RESULTS

The results of the short-term ambient air monitoring program are presented in the subsections below for both the downwind and upwind monitoring.

When the handheld monitor did not detect H_2S, the reading is recorded and averaged as zero. Field sheets, containing the raw 1-minute data, are presented in Appendix C.

4.1 DOWNWIND MONITORING

The results of the downwind monitoring events for the 10-minute time averaging period are presented in Table 4.

Table 4 Downwind Monitoring Results – 10-minute Time Averaging Period (Handheld H_2S Analyzer)

Date	Location	Range in 10-minute Average Concentrations (ppm)						Average 10-minute Concentration (ppm)
		1	2	3	4	5	6	
August 29, 2017	6	0.014	0	0	0	0	0	0.002
	7	0	0	0	0	0	0	0
August 30, 2017	5	0.010	0.018	0.011	0.011	0.009	0.010	0.012
	6	0.001	0.002	0.005	0.005	0.011	0.040	0.011
	7	0	0	0	0.002	0.001	0.004	0.001
	8	0	0	0	0	0	0	0
August 31, 2017	5	0.002	0.002	0.010	0.002	0.002	0.001	0.003
	6	0.007	0.006	0.006	0.007	0.014	0.028	0.011
	7	0.004	0.013	0.020	0.037	0.010	0.013	0.016
	8	0.002	0.003	0.001	0.003	0.002	0.002	0.002

Table 4 Downwind Monitoring Results – 10-minute Time Averaging Period (Handheld H_2S Analyzer)

Date	Location	Range in 10-minute Average Concentrations (ppm)						Average 10-minute Concentration (ppm)
		1	2	3	4	5	6	
August 31, 2017 – September 1, 2017	6	0.035	0.034	0.038	0.027	0.019	0.027	0.03
	7	0.005	0.005	0.009	0.008	0.006	0.006	0.007

The10-minute concentrations of H_2S ranged from 0 to 0.040 ppm, and the highest concentrations were measured at monitoring sites 6 and 7 overnight on August 31, 2017 to September 1, 2017.

The results of the downwind monitoring events for the 15-minute time averaging period are presented in Table 5.

Table 5 Downwind Monitoring Results – 15-minute Time Averaging Period (Handheld H_2S Analyzer)

Date	Location	Range in15-minute Average Concentrations (ppm)				Average 15-minute Concentration (ppm)
		1	2	3	4	
August 29, 2017	6	0.01	0	0	0.001	0.003
	7	0	0	0	0	0
August 30, 2017	5	0.01	0.01	0.01	0.01	0.010
	6	0.002	0.004	0.008	0.03	0.011
	7	0	0	0.002	0.003	0.001
	8	0	0	0	0	0
August 31, 2017	5	0.002	0.007	0.002	0.001	0.003
	6	0.007	0.006	0.009	0.02	0.011
	7	0.005	0.02	0.03	0.01	0.016
	8	0.003	0.001	0.002	0.002	0.002
August 31, 2017 – September 1, 2017	6	0.03	0.04	0.03	0.02	0.030
	7	0.005	0.007	0.007	0.006	0.006
Canadian Occupational Exposure Levels (OELs; 15-minute TLV STEL) (ppm)		**5**	**5**	**5**	**5**	**5**

The 15-minute average concentrations of H_2S are well below the 5 ppm ACGIH STEL at each monitoring site for each monitoring event. The maximum 15-minute average was 0.04 ppm at location 6 overnight on August 31-September 1st. The 8-hour TWA of 1 ppm was also not exceeded throughout the monitoring program. As indicated under Section 3, the comparison to occupational exposure criteria is presented here for guidance purposes only.

The results of the downwind monitoring events for the 30-minute time averaging period are presented in Table 6.

Table 6 Downwind Monitoring Results – 30-minute Time Averaging Period (Handheld H_2S Analyzer)

Date	Location	30-min Average Concentration (ppm)	
August 29, 2017	6	0.005	0.001
	7	0	0
August 30, 2017	5	0.010	0.010
	6	0.003	0.020
	7	0	0.002
	8	0	0
August 31, 2017	5	0.004	0.002
	6	0.006	0.020
	7	0.010	0.020
	8	0.002	0.002
August 31, 2017 – September 1, 2017	6	0.040	0.020
	7	0.006	0.006

The 30-minute concentrations of H_2S ranged from 0 to 0.04 ppm. The maximum 30-minute average, of 0.04 ppm, was measured at monitoring location 6 overnight on August 31st to September 1st. This is consistent with residents' observations that the odour is worse late in the evening/early morning, the usual time of slowest dispersion of air in the atmosphere.

The results of the downwind monitoring events for the 1-hour time averaging period are presented in Table 7.

Table 7 Downwind Monitoring Results – 1-Hour Time Averaging Period (Handheld H_2S Analyzer)

Date	Location	1-hour Average Concentration (ppm)
August 29, 2017	6	0.003
	7	0
August 30, 2017	5	0.010
	6	0.010
	7	0.001
	8	0
August 31, 2017	5	0.003
	6	0.010
	7	0.020
	8	0.002
	6	0.030

Table 7 Downwind Monitoring Results – 1-Hour Time Averaging Period (Handheld H_2S Analyzer)

Date	Location	1-hour Average Concentration (ppm)
August 31, 2017 – September 1, 2017	7	0.006
Nova Scotia 1-hour Maximum Permissible Ground Level Concentration (ppm)		**0.030**

The 1-hour concentrations of H_2S ranged from 0 to 0.03 ppm. The maximum 1-hour concentration, of 0.03 ppm, was measured at monitoring site 6 overnight on August 31, 2017 to September 1, 2017. This is consistent with residents' observations that the odour is worse late in the evening/early morning, the usual time of slowest dispersion of air in the atmosphere.

4.2 UPWIND MONITORING

The range of H_2S concentrations recorded during the upwind spot check monitoring, for each monitoring event, are presented in Table 8.

When conducting the first ambient air monitoring event it was determined that monitoring site's 2 and 3 shared a common driveway and therefore were considered to be the same monitoring site. Results at these locations have therefore been presented together.

Table 8 Upwind Monitoring Results – Range of H_2S Concentrations (Handheld H_2S Analyzer)

Date	Location	H_2S Concentration Range (ppm)
August 29, 2017	1	0.001 – 0.002
	2/3	0 - 0.001
	4	0 - 0.002
August 30, 2017	1	0.001 - 0.002
	2/3	0 - 0.001
	4	0 - 0.001
August 31, 2017	1	0 - 0.003
	2/3	0 – 0.003
	4	0.001 - 0.002

Upwind monitoring was not conducted simultaneously during the fourth ambient air monitoring event (*i.e.*, overnight on August 31st) due to safety concerns (employees working alone after dark), and the fact that the focus was on the downwind locations. As presented in Table 8, the upwind concentrations were measurably lower than the downwind concentrations and remained consistently low over each ambient air monitoring event. The upwind monitoring data is typical for background ambient air levels.

5.0 DISCUSSION

The results of the short term ambient air monitoring program for the Three Fathom Harbour Wetland, indicate above background levels of hydrogen sulfide downwind of the Project. On one occasion at one of two sites sampled during the evening of August 31-September 1, the closest site to the Project (monitoring site 6), had a concentration at the Nova Scotia 1-hour Maximum Permissible Ground Level Concentration for H_2S of 0.03 ppm. The 1-hour concentrations of H_2S at the other monitoring sites were well below the provincial standard. sulfide The one high value corroborated with the comments received from the nearest residents to the Project site during the communication plan regarding the timeframe of worst odours (i.e. at night during calm conditions and low tides).

There were no exceedances of the Canadian occupational exposure limits for H_2S, which are adopted from those published by the American Conference of Governmental Industrial Hygienists (ACGIH).

Since the issuance of the Directive from NSE, Health Canada and Environment and Climate Change Canada have released a Draft Screening Assessment (September 9, 2017), titled "Draft Screening Assessment, Hydrogen Sulfide (H_2S), Sodium Sulfide (Na(SH)) and Sodium Sulfide (Na2S)". The screening assessment was undertaken to determine whether hydrogen sulfide presents or may present a risk to the environment or to human health (Environment and Climate Change Canada and Health Canada 2017). The assessment considered the inhalation of ambient air containing concentrations of H_2S ranging from 1.4 µg/m^3 – 43.4 µg/m^3 (0.001 to 0.031 ppm) near point sources (both natural and industrial), and concluded that such levels do not constitute a risk to human life, "hydrogen sulfide,,, [is] not entering the environment in a quantity or concentration or under conditions that have an immediate or long-term effect on the environment or its biological diversity or that constitute or may constitute a danger to the environment on which life depends,,,, [nor] constitute or may constitute a danger in Canada to human life or health" (Environment and Climate Change Canada and Health Canada 2017). The following is also stated in the Synopsis of the document (page 2):

> "The upper bounding concentrations of hydrogen sulfide in ambient air are based on a review of the available Canadian monitoring data. The range of concentrations of 1-31 ppb (1.4-43.4 µg/m^3 [0.001 to 0.031 ppm]) is used in the risk characterization. The lowest value of this range represents the overall average concentration measured in an urban area presumed to be away from major anthropogenic sources; the highest value of the range is the highest of all 99th percentile concentrations derived from measurements near point sources in Canada [measurements near a pulp and paper mill]. Margins between upper-bounding concentrations of hydrogen sulfide in ambient air and levels associated with critical health effects (ocular, respiratory, neurological effects) are considered to be adequate to address uncertainties in the health effects and exposure databases. In occupational settings, severe health effects have been reported

> due to accidental acute exposure to high levels of hydrogen sulfide. These levels, specific to industrial settings, are several orders of magnitude higher than concentrations encountered in a community setting and are not considered relevant for general population risk characterization."

6.0 CONCLUSION

As noted above in Section 5, the results of the short term ambient air monitoring program for the Three Fathom Harbour Wetland Restoration Project, indicate above background levels of hydrogen sulfide downwind of the Project. The average 1-hour concentrations of H_2S were below the Nova Scotia Air Quality Regulation for H_2S (0.03 ppm) at each monitoring site, except for monitoring site 6 which was just at the limit on one occasion (midnight August 31st). The average 15-minute concentrations of H_2S were orders of magnitude below the American Conference of Governmental Industrial Hygienists Short Term Exposure Limit (ACGIH STEL) for H_2S (5 ppm) at each monitoring site (<0.001 to 0.04 ppm).

7.0 CLOSING

This report has been prepared for the sole benefit of Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR), and may not be relied upon by any other person or entity without the express written consent of Stantec and NSTIR. Any use of this report by a third party, or any reliance on decisions made based upon this report, are the responsibility of the third party. Stantec accepts no responsibility for damages, if any, suffered by any third party because of decisions made or actions based on this report.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. The conclusions presented represent the best judgment of Stantec Consulting Ltd. based on the data obtained during the work. Due to the nature of the work, Stantec Consulting Ltd. cannot warrant against undiscovered liabilities. Stantec disclaims liability for use by any other party and for any other purpose. conclusions presented in this report should not be construed as legal advice.

November 3, 2017

This report was prepared by Gillian Hatcher, with quality review by Vicki Corning, P.Eng. and independent review by John Walker, Ph.D. Should you have any questions or concerns please feel free to contact the undersigned.

Gillian Hatcher, M.A.Sc.
Atmospheric Scientist
Phone: 902-468-7777
Fax: 902-468-9009
gillian.hatcher@stantec.com

Vicki Corning, P.Eng.
Senior Associate, Environmental Services
Tel: (506) 452-7000
victoria.corning@stantec.com

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8.0 REFERENCES

Environmental and Climate Change Canada and Health Canada. 2017. Draft Screening Assessment, Hydrogen Sulfide (H_2S), Sodium Sulfide (Na(SH)) and Sodium Sulfide (Na_2S). Available at https://www.canada.ca/en/health-canada/services/chemical-substances/other-chemical-substances-interest/hydrogen-sulfide.html#toc0 and http://www.ec.gc.ca/ese-ees/2C9C9061-4498-4185-A7B6-C67ADF63CDE3/EN_H2S%20SAR%20Final.pdf

APPENDIX A
MONITORING PLAN

Stantec Consulting Ltd.
102-40 Highfield Park Drive, Dartmouth NS B3A 0A3

June 26, 2017
File: 121414799

Attention: Kelly Henderson, Environmental Analyst
Nova Scotia Department of Transportation and Infrastructure Renewal
Environmental Services
1672 Granville Street
Halifax, NS B3J 2N2

Dear Ms. Henderson,

Reference: Short Term Air Monitoring Plan for Hydrogen Sulphide, Three Fathom Harbour, NS

Stantec Consulting Ltd. (Stantec) completed this Short-Term Air Monitoring Plan (the Plan) on behalf of Nova Scotia Department of Transportation and Infrastructure and Renewal (NSTIR) in response to an Environmental Act Directive (dated April 28, 2017; the Directive) received by NSTIR from Nova Scotia Environment (NSE). This Plan is intended to meet the requirements of the Directive.

The objective of the Plan is to obtain a better understanding of the levels of hydrogen sulphide (H_2S) present in the ambient air surrounding the Three Fathom Harbour Tidal Wetland Restoration Project (the Project), located near the Three Fathom Harbour Road in Halifax Regional Municipality (HRM), and determine if such levels pose a risk to human health. The Plan, as outlined in detail below, consists of communicating with nearby residents and conducting ambient air monitoring for H_2S using a hand held analyzer, supplemented with Summa™ Canister samples and subsequent analysis for H_2S via gas-chromatography, at several residential locations surrounding the Project.

BACKGROUND

The Project site is a former tidal wetland that, due to the construction of three transportation routes (i.e., former Musquodoboit Railway, Highway 207, and Three Fathom Harbour Road), became separated from Porters Lake and Three Fathom Harbour. This construction altered the local brackish-freshwater system.

Work associated with the Project was completed in the summer of 2015 and included the replacement of a culvert on Three Fathom Harbour Road and upgrades to the causeway, thereby improving the hydrology of the site and enabling unrestricted flow of tidal waters. Before and during the construction of the Project, however, a layer of wrack (combination of seaweeds) formed on the adjacent beach and its decomposition is believed to release a noxious gas (i.e. H_2S). The deposition of wrack in the fall/winter and clearing out in summer months appears to be a pattern for the area. After construction seaweed periodically enters and is deposited within the marsh. Regardless of timing, decomposition releases noxious gases.

Reference: Short Term Air Monitoring Plan for Hydrogen Sulphide, Three Fathom Harbour, NS

In May 2016, the NSE began to receive complaints from residents living near the Project. The residents cited the newly forming salt marsh was emitting strong odours of rotten eggs (suspected to be H_2S) into the air around their homes. In March 2017, additional odour complaints were received by NSE and concern was expressed over the potential for health effects due to long-term exposure to hydrogen sulfide.

Because of these concerns, NSE issued the Directive to NSTIR. According to the Directive, NSTIR must provide NSE with a short-term plan for monitoring H_2S in the ambient air surrounding the Project site. The Plan shall include:

- Proposed monitoring locations, which shall include all residential receptors within a 300 meter (m) radius of the boundaries (with the permission of property owners);
- Proposed approximate date range(s) and conditions for monitoring events. Sampling shall be completed when odours are present, and include a "worst case" scenario (i.e. when odours around the Project site are strongest);
- Proposed communication plan with residents to determine dates and times for monitoring events;
- Sampling methodology, including standards for equipment and procedures which will be followed;
- Analytical methodology; and
- Data collected shall be presented in tabular format and include H_2S concentrations over the following averaging periods: 15-minutes, 30-minutes, and 1-hour.

COMMUNICATION PLAN

Properties (i.e. residential property with a house) located within 300 m of the Project are listed in Table 1 and graphically illustrated on Figure 1. The name of the property owner(s) and civic address of the property have also been included in the table.

Table 1 Properties within 300 m of the Project

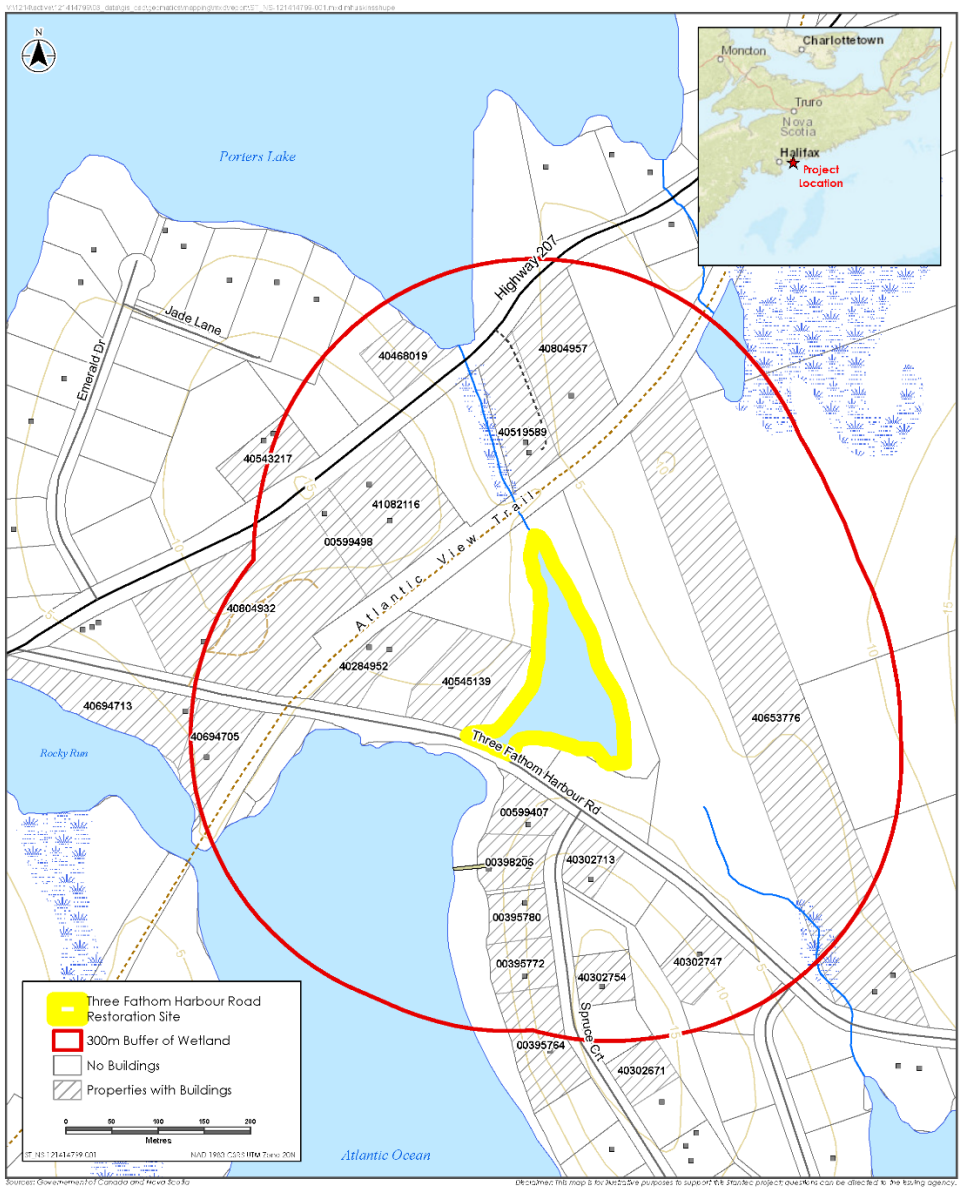
PID	Owner Name	Address
40694713	Avery Darrin Pirri	40 Three Fathom Harbour Road, Three Fathom Harbour
40694705	Avery Darrin Pirri	48 Three Fathom Harbour Road, Three Fathom Harbour, Lot 6
40543217	Keith G Clark	4891 Highway 207, Three Fathom Harbour
40804932	Onorio Orlando Pirri	39 Three Fathom Harbour Road, Three Fathom Harbour
40519589	Brian Wade Murphy	4936 Highway 207, Three Fathom Harbour, Lot 5
40804957	Bertha Margaret Murphy	4960 Highway 207, Three Fathom Harbour
00395764	Morris Llewellyn Thatcher Josephine Thatcher	50 Spruce Court, Three Fathom Harbour, Lot 65A

Reference: Short Term Air Monitoring Plan for Hydrogen Sulphide, Three Fathom Harbour, NS

Table 1 Properties within 300 m of the Project

PID	Owner Name	Address
	Christopher L Thatcher Michael A Thatcher	
40302754	Lawrence Franklin Willoughby, Jr. Susan Mae D. Willoughby	31 Spruce Court, Three Fathom Harbour, Lot 27
00395772	Glenn W Kennedy Linda D Kennedy	30 Spruce Court, Three Fathom Harbour, Lot 4
00395780	John William Allen Susan Jane Macleod	16 Spruce Court, Three Fathom Harbour, Lot 3
40302713	Robert Dwight Macbournie Elizabeth Ann Macbournie	9 Spruce Court, Three Fathom Harbour, Lot 25
00398206	Darrell Hugh Watts Jacqueline Marie Lorette	3 Spruce Court, Three Fathom Harbour, Lot 2
00599498	Gabriel Sutherland Purcell Kirsten Mae Stubbs	4896 Highway 207, Three Fathom Harbour, Lot 1 & Parcel 1A
40284952	Adam Bruce Frederick Benjamin Renee Jeannine Craig	79 Three Fathom Harbour Road, Three Fathom Harbour, Lot 1
41082116	Douglas Bruce Lauder Belinda Lee Lauder	4912 Highway 207, Three Fathom Harbour, Lot 6
40545139	Kevin George Hebb	95 Three Fathom Harbour Road, Three Fathom Harbour, Lot 3
40468019	Steven Sidney Smith	4929 Highway 207, Three Fathom Harbour, Lot 1
00599407	James Alphonses Flynn Sylvia Flynn	4 Spruce Court, Three Fathom Harbour, Lot 1
40302671	Andrew Ray Brittany Emma Ray	61 Spruce Court, Three Fathom Harbour, Lot 29
40302747	Michael Scott Miller Tanya Grace Miller	Three Fathom Harbour Road, Three Fathom Harbour
40653776	Wayne David Russell Kimberley Anne Russell	215 Three Fathom Harbour Road,Three Fathom Harbour

Reference: Short Term Air Monitoring Plan for Hydrogen Sulphide, Three Fathom Harbour, NS

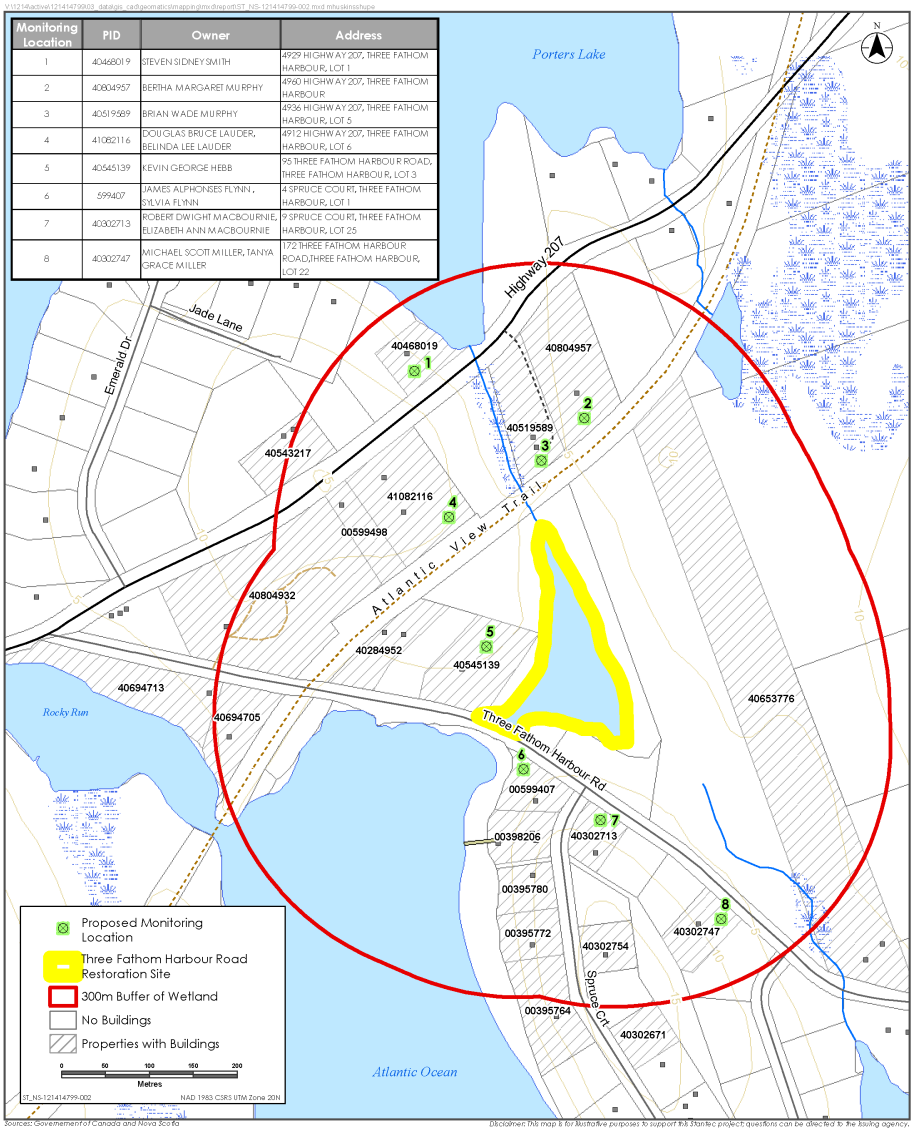


Properties within 300m of the Project Area

Reference: Short Term Air Monitoring Plan for Hydrogen Sulphide, Three Fathom Harbour, NS

Those properties located closest to the Project site would be most exposed to potential releases of H_2S and therefore have been proposed for monitoring (refer to Figure 2).

