EMISSIONS TEST PROTOCOL

J.H. BAXTER & CO.

EMISSIONS TESTING ON VAPOR PHASE CARBON UNIT AND PENTACHLOROPHENOL STACK

Lane Regional Air Protection Agency
Standard Air Contaminant Discharge Permit: 200502

Prepared for:

J.H. Baxter & Co.
3494 Roosevelt Blvd.
Eugene, OR 97402

Prepared by:

Bison Engineering, Inc.
3143 East Lyndale Avenue
Helena, MT 59601
(406) 442-5768
www.bison-eng.com

Project Number: JHB221625
Protocol Submitted: October 19, 2021

STAC STACK TESTING ACCREDITATION COUNCIL
A2LA ACCREDITED TO ASTM D7036 ONLY CERT #4675.01
BISON ENGINEERING, INC.

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PROTOCOL ENDORSEMENT

Bison Engineering, Inc. certifies that emissions testing will be conducted as described in this protocol. Every effort will be made to obtain reliable, repeatable, and representative data using approved test methods and following procedures listed in Bison Engineering, Inc.'s quality manual and American Society for Testing and Materials (ASTM) D7036-04.

Project Manager: Zach Harding

Title: Source Testing Director

Signature: 

Date: 10/19/2021

1.0 INTRODUCTION

J.H. Baxter & Co. (Baxter) has contracted Bison Engineering, Inc. (Bison) to perform emissions testing at their wood preservation facility in Eugene, Oregon. The Lane Regional Air Protection Agency (LRAPA) requested emissions testing on three of the facility's emission units: the vapor phase carbon (VPC) unit while using the creosote preservative solution, the pentachlorophenol (PCP) stack, and the ammoniacal copper zinc arsenate (ACZA) scrubber exhaust. The ACZA scrubber exhaust was tested in September of 2021.

The Baxter facility is subject to the provisions of LRAPA Standard Air Contaminant Discharge Permit (ACDP) number 200502. The test program outlined in this document will provide measured mass emission rates of specific toxic air contaminants (TACs) to support the development of Baxter's Cleaner Air Oregon (CAO) emissions inventory. This test plan is designed to fulfill the stack testing requests outlined in the letter sent to Baxter by LRAPA on January 7, 2021.

As requested by LRAPA, the pollutants to be measured include dioxins and furans, polycyclic aromatic hydrocarbons (PAHs), PAH-derivatives, and total non-methane volatile organic compounds (NM-VOCs). Measured flue gas moistures, flow rates and an assumed ambient molecular weight will be used to determine pollutant mass emission rates.

Testing will be performed in accordance with LRAPA requirements and follow EPA methodologies found in Title 40, Code of Federal Regulations (CFR) Part 60, Appendix A. Table 1 presents the pollutants to be quantified alongside reporting units.

Table 1: Source Test Pollutants and Units

J.H. Baxter & Co. Eugene, Oregon Source Test Pollutants and Units		
Source	**Pollutant**	**Reporting Units**
VPC inlet	NM-VOCs	ppmvw, lb/hr
VPC outlet	NM-VOCs	ppmvw, lb/hr, lb/ft^3 of treated wood
	Dioxins/Furans	ng/dscm, lb/hr, lb/ft^3 of treated wood
	PAHs	
	PAH-derivatives	
PCP outlet	Dioxins/Furans	ng/dscm, lb/hr, lb/ft^3 of treated wood
	PAHs	
	PAH-derivatives	

lb/ft^3 of treated wood – pounds per cubic foot of treated wood produced
ppmvw – parts per million by volume wet
ng/dscm – nanograms per dry standard cubic meter
lb/hr – pounds per hour

2.0 KEY PERSONNEL AND CONTACT INFORMATION

Emissions testing will be performed by Bison's Helena, Montana-based source testing team. Zach Harding, Source Testing Director, will serve as project coordinator and the primary client contact point for this test campaign. Conor Fox, QI, Project Scientist, will lead on-site testing. Adam Bender, QI, Project Scientist; Jacob Rankin, QI, Environmental Engineer; and Jackson Wilkins, Staff Scientist, will assist Mr. Fox on-site. Additional field team members may be assigned to cover continuous sampling periods longer than 12 hours in two shifts. Lynn Dunnington, Environmental Analyst, will perform a quality assurance review of all test data and the report. Mr. Harding will perform the project manager's review and submit the final report.