Monitoring Location	PID	Owner	Address
1	40468019	STEVEN SIDNEY SMITH	4929 HIGHWAY 207, THREE FATHOM HARBOUR, LOT 1
2	40804957	BERTHA MARGARET MURPHY	4960 HIGHWAY 207, THREE FATHOM HARBOUR
3	40519589	BRIAN WADE MURPHY	4936 HIGHWAY 207, THREE FATHOM HARBOUR, LOT 5
4	41082116	DOUGLAS BRUCE LAUDER, BELINDA LEE LAUDER	4912 HIGHWAY 207, THREE FATHOM HARBOUR, LOT 6
5	40545139	KEVIN GEORGE HEBB	95 THREE FATHOM HARBOUR ROAD, THREE FATHOM HARBOUR, LOT 3
6	599407	JAMES ALPHONSES FLYNN , SYLVIA FLYNN	4 SPRUCE COURT, THREE FATHOM HARBOUR, LOT 1
7	40302713	ROBERT DWIGHT MACBOURNIE, ELIZABETH ANN MACBOURNIE	9 SPRUCE COURT, THREE FATHOM HARBOUR, LOT 25
8	40302747	MICHAEL SCOTT MILLER, TANYA GRACE MILLER	172 THREE FATHOM HARBOUR ROAD,THREE FATHOM HARBOUR, LOT 22



Proposed Monitoring Locations

Stantec

AMBIENT AIR MONITORING PLAN OF HYDROGEN SULPHIDE NEAR THE THREE FATHOM HARBOUR TIDAL WETLAND RESTORATION PROJECT

Figure 2

Reference: Short Term Air Monitoring Plan for Hydrogen Sulphide, Three Fathom Harbour, NS

The owners of each property, identified in Figure 2 as a monitoring location, will be contacted by Stantec, either via telephone or a mailed letter, to obtain their permission to access their property for monitoring and to gain information pertaining to:

- A description of the odour; and
- Conditions under which the odour is predominant (i.e. dates and times and relevant weather conditions).

  A summary of this correspondence (including the names of those individuals spoken with and the dates and times of the correspondence) will be included as an Appendix to the final report.

The Plan presented below has been developed using information currently available. If additional information is obtained, through corresponding with the residents, that would warrant changes to the Plan, those changes would be discussed with NSTIR and communicated to NSE prior to the monitoring taking place. A copy of the final report will be provided to participating residents at the end of the monitoring program.

MONITORING PLAN

MONITORING AND SAMPLING METHODOLOGY

Based on the information provided by NSTIR, the gas H_2S is likely the most abundant compound of interest being released by the restored tidal wetland. The compound H_2S is a colorless gas that has a characteristic rotten egg smell at low concentrations; it has an odour detection threshold as low as 0.0005 ppm (Journal of Air Pollution Control Association 2012).

Monitoring for H_2S will be conducted using a Jerome J605 handheld H_2S analyzer with an analysis range of 0.003 - 50 ppm (which is above the odour detection threshold for H_2S but below human health exposure criteria). Measurements will be logged over 10-minute, 30-minute, and 1-hour time periods downwind of the wetland. NSE had requested that the measurements be collected over 15-minute, 30-minute, and 1-hour time periods; however, Stantec is suggesting that the monitoring occur over a 10-minute period versus a 15-minute to allow for comparison to human health exposure thresholds (refer to Tables 2 and 3). Simultaneously, upwind spot check measurements will be collected with a second handheld analyzer. If H_2S is detected during the upwind spot check monitoring, longer duration (i.e. 10-minute) monitoring will be conducted at that location.

Wind direction will be monitored online at Wind Finder (Wind, Waves, and Weather Forecast) for Lawrencetown Beach and will be checked on site using a wind sock mounted in a location visible to the technician.

Reference: Short Term Air Monitoring Plan for Hydrogen Sulphide, Three Fathom Harbour, NS

To support the hand-held monitoring, three samples of ambient air will also be collected during one monitoring event, over a 10-minute time period, using Summa™ Canisters, and analyzed for H_2S via Gas- Chromatography (GC). The reference detection limit for H_2S via summa canister and gas-chromatography is 0.01 ug/m^3 (0.000007 ppm) (which is below the odour detection threshold for H_2S).

MONITORING FREQUENCY AND LOCATIONS

Three monitoring events will be implemented, on separate days, to try and capture "worse case" conditions (i.e. capture a particular wind direction) at each residential receptor due to the receptors being located in three cardinal directions from the wetland.

Pending correspondence with the nearest residences, Stantec has identified that the "worst case" condition likely occurs during days with calm winds, warm temperatures, during daytime hours when the tide is low and exposure of biological material available for decomposition is highest. An overview of the monitoring events is presented in Table 2. The monitoring locations are dependent on wind direction and consist of those residential receptors located closest to the Project. Those locations are presented in Figure 2.

Table 2 Overview of Monitoring Events

Monitoring Event No.	Wind Direction (Blowing From)	Description of Monitoring Conditions	Downwind Monitoring Locations	Upwind Monitoring Locations
1	S, SE	Calm winds (i.e. <15 - 20 km/hr), warm temperatures, low tide	1, 2, 3, 4, 5	6, 7,8
2	E, NE	Calm winds (i.e. <15 - 20 km/hr), warm temperatures, low tide	5, 6, 7,8	2, 3, 4
3	N, NW	Calm winds (i.e. <15 - 20 km/hr), warm temperatures, low tide	5, 6, 7,8	2, 3, 4

Pending approval of the Plan by NSE and communication with the nearby residences, dates for monitoring will be proposed based on when suitable meteorological conditions consistent with warm, calm conditions overlap with the occurrence of low tides. Stantec will use meteorological and tidal predictions from the Environment Canada and Wind Finder to finalize the monitoring events times. Stantec will confirm and document meteorological and tide conditions on site during the monitoring sessions.

A control sample may be collected at a nearby site that is comparable to the Project site. Currently a comparable site has not been identified, but if conditions change and one is identified during the monitoring program, it will be monitored for H_2S using the hand-held analyzer.

Reference: Short Term Air Monitoring Plan for Hydrogen Sulphide, Three Fathom Harbour, NS

LABORATORY ANALYTICAL PROCEDURES

The ambient air samples collected via Summa™ Canisters will be couriered to the Maxxam Analytics laboratory in Mississauga, Ontario for analysis. A copy of Maxxam's Scope of Accreditation is attached to this letter.

REPORTING

The results of all three monitoring events will be presented in one letter report. Within the report, the H_2S monitoring results will be presented for the control sample (if collected), the hand-held monitoring data and from the Summa™ Canisters /GC analysis. The measured concentrations of H_2S will be compared to those criteria presented in Tables 3 (ambient air quality criteria for Nova Scotia and Ontario) and 4 (human exposure criteria) to determine potential effects to human health.

Table 3 Applicable Ambient Air Quality Regulatory Criteria for Hydrogen Sulphide (H_2S)

Averaging Period	µg/m³	ppm
Nova Scotia Air Quality Regulations (Maximum Permissible Ground Level Concentrations)		
1-hour	42	0.03
Ontario Regulation 419/05: Air Pollution - Local Air Quality		
10-minute	13	0.009
30-minute	10	0.007

Notes:
µg/m³ - micrograms per cubic metre
ppm - parts per million

The Ontario Ministry of Environment and Climate Change have also developed upper risk thresholds (URT) for some contaminants and they are included in Schedule 6 of *Ontario Regulation 419/05: Air Pollution - Local Air Quality*. The URT for H_2S under Schedule 6 of *Ontario Regulation 419/05: Air Pollution - Local Air Quality* is 210 µg/m³ (0.15 ppm). The URT is not an ambient air standard but an upper boundary for risk allowing sites the time to implement necessary emission reduction programs before ambient standards are exceeded.

The United States Environmental Protection Agency (US EPA) have developed Acute Exposure Guideline Levels (AEGL) for H_2S. The AEGL thresholds represent exposure limits (exposure levels below which adverse health effects are not likely to occur) for the general public and are applicable to emergency exposures ranging from 10 minutes to 8 hours. Three levels (AEGL-1, AEGL-2, and AEGL-3) are developed for each of five exposure periods (10-minute, 30-minute, 1-hour, 4-hour, and 8-hour) and are distinguished by varying degrees of severity of toxic effects. The three AEGLs are defined as follows: AEGL-1 is the airborne concentration (expressed as ppm [parts

per million] or mg/m3 [milligrams per cubic meter]) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure. The AEGL-2 is the airborne concentration (expressed as ppm or mg/m3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape. The AEGL-3 is the airborne concentration (expressed as ppm or mg/m3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening adverse health effects or death (National Academy of Sciences 2010).

The AEGLs, for the exposure periods relevant to this Project, developed for H_2S are presented in Table 4.

Table 4 Acute Exposure Guideline Levels for Hydrogen Sulphide (H_2S)

United States Environmental Protection Agency (US EPA) Acute Exposure Guideline Levels (AEGLs) for H_2S (ppm)			
Averaging Period	**AEGL-1**	**AEGL-2**	**AEGL-3**
10 min	0.75	41	76
30 min	0.60	32	59
1 hour	0.51	27	50

NSTIR will be informed within 48-hours of knowledge of a recorded exceedance. This will allow for potential adjustment of the monitoring plan and discussions with NSE.

REFERENCES

Journal of the Air Pollution Control Association. 2012. Odor Threshold Determinations of 53 Odorant Chemicals, acquired from http://www.tandfonline.com/doi/pdf/10.1080/00022470.1969.10466465

National Academy of Sciences. 2010. Acute Exposure Guideline Levels for Selected Airborne Chemicals, acquired from https://www.epa.gov/sites/production/files/2014-11/documents/hydrogen_sulfide_final_volume9_2010.pdf

Reference: Short Term Air Monitoring Plan for Hydrogen Sulphide, Three Fathom Harbour, NS

CLOSURE

This Plan was prepared by Alicia Fancy and Gillian Hatcher, and reviewed by Dr. John Walker and Dr. Mike Murphy.

We trust this is sufficient for your current needs. Please do not hesitate to contact the undersigned with any questions, comments, or concerns.

Regards,

STANTEC CONSULTING LTD.

Gillian Hatcher, M.A.Sc.
Associate, Project Manager
Phone: (902) 468-7777 ext 7300
gillian.hatcher@stantec.com

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Limitations

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. This report should not be construed as legal advice.

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Standards Council of Canada

600-55 Metcalfe Street
Ottawa, ON K1P 6L5
Canada

Conseil canadien des normes

55, rue Metcalfe, bureau 600
Ottawa, ON K1P 6L5
Canada

SCOPE OF ACCREDITATION

Maxxam Analytics International Corporation
6740 Campobello Road
Mississauga, ON
L5N 2L8

Accredited Laboratory No. 97
(Conforms with requirements of CAN-P-1585, CAN-P-1587 , CAN-P-1595 , CAN-P-4E (ISO/IEC 17025:2005))

CONTACT: Anuradha Ramesh
TEL: +1 905 817 5700 ext.4161
FAX: +1 905 817 5777
EMAIL: aramesh@maxxam.ca
URL: http://www.maxxam.ca

CLIENTS SERVED: All interested parties

FIELDS OF TESTING: Biological, Chemical/Physical

PROGRAM SPECIALTY AREA: Agriculture Inputs, Food, Animal Health and Plant Protection (PSA-AFAP) , Environmental, Environmental (OSDWA)

SCOPE ISSUED ON: 2017-02-16

ACCREDITATION VALID TO: 2018-10-06

Note: Food and Water Microbiology tests are performed at 6660 Campobello Road,

Mississauga, ON L5N 2L9
Note : Neutron Activation and Radiological analyses are conducted at 6790 Kitimat Road, Unit 4, Mississauga, Ontario L5N 5L9

NON METALLIC MINERALS AND PRODUCTS

Petroleum Refinery Products: (Including asphalt materials; petrochemicals; fuels and lubricants)
Fuels and Lubricants are performed at the following location:
Maxxam Analytics, PETROCHEMICAL LABORATORY
4141 Sladeview Crescent Unit 10
Mississauga, ON

TEST METHOD DEVELOPMENT & EVALUATION AND NON-ROUTINE TESTING

Note: Laboratories accredited under this Program Specialty Area have demonstrated that they meet ISO/IEC 17025 requirements for routine testing under the same product classification as described below.

Chemical Analysis:

1. Development and validation of new testing methodology for the screening and determination of chemical compounds in food, water and environmental samples.
2. Development of testing methods for the assessment and validation of commercially available test kits for the screening and determination of mycotoxins, allergens and histamines in food, water and environmental samples.
3. Development and validation of mass spectral techniques in food, water and environmental samples.

Microbiology Analysis

1. Development and validation of analytical methods for detection, isolation, identification and characterization of microorganism including bacteria, yeast and molds in food, water and environmental samples.
2. Development, evaluation and validation of new test kits including commercial test kits for the detection and/or enumeration of microorganisms in food, water and environmental samples.

3. Modification, improvement and validation of published or existing methods for detection and/or enumeration of microorganisms in food, water and environmental samples.

4. Analysis of non-routine analytical methods for MPN in food borne pathogens; including but not limited to Salmonella, Shigella, Listeria species or Listeria monocytogenes, E.coli O157:H7, Campylobacter species or Campylobacter jejuni, Vibrio species or Vibrio parahaemolyticus, Vibrio vulnificus, Vibrio cholera, Enterobacter sakazakii

Procedures used for Test Method Development & Evaluation and Non-routine Testing:
COR WI-00122 Procedure for Compliance to CAN-P-1595
COR1SOP-00049: Enumeration of Foodborne Pathogens by MPN

ANIMAL AND PLANTS (AGRICULTURE)

Foods and Edible Products: (Human and Animal Consumption)

(Animal Tissue, Animal Derived Foods (Dairy, Honey, Eggs), Meat, Fish, Seafood, Fresh and Processed Fruit and Vegetables, Urine, Veal)

CAM SOP 00408	ICP OES-Metals in Air, Waters, Foods, Swabs, Solids, Paint and Sludge
	Arsenic
	Calcium
	Chromium
	Copper
	Iron
	Magnesium
	Manganese
	Molybdenum
	Phosphorus
	Potassium
	Sodium
	Sulphur
	Zinc
CAM SOP 00440	Nitrate, Nitrite and TON in Waters, Solids, Sludge and Food by FIA
	Nitrate
	Nitrite
CAM SOP 00447	ICPMS Metals in Waters, Foods, Solids, Swabs and Biota
	Aluminum
	Arsenic
	Barium
	Boron
	Cadmium
	Calcium
	Chromium
	Copper

	Iron
	Lead
	Magnesium
	Manganese
	Nickel
	Phosphorus
	Potassium
	Selenium
	Sodium
	Tin
	Titanium
	Zinc
CAM SOP 00453	Mercury in Liquids, Soils, Swabs, Paint and Food by Cold Vapour A.A
CAM SOP-00756	Perchlorate in Food by LCMSMS

(Fish and Seafood)

BRL SOP-00403	PCB Congeners (209 analytes) by HRGC HRMS in Food Product (Modified USEPA Method 1668, MOE Method DFPCB-E3418, and Environment Canada Method EPS1/RM)
BRL SOP-00410	Dioxins/Furans in Water, Soil, Food and Biota by HRGC HRMS (EPA 1613)
	1,2,3,4,6,7,8,9-C18-Dibenzofuran
	1,2,3,4,6,7,8,9-C18-Dibenzo-p-dioxin
	1,2,3,4,6,7,8-C17-Dibenzofuran
	1,2,3,4,6,7,8-C17-Dibenzo-p-dioxin
	1,2,3,4,7,8,9-C17-Dibenzofuran
	1,2,3,4,7,8-C16-Dibenzofuran
	1,2,3,4,7,8-C16-Dibenzo-p-dioxin
	1,2,3,6,7,8-C16-Dibenzofuran
	1,2,3,6,7,8-C16-Dibenzo-p-dioxin
	1,2,3,7,8,9-C16-Dibenzofuran
	1,2,3,7,8,9-C16-Dibenzo-p-dioxin
	1,2,3,7,8-C15-Dibenzofuran
	1,2,3,7,8-C15-Dibenzo-p-dioxin
	2,3,4,6,7,8-C16-Dibenzofuran
	2,3,4,7,8-C15-Dibenzofuran
	2,3,7,8-C14-Dibenzofuran
	2,3,7,8-C14-Dibenzo-p-dioxin
	H6CDD

	H6CDF
	H7CDD
	H7CDF
	O8CDD
	O8CDF
	P5CDD
	P5CDF
	PCDD/PCDF
	T4CDD
	T4CDF
BRL SOP-00423	PAH Compounds by HRGC/ HRMS in Food Products, Sediment and Water (Modified EPA 3540C, CARB 429)
	2-chloronapthalene
	2-Methyl napthalene
	Acenaphthene
	Acenaphthylene
	Anthracene
	Benzo(a)anthracene
	Benzo(a)pyrene
	Benzo(b)fluoranthene
	Benzo(e) pyrene
	Benzo(g,h,i)perylene
	Benzo(k)fluoranthene
	Bibenz(a,h)anthracene
	Chrysene
	Coronene
	Fluoranthene
	Fluorene
	Indeno(1,2,3-cd)pyrene
	Napthalene
	Perylene
	Phenanthrene
	Pyrene

(Food Chemistry - General)

BRL SOP-00408	PCB Congeners Analyses by HRGC/HRMS (modified EPA 1668A and 1668B)
	PCB Congeners (209 analytes)
BRL SOP-00410	Dioxins/Furans in Water, Soil (EPA 1613), Food and Biota (modified EPA 1613) by HRGC HRMS

	1,2,3,4,6,7,8,9-C18-Dibenzofuran
	1,2,3,4,6,7,8,9-C18-Dibenzo-p-dioxin
	1,2,3,4,6,7,8-C17-Dibenzofuran
	1,2,3,4,6,7,8-C17-Dibenzo-p-dioxin
	1,2,3,4,7,8,9-C17-Dibenzofuran
	1,2,3,4,7,8-C16-Dibenzofuran
	1,2,3,4,7,8-C16-Dibenzo-p-dioxin
	1,2,3,6,7,8-C16-Dibenzofuran
	1,2,3,6,7,8-C16-Dibenzo-p-dioxin
	1,2,3,7,8,9-C16-Dibenzofuran
	1,2,3,7,8,9-C16-Dibenzo-p-dioxin
	1,2,3,7,8-C15-Dibenzofuran
	1,2,3,7,8-C15-Dibenzo-p-dioxin
	2,3,4,6,7,8-C16-Dibenzofuran
	2,3,4,7,8-C15-Dibenzofuran
	2,3,7,8-C14-Dibenzofuran
	2,3,7,8-C14-Dibenzo-p-dioxin
	H6CDD
	H6CDF
	H7CDD
	H7CDF
	O8CDD
	O8CDF
	P5CDD
	P5CDF
	PCDD/PCDF
	T4CDD
	T4CDF
BRL SOP-00423	PAH Compounds by HRGC/ HRMS in Food Products, Sediment and Water (modified EPA 3540C, CARB 429) - For Food Products only
	Acenaphthene
	Acenaphthylene
	Anthracene
	Benzo(a)anthracene
	Benzo(a)pyrene
	Benzo(b/j)fluoranthene
	Benzo(g,h,i)perylene

	Benzo(k)fluoranthene Chrysene Dinbenzo(a,h)anthracene Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene Phenanthrene Pyrene
CAM SOP 00408	ICP OES-Metals in Air, Waters, Foods, Swabs, Solids, Paint and Sludge Only for: Calcium Copper Chromium Iron Magnesium Manganese Molybdenum Phosphorus Potassium Sodium Sulphur Zinc
CAM SOP 00413	Measurement of pH in Water, Soils and Food Samples
CAM SOP 00423	The Determination of Brookfield Viscosity in Food
CAM SOP 00700	Determination of Cholesterol in Foods, Feeds and Oils by GC/FID
CAM SOP 00701	Determination of Fat in Meat by Gravimetry
CAM SOP 00702	Determination of Fatty Acids in Fats and Oils by GC/FID
CAM SOP 00703	Determination of Sodium Chloride in Food and Feed Products by Titration
CAM SOP 00705	Determination of Fat in Foods using Soxhlet Extraction
CAM SOP 00706	Determination of Fat in Foods using Acid Hydrolysis
CAM SOP 00707	Total Dietary Fibre Soluble Fibre and Insoluble Fibre in Foods by Gravimetry
CAM SOP 00708	Determination of Sugars in Foods by Refractive Index
CAM SOP 00709	Vitamin A and B-Carotene in Food by HPLC
CAM SOP 00710	The Determination of Fat by the Modified Mojonnier Method in Milk, Cream, Milkshake Mix and Confectionary Products
CAM SOP 00711	Determination of Protein in Foods, Feeds and Edible Oils by Combusion
CAM SOP 00712	Vitamin E in foods, feeds, milk, and other dairy products by Capillary GC

CAM SOP 00713	Determination of Ash in Food and Food Products by Gravimetry
CAM SOP 00714	Determination of Acidity in Food and Food Products by Titration
CAM SOP 00715	Determination of Moisture and Total Solids in Food and Food Products by Gravimetry
CAM SOP 00716	Determination of Starch in Food by Spectrophotometry
CAM SOP 00717	Determination of Peroxide Value of Oils and Fats by Titration
CAM SOP 00718	Sulfites in Food and in Seafood by Gravimetry
CAM SOP 00719	Determination of Vitamin D-3 (Cholecalciferol) inFood Products by HPLC
CAM SOP 00720	Determination of Free Fatty Acids in Foods
CAM SOP 00722	The Determination of TBA Value in Foods by Spectrophotometry
CAM SOP 00724	Determination of Vitamin C in Complex Foodstuffs Using HPLC with Electrochemical Detector (Modified QFCL-001-01)
CAM SOP 00732	Determination of Water Activity in Food by Aqualab Water Activity Meter
CAM SOP 00734	Allergens in Foods and Swabs, Mycotoxin in Food using ELISA
CAM SOP 00739	Brix (Soluble Solids) in Foods, Juices and Honey by Refractometer
CAM SOP 00740	Sorbic and Benzoic Acids by HPLC in Food and Beverages
CAM SOP 00750	Determination of Total Folates (Vitamin B9) in Foods by Microbiological Assay
CAM SOP 00751	Determination of Niacin (Vitamin B3) in Food by Microbiological Assay
CAM SOP 00752	Determination of Pantothenic Acid (Vitamin B5) in Food by Microbiological Assay
CAM SOP 00754	Determination of Cobalamin (Vitamin B12) in Food by Microbiological Assay
CAM SOP 00755	Determination of Pyridoxine (Vitamin B6) in Foods by Microbiology Assay
CAM SOP 00874	Analysis of Melamine and Cyanuric Acid in Food by LC/MS/MS
CAM SOP 00882	Determination of Thiamine (Vitamin B1) in Foods by Fluorometry
CAM SOP 00884	Determination of Riboflavin (Vitamin B2) in Foods by Fluorometry
CAM SOP 00885	Analysis of Acrylamide in Food by LCMSMS
CAM SOP-00761	Total Dietary Fibre in Food
CAM SOP-00807	Determination of Perfluorinated Compounds in Food by LC/MS/MS
CAM SOP-00926	Determination of Amino Acids by HPLC
CAM SOP-00932	Nitrite and Nitrate in Meat and Food Products by HPLC

(Microbiological)

BAX® SYSTEM REAL-TIME PCR	The BAX ® SYSTEM REAL-TIME PCR ASSAY STEC SUITE

ASSAY STEC SUITE

AOAC 2014.05	Enumeration of Yeast and Moulds in Food using 3M™ Petrifilm™ Rapid Yeast And Mold Count (RYM) Plate
AOAC RI 050902	The DuPont Qualicon BAX® System Real-Time PCR Assay for Vibrio cholerae/parahaemolyticus/vulnificus
Assurance GDS ® MPX Top7 STEC Assay	BioControl Assurance GDS ® MPX Top 7 STEC
COR1SOP-00019	Enumeration of Coliforms, Faecal Coliforms and *E. Coli* in foods using the MPN Method (Modified MFHPB-19; option of standard 3-tube and 10-tube MPN method)
FDA BAM	Isolation and Identification of *Salmonella* in Food and Environmental Samples Following the FDA-BAM Method
MFHPB-10	Isolation of *Escherichia coli* O157:H7/NM from foods and environmental surface samples
MFHPB-18	Determination of the Aerobic Colony Count in Foods
MFHPB-19	Enumeration of Coliforms, Faecal Coliforms and of *E. coli* in Foods by using the MPN Method
MFHPB-20	Isolation and Identification of *Salmonella* from Foods and Environmental Samples
MFHPB-21	Enumeration of *Staphylococcus aureus* in Foods
MFHPB-22	Enumeration of Yeasts and Molds in Foods
MFHPB-23	Enumeration of *Clostridium perfringens* in Foods
MFHPB-24	Detection of Salmonella in foods by Vidas SLM™ Method
MFHPB-27	Enumeration of *Escherichia coli* in Foods by the Direct Plating (DP) Method
MFHPB-29	Detection of Listeria spp. in foods and environmental samples by the VIDAS Listeria ™ Method
MFHPB-30	Isolation of *Listeria monocytogenes* and *Listeria spp* from foods and environmental samples
MFHPB-31	Determination of Coliforms in Foods Using Violet Red Bile Agar
MFHPB-33	Enumeration of Total Aerobic Bacteria in Food Products and Food Ingredients Using 3M™ Petrifilm™ Aerobic Count Plates
MFHPB-34	Enumeration of *E. coli* and Coliforms in Food Products and Food Ingredients Using 3M™ Petrifilm™ E. coli Plates
MFHPB-35	Enumeration Of Coliforms In Food Products And Food Ingredients Using 3M™ Petrifilm™ Coliform Count Plates
MFLP-06	Detection of *SALMONELLA SPP*. in Foods using the 3M™ Molecular Detection System Test Kit
MFLP-21	Enumeration of *Staphylococcus aureus* in Foods and Environmental Samples Using 3M™ Petrifilm™ Staph Express Count (STX) Plates
MFLP-25	Isolation and Identification of *Shigella spp*. from Food

MFLP-28	The Qualicon Bax® System Method for the Detection of *Listeria Monocytogenes* in a Variety of Food
MFLP-29	The Qualicon Bax® System Method for the Detection of *Salmonella* in a Variety of Food and Environmental Samples
MFLP-30	The Dupont Qualicon Bax® System Method for the Detection of *E. coli* O157:H7 in Raw Beef and Fruit Juice
MFLP-33	Detection of *Listeria monocytogenes* in foods by the VIDAS LMO 2™method
MFLP-36	Detection of Salmonella in Food and Environmental Surface Samples-Assurance GDS ® for Salmonella Tq Genetic Detection System
MFLP-37	Part 1: Detection of Halophilic Vibrio Species in Seafood Part 2: Detection of Vibrio Cholerae
MFLP-38	Detection of *Salmonella spp*. from All Foods and Selected Environmental Surfaces using IQ-Check™ Salmonella Real-time PCR Test Kit
MFLP-39	Detection of *Listeria spp.* From Environmental Surfaces Using iQ-CheckTM *Listeria spp*. Real-Time PCR Test Kit
MFLP-40	Detection of Salmonella in food products by the VIDAS® Easy Salmonella (SLM) Method
MFLP-42	Isolation and Enumeration of *Bacillus cereus* in Foods
MFLP-44	Enumeration of Aerobic and Anaerobic sporeformers
MFLP-46	Isolation of Thermophilic *Campylobacter* from Food
MFLP-49	Detection of *Salmonella* in Food Products by the VIDAS® UP Salmonella (SPT) Method
MFLP-54	Detection of *Listeria monocytogenes* from selected foods using iQ-Check™ *Listeria monocytogenes* Real-Time PCR Test Kit
MFLP-65	MFLP-65 - Detection of staphylococcal enterotoxins in food products using the vidas® staph enterotoxin ii (set2), an elfa (enzyme linked fluorescent assay) technique
MFLP-74	Enumeration of Listeria monocytogenes in Foods
MFLP-76	The DuPont Qualicon BAX® System real time method for the detection of *E.coli* O157:H7 in raw beef trim and raw ground beef
MFLP-77	Detection of Listeria monocytogenes and other Listeria spp. in food products and environmental samples by the VIDAS® Listeria species Xpress (LSX) method
MFLP-83	Detection of Verotoxins VT 1 And VT 2 by The Merck Duopath® Verotoxin Kit
MFLP-9	Enumeration of *Enterobacteriaceae* Species in Food and Environmental Samples Using 3M™ Petrifilm™ Enterobacteriaceae Count Plates
MLG 4	FSIS Procedure for the Isolation and Identification of *Salmonella* from Meat, Poultry and Egg Products
MLG 4C	FSIS Procedure for the Use of the BAX System, PCR Assay for

	Screening *Salmonella* in Raw Meat, Carcass Sponge Samples, Whole Bird Rinses, Ready to Eat Meat and Poultry Products, and Pasteurized Egg Products
MLG41	Isolation, Identification,and Enumeration of *Campylobacter jejuni/coli/lari* from Poultry Rinse and Sponge Samples
MLG41A	FSIS Procedure for the Use of a Polymerase Chain Reaction (PCR) Assay for Screening *Campylobacter jejuni/coli/lari* in Poultry Rinse, Sponge and Raw Product Samples

Animal or Vegetable Fats and Oils and Their Cleavage Products; prepared edible fats; animal or vegetable waxes

Beverages, Spirits and Vinegar

CAM SOP-00739	Brix (Soluble Solids) in Foods, Juices and Honey by Refractometer
CAM SOP-00740	Sorbic and Benzoic Acids by HPLC in Food and Beverages

Dairy Products

See Animal Tissue, Animal Derived Foods (Dairy, Honey, Eggs), Meat, Fish, Seafood, Fresh and Processed Fruit and Vegetables, Urine, Veal

CAM SOP-00736	Determination of Undenatured Whey Protein Nitrogen in Non Fat Dry Milk by Spectrophotometry
CAM SOP-00737	Determination of Solubility Index by Volumetric Analysis
CAM SOP-00738	Determination of Scorched Particles Using Water Disc Method

Edible Fruits and Nuts

See Fresh and Processed Fruit and Vegetables

Edible Vegetables and Certain Roots and Tubers

See Fresh and Processed Fruit and Vegetables

Meat and Edible Meat Offal

(Meat and Meat Products (See Animal Tissue, Animal Derived Foods (Dairy, Honey, Eggs), Meat, Fish, Seafood, Fresh and Processed Fruit and Vegetables, Urine, Veal))

ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND SAFETY

Environmental

(Soil/Sediment/Water/Air)

BQL SOP-00001	NEUTRON ACTIVATION Long Lived Isotopes which may include: Antimony Arsenic Barium Cerium Cesium Chromium Cobalt Europium Gold Hafnium Iron Lanthanum Lutetium Molybdenum Neodymium Nickel Rubidium Samarium Scandium Selenium Silver Sodium Tantalum Terbium Thorium Titanium Tungsten Uranium Ytterbium Zinc Zirconium
BQL SOP-00004	NEUTRON ACTIVATION Short-Lived Elements which may include: Aluminum

	Barium
	Bromine
	Calcium
	Chlorine
	Dysprosium
	Europium
	Fluorine
	Indium
	Iodine
	Magnesium
	Manganese
	Potassium
	Samarium
	Sodium
	Strontium
	Titanium
	Vanadium
BQL SOP-00005	DELAYED NEUTRON COUNTING for Uranium and U-235
BQL SOP-00006	ALPHA SPECTROMETRY
	Polonium-210
	Radium-224
	Radium-226 (OSDWA)
	Thorium-228
	Thorium-230
	Thorium-232
	Uranium-234
	Uranium-235
	Uranium-238
BQL SOP-00007	GAMMA SPECTROMETRY
	Natural Decay Chain Isotopes which may include Th-234, Th-230, Ra-226, Pb-210, U-235, Th-227, Ra-223, Ac-228, Ra-228 (OSDWA), Rn-222 (OSDWA), Pb-212, Pb-214, Bi-214, Tl-208
	Synthetic Isotopes which may include Cs-137, Cs-134, I-131, Zn-65, Co-60, Mn-54, Am-241
BQL SOP-00008	GAS FLOW PROPORTIONAL COUNTING
	Gross Alpha Activity (OSDWA) Gross Beta Activity (OSDWA)
	Other radionuclides which may include Lead-210, (OSDWA) Radium-228 Strontium-90
BQL SOP-00009	LIQUID SCINTILLATION COUNTING which may include:

	Carbon-14
	Tritium (OSDWA)

Air

BQL-SOP-00010	Electret Ion Chamber Measurement for Radon-222
BRL SOP-00103	Metals by ICP/MS in Water, Soil, Air and Biota (Modified NIOSH 7300, 6009)
	Antimony
	Arsenic
	Barium
	Beryllium
	Bismuth
	Boron
	Cadmium
	Calcium
	Chromium
	Cobalt
	Copper
	Iron
	Lead
	Lithium
	Magnesium
	Manganese
	Molybdenum
	Nickel
	Phosphorus
	Potassium
	Selenium
	Silicon
	Silver
	Sodium
	Strontium
	Thallium
	Tin
	Titanium
	Tungsten
	Vanadium
	Zinc
	Uranium

BRL SOP-00104	Mercury by CVAAS in Water, Soil ,Air and Biota
	Mercury (Hg)
BRL SOP-00105	Anions by IC in Water, Soil and Air
	Bromide
	Chloride
	Fluoride
	Nitrite
	Phosphate
	Sulfate
BRL SOP-00106	Hexavalent Chromium by IC in Air
	Chromium VI
BRL SOP-00107	Ammonia in Air by IC (Based on EPA CTM-027, EPA Method 206)
	Ammonia (as NH4+)
BRL SOP-00108	Anions From Emission Sampling Trains by IC (Modified EPA 26/26A, EPA SW846 9057)
	Bromine
	Chlorine
	Fluorine
	Hydrogen Bromide
	Hydrogen Chloride
	Hydrogen Fluoride
	Hydrogen Iodide
	Iodine
	Nitric Acid
BRL SOP-00109	Gravimetric Determination of PM Emission from Stationary Sources and Air
	Particulates of Filters, Gravimetric
BRL SOP-00200	Semivolatiles Full Scan by GCMS in Water, Soil and Stack Gas Samples (Modified EPA SW846 8270C, 3510C, 3540C, 3640A, 0010)
	1,2,4-Trichlorobenzene
	1,2-Dichlorobenzene
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	1-Chloronaphthalene
	1-Methylnaphthalene
	2,3,4,5-Tetrachlorophenol
	2,3,4,6-Tetrachlorophenol
	2,3,4-Trichlorophenol
	2,3,5,6-Tetrachlorophenol
	2,3,5-Trichlorophenol

2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dichlorophenol
2,6-Dinitrotoluene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Methylphenol (o-Cresol)
2-Nitroaniline
2-Nitrophenol
3,3'-Dichlorobenzidine
3+4 Methylphenol (m+p-Cresol)
3-Nitroaniline
4,6-Dinitro-2-methylphenol
4-Bromophenyl Phenyl Ether
4-Chloro-3-Methylphenol
4-Chloroaniline
4-Chlorophenyl Phenyl Ether
4-Nitroaniline
4-Nitrophenol
5-Nitroancenphthene
Acenaphthene
Acenaphthylene
Aniline
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Benzoic Acid
Benzyl Alcohol
Benzyl Butyl Phthalate
Biphenyl
Bis (2-chloroethoxy)Methane
Bis (2-chloroethyl) Ether

	Bis (2-chloroisopropyl) Ether
	Bis (2-ethylhexyl) Phthalate
	Camphene
	Carbozole
	Chrysene
	Dibenzo (a,h) anthracene
	Dibenzofuran
	Diethyl Phthalate
	Dimethyl Phthalate
	Di-n-Butylphthalate
	Di-n-Octylphthalate
	Diphenylether
	Fluoranthene
	Fluorene
	Hexachlorobenzene
	Hexachlorobutadiene
	Hexachlorocyclopentadiene
	Hexachloroethane
	Indeno (1,2,3-cd) pyrene
	Indole
	Isophorone
	Naphthalene
	Nitrobenzene
	N-Nitrosodimethylamine (NDMA)
	N-Nitroso-di-N-Propylamine
	N-Nitrosodiphenylamine
	Pentachlorophenol
	Perylene
	Phenanthrene
	Phenol
	Pyrene
BRL SOP-00201	PAHs by SIM GCMS in Water, Soil and Air (Modified CARB 429)
	2-Methylnaphthalene
	Acenaphthene
	Acenaphthylene
	Anthracene
	Benzo (a) anthracene
	Benzo (a) pyrene
	Benzo (e) pyrene
	Benzo (g,h,i) perylene

	Benzo (k) fluoranthene
	Benzo(b) fluoranthene
	Chrysene
	Dibenzo (a,h) anthracene
	Fluoranthene
	Fluorene
	Indeno (1,2,3 cd) pyrene
	Naphthalene
	Perylene
	Phenanthrene
	Pyrene
BRL SOP-00304	Volatiles in Summa Canisters by GCMS (Modified EPA TO-14A AND TO-15)
	1,1,1-Trichloroethane
	1,1,1,2-tetrachloroethane
	1,1,2,2-Tetrachloroethane
	1,1,2-Trichloroethane
	1,1-Dichloroethane
	1,1-Dichloroethene
	1,2,3-Trimethylbenzene
	1,2,4-Trichlorobenzene
	1,2,4-Trimethylbenzene
	1,2-Dichlorobezene
	1,2-Dichloroethane
	1,2-Dichloropropane
	1,3,5-Trimethylbenzene
	1,3-Butadiene
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	1,4-Dioxane
	2,2,4-Trimethypentane
	Butane
	2-Butanone (MEK)
	2-Hexanone
	2-Propanol
	4-Ethyltoluene
	4-Methyl-2-Pentanone
	Acetone
	Allyl Chloride
	Benzene

Benzyl chloride
Bis (2-Chloroethyl) Ether
Bromobenzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethene
cis-1,3-Dichloropropene
Cyclohexane
Decane
Dibromochloromethane
Dibromomethane
Dichlorodifluoromethane
Ethanol
Ethyl Acetate
Ethyl acrylate
Ethyl Benzene
Ethyl Bromide
Ethylene Dibromide
Halocarbon 113
Halocarbon 114
Heptane
Hexachlorobutadiene
Hexane
Isopropyl benzene (Cumene)
Methyl Cyclohexane
Methyl Methacrylate
Methyl Tertbutyl Ether
Methylene Chloride
m-xylene
o-xylene
Propene
p-xylene
Styrene

	Tetrachloroethene
	Tetrahydrofuran
	Toluene
	trans 1,2-Dichloroethene
	trans 1,3-Dichloropropene
	trans-1,2-Dichloropropene
	Trichloroethene
	Trichlorofluoromethane
	Vinyl Acetate
	Vinyl Bromide
	Vinyl Chloride
	Xylenes (total)
BRL SOP-00408	PCB Congener (209 Analytes) by HRGC HRMS in Water, Soil and Air (Modified EPA 1668A)

(PCDD/PCDF - Air)

BRL SOP-00404	Dioxins and Furans by HRGC HRMS in Air Samples (Modified EPA 40CFR PART 60 APP. A METHOD 23/23A)
	1,2,3,4,6,7,8,9-C18-Dibenzofuran
	1,2,3,4,6,7,8,9-C18-Dibenzo-p-dioxin
	1,2,3,4,6,7,8-C17-Dibenzofuran
	1,2,3,4,6,7,8-C17-Dibenzo-p-dioxin
	1,2,3,4,7,8,9-C17-Dibenzofuran
	1,2,3,4,7,8-C16-Dibenzofuran
	1,2,3,4,7,8-C16-Dibenzo-p-dioxin
	1,2,3,6,7,8-C16-Dibenzofuran
	1,2,3,6,7,8-C16-Dibenzo-p-dioxin
	1,2,3,7,8,9-C16-Dibenzofuran
	1,2,3,7,8,9-C16-Dibenzo-p-dioxin
	1,2,3,7,8-C15-Dibenzofuran
	1,2,3,7,8-C15-Dibenzo-p-dioxin
	2,3,4,6,7,8-C16-Dibenzofuran
	2,3,4,7,8-C15-Dibenzofuran
	2,3,7,8-C14-Dibenzofuran
	2,3,7,8-C14-Dibenzo-p-dioxin
	H6CDD
	H6CDF
	H7CDD
	H7CDF

O8CDD
O8CDF
P5CDD
P5CDF
PCDD/PCDF
T4CDD
T4CDF

(Volatiles - Air)

BRL SOP-00302	VOST Analyses by GCMS in Air (Modified EPA SW846 5041 A, 8260)
	1,1,1-Trichloroethane
	1,1,2,2-Tetrachloroethane
	1,1,2-Trichloroethane
	1,1-Dichloroethane
	1,2,3-Trichloropropane
	1,2-Dichlorobenzene
	1,2-Dichloroethane
	1,2-Dichloropropane
	1,3-Dichlorobenzene
	1,4-Difluorobenzene
	2-Butanone
	2-Hexanone
	4-Methyl-2-Pentanone
	Acetone
	Benzene
	Bromodichloromethane
	Bromoform
	Bromomethane
	Carbon Disulfide
	Carbon Tetrachloride
	Chlorobenzene
	Chlorodibromomethane
	Chloroethane
	Chloroform
	Chloromethane
	cis-1,2-Dichloroethylene
	cis-1,3-Dichloropropene
	Dichlorodifluoromethane

	Ethyl Benzene
	Ethylene Dibromide
	Iodomethane
	Methylene Chloride
	Styrene
	Tetrachloroethene
	Toluene
	Trans-1,2-Dichloroethylene
	Trans-1,3-Dichloropropene
	Trichloroethene
	Trichlorofluoromethane
	Vinyl Chloride
	Xylenes

Air Filter

CAM SOP-00408	ICP OES-Metals in Air, Waters, Foods, Swabs, Solids, Paint and Sludge
	Antimony
	Arsenic
	Barium
	Beryllium
	Bismuth
	Boron
	Cadmium
	Calcium
	Chromium
	Cobalt
	Copper
	Iron
	Lead
	Lithium
	Magnesium
	Manganese
	Molybdenum
	Nickel
	Phosphorus
	Potassium
	Selenium
	Silicon

	Silver
	Sodium
	Strontium
	Tin
	Titanium
	Total and Dissolved Metals
	Total and Dissolved Metals
	Total and Dissolved Metals
	Tungsten
	Vanadium
	Zinc

Biosolids

MICROBIOLOGY (Biosolids)

Oil

CAM SOP-00328	Polychlorinated Biphenyls in Oil Samples (PCBs) by GC/ECD
	Aroclor-1016
	Aroclor-1221
	Aroclor-1232
	Aroclor-1242
	Aroclor-1248
	Aroclor-1254
	Aroclor-1260
	Aroclor-1262
	Aroclor-1268
	Total PCB
CAM SOP-00453	Mercury in Liquids, Soils, Swabs, Paint,Oil and Food by Cold Vapour A.A.

Paint

CAM SOP 00408	ICP OES-Metals in Air, Waters, Foods, Swabs, Solids, Paint and Sludge
	Aluminum
	Arsenic
	Barium
	Beryllium
	Bismuth

	Cadmium
	Calcium
	Chromium
	Cobalt
	Copper
	Lead
	Magnesium
	Manganese
	Nickel
	Potassium
	Sodium
	Strontium
	Sulfur
	Vanadium
	Zinc
CAM SOP-00453	Mercury in Liquids, Soils, Swabs, Paint and Food by Cold Vapour A.A.

Solids

(Soil, Sediment, other environmental solids)

BRL SOP-00217	1,4 Dioxane in Water and Soil using Isotope Dilution by GCMS
BRL SOP-00406	Dioxins and Furans by HRGC HRMS in Water and Soil (Modified EPA SW846 8290)
	1,2,3,4,6,7,8,9-C18-Dibenzofuran
	1,2,3,4,6,7,8,9-C18-Dibenzo-p-dioxin
	1,2,3,4,6,7,8-C17-Dibenzofuran
	1,2,3,4,6,7,8-C17-Dibenzo-p-dioxin
	1,2,3,4,7,8,9-C17-Dibenzofuran
	1,2,3,4,7,8-C16-Dibenzofuran
	1,2,3,4,7,8-C16-Dibenzo-p-dioxin
	1,2,3,6,7,8-C16-Dibenzofuran
	1,2,3,6,7,8-C16-Dibenzo-p-dioxin
	1,2,3,7,8,9-C16-Dibenzofuran
	1,2,3,7,8,9-C16-Dibenzo-p-dioxin
	1,2,3,7,8-C15-Dibenzofuran
	1,2,3,7,8-C15-Dibenzo-p-dioxin
	2,3,4,6,7,8-C16-Dibenzofuran
	2,3,4,7,8-C15-Dibenzofuran

	2,3,7,8-C14-Dibenzofuran
	2,3,7,8-C14-Dibenzo-p-dioxin
	H6CDD
	H6CDF
	H7CDD
	H7CDF
	O8CDD
	O8CDF
	P5CDD
	P5CDF
	PCDD
	PCDF
	T4CDD
	T4CDF
BRL SOP-00408	PCB Congener (209 Analytes) by HRGC HRMS in Water, Soil and Air (Modified EPA 1668A)
CAM SOP-00460	Determination of Nitrogen in Soil/Sediment by Combustion
CAM SOP 00307, CAM SOP 00317 CAM SOP 00309	Organochlorine Pesticides and PCBs in Solids, Water and Biological Materials by GC-ECD, Polychlorinated Biphenyls (PCBs) as Aroclors in Solid, Water, and Biological Samples by GC-ECD, and Neutral Chlorinated Hydrocarbons in Solid and Water by GC/ECD
	1,2,3,4-Tetrachlorobenzene
	1,2,3,5-Tetrachlorobenzene
	1,2,4,5-Tetrachlorobenzene
	1,2,4-Trichlorobenzene
	1,3,5-Trichlorobenzene
	2,4,5-Trichlorotoluene
	a-BHC
	a-Chlordane
	Aldrin
	Aroclor 1016
	Aroclor 1221
	Aroclor 1232
	Aroclor 1242
	Aroclor 1248
	Aroclor 1254
	Aroclor 1260
	Aroclor 1262
	Aroclor 1268
	b-BHC
	d-BHC

	Dieldrin
	Endosulfan I
	Endosulfan II
	Endosulfan Sulfate
	Endrin
	g-Chlordane
	Heptachlor
	Heptachlor Epoxide
	Hexachlorobenzene
	Hexachlorobutadiene
	Hexachlorocyclopentadiene
	Hexachloroethane
	Lindane
	Methoxychlor
	Mirex
	o,p' DDD
	o,p' DDE
	o,p'-DDT
	Octachlorostyrene
	Oxychlordane
	p,p'-DDD
	p,p'-DDE
	p,p'-DDT
	Pentachlorobenzene
	Total PCB
	Toxaphene
CAM SOP 00310	The Determination of Formaldehyde in Water and Soil by HPLC
CAM SOP 00449	Fluoride in Waters, Soil, Air, and Vegetation, by ISE
CAM SOP 00463	Determination of Chloride in Water and Soil by MicroColourimetry
CAM SOP 00464	Sulphate Determination in Water and Soils by Automated Turbidimetry
CAM SOP-00226	Volatile Organic Compounds by Purge and Trap GC/MS in Water, Leachates and Soil
	1,1,1,2-Tetrachloroethane
	1,1,1-Trichloroethane
	1,1,2,2-Tetrachloroethane
	1,1,2-Trichloroethane
	1,1-dichloroethane
	1,1-Dichloroethene
	1,2-Dibromoethane

	1,2-Dichlorobenzene
	1,2-Dichloroethane
	1,2-Dichloropropane
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	2-Hexanone
	Acetone
	Benzene
	Bromodichloromethane
	Bromoform
	Bromomethane
	Carbon Tetrachloride
	Chlorobenzene
	Chloroethane
	Chloroform
	Chloromethane
	cis-1,2-Dichloroethene
	cis-1,3-Dichloropropene
	Dibromochloromethane
	Dichlorodifluoromethane
	Dichloroethane
	Ethylbenzene
	Hexane
	m/p-xylene
	Methyl Ethyl Ketone
	Methyl Isobutyl Ketone
	Methyl Tertbutyl Ether
	o-xylene
	Styrene
	Tetrachloroethene
	Toluene
	trans-1,2-Dichloroethene
	trans-1,3-Dichloropropene
	Trichloroethene
	Trichlorofluoromethane
	Vinyl Chloride
CAM SOP-00228	Volatile Organic Compounds by Headspace GC/MS in Water and Soil
	1,1,1,2-Tetrachloroethane
	1,1,1-Trichloroethane
	1,1,2,2-Tetrachloroethane

1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
2-Hexanone
3-Dichlorobenzene
Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethene
cis-1,3-Dichloropropene
Dibromochloromethane
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Hexane
m/p-xylene
Methyl Ethyl Ketone
Methyl Isobutyl Ketone
Methyl Tertbutyl Ether
o-xylene
Styrene
Tetrachloroethene
Toluene
trans-1,2-Dichloroethene
trans-1,3-Dichloropropene
Trichloroethene
Trichlorofluoromethane
Vinyl Chloride

CAM SOP-00230

Volatile Organic Compounds (VOCs) and F1 Hydrocarbons In Solid and GC/MS/FID

1,1,1 Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethylene
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dibromochloromethane
Dichlorodifluoromethane
Ethylbenzene
Ethylene dibromide
F1(C6-C10)
Hexane
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl t-butyl ether
Methylene chloride
m-Xylene
o-Xylene
p-Xylene
Styrene
Tetrachloroethylene

	Toluene
	trans-1,2-Dichloroethylene
	trans-1,3-Dichloropropene
	Trichloroethylene
	Trichlorofluoromethane
CAM SOP-00301	Determination of Semivolatile Organics (Acid / Base Neutral Extractables) in Solid And Aqueous Samples Using GC/MS operating under both the Full Scan and Selected Ion Monitoring (SIM) Modes
	1,2,4-Trichlorobenzene
	1,2-Dichlorobenzene
	1,2-Diphenylhydrazine
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	1-Methylnaphthalene
	2,3,4,5-Tetrachlorophenol
	2,3,4,6-Tetrachlorophenol
	2,3,4-Trichlorophenol
	2,3,5,6-Tetrachlorophenol
	2,3,5-Trichlorophenol
	2,3,6-Trichlorophenol
	2,3-Dichlorophenol
	2,4,5-Trichlorophenol
	2,4,6-Trichlorophenol
	2,4-Dichloro Phenol
	2,4-Dimethyl Phenol
	2,4-Dinitrophenol
	2,4-Dinitrotoluene
	2,5-Dichlorophenol
	2,6-Dichlorophenol
	2,6-Dinitrotoluene
	2-Chloronaphthalene
	2-Chlorophenol
	2-Methylnapthalene
	2-Nitrophenol
	3,3'-Dichlorobenzidene
	3,4,5-Trichlorophenol
	3,4-Dichlorophenol
	3,5-Dichlorophenol
	3-Chlorophenol

4,6-Dinitro-O-Cresol
4-Bromophenyl Phenyl Ether
4-Chloroaniline
4-Chlorophenol
4-Chlorophenyl Phenyl Ether
4-Nitrophenol
Acenaphthene
Acenaphthylene
Amytryne
Anthracene
Atrazine
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (e) pyrene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Biphenyl
Bis (2-Chloro Ethoxy) Methane
Bis (2-Chloro Ethyl) Ether
Bis (2-Chloro Isopropyl) Ether
Bis (2-ethylhexyl) Phthaltate
Butyl Benzyl Phthalate
Chrysene
Cyanazine
Diazinon
Dibenzo (a,h) anthracene
Diethyl Phthalate
Dimethyl Phthalate
Di-n-Butylphthalate
Di-n-Octylphthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1,2,3 - cd) pyrene
Isophorone
m/p-cresol

	Malathion
	Metribuzin
	Naphthalene
	Nitrobenzene
	N-Nitrosodimethylamine
	N-Nitroso-Di-N Propyl Amine
	N-Nitroso-Diphenylamine/Diphenylamine
	o-Cresol
	Parathion Ethyl
	Parathion Methyl
	P-Chloro-M-Cresol
	pentachlorobenzene
	Pentachloro-phenol
	Phenanthrene
	Phenol
	Prometon
	Prometryn
	Prometryne
	Propazine
	Pyrene
	Quinoline
	Simazine
	Simetryn
	Terbutryn
CAM SOP-00315	Determination of CCME C6-C10 Hydrocarbons (F1) and BTEX in Soil and Water by Headspace-GC/MS/FID BTEX (Benzene, Toluene, Ethylbenzene, Xylenes) F1: C6-C10
CAM SOP-00316	The Determination of CCME Extractable Petroleum Hydrocarbons (F2-4) in Water and Soil by GC-FID F2: C10-C16 F3: C16-C34 F4: C34-C50 F4G
CAM SOP-00318	Determination Of Polynuclear Aromatic Hydrocarbons (PAHs) In Solid And Water Samples Using Selected Ion Monitoring (SIM) GCMS
	1-methylnaphthalene
	2-methylnaphthalene
	Acenaphthene
	Acenaphthylene

	Anthracene
	Benzo (a) anthracene
	Benzo (a) pyrene
	Benzo (b,j) fluoranthene
	Benzo (g,h,i) perylene
	Benzo (k) fluoranthene
	Chrysene
	Dibenzo (a,h) anthracene
	Fluoranthene
	Fluorene
	Indeno (1,2,3-cd) pyrene
	Naphthalene
	Phenanthrene
	Pyrene
CAM SOP-00320	The Determination of Nitroaromatics and Nitramines in Water and Soil Samples by HPLC
	1,3,5-Trinitrobenzene
	1,3-Dinitrobenzene
	2,4,6-Trinitrotoluene
	2,4-Dinitrotoluene
	2,6-Dinitrotoluene
	2-Amino-4,6-dinitrotoluene
	2-Nitrotoluene
	3,5-Dinitroaniline
	3-Nitrotoluene
	4-Amino-2,6-dinitrotoluene
	4-Nitrotoluene
	Hexahydro-1,3,5-trinitro-1,3,5-triazine
	Methyl-2,4,6-trinitrophenylnitramine
	Nitrobenzene
	Nitroglycerin
	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
	Pentaerythritol tetranitrite (PETN)
CAM SOP-00322	The Determination of Propylene Glycol, Ethylene Glycol and Diethylene Glycol in Liquids, Oils and solids by GC FID
	Diethylene Glycol
	Ethylene Glycol
	Propylene Glycol
CAM SOP-00323	Total Petroleum Hydrocarbons Soxhlet Extraction Method for Soil Sample

CAM SOP-00324	Oil and Grease Soxhlet Extraction Method for Soil Sample
CAM SOP-00330	Determination of Phenoxy Acid Herbicides and related compounds in Aqueous and Solid Samples Using Selected Ion Monitoring (SIM) GC/MS
	2,4,5-T
	2,4,5-TP
	2,4-D
	2,4-DB
	2,4-DP (dichlorprop)
	3,5-dichlorobenzoic acid
	Acifluorfen
	Bentazon
	Chloramben
	DCPA Diacid
	Dicamba
	Dinoseb (DNBP)
	MCPA
	MCPP
	Pentachlorophenol
	Picloram
CAM SOP-00332	Determination of Chlorinated Phenols in Soil and Water Using Selected Ion Monitoring (SIM) GC/MS
	2,3,4,5-Tetrachlorophenol
	2,3,4,6-Tetrachlorophenol
	2,3,4-Trichlorophenol
	2,3,5,6-Tetrachlorophenol
	2,3,5-Trichlorophenol
	2,3,6-Trichlorophenol
	2,3-Dichlorophenol
	2,4,5-Trichlorophenol
	2,4,6-Trichlorophenol
	2,4-Dichlorophenol
	2,4-Dimethylphenol
	2,4-Dinitrophenol
	2,5-Dichlorophenol
	2,6-Dichlorophenol
	2-Chlorophenol
	2-Nitrophenol
	3,4,5-Trichlorophenol
	3,4-Dichlorophenol

	3,5-Dichlorophenol
	4,6-Dinitro-2-methylphenol
	4-Chloro-3-Methylphenol
	4-Chlorophenol
	4-Nitrophenol
	m/p-Cresol
	o-Cresol
	Pentachlorophenol
	Phenol
CAM SOP-00333	Determination of Selected Pesticides in Soil by LC/MS/MS
	Atrazine
	Bromacil
	Desethyl-atrazine
	Diuron
	Linuron
	Simazine
	Tebuthiuron
CAM SOP-00408	ICP OES- Metals in Air, Waters, Foods, swabs, Solids, Paint and Sludge
	Aluminum
	Antimony
	Arsenic
	Barium
	Beryllium
	Bismuth
	Boron
	Cadmium
	Calcium
	Chromium
	Cobalt
	Copper
	Iron
	Lead
	Lithium
	Magnesium
	Manganese
	Molybdenum
	Nickel
	Phosphorus
	Potassium

	Selenium
	Silicon
	Silver
	Sodium
	Strontium
	Sulphur
	Thallium
	Tin
	Titanium
	Vanadium
	Zinc
CAM SOP-00413	Measurement of pH in Water, Soils and Food Samples
CAM SOP-00414	Electrical Conductivity in Waters and Sludge, Soil Extracts
CAM SOP-00432	Ignitability of Solids
CAM SOP-00435	Anions in Soil, Water and Air by Ion Chromatography
	Bromide
	Chloride
	Fluoride
	Nitrate
	Nitrite (NO2)
	PO4
	Sulfate
CAM SOP-00436	Hexavalent Chromium by IC in Water and Soil
CAM SOP-00440	Nitrate, Nitrite and TON in Waters, Solids, Sludge and Food by FIA
	Nitrate
	Nitrite
CAM SOP-00441	Ammonia in Waters Biosolids and Soil Samples by Colourimetry
	Ammonia
CAM SOP-00444	Analysis of Phenolics in Water and Soil Colorimetric Automated 4-AAP
	Phenolics
CAM SOP-00445	Determination of Moisture Content Solids by Gravimetry
CAM SOP-00447	ICPMS Metals in Waters, Foods, Solids and Biota
	Total and Dissolved Metals
	Aluminum
	Antimony
	Arsenic
	Barium
	Beryllium
	Bismuth

	Boron
	Cadmium
	Calcium
	Chromium
	Cobalt
	Copper
	Iron
	Lead
	Lithium
	Magnesium
	Manganese
	Mercury
	Molybdenum
	Nickel
	Phosphorus
	Potassium
	Selenium
	Silver
	Sodium
	Strontium
	Tellurium
	Thallium
	Thorium
	Tin
	Titanium
	Tungsten
	Uranium
	Vanadium
	Zinc
	Zirconium
CAM SOP-00453	Mercury in Liquids, Soils, Swabs, Paint and Food by Cold Vapour A.A.
CAM SOP-00454	TKN Determination in Waters, Solids, Sludge by Colourimetry (FIA)
	Total Kjeldahl Nitrogen
CAM SOP-00457	Analysis of Cyanide in Liquids and Solids by Colourimetry
	Cyanide (SAD)
	Free Cyanide
CAM SOP-00461	Analysis of Ortho-Phosphate in Water and Soil by Micro-Colourimetry
	Phosphate

CAM SOP-00467	Particle Size Distribution Sieve Analysis in Soil
CAM SOP-00468	TOC and TC in Solids by Furnace Combustion
	Total Carbon
	Total Organic Carbon
CAM SOP-00894	Determination of Perfluorinated Compounds in Water and Soil By LC-MS-MS
	PFBS (Perfluorobutanesulfonate)
	PFHxS (Perfluorohexanesulfonate)
	6:2FTS (6:2 Fluorotelomersulfonate)
	8:2FTS (8:2 Fluorotelomersulfonate)
	EtFOSA (N-ethylperfluorooctanesulfonamide)
	EtFOSAA (N-ethylperfluorooctanesulfonamidoacetic acid)
	EtFOSE (N-ethylperfluorooctanesulfonamidoethanol)
	MeFOSA (N-methylperfluorooctanesulfonamide)
	MeFOSAA (N-methylperfluorooctanesulfonamidoacetic acid)
	MeFOSE (N-methylperfluorooctanesulfonamidoethanol)
	PFBA (Perfluorobutanoic acid)
	PFDA (Perfluorodecanoic acid)
	PFDoA (Perfluorododecanoic acid)
	PFDS (Perfluorodecanesulfonate)
	PFHpA (Perfluoroheptanoic acid)
	PFHpS (Perfluoroheptanesulfonate)
	PFHxA (Perfluorohexanoic acid)
	PFNA (Perfluorononanoic acid)
	PFOA (Perfluoro-n-Octanoic Acid)
	PFOS (Perfluoro-1-Octanesulfonate)
	PFOSA (Perfluorooctanesulfonamide)
	PFPeA (Perfluoropentanoic acid)
	PFTeDA (Perfluorotetradecanoic acid)
	PFTrDA (Perfluorotridecanoic acid)
	PFUnA (Perfluoroundecanoic acid)

(SWABS)

CAM SOP 00734	Allergens in Foods and Swabs, Mycotoxin in Food using ELISA
CAM SOP-00309	Polychlorinated Biphenyls (PCBs) as Aroclors in Solid, Water, and Biological Samples by GC-ECD
	Aroclor 1016
	Aroclor 1221
	Aroclor 1232

	Aroclor 1242
	Aroclor 1248
	Aroclor 1254
	Aroclor 1260
	Aroclor 1262
	Aroclor 1268
CAM SOP-00408	ICP OES- Metals in Air, Waters, Foods, swabs, Solids, Paint and Sludge
	Aluminum
	Antimony
	Arsenic
	Barium
	Beryllium
	Bismuth
	Boron
	Cadmium
	Calcium
	Chromium
	Cobalt
	Copper
	Iron
	Lead
	Magnesium
	Manganese
	Molybdenum
	Nickel
	Phosphorus
	Potassium
	Selenium
	Silver
	Sodium
	Strontium
	Sulphur
	Tin
	Titanium
	Vanadium
	Zinc

Waste
(Leachates)

BRL SOP-00400	Nitrosamines Analysis in Water and Soil by HRGC HRMS
	N−Nitroso−di−n−butylamine
	N−Nitroso−di−n−propylamine
	N−Nitrosodiethylamine
	N−Nitrosodimethylamine
	N−Nitrosoethylmethylamine
	N−Nitrosomorpholine
	N−Nitrosopiperidine
	N−Nitrosopyrrolidine
BRL SOP-00410	Dioxin and Furans in Water, Leachates, Soil, Food and Biota by HRGC HRMS (EPA 1613)
	1,2,3,4,6,7,8,9-Cl8-Dibenzofuran
	1,2,3,4,6,7,8,9-Cl8-Dibenzo-p-dioxin
	1,2,3,4,6,7,8-Cl7-Dibenzofuran
	1,2,3,4,6,7,8-Cl7-Dibenzo-p-dioxin
	1,2,3,4,7,8,9-Cl7-Dibenzofuran
	1,2,3,4,7,8-Cl6-Dibenzofuran
	1,2,3,4,7,8-Cl6-Dibenzo-p-dioxin
	1,2,3,6,7,8-Cl6-Dibenzofuran
	1,2,3,6,7,8-Cl6-Dibenzo-p-dioxin
	1,2,3,7,8,9-Cl6-Dibenzofuran
	1,2,3,7,8,9-Cl6-Dibenzo-p-dioxin
	1,2,3,7,8-Cl5-Dibenzofuran
	1,2,3,7,8-Cl5-Dibenzo-p-dioxin
	2,3,4,6,7,8-Cl6-Dibenzofuran
	2,3,4,6,7,8-Cl6-Dibenzofuran
	2,3,4,7,8-Cl5-Dibenzofuran
	2,3,7,8-Cl4-Dibenzofuran
	2,3,7,8-Cl4-Dibenzo-p-dioxin
	H6CDD
	H6CDF
	H7CDD
	H7CDF
	O8CDD
	O8CDF
	P5CDD
	P5CDF
	PCDD
	PCDF

	T4CDD
	T4CDF
CAM SOP-00226	Volatile Organic Compounds by Purge and Trap GC/MS in Water, Leachates and Soil
	1,1,1,2-Tetrachloroethane
	1,1,1-Trichloroethane
	1,1,2,2-Tetrachloroethane
	1,1,2-Trichloroethane
	1,1-dichloroethane
	1,1-Dichloroethene
	1,2-Dibromoethane
	1,2-Dichlorobenzene
	1,2-Dichloroethane
	1,2-Dichloropropane
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	2-Hexanone
	Acetone
	Benzene
	Bromodichloromethane
	Bromoform
	Bromomethane
	Carbon Tetrachloride
	Chlorobenzene
	Chloroethane
	Chloroform
	Chloromethane
	cis-1,2-Dichloroethene
	cis-1,3-Dichloropropene
	Dibromochloromethane
	Dichlorodifluoromethane
	Dichloroethane
	Ethylbenzene
	Hexane
	m/p-xylene
	Methyl Ethyl Ketone
	Methyl Isobutyl Ketone
	Methyl Tertbutyl Ether
	o-xylene
	Styrene

	Tetrachloroethene
	Toluene
	trans-1,2-Dichloroethene
	trans-1,3-Dichloropropene
	Trichloroethene
	Trichlorofluoromethane
	Vinyl Chloride
CAM SOP-00228	Volatile Organic Compounds by Headspace GC/MS in Water, Leachates and Soil
	1,1,1,2-Tetrachloroethane
	1,1,1-Trichloroethane
	1,1,2,2-Tetrachloroethane
	1,1,2-Trichloroethane
	1,1-dichloroethane
	1,1-Dichloroethene
	1,2-Dibromoethane
	1,2-Dichlorobenzene
	1,2-Dichloroethane
	1,2-Dichloropropane
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	2-Hexanone
	Acetone
	Benzene
	Bromodichloromethane
	Bromoform
	Bromomethane
	Carbon Tetrachloride
	Chlorobenzene
	Chloroethane
	Chloroform
	Chloromethane
	cis-1,2-Dichloroethene
	cis-1,3-Dichloropropene
	Dibromochloromethane
	Dichlorodifluoromethane
	Dichloroethane
	Ethylbenzene
	Hexane
	m/p-xylene

	Methyl Ethyl Ketone Methyl Isobutyl Ketone Methyl Tertbutyl Ether o-xylene Styrene Tetrachloroethene Toluene trans-1,2-Dichloroethene trans-1,3-Dichloropropene Trichloroethene Trichlorofluoromethane
CAM SOP-00301	Determination of Semivolatile Organics (Acid / Base Neutral Extractables) in Solid And Aqueous Samples Using GC/MS operating under both the Full Scan and Selected Ion Monitoring (SIM) Modes Anthracene 1,2,4-Trichlorobenzene 1,2-Dichlorobenzene 1,2-Diphenylhydrazine 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1-Methylnaphthalene 2,3,4,5-Tetrachlorophenol 2,3,4,6-Tetrachlorophenol 2,3,4-Trichlorophenol 2,3,5,6-Tetrachlorophenol 2,3,5-Trichlorophenol 2,3,6-Trichlorophenol 2,3-Dichlorophenol 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol 2,4-Dichloro Phenol 2,4-Dimethyl Phenol 2,4-Dinitrophenol 2,4-Dinitrotoluene 2,5-Dichlorophenol 2,6-Dichlorophenol 2,6-Dinitrotoluene 2-Chloronaphthalene 2-Chlorophenol

2-Methylnapthalene
2-Nitrophenol
3,3'-Dichlorobenzidene
3,4,5-Trichlorophenol
3,4-Dichlorophenol
3,5-Dichlorophenol
3-Chlorophenol
4,6-Dinitro-O-Cresol
4-Bromophenyl Phenyl Ether
4-Chloroaniline
4-Chlorophenol
4-Chlorophenyl Phenyl Ether
4-Nitrophenol
Acenaphthene
Acenaphthylene
Amytryne
Atrazine
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (e) pyrene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Biphenyl
Bis (2-Chloro Ethoxy) Methane
Bis (2-Chloro Ethyl) Ether
Bis (2-Chloro Isopropyl) Ether
Bis (2-ethylhexyl) Phthaltate
Butyl Benzyl Phthalate
Chrysene
Cyanazine
Diazinon
Dibenzo (a,h) anthracene
Diethyl Phthalate
Dimethyl Phthalate
Di-n-Butylphthalate
Di-n-Octylphthalate
Fluoranthene
Fluorene
Pentachlorobenzene

	Hexachlorobenzene
	Hexachlorobutadiene
	Hexachlorocyclopentadiene
	Hexachloroethane
	Indeno (1,2,3 - cd) pyrene
	Isophorone
	m/p-cresol
	Malathion
	Metribuzin
	Naphthalene
	Nitrobenzene
	N-Nitrosodimethylamine
	N-Nitroso-Di-N Propyl Amine
	N-Nitroso-Diphenylamine/Diphenylamine
	o-Cresol
	Parathion Ethyl
	Parathion Methyl
	P-Chloro-M-Cresol
	Pentachloro-phenol
	Phenanthrene
	Phenol
	Prometon
	Prometryn
	Prometryne
	Propazine
	Pyrene
	Quinoline
	Simazine
	Simetryn
	Terbutryn
CAM SOP-00305	Analysis of Glyphosate in Water, Leachates and Soil by HPLC
CAM SOP-00306	Analysis of Diuron, Guthion, and Temephos in Water by HPLC
	Diuron
	Guthion (azinphos-methyl)
	Temephos
CAM SOP-00307, CAM SOP-00309, CAM SOP-00317	Organochlorine Pesticides and PCBs in Solids, Water and Biological Materials by GC-ECD, Polychlorinated Biphenyls (PCBs) as Aroclors in Solid, Water, and Biological Samples by GC-ECD, and Neutral Chlorinated Hydrocarbons in Solid and Water by GC/ECD
	1,2,3,4-Tetrachlorobenzene
	1,2,3,5-Tetrachlorobenzene

1,2,4,5-Tetrachlorobenzene
1,2,4-Trichlorobenzene
1,3,5-Trichlorobenzene
2,4,5-Trichlorotoluene
a-BHC
a-Chlordane
Aldrin
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Aroclor 1262
Aroclor 1268
b-BHC
d-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
g-Chlordane
Heptachlor
Heptachlor Epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Lindane
Methoxychlor
Mirex
o,p' DDD
o,p' DDE
o,p'-DDT
Octachlorostyrene
Oxychlordane
p,p'-DDD
p,p'-DDE

	p,p'-DDT
	Pentachlorobenzene
	Total PCB
CAM SOP-00315	Determination of CCME C6-C10 Hydrocarbons (F1) and BTEX in Soil and Water by Headspace-GC/MS/FID
	BTEX (Benzene, Toluene, Ethylbenzene, Xylenes)
	F1: C6-C10
CAM SOP-00316	The Determination of CCME Extractable Petroleum Hydrocarbons (F2-4) in Water and Soil by GC-FID
	F2: C10-C16
	F3: C16-C34
	F4: C34-C50
	F4G
CAM SOP-00318	Determination Of Polynuclear Aromatic Hydrocarbons (PAHs) In Solid And Water Samples Using Selected Ion Monitoring (SIM) GCMS
	1-methylnaphthalene
	2-methylnaphthalene
	Acenaphthene
	Acenaphthylene
	Anthracene
	Benzo (a) anthracene
	Benzo (a) pyrene
	Benzo (b,j) fluoranthene
	Benzo (g,h,i) perylene
	Benzo (k) fluoranthene
	Chrysene
	Dibenzo (a,h) anthracene
	Fluoranthene
	Fluorene
	Indeno (1,2,3-cd) pyrene
	Naphthalene
	Phenanthrene
	Pyrene
CAM SOP-00327	Analysis of Diquat and Paraquat in Water by HPLC-UV Detector Using Aqueous Ionic Mobile Phase
	Diquat
	Paraquat
CAM SOP-00411	Nitrilotriacetic Acid (NTA) in Water by UV-Vis Spectroscopy
CAM SOP-00440	Nitrate, Nitrite and TON in Waters, Solids, Sludge and Food by FIA
	Nitrate
	Nitrite

CAM SOP-00447	ICPMS Metals in Waters, Foods, Solids, Swabs and Biota Aluminum Arsenic Barium Boron Cadmium Calcium Chromium Copper Iron Lead Magnesium Manganese Nickel Phosphorus Potassium Selenium Sodium Tin Titanium Zinc
CAM SOP-00449	Fluoride in Waters, Soil, Air and Vegetation by ISE. Fluoride
CAM SOP-00453	Mercury in Liquids, Soils, Swabs, Paint and Food by Cold Vapour A.A.
CAM SOP-00457	Analysis of Cyanide in Liquids and Solids by Colourimetry Cyanide (SAD) Free Cyanide

Water (Inorganic)

CAM SOP 00463 (OSDWA)	Determination of Chloride in Water and Soil by MicroColourimetry
CAM SOP 00464 (OSDWA)	Sulphate Determination in Water and Soils by Automated Turbidimetry
CAM SOP-00326 **(OSDWA)**	Determination of Total Oil and Grease, Petroleum Hydrocarbons (heavy), Mineral Oil and Grease and Animal and Vegetable Oil and Grease in Water by Gravimetry

	Mineral, Animal and Vegetable Oil and Grease
	Petroleum Hydrocarbons (Heavy - F4G)
	Total Oil and Grease
CAM SOP-00407	Determination of Phosphorus(all forms) in Waters by Colorimetry (FIA)
	Hydrolysed phosphorus
	Ortho-phosphate **(OSDWA)**
	Total Phosphorus **(OSDWA)**
CAM SOP-00408	ICP OES-Metals in Air, Waters, Foods, Swabs, Solids, Paint and Sludge
	Aluminum
	Antimony
	Arsenic
	Barium
	Beryllium
	Bismuth
	Boron
	Cadmium
	Calcium
	Chromium
	Cobalt
	Copper
	Iron
	Lead
	Magnesium
	Manganese
	Molybdenum
	Nickel
	Phosphorus
	Potassium
	Selenium
	Silicon
	Silver
	Sodium
	Strontium
	Sulfur
	Thallium
	Tin
	Uranium
	Vanadium

	Zinc
	Zirconium
CAM SOP-00409	Colourimetric Determination of Ferrous Iron in Water
CAM SOP-00410 **(OSDWA)**	Colorimetric Determination of Tannin and Lignin in liquid samples
CAM SOP-00411 (OSDWA)	Nitrilotriacetic Acid (NTA) in Water by UV-Vis Spectroscopy
CAM SOP-00412 **(OSDWA)**	Spectrophotometric Determination of Colour in Water Samples
	Color
CAM SOP-00413 **(OSDWA)**	Measurement of pH in Water, Soils and Food Samples
CAM SOP-00414 **(OSDWA)**	Electrical Conductivity in Waters and Sludge, Soil Extracts
CAM SOP-00416 **(OSDWA)**	COD in Water by Colorimetry
	COD (Chemical Oxygen Demand)
CAM SOP-00417 **(OSDWA)**	Turbidity in Water by Nephelometry
	Turbidity
CAM SOP-00425	Determination of Free or Total Chlorine in Water by HACH Colorimetry
	Free chlorine
	Total chlorine
CAM SOP-00427 **(OSDWA)**	Determination of Biochemical Oxygen Demand in Waters by D.O. Meter
	BOD (5 day)
	CBOD (5 day)
	Dissolved Oxygen
CAM SOP-00428 **(OSDWA)**	Determination of Solids in Water, Solid and Semisolid (biosolid, sludge) Samples by Gravimetry
	Fixed and Volatile Solids
	Total Dissolved Solids
	Total Suspended Solids
CAM SOP-00431 (OSDWA)	Organic Acids in Water by Ion Chromatography
	Acetic Acid
	Butyric Acid
	Formic Acid
	Propionic Acid
CAM SOP-00433 **(OSDWA)**	Determination of Inorganic Carbon in Water by IR Detection

	DIC - Dissolved Inorganic Carbon TIC-Total Inorganic Carbon
CAM SOP-00435 **(OSDWA)**	Anions in Food, Soil, Water and Air by Ion Chromatography
	Bromide Chloride Sulfate
CAM SOP-00436 **(OSDWA)**	Hexavalent Chromium by IC in Water and Soil
	Hexavalent Chromium (CrVI)
CAM SOP-00440 **(OSDWA)**	Nitrite, Nitrate and TON in Waters, Solids, Sludge and Food by FIA
	Nitrate plus Nitrite Nitrite
CAM SOP-00441 **(OSDWA)**	Ammonia in Waters Biosolids and Soil Samples by Colourimetry
	Ammonia
CAM SOP-00444 **(OSDWA)**	Analysis of Phenolics in Water and Soil-Colorimetric Automated 4-AAP
	Total Phenolics
CAM SOP-00446 **(OSDWA)**	Organic Carbon Analysis in Waters by Combustion and IR Detection
	DOC – Dissolved Organic Carbon TOC – Total Organic Carbon
CAM SOP-00447 **(OSDWA)**	ICPMS Metals in Waters, Foods, Solids and Biota Metals
	Aluminum Antimony Arsenic Barium Beryllium Bismuth Boron Cadmium Calcium Chromium Cobalt Copper Iron Lead Lithium

	Magnesium
	Manganese
	Molybdenum
	Nickel
	Potassium
	Selenium
	Silicon
	Silver
	Sodium
	Strontium
	Tellurium
	Thallium
	Thorium
	Tin
	Titanium
	Tungsten
	Uranium
	Vanadium
	Zinc
	Zirconium
CAM SOP-00448 **(OSDWA)**	Alkalinity in Waters by PC-Titrate.
	Alkalinity (pH 4.5)
CAM SOP-00449 **(OSDWA)**	Fluoride in Waters, Soil, Air and Vegetation by ISE
CAM SOP-00451 **(OSDWA)**	Determination of Perchlorate in Water and Soil by LC/MS/MS
CAM SOP-00453 **(OSDWA)**	Mercury in Liquids, Soils, Swabs, Paint and Food by Cold Vapour A.A.
CAM SOP-00455 **(OSDWA)**	Sulphide Determination in Water by Ion Selective Electrode
CAM SOP-00457 (OSDWA)	Analysis of Cyanide in Liquids and Solids by Colourimetry
	Cyanide (SAD)
	Free Cyanide
CAM SOP-00458	Measurement of Total Residual Chlorine in Water by Amperometric Titration
CAM SOP-00459 (OSDWA)	UV Transmittance (Percent T) at 254 nm in Water and Wastewater by UV-VIS Spectroscopy
	% Transmittance
CAM SOP-00461	Analysis of Ortho-Phosphate in Water and Soil by Micro-Colourimetry

(OSDWA)	
CAM SOP-00473	Colourimetric Determination of Thiocyanate in Liquid Samples
CAM SOP-00938 **(OSDWA)**	Total Kjeldahl Nitrogen in Waters (TKN) from Colorimetric TN and NO2/NO3 Total Nitrogen (TN) NO2/NO3

Water (Microbiology)

CAM SOP-00508 **(OSDWA)**	Enumeration of Pseudomonas Aeruginosa in Water with the Membrane Filtration Technique Pseudomonas Aeruginosa
CAM SOP-00511	Enumeration of Fecal Streptococcus and Enterococcus in Water with the Membrane Filtration Technique Enterococcus Fecal Streptococcus **(OSDWA)**
CAM SOP-00512	Heterotrophic Plate Count in Water and Wastewater using the Pour Plate and Membrane Filtrations Techniques Heterotrophic Plate Count (HPC) **(OSDWA)** Heterotrophic Plate Count (MF)
CAM SOP-00514 **(OSDWA)**	Detection of Coliforms, Fecal Coliforms, E.coli, in Water with the Presence/Absence Technique Escherichia coli (E. coli) Fecal Coliforms Total Coliforms
CAM SOP-00551 **(OSDWA)**	Enumeration of Coliform and E.coli in Potable Water Using Membrane Filtration and DC Agar Background Escherichia coli (E. coli) Total Coliforms
CAM SOP-00552	Enumeration of Coliform, Fecal Coliform and E.coli in Water and Environmental Samples Using Mendo, mFC-RA and mFC-BCIG Agar and of E.coli in Biosolids using mFC-BCIG Agar Background Counts Escherichia coli (E. coli) Fecal Coliforms **(OSDWA)** Total Coliforms
CAM SOP-00581	Detection of Coliforms and E.coli in Water by Presence/Absence Technique by using LMX Broth Escherichia coli (E. coli) Total Coliforms

Water (Organic)

BRL SOP-00217 **(OSDWA)**	1,4-Dioxane in Water and Soil Using Isotope Dilution by GCMS
BRL SOP-00400 **(OSDWA)**	Nitrosamines Analysis in Water and Soil by HRGC HRMS
	N−Nitrosodiethylamine
	N−Nitrosodimethylamine
	N−Nitrosoethylmethylamine
	N−Nitrosomorpholine
	N−Nitrosopiperidine
	N−Nitrosopyrrolidine
	N-Nitroso-di-n-butylamine
	N-Nitroso-di-n-propylamine
BRL SOP-00408 **(OSDWA)**	PCB Congener (209 Analytes) by HRGC HRMS in Water, Soil and Air (Modified EPA 1668A)
	209 Congeners
BRL SOP-00410	Dioxin and Furans in Water, Leachates, Soil, Food and Biota by HRGC HRMS (EPA 1613)
	1,2,3,4,6,7,8,9-Cl8-Dibenzofuran
	1,2,3,4,6,7,8,9-Cl8-Dibenzo-p-dioxin
	1,2,3,4,6,7,8-Cl7-Dibenzofuran (OSDWA)
	1,2,3,4,6,7,8-Cl7-Dibenzo-p-dioxin (OSDWA)
	1,2,3,4,7,8,9-Cl7-Dibenzofuran (OSDWA)
	1,2,3,4,7,8-Cl6-Dibenzofuran (OSDWA)
	1,2,3,4,7,8-Cl6-Dibenzo-p-dioxin (OSDWA)
	1,2,3,6,7,8-Cl6-Dibenzofuran (OSDWA)
	1,2,3,6,7,8-Cl6-Dibenzo-p-dioxin (OSDWA)
	1,2,3,7,8,9-Cl6-Dibenzofuran (OSDWA)
	1,2,3,7,8,9-Cl6-Dibenzo-p-dioxin (OSDWA)
	1,2,3,7,8-Cl5-Dibenzofuran (OSDWA)
	1,2,3,7,8-Cl5-Dibenzo-p-dioxin (OSDWA)
	2,3,4,6,7,8-Cl6-Dibenzofuran (OSDWA)
	2,3,4,7,8-Cl5-Dibenzofuran (OSDWA)
	2,3,7,8-Cl4-Dibenzofuran (OSDWA)
	2,3,7,8-Cl4-Dibenzo-p-dioxin (OSDWA)
	H6CDD (OSDWA)
	H6CDF (OSDWA)
	H7CDD (OSDWA)
	H7CDF (OSDWA)
	O8CDD (OSDWA)

	O8CDF (OSDWA)
	P5CDD (OSDWA)
	P5CDF (OSDWA)
	PCDD (OSDWA)
	PCDF (OSDWA)
	T4CDD (OSDWA)
	T4CDF (OSDWA)
BRL SOP-00412 **(OSDWA)**	Geosmin and 2-MIB in Water by HRGC HRMS
	2-Methylisoborneol
	Geosmin
CAM SOP 00310 (OSDWA)	The Determination of Formaldehyde in Water and Soil by HPLC
CAM SOP-00219	Analysis of Dissolved Methane and Other Gases in Water by GC/FID Headspace
	Acetylene
	Carbon Dioxide
	Ethane
	Ethylene
	Methane (OSDWA)
	Propane
	Propylene
CAM SOP-00226	Volatile Organic Compounds by Purge and Trap GC/MS in Water and Soil
	1- Butanol (OSDWA)
	1,1,1,2-Tetrachloroethane (OSDWA)
	1,1,1-Trichloroethane (OSDWA)
	1,1,2,2-Tetrachloroethane (OSDWA)
	1,1,2-Trichloroethane (OSDWA)
	1,1,2-Trichlorotrifluoroethane (OSDWA)
	1,1-Dichloroethane (OSDWA)
	1,1-dichloroethylene (OSDWA)
	1,2,3 – Trichlorobenzene (OSDWA)
	1,2,3 – Trichloropropane (OSDWA)
	1,2,3 – Trimethylbenzene (OSDWA)
	1,2,4 – Trichlorobenzene (OSDWA)
	1,2,4 – Trimethylbenzene (OSDWA)
	1,2-dichlorobenzene (OSDWA)
	1,2-dichloroethane (OSDWA)
	1,2-Dichloropropane (OSDWA)
	1,3,5 – Trichlorobenzene (OSDWA)

1,3,5 – Trimethylbenzene (OSDWA)
1,3-Dichlorobenzene (OSDWA)
1,4-dichlorobenzene (OSDWA)
1-Propanol (OSDWA)
2-Butanol (OSDWA)
2-Chloroethyl vinyl ether (OSDWA)
2-Hexanone (OSDWA)
Acetaldehyde (OSDWA)
Acetone (2-Propanone) (OSDWA)
Acrolein (OSDWA)
Acrylonitrile (OSDWA)
Benzene (OSDWA)
Bromodichloromethane (OSDWA)
Bromoform (OSDWA)
Bromomethane (OSDWA)
Butyl acetate (OSDWA)
Butyl acrylate (OSDWA)
Carbon disulfide (OSDWA)
Carbon Tetrachloride (OSDWA)
Chlorobenzene (OSDWA)
Chlorodibromomethane (OSDWA)
Chloroethane (OSDWA)
Chloroform (OSDWA)
Chloromethane (OSDWA)
cis-1,2-Dichloroethylene (OSDWA)
cis-1,3-Dichloropropene (OSDWA)
Cyclohexane (OSDWA)
Dichlorodifluoromethane (OSDWA)
Dichloromethane (OSDWA)
Dicyclopentadiene
Diethyl ether (OSDWA)
Diisopropyl ether (OSDWA)
Ethanol (OSDWA)
Ethyl acetate (OSDWA)
Ethyl acrylate (OSDWA)
Ethylbenzene (OSDWA)
Ethylene dibromide (OSDWA)
Hexane (OSDWA)
Isobutanol (OSDWA)
Isopropanol (OSDWA)

	Isopropyl acetate (OSDWA) m/p-xylene (OSDWA) Methyl acetate (OSDWA) Methyl acrylate (OSDWA) Methyl Ethyl Ketone (OSDWA) Methyl isobutyl Ketone (OSDWA) Methyl methacrylate (OSDWA) Methyl t-butyl ether (OSDWA) Naphthalene (OSDWA) o-xylene (OSDWA) Propyl acetate (OSDWA) Styrene (OSDWA) Tert-Butanol (OSDWA) Tetrachloroethylene (OSDWA) Tetrahydrofuran (OSDWA) Toluene (OSDWA) trans-1,2-Dichloroethylene (OSDWA) trans-1,3-Dichloropropene (OSDWA) Trichloroethylene (OSDWA) Trichlorofluoromethane (OSDWA) Vinyl acetate (OSDWA) Vinyl Chloride (OSDWA)
CAM SOP-00228	Volatile Organic Compounds by Headspace GC/MS in Water and Soil (Headspace Analysis) 1- Butanol (OSDWA) 1,1,1,2-Tetrachloroethane (OSDWA) 1,1,1-Trichloroethane (OSDWA) 1,1,2,2-Tetrachloroethane (OSDWA) 1,1,2-Trichloroethane (OSDWA) 1,1,2-Trichlorotrifluoroethane 1,1-Dichloroethane (OSDWA) 1,1-dichloroethylene (OSDWA) 1,2,3 - Trichlorobenzene 1,2,3 - Trichloropropane 1,2,3 - Trimethylbenzene 1,2,4 - Trichlorobenzene 1,2,4 - Trimethylbenzene 1,2-dichlorobenzene (OSDWA) 1,2-dichloroethane (OSDWA)

1,2-Dichloropropane (OSDWA)
1,3,5 - Trichlorobenzene
1,3,5 - Trimethylbenzene
1,3-Dichlorobenzene (OSDWA)
1,4-dichlorobenzene (OSDWA)
1-Propanol
2-Butanol
2-Chloroethyl vinyl ether
2-Hexanone
Acetaldehyde
Acetone (2-Propanone) (OSDWA)
Acrolein
Acrylonitrile
Benzene (OSDWA)
Bromodichloromethane (OSDWA)
Bromoform (OSDWA)
Bromomethane (OSDWA)
Butyl acetate
Butyl acrylate
Carbon disulfide
Carbon Tetrachloride (OSDWA)
Chlorobenzene (OSDWA)
Chlorodibromomethane (OSDWA)
Chloroethane (OSDWA)
Chloroform (OSDWA)
Chloromethane (OSDWA)
cis-1,2-Dichloroethylene (OSDWA)
cis-1,3-Dichloropropene (OSDWA)
Cyclohexane
Dichlorodifluoromethane (OSDWA)
Dichloromethane (OSDWA)
Dicyclopentadiene
Diethyl ether
Diisopropyl ether
Ethanol
Ethyl acetate
Ethyl acrylate
Ethylbenzene (OSDWA)
Ethylene dibromide (OSDWA)
Hexane (OSDWA)

	Isobutanol
	Isopropanol
	Isopropyl acetate
	Isopropylbenzene
	m/p-xylene (OSDWA)
	Methyl acetate
	Methyl acrylate
	Methyl Ethyl Ketone (OSDWA)
	Methyl isobutyl Ketone (OSDWA)
	Methyl methacrylate
	Methyl t-butyl ether (OSDWA)
	Naphthalene
	o-xylene (OSDWA)
	Propyl acetate
	Styrene (OSDWA)
	Tert-Butanol
	Tetrachloroethylene (OSDWA)
	Tetrahydrofuran
	Toluene (OSDWA)
	trans-1,2-Dichloroethylene (OSDWA)
	trans-1,3-Dichloropropene (OSDWA)
	Trichloroethylene (OSDWA)
	Trichlorofluoromethane (OSDWA)
	Vinyl acetate
	Vinyl Chloride (OSDWA)
CAM SOP-00230	Volatile Organic Compounds (VOCs) and F1 Hydrocarbons In Solid and Water Samples Using Headspace GC/MS/FID
	1,1,1,2-Tetrachloroethane
	1,1,1-Trichloroethane
	1,1,2,2-Tetrachloroethane
	1,1,2-Trichloroethane
	1,1-Dichloroethane
	1,1-Dichloroethylene
	1,2-Dichlorobenzene
	1,2-Dichloroethane
	1,2-Dichloropropane
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	Acetone
	Benzene

	Bromodichloromethane
	Bromoform
	Bromomethane
	Carbon Tetrachloride
	Chlorobenzene
	Chloroethane
	Chloroform
	Chloromethane
	cis-1,2-Dichloroethylene
	cis-1,3-Dichloropropene
	Dibromochloromethane
	Dichlorodifluoromethane
	Ethylbenzene
	Ethylene dibromide
	F1(C6-C10)
	Hexane
	Methyl ethyl ketone
	Methyl isobutyl ketone
	Methyl t-butyl ether
	Methylene chloride
	m-Xylene
	o-Xylene
	p-Xylene
	Styrene
	Tetrachloroethylene
	Toluene
	trans-1,2-Dichloroethylene
	trans-1,3-Dichloropropene
	Trichloroethylene
	Trichlorofluoromethane
	Vinyl chloride
CAM SOP-00301	Determination of Semivolatile Organics Acid/Base Neutral Extractables) in Solid and Aqueous Samples Using GC/MS operating under both the Full Scan and Selected Ion Monitoring (SIM) Modes
	1,2,4-Trichlorobenzene (OSDWA)
	1,2-Dichlorobenzene
	1,2-Diphenylhydrazine
	1,3-Dichlorobenzene (OSDWA)
	1,4-Dichlorobenzene
	1-Methylnaphthalene (OSDWA)

2,3,4,5-Tetrachlorophenol (OSDWA)
2,3,4,6-tetrachlorophenol (OSDWA)
2,3,4-Trichlorophenol (OSDWA)
2,3,5,6-Tetrachlorophenol (OSDWA)
2,3,5-Trichlorophenol (OSDWA)
2,3,6-Trichlorophenol (OSDWA)
2,3-Dichlorophenol (OSDWA)
2,4,5-TP (OSDWA)
2,4,5-Trichlorophenol (OSDWA)
2,4,5-trichlorophenoxyacetic acid (OSDWA)
2,4,6-trichlorophenol (OSDWA)
2,4-dichlorophenol (OSDWA)
2,4-dichlorophenoxyacetic acid (OSDWA)
2,4-Dimethyl Phenol (OSDWA)
2,4-Dinitrophenol (OSDWA)
2,4-Dinitrotoluene (OSDWA)
2,5-Dichlorophenol (OSDWA)
2,6-Dichlorophenol (OSDWA)
2,6-Dinitrotoluene (OSDWA)
2-Chloronaphthalene (OSDWA)
2-Chlorophenol
2-Methylnaphthalene (OSDWA)
2-Nitrophenol (OSDWA)
3,3'-Dichlorobenzidene (OSDWA)
3,4,5-Trichlorophenol (OSDWA)
3,4-Dichlorophenol (OSDWA)
3,5-Dichlorophenol (OSDWA)
3-Chlorophenol
4,6-Dinitro-o-Cresol (OSDWA)
4-Bromophenyl Phenyl Ether (OSDWA)
4-Chloroaniline (OSDWA)
4-Chlorophenol
4-Chlorophenyl Phenyl Ether (OSDWA)
4-Nitrophenol (OSDWA)
Acenaphthene (OSDWA)
Acenaphthylene (OSDWA)
Alachlor (OSDWA)
Aldicarb (OSDWA)
Ametryn (OSDWA)
Anthracene (OSDWA)

Atrazine (OSDWA)
Bendiocarb (OSDWA)
Benzo (a) anthracene (OSDWA)
Benzo (a) pyrene (OSDWA)
Benzo (b) fluoranthene (OSDWA)
Benzo (e) pyrene (OSDWA)
Benzo (g,h,i) perylene (OSDWA)
Benzo (k) fluoranthene (OSDWA)
Biphenyl (OSDWA)
Bis (2-Chloro Ethoxy)Methane (OSDWA)
Bis (2-Chloro Ethyl) Ether (OSDWA)
Bis (2-Chloro Isopropyl) Ether (OSDWA)
Bis (2-ethylhexyl) Phthalate (OSDWA)
Bromoxynil (OSDWA)
Butyl Benzyl Phthalate (OSDWA)
Carbaryl (OSDWA)
Carbofuran (OSDWA)
Chlordane (a,g)
Chlorpyrifos (ethyl) (OSDWA)
Chrysene (OSDWA)
Cyanazine (OSDWA)
Des-ethylatrazine (OSDWA)
Diazinon (OSDWA)
Dibenzo (a,h) anthracene (OSDWA)
Dicamba (OSDWA)
Diclofop-methyl (as free acid) (OSDWA)
Diethyl Phthalate (OSDWA)
Dimethoate (OSDWA)
Dimethyl Phthalate (OSDWA)
Di-n-Butylphthalate (OSDWA)
Di-n-Octylphthalate (OSDWA)
Dinoseb (OSDWA)
Fluoranthene (OSDWA)
Fluorene (OSDWA)
Hexachlorobenzene (OSDWA)
Hexachlorobutadiene (OSDWA)
Hexachlorocyclopentadiene
Hexachloroethane (OSDWA)
Indeno (1,2,3 - cd) pyrene (OSDWA)
Isophorone (OSDWA)

	m,p-cresol (OSDWA) Malathion (OSDWA) MCPA(OSDWA) Methoxychlor (OSDWA) Methyl Parathion (OSDWA) Metolachlor (OSDWA) Metribuzin (OSDWA) Naphthalene (OSDWA) Nitrobenzene (OSDWA) N-Nitroso-di-n-Propyl Amine (OSDWA) N-Nitroso-Diphenylamine/Diphenylamine (OSDWA) o-Cresol (OSDWA) Oxychlordane (OSDWA) p,p'-DDD p,p'-DDE Parathion (ethyl) (OSDWA) p-chloro-m-cresol (OSDWA) Pentachlorobenzene Pentachlorophenol (OSDWA) Phenanthrene (OSDWA) Phenol (OSDWA) Phorate (OSDWA) Picloram (OSDWA) Prometon (OSDWA) Prometryne (OSDWA) Propazine (OSDWA) Pyrene (OSDWA) Quinolone Simazine (OSDWA) Simetryn (OSDWA) Terbufos (OSDWA) Terbutryn (OSDWA) Triallate (OSDWA) Trifluralin (OSDWA)
CAM SOP-00305 **(OSDWA)**	Analysis of Glyphosate in Water and Soil by HPLC
CAM SOP-00306 **(OSDWA)**	Analysis of Diuron, Guthion, and Temephos in Water by HPLC
	Diuron Guthion (azinphos-methyl)

	Temephos
CAM SOP-00307**(OSDWA)**, CAM SOP-00317 (**OSDWA),** CAM SOP-00309	Organochlorine Pesticides and PCBs in Solids, Water and Biological Materials by GC-ECD, Polychlorinated Biphenyls (PCBs) as Aroclors in Solid, Water, and Biological Samples by GC-ECD, and Neutral Chlorinated Hydrocarbons in Solid and Water by GC/ECD
	1,2,3,4-tetrachlorobenzene
	1,2,3,5-Tetrachlorobenzene
	1,2,3-Trichlorobenzene
	1,2,4,5-Tetrachlorobenzene
	1,2,4-Trichlorobenzene
	1,3,5-Trichlorobenzene
	2,4,5-Trichlorotoluene
	A - BHC
	a - Chlordane
	Aldrin
	Aroclor 1262
	Aroclor-1016
	Aroclor-1221
	Aroclor-1232
	Aroclor-1242
	Aroclor-1248
	Aroclor-1254
	Aroclor-1260
	Aroclor-1268
	b-BHC
	d-BHC
	Dieldrin
	Endosulfan I
	Endosulfan II
	Endosulfan Sulfate
	Endrin
	Endrin Aldehyde
	Endrin Ketone
	g - Chlordane
	Heptachlor
	Heptachlor Epoxide
	Hexachlorobenzene
	Hexachlorobutadiene
	Hexachlorocyclopentadiene
	Hexachloroethane

	Lindane (gamma-BHC)
	Methoxychlor
	Mirex
	O,p'-DDD
	O,p'-DDE
	O,p'-DDT
	Octachlorostyrene
	Oxychlordane
	p,p' - DDT
	p,p' Methoxychlor
	p,p'-DDD
	p,p'-DDE
	Pentachlorobenzene
	Total PCBs(OSDWA)
	Toxaphene
CAM SOP-00313	Analysis of 4-Nonylphenol and Nonylphenol Ethoxylates in Water by HPLC
	4-Nonylphenol
	Total Nonylphenol Ethoxylates
CAM SOP-00315 **(OSDWA)**	Determination of CCME C6-C10 Hydrocarbons (F1) and BTEX in Soil and Water by Headspace GC/MS/FID
	Benzene
	Ethylbenzene
	F1: C6-C10
	m/p-xylene
	o-xylene
	Toluene
CAM SOP-00316 **(OSDWA)**	Determination of CCME Extractable Petroleum Hydrocarbons (F2-4) in Water and Soil by GC/FID
	F2: C10-C16
	F3: C16-C34
	F4: C34-C50
CAM SOP-00318	Determination Of Polynuclear Aromatic Hydrocarbons (PAHs) In Solid And Water Samples Using Selected Ion Monitoring (SIM) GCMS
	1-methylnaphthalene
	2-methylnaphthalene
	Acenaphthene
	Acenaphthylene
	Anthracene
	Benzo (a) anthracene

	Benzo (a) pyrene
	Benzo (b,j) fluoranthene
	Benzo (g,h,i) perylene
	Benzo (k) fluoranthene
	Chrysene
	Dibenzo (a,h) anthracene
	Fluoranthene
	Fluorene
	Indeno (1,2,3-cd) pyrene
	Naphthalene
	Phenanthrene
	Pyrene
CAM SOP-00320 **(OSDWA)**	The Determination of Nitroaromatics and Nitramines in Water and Soil Samples by HPLC
	1,3,5-Trinitrobenzene
	1,3-Dinitrobenzene
	2,4,6-Trinitrotoluene
	2,4-Dinitrotoluene
	2,6-Dinitrotoluene
	2-Amino-4,6-dinitrotoluene
	2-Nitrotoluene
	3,5-Dinitroaniline
	3-Nitrotoluene
	4-Amino-2,6-dinitrotoluene
	4-Nitrotoluene
	Hexahydro-1,3,5-trinitro-1,3,5-triazine
	Methyl-2,4,6-trinitrophenylnitramine
	Nitrobenzene
	Nitroglycerin
	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
	Pentaerythritol tetranitrite (PETN)
CAM SOP-00322 **(OSDWA)**	The Determination of Propylene Glycol, Ethylene Glycol and Diethylene Glycol in Liquids, Oils and solids by GC/FID
	Diethylene glycol
	Ethylene glycol
	Propylene glycol
CAM SOP-00327 **(OSDWA)**	Analysis of Diquat and Paraquat in Water by HPLC-UV Detector Using Aqueous Ionic Mobile Phase
	Diquat
	Paraquat

CAM SOP-00330	Determination of Phenoxy Acid Herbicides and related compounds in Aqueous and Solid Samples Using Selected Ion Monitoring (SIM) GC/MS
	2,4,5-T
	2,4,5-TP
	2,4-D
	2,4-DB
	2,4-DP (dichlorprop)
	3,5-dichlorobenzoic acid
	Acifluorfen
	Bentazon
	Chloramben
	DCPA Diacid
	Dicamba
	Dinoseb (DNBP)
	MCPA
	MCPP
	Pentachlorophenol
	Picloram
CAM SOP-00332	Determination of Chlorinated Phenols in Soil and Water Using Selected Ion Monitoring (SIM) GC/MS
	2,3,4,5-Tetrachlorophenol
	2,3,4,6-Tetrachlorophenol
	2,3,4-Trichlorophenol
	2,3,5,6-Tetrachlorophenol
	2,3,5-Trichlorophenol
	2,3,6-Trichlorophenol
	2,3-Dichlorophenol
	2,4,5-Trichlorophenol
	2,4,6-Trichlorophenol
	2,4-Dichlorophenol
	2,4-Dimethylphenol
	2,4-Dinitrophenol
	2,5-Dichlorophenol
	2,6-Dichlorophenol
	2-Chlorophenol
	2-Nitrophenol
	3,4,5-Trichlorophenol
	3,4-Dichlorophenol
	3,5-Dichlorophenol

	4,6-Dinitro-2-methylphenol
	4-Chloro-3-Methylphenol
	4-Chlorophenol
	4-Nitrophenol
	m/p-Cresol
	o-Cresol
	Pentachlorophenol
	Phenol
CAM SOP-00435	
	Anions in Food, Soil, Water and Air by Ion Chromatography
	Bromide
	Chloride
	Fluoride
	Nitrate
	Nitrite (NO2)
	PO4
	Sulfate
CAM SOP-00883	Determination of Morpholine in Water Using LC/MS/MS
CAM SOP-00894	Determination of Perfluorinated Compounds in Water and Soil By LC-MS-MS
	6:2FTS (6:2 Fluorotelomersulfonate)
	8:2FTS (8:2 Fluorotelomersulfonate)
	EtFOSA (N-ethylperfluorooctanesulfonamide)
	EtFOSAA (N-ethylperfluorooctanesulfonamidoacetic acid)
	EtFOSE (N-ethylperfluorooctanesulfonamidoethanol)
	MeFOSA (N-methylperfluorooctanesulfonamide)
	MeFOSAA (N-methylperfluorooctanesulfonamidoacetic acid)
	MeFOSE (N-methylperfluorooctanesulfonamidoethanol)
	PFBA (Perfluorobutanoic acid)
	PFBS (Perfluorobutanesulfonate)
	PFDA (Perfluorodecanoic acid)
	PFDoA (Perfluorododecanoic acid)
	PFDS (Perfluorodecanesulfonate)
	PFHpA (Perfluoroheptanoic acid)
	PFHpS (Perfluoroheptanesulfonate)
	PFHxA (Perfluorohexanoic acid)
	PFHxS (Perfluorohexanesulfonate)
	PFNA (Perfluorononanoic acid)
	PFOA (Perfluoro-n-Octanoic Acid)

PFOS (Perfluoro-1-Octanesulfonate)
PFOSA (Perfluorooctanesulfonamide)
PFPeA (Perfluoropentanoic acid)
PFTeDA (Perfluorotetradecanoic acid)
PFTrDA (Perfluorotridecanoic acid)
PFUnA (Perfluoroundecanoic acid)

Occupational Health and Safety:

Air Monitoring

(Compressed Breathing Air Systems - Z180.1-00, Z180.1-13, Z275.1-05, Z275.2-15)

(Medical Gases - CAN/CSA Z10083-08, CAN/CSA Z7396.1-06, Z7396.1-09, Z7396.1-12)

CAM SOP-00200	Analysis of Oxygen, Nitrogen, Carbon Dioxide, Carbon Monoxide and Methane in Compressed Breathing and Medical Gases
CAM SOP-00201	Analysis of Halogenated Hydrocarbon Compounds in Compressed Breathing Gases
CAM SOP-00202	Total Non-methane Hydrocarbons in Compressed Breathing and Medical Gases
CAM SOP-00203	Analysis of Nitrous Oxide in Compressed Breathing and Medical Gases
CAM SOP-00204	C2-C4 Hydrocarbons in Compressed Breathing and Medical Gases
CAM SOP-00205	Analysis of Water, Water Vapour and Odour in Compressed Breathing and Medical Gases
CAM SOP-00206	Determining Oil Particulates and Condensates in Compressed Breathing Gases
CAM SOP-00209	Analysis of Percent Level Carbon Dioxide in Medical Gases
CAM SOP-00210	Analysis of Oxygen by Paramagnetic Analyser in Compressed Breathing Gases
CAM SOP-00216	Analysis of Percent Level Medical Nitrousoxide
CAM SOP-00221	Analysis of Nitrogen Oxides (NOx) in Gases
CAM SOP-00223	Analysis of Percent Level Helium in Compressed Breathing Gases
CAM SOP-00225	Percent Level Gas Analyses in Gas Samples
	Oxygen
	Nitrogen
	Carbon dioxide
	Carbon monoxide
	methane

METALLIC ORES AND PRODUCTS

Concentrates, Metallic Liquors and Other Process Products:
Refer to major sub-heading: **Mineral Analysis Testing**

Mineral Analysis Testing

(Ores and Rocks: Mineral Assaying Soil/Sediment Precious Metals)

BQL SOP-00001	NEUTRON ACTIVATION Long Lived Isotopes which may include: Antimony Arsenic Barium Cerium Cesium Chromium Cobalt Europium Gold Hafnium Iron Lanthanum Lutetium Molybdenum Neodymium Nicke Rubidium Samarium Scandium Selenium Silver Sodium Tantalum Terbium Thorium Titanium Tungsten Uranium

	Ytterbium
	Zinc
	Zirconium
BQL SOP-00002	NEUTRON ACTIVATION Platinum Group Elements with Nickel-Sulphide Fire Assay Pre-Concentration which may include
	Os
	Ir
	Pd
	Pt
	Rh
	Ru
BQL SOP-00003	PROMPT GAMMA ACTIVATION Boron by Prompt-Gamma
BQL SOP-00004	NEUTRON ACTIVATION Short-Lived Elements which may include:
	Aluminum
	Barium
	Bromine
	Calcium
	Chlorine
	Dysprosium
	Europium
	Fluorine
	Indium
	Iodine
	Magnesium
	Manganese
	Potassium
	Samarium
	Sodium
	Strontium
	Titanium
	Vanadium
BQL SOP-00005	DELAYED NEUTRON COUNTING for Uranium and U-235
BQL SOP-00007	GAMMA SPECTROMETRY in SOLIDS Natural Decay Chain Isotopes which may include: Natural Decay Chain Isotopes which may include Th-234,
	Th-230, Ra-414, Pb-210, U-235, Th-227, Ra-223, Ac-228,

Ra-228, Pb-212, Rn-222, Pb-214, Bi-214
Synthetic Isotopes which may include Cs-137, Cs-134, I-131, Zn-65, Co-60, Mn-54

NON METALLIC MINERALS AND PRODUCTS

Petroleum Refinery Products: (Including asphalt materials; petrochemicals; fuels and lubricants)

Fuels and Lubricants

ASTM D0092	Flash and Fire Points by Cleveland Open Cup Tester (SLA SOP 00010)
ASTM D0093	Flash Point by Pensky-Martens Closed Cup Tester (SLA SOP-00029)
ASTM D0130	Corrosiveness to Copper from Petroleum Products by Copper Strip Test (SLA SOP-00031)
ASTM D0445	Kinematic Viscosity of Transparent and Opaque Liquids (SLA SOP 00028)
ASTM D0482	Ash from Petroleum Products (SLA SOP-00117)
ASTM D0524	Ramsbotton Carbon Residue Of Petroleum Products (SLA SOP-00113)
ASTM D0611	Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents (SLA SOP-00023)
ASTM D0664	Acid Number of Petroleum Products by Potentiometric Titration (SLA SOP-00054)
ASTM D0721	Oil Content of Petroleum Waxes (SLA SOP-00034)
ASTM D0874	Sulfated Ash from Lubricating Oils and Additives (SLA SOP-00013)
ASTM D0892 (IP146 Alternative)	Foaming Characteristics of Lubricating Oils (SLA SOP-00012)
ASTM D0974	Acid and Base Number by Color Indicator Titration (SLA SOP-00017)
ASTM D1298	Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method (SLA SOP-00056)
ASTM D1401	Water Separability of Petroleum Oils and Synthetic Fluids (SLA SOP-00018)
ASTM D1500	ASTM Color of Petroleum Products (ASTM Color Scale) (SLA SOP-00063)
ASTM D1796	Water and Sediment in Fuel Oils by the Centrifuge Method (SLA SOP 00001)
ASTM D2896	Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration (Procedure B) (SLA SOP00005)
ASTM D2983	Low-Temperature Viscosity of Lubricants Measured by Brookfield Viscometer (SLA SOP 00024)

ASTM D4052	Density and Relative Density of Liquids by Digital Density Meter (SLA SOP-00019)
ASTM D4294	Sulphur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry (SLA SOP-00026)
ASTM D4629	Trace Nitrogen in Liquid Petroleum Hydrocarbons by Syringe/Inlet Oxidative Combustion and Chemiluminescence Detection (SLA SOP-00115)
ASTM D4951	Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (SLA SOP-00111)
ASTM D5185	Determination of Additive Elements, Wear Metals, and Contaminants in used Lubricating Oils and Determination of Selected Elements in Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (SLA SOP-00114)
ASTM D5293	Apparent Viscosity of Engine Oils and Base Stocks Between -5° and -35° C by Using the Auto Cold- Cranking Simulator (SLA SOP-00057)
ASTM D5453	Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Oil, Diesel Engine Oil, and Engine Oil by Ultraviolet Fluorescence (SLA SOP-00106)
ASTM D5771	Cloud Point of Petroleum Products (Optical Detection Stepped Cooling Method) (SLA SOP-00119)
ASTM D5950	Pour Point of Petroleum Products (Automatic Tilt Method)(SLA SOP-00030)
ASTM D6304	Determination of Water in Petroleum Products, Lubricating Oils and Additives by Coulometric Karl Fisher Titration (SLA SOP-00112)

Notes:

CAN-P-4E (ISO/IEC 17025): General Requirements for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025: 2005)
CAN-P-1587: Requirements for the Accreditation of Agricultural Inputs, Food, Animal Health and Plant protection Testing Laboratories
CAN-P-1585: Requirements for the Accreditation of Environmental Testing Laboratories
APHA: American Public Health Association – Standard Methods for the Examination of Water and Wastewater
"OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002)
ASTM: American Society for Testing and Materials
SLA SOP: Subject Laboratory In-House Test Method

Chantal Guay, ing., P. Eng. Vice President, Accreditation Services

Date: 2017-01-05

Number of Scope Listings: 311
SCC 1003-15/25
Partner File #0
Partner: SCC
MOE License No.: 2312, 2315

APPENDIX B
HOME OWNERS LETTER AND COMMENTS RECEIVED

Stantec Consulting Ltd.
102-40 Highfield Park Drive, Dartmouth NS B3A 0A3

REGISTERED MAIL

July 27, 2017
File: 121414799

Attention: Attention
Recipient's Address

Dear Recipient's Name,

Reference: Air Monitoring, Three Fathom Harbour Tidal Wetland Restoration Project

Stantec Consulting Ltd. (Stantec) has been contracted by Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) to conduct ambient air monitoring near the Three Fathom Harbour Tidal Wetland Restoration Project. The objective of the Plan is to obtain a better understanding of the levels of hydrogen sulphide (H_2S) present in the ambient air surrounding the Three Fathom Harbour Tidal Wetland Restoration Project (the Project), located near Three Fathom Harbour Road, and determine if such levels pose a risk to human health.

Your property has been identified as a potential monitoring location due to its vicinity to the wetland and Stantec is requesting permission to access your property for monitoring purposes. We would also like to discuss with you, details pertaining to what your experience has been with regards to odours from the Project site, prior to conducting any monitoring. Any response is on a voluntary basis, but we request contact by August 4, 2017 to ensure work occurs during the warm summer season. If you are unable to respond before that time, please feel free to make contact and provide any information you feel may be relevant.

Details pertaining to the Project, air monitoring and Stantec's contact information are provided below.

Background to the Project

The Three Fathom Harbour Tidal Wetland Restoration Project site is a former tidal wetland that was altered, due to the construction of three transportation routes (i.e., former Musquodoboit Railway, Highway 207, and Three Fathom Harbour). This construction altered the local salt marsh. In the summer of 2015, work to restore the wetland was initiated and included the replacement of a culvert on Three Fathom Harbour Road and upgrades to the causeway, thereby improving the hydrology of the site and enabling unrestricted flow of tidal waters.

Since May of 2016 Nova Scotia Environment (NSE) has been receiving odour complaints from residents living near the wetland. The source of the odour is believed to be from the natural release of H_2S gas during decomposition of seaweed that drifted into the marsh from the adjacent bay. Prior to restoration, this seaweed (also known as wrack) accumulated on the adjacent beach. During the year, wrack is periodically transported into the marsh with the tides to decompose or be flushed out again on higher tidal cycles and storms.

Reference: Air Monitoring, Three Fathom Harbour Tidal Wetland Restoration Project

In response to such complaints, NSE issued a Directive to NSTIR to develop a short term air monitoring plan to determine the levels of H_2S in the ambient air surrounding the Project site and whether such levels pose a risk to human health.

Ambient Air Monitoring Plan

A short term air monitoring plan, to monitor H_2S surrounding the Project site, has been prepared and submitted to NSE for approval.

Monitoring will consist of sampling H_2S at several locations downwind and upwind of the Project site using a handheld H_2S analyzer over a period of three separate monitoring events. The date and time of the monitoring events will be determined based on meteorological and tidal conditions, as well as using information gathered from communicating with the nearest residents. The results of the monitoring will be summarized in a report that will be issued to NSE. This report will be made available to nearby residents upon request.

Closing

We request that you contact Ms. Gillian Hatcher to further discuss any questions or concerns that you may have to in relation to the air monitoring, and to determine if you would allow Stantec personnel access to your property for monitoring purposes.

We look forward to hearing from you.

Regards,

STANTEC CONSULTING LTD.

Gillian Hatcher, M.A.Sc.
Environmental Scientist
Office: (902) 468-7777 ext 4687300
Cell: (902) 497-6736
Gillian.Hatcher@Stantec.com

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Monitoring Site No.	PID	Owner	Address	Comments
1	40468019	Steven Sidny Smith	4929 Highway 207, Three Fathom Harbour, Lot 1	This home owner did not make contact with Stantec.
2	40804957	Bertha Margaret Murphy	4960 Highway 207, Three Fathom Harbour	Home owner indicated that the odour smelt like the dumping of a sewer, and that conditions seem worse during a SW wind.
3	40519589	Brian Wade Murphy	4936 Highway Highway 207, Three Fathom Harbour, lot 5	Home owner did not make contact with Stantec, however the home owner at Monitoring Site 2 indicated during discussions that her son was the owner of the house at Monitoring Site 3 and he was ok with Stantec performing monitoring on his property.
4	41082116	Douglas Bruce Lauder, Belindar Lee Lauder	4912 Highay 207, Three Fathom Harbour, Lot 6	Odour characterized as smelling like "sewer", comparison made to a septic tank overflowing. Home owner also indicated that they could not open their windows overnight due to the odour.
5	40545139	Kevin George Hebb	95 Three Fathom Harbour Road, Three Fathom Harbour, Lot 3	This home owner did not make contact with Stantec.
6	599407	James Alphonses Flynn, Sylvia Flynn	4 Spruce Court, Three Fathom Harbour, Lot 1	Home owner indicated that the odour is worse overnight during low tide conditions, and smells like a septic tank overflowed inside their home. They also expressed concern for their health.
7	40302713	Robert Dwight Macbournie, Elizabeth Anne Macbournie	9 Spruce Court, Three Fathom Harbour, Lot 25	Home owner indicated that the odour is always noticable, some days are stronger than others however.
8	40302747	Michael Scott Miller, Tanya Grace Miller	172 Three Fathom Harbour Road, Three Fathom Harbour, Lot 22	Home owner indicated that the odour is worse overnight during spring and summer at low tide. They indicated that it was particularly bad in June, and they could not keep their windows open overnight.

APPENDIX C
CALIBRATION RECORDS AND FIELD SHEETS

ARIZONA INSTRUMENT LLC
3375 N. Delaware St., Chandler, AZ 85225
(800) 528-7411 • (602) 470-1414
www.azic.com • customerservice@azic.com

Certification of Instrument Calibration

RMA # 2421184

Pine Environmental
92 N. Main St, Bldg 20
Windsor, NJ 08561

This is to certify that the Jerome **J605-0001** Gold Film Hydrogen Sulfide Analyzer, Serial Number **60500188**, with Sensor Number **16-5-18-W2BS**, was calibrated with standard units traceable to NIST.

Calibration Status as Received: **In Calibration**

		Actual		Calibration Gas		Allowable Range		
Incoming:	Range 1	0.491	ppm H2S	0.500	ppm H2S	0.470 - 0.530		ppm H2S
Outgoing:	Range 1	0.497	ppm H2S	0.500	ppm H2S	0.475 - 0.525		ppm H2S
	RSD %	0.79				<3%		

Calibration Status as Left: **In Calibration**

Estimated Uncertainty of Calibration System: 2.4%

Calibration Date: 02-Feb-2017 Recalibration Date: 01-Feb-2018

Temperature °F: 71.00 % Relative Humidity: 24.00

Approved By:_____ Date Approved: 06-Feb-2017
Title: Johnny Padilla - Quality Control

Equipment Used:

H2S Calibration Standard: CC-57152 **NIST#:** 1385481
Calibration Date: 17-Aug-2016 **Calibration Date Due:** 18-Aug-2019

Mass Flow Controller B: 124604 **NIST#:** 152971
Calibration Date: 28-Nov-2016 **Calibration Date Due:** 28-Nov-2017

Mass Flow Controller D: 124602 **NIST#:** 151792
Calibration Date: 08-Nov-2016 **Calibration Date Due:** 08-Nov-2017

Digital Multimeter: 84370196 **NIST#:** 7000660
Calibration Date: 28-Nov-2016 **Calibration Date Due:** 28-Nov-2017

Flowmeter: US04I26034 **NIST#:** 1813; 1817; 1796
Calibration Date: 29-Aug-2016 **Calibration Date Due:** 30-Aug-2017

Calibration Procedure Used: 730-0099

Arizona Instrument certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracy are traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY within the limitations of the Institute's calibration services, or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of self-calibration techniques.

Disclaimer: Any unauthorized adjustments, removal or breaking of QC seals, or other customer modifications on your Jerome Analyzer WILL VOID this factory calibration. Because any of the above acts could affect the calibration and readings of the instrument, their certification will no longer be valid and, further, Arizona Instrument LLC WILL NOT be responsible for any liabilities created as a result of using the instrument after such adjustments, seal removal, or modifications. As long as a functional test is within range, according to the procedure outlined in the Operator's Manual, the instrument is performing correctly.

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

3470 Gardner Court
Burnaby, BC V5G 3K4
Toll-free: (877) 678-8383

Pine Environmental Services, Inc.

Instrument ID 22232
Description ARIZONA INSTRUMENT JEROME® J605 HYDROGEN SULFIDE ANALYZER
Calibrated 8/16/2017 4:01:35PM

Manufacturer	Arizona	**State Certified**	
Model Number	J605	**Status**	Pass
Serial Number/ Lot Number	60500188	**Temp °C**	24
Location	British Columbia	**Humidity %**	36
Department			

Calibration Specifications

Group # 1
Group Name Regen Cycle / Zero Test
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Next Cal Date / Last Cal Date/ Expiration Date Opened Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Alfonso Perez

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

ARIZONA INSTRUMENT LLC
3375 N. Delaware St., Chandler, AZ 85225
(800) 528-7411 • (602) 470-1414
www.azic.com • customerservice@azic.com

Certification of Instrument Calibration

Pine Environmental
92 N. Main St, Bldg 20
Windsor, NJ 08561

RMA # 2448276

This is to certify that the Jerome **X631 0101** Gold Film Hydrogen Sulfide Analyzer, Serial Number **2372**, with Sensor Number **17-3-23-X2DS**, was calibrated with standard units traceable to NIST.

Calibration Status as Received: **Out of Calibration**

		Actual		Calibration Gas		Allowable Range
Incoming:	Range 1	0.150	ppm H2S	0.500	ppm H2S	+/- 6%
	RSD %	65.93				<5%
Outgoing:	Range 1	0.506	ppm H2S	0.500	ppm H2S	+/- 6%
	RSD %	1.27				<5%

Calibration Status as Left: **In Calibration**

Estimated Uncertainty of Calibration System: 2.8%

Calibration Date: 09-May-2017 Recalibration Date: 08-May-2018

Temperature °F: 71.50 % Relative Humidity: 38.00

Approved By: Cheryl Hradek Date Approved: 10-May-2017
Title: Cheryl Hradek - Quality Control

Equipment Used:

H2S Calibration Standard: CC-57152 **NIST#:** 1385481
Calibration Date: 17-Aug-2016 **Calibration Date Due:** 18-Aug-2019

Mass Flow Controller B: 124604 **NIST#:** 152971
Calibration Date: 28-Nov-2016 **Calibration Date Due:** 28-Nov-2017

Mass Flow Controller D: 124602 **NIST#:** 151792
Calibration Date: 08-Nov-2016 **Calibration Date Due:** 08-Nov-2017

Digital Multimeter: 66961028 **NIST#:** 7000660
Calibration Date: 28-Mar-2017 **Calibration Date Due:** 28-Mar-2018

Flowmeter: US10H44183 **NIST#:** 1813; 1817; 1796
Calibration Date: 08-Nov-2016 **Calibration Date Due:** 09-Nov-2017

Calibration Procedure Used: 730-0032

Arizona Instrument certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracy are traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY within the limitations of the Institute's calibration services, or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of self-calibration techniques.
Disclaimer: Any unauthorized adjustments, removal or breaking of QC seals, or other customer modifications on your Jerome Analyzer WILL VOID this factory calibration. Because any of the above acts could affect the calibration and readings of the instrument, their certification will no longer be valid and, further, Arizona Instrument LLC WILL NOT be responsible for any liabilities created as a result of using the instrument after such adjustments, seal removal, or modifications.
As long as a functional test is within range, according to the procedure outlined in the Operator's Manual, the instrument is performing correctly.

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

6380 Tomken Road, Unit 1 & 2
Mississauga, ONTARIO L5T1Y4
Toll-free: (866) 688-0388

Pine Environmental Services, Inc.

Instrument ID 12951
Description Jerome 631-X
Calibrated 8/16/2017 5:26:07PM

Manufacturer Arizona
Model Number 631-X
Serial Number/ Lot Number 2372
Location Ontario
Department

State Certified
Status Pass
Temp °C 24
Humidity % 55

Calibration Specifications

Group # 1
Group Name Regen and Zero
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Next Cal Date / Last Cal Date/ Expiration Date Opened Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Kevin Johnson

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

Upwind Monitoring Field Sheet

Monitoring location: Monitoring site 1

Date: Aug 29/17 11:05

Name: A. Fancey

Wind direction: very light breeze (S)

Weather: Full sun / no clouds

Temperature: 17°C

Reading

1 0.002 ppm

2 0.002 ppm

3 0.001 ppm

4 0.002 ppm

5 0.002 ppm

6 0.001 ppm

Notes: Heard a dog bark
Talked to homeowner.
Mentioned there is a
lot of Hogweed around
no odour present

Stantec

Downwind Monitoring Field Sheet J605 Project Number 121414799

Monitoring location: 6
Date: Aug 29/17
Name:

Wind direction: N
Weather: sunny, ~~[illegible]~~, clear sky
Temperature: 17°C -> 21°C

	Reading		Reading		Reading	
9:48	1	3.88 ppb	21		41	
9:50	2	0.00 ppb	22		42	
	3	0.00 ppb	23		43	
	4	0.00 ppb	24		44	
	5	52.08 ppb	25		45	
	6	56.86 ppb	26		46	
	7	0.00 ppb	27		47	
	8	8.86 ppb	28		48	
	9	18.67 ppb	29		49	
	10	3.73 ppb	30		50	
	11	0.00	31		51	
	12	0.00	32		52	
	13	0.00	33		53	
	14	0.00	34		54	
	15	0.00	35		55	
	16		36		56	
	17		37		57	
	18		38		58	
	19		39		59	
	20		40		60	

smell
smell slight
none, no wind
" "
no smell, slight

wind is very light

wind shift -> from west (WNW)

Notes: slight odour stronger @ times, @ around 10:10 wind died, then 10:15 wind shift from WNW

Stantec

Monitoring location: Monitoring site 3
Date: Aug 29/17 10:54 am
Name: A. Fancey
Wind direction: Very light wind (south)
Weather: Full sun, no cloud
Temperature: 16°C
Civic address: 4939 Hwy 207

Reading

1	0.001 ppm
2	0.003 ppm
3	0.001 ppm
4	0.002 ppm
5	0.002 ppm (Low BATT flash)
6	0.001 ppm

Notes:

Monitoring location: Monitoring site 2
Date: Aug 29/17 10:59 am
Name: A. Fancey
Wind direction: very light wind (S)
Weather: full sun, no cloud
Temperature: 16°C
Civic address: 4960 Hwy 207

Reading

1	0.000 ppm
2	0.002 ppm
3	0.002 ppm
4	0.004 ppm
5	0.003 ppm
6	0.002 ppm

Notes:

Downwind Monitoring Field Sheet

Project Number 121414799

wind shift west wind

Monitoring location: 6

Date: Aug 29/17

Name:

Wind direction: west (WNW)

Weather: Sun

Temperature: 20°C

	Reading		Reading		Reading	
SW wind	1	0.00	21	0.00 ppb	41	0.002 ppm
	2	0.00 ppb	22	0.00 ppb	42	0.002 ppm
	3	0.00 ppb	23	0.00 ppb	43	0.001 ppm
	4	0.00 ppb	24	0.00 ppb	44	0.001 ppm
	5	0.00 ppb	25	0.00 ppb	45	0.001 ppm
	6	0.00 ppb	26	0.00 ppb	46	
	7	0.00 ppb	27	0.00 ppb	47	
South	8	0.00 ppb	28	0.00 ppb	48	
	9	0.00 ppb	29	0.00 ppb	49	
	10	0.00 ppb	30	0.00 ppb	50	
Jerome 631 →	11	0.00 ppb	31	0.001 ppm	51	
	12	0.00 ppb	32	0.000 ppm	52	
	13	0.00 ppb	33	0.001 ppm	53	
	14	0.00 ppb	34	0.002 ppm	54	
	15	0.00 ppb	35	0.001 ppm	55	
	16	0.00 ppb	36	0.001 ppm	56	
	17	0.00 ppb	37	0.002 ppm	57	
	18	0.00 ppb	38	0.002 ppm	58	
	19	0.00 ppb	39	0.001	59	
	20	0.00 ppb	40	0.001	60	

Notes:

Stantec

Downwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: 7

Date: Aug 29/17

Name:

Wind direction: SSW

Weather: Sunny, no clouds.

Temperature: 20°C

Reading		Reading		Reading	
1	0.00 ppb	21	0.00 ppb	41	0.00 ppb
2	0.00 ppb	22	0.00 ppb	42	0.00 ppb
3	0.00 ppb	23	0.00 ppb	43	0.00 ppb
4	0.00 ppb	24	0.00 ppb	44	0.00 ppb
5	0.00 ppb	25	0.00 ppb	45	0.00 ppb
6	0.00 ppb	26	0.00 ppb	46	0.00 ppb
7	0.00 ppb	27	0.00 ppb	47	0.00 ppb
8	0.00 ppb	28	0.00 ppb	48	0.00 ppb
9	0.00 ppb	29	0.00 ppb	49	0.00 ppb
10	0.00 ppb	30	0.00 ppb	50	0.00 ppb
11	0.00 ppb	31	0.00 ppb	51	0.00 ppb
12	0.00 ppb	32	0.00 ppb	52	0.00 ppb
13	0.00 ppb	33	0.00 ppb	53	0.00 ppb
14	0.00 ppb	34	0.00 ppb	54	0.00 ppb
15	0.00 ppb	35	0.00 ppb	55	0.00 ppb
16	0.00 ppb	36	0.00 ppb	56	0.00 ppb
17	0.00 ppb	37	0.00 ppb	57	0.00 ppb
18	0.00 ppb	38	0.00 ppb	58	0.00 ppb
19	0.00 ppb	39	0.00 ppb	59	0.00 ppb
20	0.00 ppb	40	0.00 ppb	60	0.00 ppb

Notes: No smell coming off ocean, start @ 12:40 pm. Tide on way in, No water from tide is in the pond yet. End @ 1:49 pm

Stantec

Monitoring location: Monitoring site 4
Date: Aug 29, 2017 10:06 am
Name: A. Fanjoy
Wind direction: N / NNW (very light breeze)
Weather: full sun, no cloud
Temperature: 16°C

4912 Hwy 207

Reading Jerome 631-X

1	0.001 ppm
2	0.002 ppm
3	0.001 ppm
4	0.000 ppm
5	0.000 ppm
6	0.001 ppm

Notes: Talked to friend of property owners who was looking after house while they are away. Dogs @ property but were friendly to me

Monitoring location: Monitoring site 2/3
Date: August 29, 2017 10:17 am
Name: A. Fanjoy
Wind direction: NS / NNW (very light)
Weather: full sun, no cloud
Temperature: 16°C

GPS 397 4936 & 4960 Hwy 207

Reading Jerome 631-Y

1	0.000 ppm
2	0.000 ppm
3	0.001 ppm
4	0.001 ppm
5	0.001 ppm
6	0.001 ppm

Notes: There are two civic addresses here: 4936 & 4960. took readings @ V in driveway

Monitoring location: between 2 & 3

Date: Aug 29/17

Name: A. Fancey

Wind direction: South / SW

Weather: Sunny

Temperature: 17°C

all readings are in ppm

Start 12:54 pm

Reading		Reading		Reading	
1	0.002 ppm	21	0.002	41	0.002
2	0.002	22	0.002	42	0.002
3	0.003	23	0.002	43	0.002
4	0.002	24	0.002	44	0.002
5	0.003	25	0.002	45	0.002
6	0.002	26	0.002	46	0.003
7	0.002	27	0.002	47	0.002
* 8	0.002 zeroed unit	28	0.002	48	0.002
9	0.002	29	0.002	49	0.002
10	0.002	30	0.001 • low batt started to flash.	50	0.002
11	0.002	31	0.001	51	0.002
12	0.001	32	0.002	52	0.000
13	0.002	33	0.002	53	0.002
14	0.002	34	0.002	54	0.002
15	0.001	35	0.002	55	0.002
16	0.001	36	0.002	56	0.001
17	0.004	37	0.002	57	0.002
18	0.002	38	0.002	58	0.002
19	0.002	39	0.002	59	0.002
20	0.002	40	0.002	60	0.003

end 2:04pm

Notes: * zeroed the unit. Talked to homeowner. See field book.

Stantec

Monitoring location: #4
Date: 30/08/2017
Name: DAN LEE
Wind direction: NE
Weather: OVERCAST
Temperature: 15°C

Reading
10:33
1 0.001 PPM
2 0.000 PPM
3 0.000 PPM
4 0.001 PPM
5 0.000 PPM
6 0.001 PPM
10:37

Notes: LITTLE TO NO BREEZE
BEAUFORT 2

Monitoring location: 2/3
Date: 30/08/2017
Name: DAN LEE
Wind direction: NE
Weather: OVERCAST
Temperature: 15°

Reading
10:39
1 0.002 PPM
2 0.002 PPM
3 0.002 PPM
4 0.002 PPM
5 0.002 PPM
6 0.003 PPM
10:43

Notes: BEAUFORT 2

Monitoring location: #4
Date: 30/08/2017
Name: DAN LEE
Wind direction: NE
Weather: OVERCAST, MINIMAL BREEZE
Temperature: 17°C

Reading

13:30	1	0,003 PPM
	2	0.005 PPM
	3	0.005 PPM
	4	0.007 PPM
	5	0.005 PPM
13:34	6	0.000 PPM

Notes: BEAUFORT 2

Monitoring location: 2/3
Date: 30/08/2017
Name: DAN LEE
Wind direction: NE
Weather: OVERCAST
Temperature: 17°C

Reading

13:35	1	0.001 PPM
	2	0.001 PPM
	3	0.000 PPM
	4	0.000 PPM
	5	0.002 PPM
13:40	6	0.001 PPM

Notes: BEAUFORT 2

Upwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: #1
Date: 30/08/2017
Name:
Wind direction:
Weather: OVERCAST
Temperature: 17°C

Reading
13:42 1 0.002
2 0.001
3 0.001
4 0.002
5 0.004
13:46 6 0.002

Notes: BEAUFORT 3, DOWN TO 2 BY END OF 6 READINGS

Monitoring location:
Date:
Name:
Wind direction:
Weather:
Temperature:

Reading
1
2
3
4
5
6

Notes:

Stantec

Upwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: #1

Date: 30/08/2017

Name: DAN LEE

Wind direction: NE

Weather:

Temperature:

Reading

10:46 ↓ 10:50

1 0.001 PPM

2 0.001 PPM

3 0.002 PPM

4 0.001 PPM

5 0.001 PPM

6 0.001 PPM

Notes: BEAUFORT 2

Monitoring location:

Date:

Name:

Wind direction:

Weather:

Temperature:

Reading

1

2

3

4

5

6

Notes:

Stantec

Monitoring location: 5

Date: 30/08/2017

Name: DAN LEE

Wind direction: NE

Weather: OVERCAST

Temperature: 15°C

Reading			Reading			Reading		
11:30	1	0.001 PPM	21	0.013 PPM		41	0.029 PPM	
	2	0.032	22	0.009		42	0.008	
	3	0.013	23	0.017		43	0.005	
	4	0.010	24	0.009	– LITTLE WIND AT ALL, ODOUR ONLY W/ BREEZE	44	0.003	
	5	0.019	25	0.005		45	0.003	
	6	0.011	26	0.014		46	0.031	– NE "GUST"
	7	0.005	27	0.006		47	0.002	
	8	0.003	28	0.003		48	0.002	
	9	0.002	29	0.020	– SLIGHT BREEZE W/ ODOUR	49	0.005	
	10	0.004	30	0.011		50	0.002	
	11	0.012	31	0.012		51	0.003	
	12	0.035	32	0.026		52	0.002	
	13	0.012 – WIND PICKING UP SOME HERE, STILL NE	33	0.009		53	0.008	– BREEZE A LITTLE HIGHER
	14	0.022	34	0.006		54	0.006	
	15	0.022	35	0.008		55	0.003	
	16	0.024 – SMELL NOW CONSTANT/MODERATE	36	0.008		56	0.019	– SUSTAINED BREEZE SMELL PRESENT MODERATE
	17	0.014 – WIND DIED OFF, ODOUR ONLY PRESENT W/ WIND "GUSTS"	37	0.008		57	0.006	
	18	0.014	38	0.008		58	0.023	
	19	0.013	39	0.010		59	0.019	
	20	0.014	40	0.015 – SLIGHT BREEZE NE, SLIGHT ODOUR		60	0.014	
				12:30				

Notes: FLAGGING TAPE PLACED ON CIVIC ADDRESS (#95) POLE AS SITE SPECIFIC WIND INDICATOR (5m FROM H_2S ANALYZER). UPON COMPLETION OF HOUR, IT SEEMS AS THOUGH ODOURS WERE AT THEIR STRONGEST WHEN A BREEZE WAS BLOWING FROM N.E, ELEVATED READINGS ALMOST ALWAYS FOLLOWED A "GUST" OF SOME DEGREE.

Stantec

Monitoring location: Point 6

Date: August 30/17

Name:

Wind direction: NE, gentle

Weather: Overcast

Temperature: 15°C

Reading		Reading		Reading	
10:29 1	0.00 ppb	21	0.00 ppb.	41	29.99 ppb. smell
2	7.09 ppb	22	11.75 ppb.	42	5.11 ppb.
3	0.00 ppb	23	4.81 ppb	43	5.16 ppb.
4	5.55 ppb	24	0.00 ppb.	44	0.00 ppb.
5	0.00 ppb	25	4.47 ppb.	45	21.02 ppb.
6	0.00 ppb	26	7.04 ppb.	46	18.43 ppb.
7	0.00 ppb	27	20.00 ppb (No apparent smell)	47	8.20 ppb.
8	0.00 ppb	28	5.63 ppb	48	4.79 ppb
9	0.00 ppb	29	0.00 ppb	49	5.31 ppb
10	0.00 ppb	30	0.00 ppb.	50	8.16 ppb
11	0.00 ppb	31	0.00 ppb.	51	3.85 ppb.
12	0.00 ppb	32	11.02 ppb.	52	8.35 ppb — smell.
@ 13	0.00 ppb	33	5.17 ppb	53	4.24 ppb
14	6.46 ppb	34	5.28 ppb.	54	0.00 ppb.
15	7.06 ppb.	35	3.60 ppb	55	0.00 ppb. slight smell.
16	0.00 ppb.	36	7.14 ppb.	56	0.00 ppb.
17	5.22 ppb	37	8.90 ppb.	57	3.66 ppb
18	0.00 ppb	38	3.64 ppb	58	0.00 ppb
19	0.00 ppb	39	6.59 ppb	59	0.00 ppb
20	0.00 ppb	40	3.48 ppb	60	0.00 ppb.

Notes: Odour was apparent when first onsite - 9:55 am, lessened @ 10:30, ~~only slight smell @ times~~

10:42 -> wind picking up from NE slight smell., 11:18 smell

Stantec

Downwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: 1

Date: 30/09/2017

Name: DAN LEE

Wind direction: NE BEAUFORT 1-2

Weather: OVERCAST

Temperature: 17°C

Reading			Reading			Reading	
14:15	1	0.002 PPM BEAUFORT 1	21	0.003 PPM		41	
	2	0.002	22	0.003		42	
	3	0.002	23	0.003		43	
	4	0.001	24	0.004	- SLIGHT INCREASE TO WIND	44	
	5	0.002	25	0.006		45	
	6	0.002	26	0.005		46	
	7	0.002	27	0.005		47	
	8	0.002	28	0.003		48	
	9	0.000	29	0.003		49	
	10	0.003	14:45 30	0.003		50	
	11	0.002	31			51	
	12	0.000	32			52	
	13	0.001	33			53	
	14	0.001	34			54	
	15	0.001	35			55	
	16	0.001	36			56	
	17	0.001	37			57	
	18	0.002	38			58	
	19	0.002	39			59	
	20	0.002	40			60	

Notes: NO ODOUR

Stantec

Downwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: Point 7

Date: August 30/17

Name:

Wind direction: NE (very little wind)

Weather: Overcast

Temperature: 16°C

Reading		Reading		Reading	
11:50 1	0.00 ppb	21	0.00 ppb.	41	
2	0.00 ppb	22	0.00 ppb	42	
3	0.00 ppb	23	0.00 ppb.	43	
4	0.00 ppb.	24	0.00 ppb	44	
5	0.00 ppb.	25	0.00 ppb	45	
6	0.00 ppb.	26	0.00 ppb	46	
7	0.00 ppb	27	0.00 ppb	47	
8	0.00 ppb.	28	0.00 ppb.	48	
9	0.00 ppb	29	0.00 ppb.	49	
10	0.00 ppb	30	0.00 ppb	wind stronger NNE 50	
11	0.00 ppb	31	0.00 ppb.	51	
12	0.00 ppb	32	0.00 ppb.	52	
13	0.00 ppb.	33	0.00 ppb.	53	
14	0.00 ppb	34	0.00 ppb.	54	
15	0.00 ppb.	35		55	
16	0.00 ppb	36		56	
17	0.00 ppb.	37		57	
18	0.00 ppb.	38		58	
19	0.00 ppb.	39		59	
20	0.00 ppb.	40		60	

Notes: No odour apparent at location (End of Driveway).
12:18 wind picking up out of NE still weak, slight change to NNE @ 12:24.

Stantec

Downwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: 8

Date: August 30/17

Name:

Wind direction: NE

Weather: Overcast

Temperature: 15°C

Reading		Reading		Reading	
1:26	1 0.00 ppb.	21	0.00 ppb.	41	0.00 ppb
	2 0.00 ppb	22	0.00 ppb.	42	0.00 ppb
	3 0.00 ppb.	23	0.00 ppb.	43	0.00 ppb
	4 0.00 ppb	24	0.00 ppb	44	0.00 ppb
	5 0.00 ppb.	25	0.00 ppb.	45	0.00 ppb
	6 0.00 ppb	26	0.00 ppb.	46	0.00 ppb.
	7 0.00 ppb.	27	0.00 ppb.	47	0.00 ppb
	8 0.00 ppb.	28	0.00 ppb.	48	0.00 ppb
	9 0.00 ppb.	29	0.00 ppb	49	0.00 ppb
	10 0.00 ppb	30	0.00 ppb	50	0.00 ppb
	11 0.00 ppb.	31	0.00 ppb.	51	0.00 ppb
	12 0.00 ppb.	32	0.00 ppb	52	0.00 ppb.
	13 0.00 ppb	33	0.00 ppb	53	0.00 ppb
	14 0.00 ppb.	34	0.00 ppb.	54	0.00 ppb.
	15 0.00 ppb.	35	0.00 ppb.	55	0.00 ppb.
	16 0.00 ppb.	36	0.00 ppb.	56	0.00 ppb.
	17 0.00 ppb.	37	0.00 ppb.	57	0.00 ppb.
	18 0.00 ppb.	38	0.00 ppb.	58	0.00 ppb.
	19 0.00 ppb	39	0.00 ppb.	59	0.00 ppb.
	20 0.00 ppb	40	0.00 ppb	60	0.00 ppb.

Notes: wind is light east of NE. no smell.

Stantec

Upwind Monitoring Field Sheet

Monitoring location: 1 1:06

Date: August 31/17

Name:

Wind direction: NW

Weather: Sunny, Partly cloudy

Temperature: 20°C

Reading

1 0.002 ppm

2 0.001 ppm

3 0.003 ppm

4 0.000 ppm

5 0.001 ppm

6 0.002 ppm

Notes:

Stantec

Monitoring location: 4 3:20

Date: August 31

Name:

Wind direction: NW

Weather: Sunny

Temperature: 24°C

Reading

1 0.003 ppm

2 0.002 ppm

3 0.002 ppm

4 0.001 ppm

5 0.003 ppm

6 0.002 ppm

Notes: No smell.

Upwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: 4 12:51

Date: August 31/17

Name:

Wind direction: NW

Weather: Partly cloudy

Temperature: 18°C

Reading

1 0.002 ppm
2 0.002 ppm
3 0.001 ppm
4 0.001 ppm
5 0.001 ppm
6 0.002 ppm

Notes: No smell
wind light out
of NW.

Monitoring location: 2/3 12:58

Date: August 31/17

Name:

Wind direction: NW

Weather: Partly cloudy

Temperature:

Reading

1 0.003 ppm
2 0.002 ppm
3 0.000 ppm
4 0.002 ppm
5 0.001 ppm
6 0.003 ppm

Notes: ~~No~~ No smell
wind ~~light~~ NW
moderate

Stantec

Upwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: 2/3 (V in driveway)
Date: Aug 31/17, 3:22 pm
Name: A. Fancey
Wind direction: N, moderate, steady
Weather: sun, clear skies.
Temperature:

Reading
1 0.00 ppb
2 0.00 ppb
3 0.00 ppb
4 0.00 ppb
5 0.00 ppb
6 0.00 ppb

Notes: No odour detectable by ~~nose~~ smell.

Monitoring location: 1 (end of driveway)
Date: Aug 31/17, 3:32 pm
Name: A. Fancey
Wind direction: N, moderate-light, steady
Weather: sun, clear skies
Temperature:

Reading
1 0.00 ppb
2 0.00 ppb
3 0.00 ppb
4 0.00 ppb
5 0.00 ppb
6 0.00 ppb

Notes: No odour detectable by smell
*4249 Hwy 207

~~3:32 pm~~

Stantec

Downwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: 5

Date: August 31/17

Name:

Wind direction: NW to WNW

Weather: sunny, partly cloudy

Temperature: 20°C

Reading		Reading			Reading	
1	0.001 ppm	21	0.002 ppm		41	0.002 ppm
2	0.001 ppm	22	0.002 ppm		42	0.002 ppm
3	0.001 ppm	23	0.002 ppm		43	0.003 ppm
4	0.001 ppm	24	0.002 ppm		44	0.003 ppm
5	0.001 ppm	25	0.003 ppm		45	0.001 ppm
6	0.002 ppm	26	0.002 ppm		46	0.002 ppm
7	0.002 ppm	27	0.002 ppm		47	0.002 ppm
8	0.002 ppm	28	0.002 ppm		48	0.002 ppm
9	0.002 ppm	29	0.009 ppm	NNE	49	0.001 ppm
10	0.003 ppm	30	0.009 ppm	NNE	50	0.001 ppm
11	0.003 ppm	31	0.003 ppm		51	0.001 ppm
12	0.001 ppm	32	0.002 ppm	NW	52	0.001 ppm
13	0.000 ppm	33	0.002 ppm	NW	53	0.001 ppm
14	0.002 ppm	34	0.002 ppm		54	0.001 ppm
15	0.002 ppm	35	0.002 ppm		55	0.001 ppm
16	0.003 ppm	36	0.002 ppm		56	0.001 ppm
17	0.002 ppm	37	0.002 ppm		57	0.001 ppm
18	0.002 ppm	38	0.002 ppm		58	0.002 ppm
19	0.002 ppm	39	0.002 ppm		59	0.001 ppm
20	0.001 ppm	40	0.003 ppm		60	0.001 ppm

Notes: No smell, upwind location is upwind.
slight wind shift @ 1:52 pm

Stantec

Downwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: 6 (Jimmy's)
Date: Aug 31/17
Name: A. Fancey

Wind direction: ~~NW~~ / N
Weather: Overcast, 16°C
Temperature: 16°C

Start - 10:43 am

Reading		odour?	Reading		odour?	Reading		odour?	
1	6.06 ppb		21	5.92 ppb	F, I	41	5.99 ppb	↑S	
2	21.61 ppb		22	3.27 ppb	F, I	42	13.32 ppb	I, S	
3	3.18 ppb		23	3.97 ppb	F, I	43	6.30 ppb	S, I	11:31 am
4	4.83 ppb		24	0.00 ppb	F, I, ↑S	44	4.39 ppb	F, I	
5	0.00 ppb		25	10.78 ppb	F, I	45	31.87 ppb	↑S, S	
6	1.76 ppb		26	0.00 ppb	↑S	46	8.60 ppb	F, I,	
7	10.82 ppb		27	3.24 ppb	not really	47	10.19 ppb	↑S	
8	6.48 ppb		28	3.64 ppb	↑S	48	35.59 ppb	↑S, F, I, S	11:36 am
9	11.03 ppb		29	20.27 ppb	F, I	49	17.01 ppb	F, I	
10	0.00 ppb		30	9.40 ppb	F, I	50	10.40 ppb	F, I, ↑S	
11	4.26 ppb		31	8.88 ppb	↑S	51	20.08 ppb	↑S, F, I	
12	0.00 ppb		32	8.44 ppb	F, I	52	24.95 ppb	↑S	11:40 am
13	8.13 ppb		33	0.00 ppb	none. stronger wind	53	8.23 ppb	F, I	
14	14.36 ppb		34	0.00 ppb	F, I. stronger wind	54	40.84 ppb	↑S, I, S	
15	9.14 ppb		35	8.24 ppb	↑S	55	26.56 ppb	↑S, I, S, wind gust	
16	4.71 ppb		36	16.75 ppb	F, I, ↑S	56	28.22 ppb	S, I, F	
17	4.99 ppb		37	13.18 ppb	↑S, F, I	57	23.14 ppb	S, I, F, ↑S	
18	4.38 ppb		38	4.01 ppb	F, I	58	55.89 ppb	S, I, ↑S	
19	6.38 ppb		39	6.81 ppb	↑S	59	40.33 ppb	S, I, F	
20	6.42 ppb		40	11.75 ppb	F, I	60	13.09 ppb	F, I	11:47 end

* Summa canister set up around this time.

Notes: Upon arrival, could smell an odour in driveway of MS6. (rotten eggs) Throughout monitoring period, wind was gusting @ times. Odour remained detectable sometimes faint, sometimes very strong. Couldn't smell odour as much when wind picked up

F = faint
I = intermittent
S = strong

↑S = short duration strong (peaks) (<5 s)

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Downwind Monitoring Field Sheet

Project Number 121414799

unit 631

Monitoring location: Point 7

Date: August 31/17

Name:

Wind direction: NNW

Weather: overcast, breezy

Temperature: 16°C

Reading			Reading			Reading		
11:14	1	0.002 ppm	21	0.020 ppm		41	0.008 ppm	NW
	2	0.000 ppm	22	0.020 ppm		42	0.008 ppm	NW
	3	0.001 ppm	23	0.010 ppm		43	0.008 ppm	NW
	4	0.000 ppm (smell slight)	24	0.028 ppm		44	0.013 ppm	NW ~~11:37~~
	5	0.001 ppm	25	0.027 ppm		45	0.004 ppm	NW
	6	0.003 ppm	26	0.012 ppm		46	0.004 ppm	NW
	7	0.008 ppm	27	0.018 ppm		47	0.004 ppm	NW
	8	0.000 ppm	28	0.014 ppm		48	0.021 ppm	N
	9	0.014 ppm (smell)	29	0.018 ppm		49	0.017 ppm	N
	10	0.008 ppm	30	0.029 ppm		50	0.017 ppm	N
	11	0.004 ppm	31	0.021 ppm		51	0.022 ppm	N
	12	0.008 ppm	32	0.017 ppm		52	0.011 ppm	} lighter wind N
	13	0.009 ppm	33	0.013 ppm		53	0.009 ppm	
	14	0.004 ppm	34	0.022 ppm		54	0.012 ppm	
	15	0.018 ppm N ↓	35	0.013 ppm		55	0.008 ppm	
	16	0.020 ppm	36	0.017 ppm		56	0.021 ppm N	stronger wind
	17	0.024 ppm	37	0.010 ppm easier		57	0.013 ppm NW	
	18	0.014 ppm	38	0.014 ppm		58	0.011 ppm NW	
	19	0.016 ppm	39	0.031 ppm		59	0.010 ppm NW	
11:34	20	0.114 ppm	40	0.017 ppm		60	0.014 ppm	

Notes: No Apparent smell @ 11:15. strong wind @ 11:37 From N (wind shift)

wind swift. NW

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Downwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: Monitoring Site 8

Date: Aug 31, 2017

Name: A. Fancey

Wind direction: NW / N changing to NNW almost W @ 31-35 wind N @ reading 37 start 2:29

Weather: sun & cloud, light wind

Temperature:

sampled @ end of driveway by road

Start 12:54 pm

Reading		odour?	Reading		odour?	Reading		odour?
1	0.00 ppb	—	1:17pm 21	3.75 ppb	F, I	41	0.002 ppm	none
2	0.00 ppb	—	22	4.70 ppb	—	42	0.001 ppm	none
3	4.38 ppb	F, I	23	5.71 ppb	F, I	43	0.001 ppm	none
4	0.00 ppb	—	24	0.00 ppb	none	44	0.001 ppm	none
5	4.58 ppb	F, I	25	0.00 ppb	none	45	0.001 ppm	none
6	0.00 ppb	none	26	0.00 ppb	none	46	0.002 ppm	none
7	0.00 ppb	none	27	0.00 ppb	none	47	0.002 ppm	none
8	4.74 ppb	F, I	28	0.00 ppb	none	48	0.002 ppm	none
9	5.59 ppb	F, I	29	0.00 ppb	none	49	0.002 ppm	none
10	3.73 ppb	F, I	30	0.00 ppb	F, I	50	0.002 ppm	none
11	3.58 ppb	F, I	31	0.00 ppb	none	51	0.002 ppm	none
12	4.66 ppb	F, I	32	0.00 ppb	none	52	0.001 ppm	none
13	6.55 ppb	F, I	33	0.00 ppb	none	53	0.001 ppm	none
14	3.53 ppb	not really	34	4.52 ppb	F	54	0.002 ppm	none
15	0.00 ppb	none	35	4.15 ppb		55	0.002 ppm	none
16	0.00 ppb	none	36	10.25 ppb	*stopped. sensor oxygen msg	56	0.001 ppm	none
17	0.00 ppb	none	37	0.002 ppm	start= 2:29 pm	57	0.002 ppm	none
18	0.00 ppb	F, I	38	0.002 ppm	no odour	58	0.002 ppm	none
19	4.42 ppb	F, I	39	0.002 ppm	none	59	0.003 ppm	none
20	3.61 ppb	F, I	40	0.002 ppm	none	60	0.003 ppm	none

slight wind change

end 2:49 pm

Notes: Wind gusty @ times.

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Odour
F = faint
I = intermittent
S = strong
↑S = strong peak (<5s)

Monitoring location: 6 (Jimmy's)

Date: Aug 31 - Sept 1 /17

Name: A. Francey

Wind direction: NW

Weather: some cloud cover, some stars visible

Temperature: 16°C

start = 11:38 pm

Reading		odour?	Reading		odour?	Reading		odour?
1	6.09 ppb	S	21	34.48 ppb	S	41	33.98 ppb	S
2	55.35 ppb	S	22	18.09 ppb	S, F, I	42	40.71 ppb	S
3	5.79 ppb	S, I	23	67.79 ppb	S	43	5.73 ppb	S, I
4	5.05 ppb	S, I	24	18.58 ppb	S, I	44	13.15 ppb	S
5	91.51 ppb	S	25	28.07 ppb	F, I, S	45	19.17 ppb	S
6	74.62 ppb	S	26	76.73 ppb	S	46	17.58 ppb	S
7	0.147 ppb	S, I, F	27	33.58 ppb	S	47	22.13 ppb	S
8	32.91 ppb	S, I	28	21.50 ppb	S	48	14.09 ppb	S
9	46.67 ppb	S, I	29	61.65 ppb	S	49	26.72 ppb	S
10	35.30 ppb	S, I	30	22.19 ppb	S	50	0.00 ppb	F, I
11	30.34 ppb	S, I	31	36.07 ppb	S	51	52.55 ppb	S
12	21.08 ppb	S, I	32	25.70 ppb	S	52	22.79 ppb	S
13	12.35 ppb	S, I, F	33	12.19 ppb	S	53	31.78 ppb	S
14	11.06 ppb	S	34	21.76 ppb	S	54	36.01 ppb	S
15	27.14 ppb	S	35	23.22 ppb	S	55	26.08 ppb	S
16	103.5 ppb	S	36	63.92 ppb	S	56	11.37 ppb	S, I
17	9.71 ppb	S, I	37	32.67 ppb	S	57	7.35 ppb	S, I
18	45.50 ppb	S, I	38	12.30 ppb	S	58	9.62 ppb	S, I
19	33.45 ppb	S, I	39	4.37 ppb	S	59	37.43 ppb	S
20	41.02 ppb	S	40	35.26 ppb	S	60	30.46 ppb	S, I

end = 12:40 pm

Notes: Strong odour in the air upon arrival on site & throughout monitoring period

Downwind Monitoring Field Sheet

Project Number 121414799

Monitoring location: Location 7

Date: August 31/Sept 1st, 2017

Name: M Malone

Wind direction:

Weather: Night, Partly cloudy, noon

Temperature: 16°C

Reading			Reading			Reading		
11:40	1	0.010 ppm	21	0.004 ppm	41	0.008 ppm
	2	0.008 ppm	22	0.004 ppm	42	0.006 ppm
	3	0.006 ppm	23	0.005 ppm	43	0.004 ppm
	4	0.004 ppm	24	0.010 ppm	44	0.000 ppm
	5	0.003 ppm	25	0.014 ppm	45	0.006 ppm
	6	0.003 ppm	26	0.012 ppm	46	0.002 ppm
	7	0.005 ppm	27	0.014 ppm	47	0.009 ppm
	8	0.003 ppm	28	0.008 ppm	48	0.008 ppm
	9	0.002 ppm	29	0.006 ppm	49	0.006 ppm
	10	0.008 ppm	30	0.009 ppm	50	0.007 ppm
	11	0.004 ppm	31	0.009 ppm	51	0.007 ppm
	12	0.004 ppm	32	0.007 ppm	52	0.009 ppm
	13	0.006 ppm	33	0.009 ppm	53	0.006 ppm
	14	0.005 ppm	34	0.012 ppm	54	0.007 ppm
	15	0.006 ppm	35	0.010 ppm	55	0.003 ppm
	16	0.006 ppm	36	0.008 ppm	56	0.004 ppm
	17	0.002 ppm	37	0.012 ppm	57	0.004 ppm
	18	0.008 ppm	38	0.004 ppm	58	0.006 ppm
	19	0.004	39	0.005 ppm	59	0.004 ppm
	20	0.006	40	0.006 ppm	60	0.005 ppm

Notes: Smell not as noticeable @ this location. Very bad close to bridge. Wind from NW.

Stantec

APPENDIX D
LAB ANALYSIS REPORT

Maxxam
A Bureau Veritas Group Company

Your Project #: 121414799
Your C.O.C. #: 32578

Attention:Gillian Hatcher

Stantec Consulting Ltd
40 Highfield Park Drive
Suite 102
Dartmouth, NS
B3A 0A3

Report Date: 2017/09/19
Report #: R4720579
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7J1545
Received: 2017/09/02, 14:00

Sample Matrix: AIR
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Canister Pressure (TO-15)	3	N/A	2017/09/18	BRL SOP-00304	EPA TO-15 m
Hydrogen Sulfide	1	N/A	2017/09/05	CAM SOP-00220	GC/FPD
Hydrogen Sulfide	2	N/A	2017/09/06	CAM SOP-00220	GC/FPD

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Your Project #: 121414799
Your C.O.C. #: 32578

Attention:Gillian Hatcher

Stantec Consulting Ltd
40 Highfield Park Drive
Suite 102
Dartmouth, NS
B3A 0A3

Report Date: 2017/09/19
Report #: R4720579
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7J1545
Received: 2017/09/02, 14:00

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Cristina (Maria) Bacchus, Project Manager
Email: CBacchus@maxxam.ca
Phone# (905)817-5763

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B7J1545
Report Date: 2017/09/19

Stantec Consulting Ltd
Client Project #: 121414799
Sampler Initials: MM

RESULTS OF ANALYSES OF AIR

Maxxam ID		FBF489	FBF490	FBF491	
Sampling Date		2017/08/30	2017/08/31	2017/08/31	
COC Number		32578	32578	32578	
	UNITS	**SAMPLE 1/1440**	**SAMPLE 2/330**	**SAMPLE 3/2243**	**QC Batch**
Volatile Organics					
Pressure on Receipt	psig	0	0	0	5169195
QC Batch = Quality Control Batch					

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Maxxam Job #: B7J1545
Report Date: 2017/09/19

Stantec Consulting Ltd
Client Project #: 121414799
Sampler Initials: MM

COMPRESSED GAS PARAMETERS (AIR)

Maxxam ID		FBF489	FBF489	FBF490	FBF491		
Sampling Date		2017/08/30	2017/08/30	2017/08/31	2017/08/31		
COC Number		32578	32578	32578	32578		
	UNITS	**SAMPLE 1/1440**	**SAMPLE 1/1440 Lab-Dup**	**SAMPLE 2/330**	**SAMPLE 3/2243**	**RDL**	**QC Batch**
Gas							
Hydrogen sulfide	ppmv	<0.5	<0.5	<0.5	<0.5	0.5	5151041

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7J1545
Report Date: 2017/09/19

Stantec Consulting Ltd
Client Project #: 121414799
Sampler Initials: MM

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B7J1545
Report Date: 2017/09/19

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121414799
Sampler Initials: MM

			Method Blank		RPD	
QC Batch	**Parameter**	**Date**	**Value**	**UNITS**	**Value (%)**	**QC Limits**
5151041	Hydrogen sulfide	2017/09/06	<0.4	ppmv	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Maxxam Job #: B7J1545
Report Date: 2017/09/19

Stantec Consulting Ltd
Client Project #: 121414799
Sampler Initials: MM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Angel Guerrero, Team Leader, VOC Air

Tom Mitchell, B.Sc, Supervisor, Compressed Gases

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