Facility:	**J.H. Baxter & Co.**
Address:	3494 Roosevelt Blvd. Eugene, OR 97402
Contact:	Don Hoffman
Phone:	(541) 689-3801
Email:	dhoffman@jhbaxter.com
Air Quality Consultant:	**Maul Foster & Alongi, Inc.**
Address:	3140 NE Broadway Street Portland, OR 97232
Contact:	Brian Snuffer Zukas
Phone:	(503) 314-8589
Email:	bsnuffer@maulfoster.com
Testing Consultant:	**Bison Engineering, Inc.**
Address:	3143 East Lyndale Avenue Helena, MT 59601
Contact:	Zach Harding
Phone:	(406) 431-8930
Email:	zharding@bison-eng.com
State Authority:	**Lane Regional Air Protection Agency**
Address:	1010 Main Street Springfield, OR 97477
Contact:	Max Hueftle
Phone:	(541) 736-1056
Email:	max@lrapa.org
Contract Laboratory:	**ALS Environmental**
Address:	1435 Norjohn Court Burlington, Ontario, Canada L7L 0E6
Contact:	Ron McLeod or Ancy Sebastian
Phone:	(905) 331-3111
Emails:	ron.mcleod@alsglobal.com ancy.sebastian@alsglobal.com

3.0 SUMMARY OF TEST PROGRAM

3.1 Facility Description

Baxter owns and operates a wood preservation facility in Eugene, Oregon. The facility treats multiple commodities including poles, railroad ties, glued laminated timbers (i.e., glulams and powerlams), pilings, posts, original equipment manufacturer parts and components, and miscellaneous dimensional lumber products. The wood products are treated with water- or oil-based preservative solutions in a high pressure and high temperature environment. Oil-based preservative solutions currently used by the facility are pentachlorophenol (PCP), creosote, and a 50/50 blend of creosote and Bunker C oil (50/50). The only water-based preservative currently used at the facility is ACZA, trade name "Chemonite".

3.2 Process Information

The facility receives pre-cut, green and kiln-dried wood from off-site locations by truck and the adjacent railroad. Unloaded material can be sent to the woodworking area for incising prior to treatment or directly to the treatment process. On-site lumber drying kilns can also be used to reduce the moisture content of green wood if required by the predetermined treatment process.

Untreated commodities are packed into bundles on a tram. The bundle configurations vary depending on the commodity type and which wood treating vessel (referred to as a "retort") will be used. A typical retort charge can range from two to 19 individual trams. After tram loading is complete, the entire tram is rolled into one of five retorts and sealed. Each retort has a unique identification number and utilizes the treatment solution(s) as follows:

- Retort 81: Creosote, 50/50, or PCP
- Retort 82: ACZA or PCP
- Retort 83: Creosote or 50/50
- Retort 84: ACZA
- Retort 85: PCP

PCP is the most frequently used preservative solution. Individual treatment process steps may vary depending on the preservative solution used and product specifications.

Once the retort is sealed, a vacuum pump is activated to allow for the preservative solution to fill the retort. A work tank is used to supply the retort with the desired preservative solution. After filling is complete, while maintaining the vacuum, the retort temperature is increased to boultonize the wood product.

Vapors generated during the conditioning process are routed to a condenser. The condenser removes liquid from the exhaust stream. Liquids removed by the condenser are routed to a hot well (i.e., sealed vessel) prior to flowing, via gravity, to a downstream collection sump. An open top catch basin is located directly below the hot well for maintenance purposes only. Process liquids collected in the sump are delivered to a recovery tank prior to entering the process water treatment system. The dried exhaust stream is routed to a knock-out drum prior to exhausting to atmosphere through the PCP stack. The dried exhaust stream during heavy oil (i.e., creosote or 50/50) charges

are routed to a downstream VPC ventilation system for control of VOC emissions prior to emitting to atmosphere.

Two on-site boilers supply steam for heating during the wood treatment process: the Kewanee boiler and the Stone Johnston boiler. The boilers can be fueled by either natural gas during normal operation, or by supplemental no. 2 distillate fuel oil.

After conditioning is complete, the retort is drained under atmospheric pressure and sealed. Compressed air is held for a predetermined amount of time at a specific pressure point, depending on product specifications, and then pressure is released. The retort is then filled with preservative solution for a second time. The volume of air displaced as the pressure is released and the retort is filled is routed to the headspace of the specified PCP work tank.

Once the retort is filled for a second time, the pressure inside the retort is increased using a high-pressure pump. During this pressure period, no process vapors or preservative solution exits the retort. Pressure is then released during the expansion bath period when a portion of the preservative solution flows out of the wood and retort, and back into the work tank. At the same time, the vacuum is activated and the temperature of the preservative solution inside the retort is increased. Vapors generated during the expansion bath period are routed to the downstream condenser, similar to the conditioning process described above.

Following the expansion bath period, the vacuum is released, and fresh air is drawn into the retort at atmospheric conditions. Preservative solution remaining in the retort is pumped back to the work tank for future use. After the retort is emptied, the vacuum is re-activated, and the steam cleanup process begins. The steam cleanup process is initiated by injecting live steam, or steam-under-pressure, into the retort. The live steam helps to recover preservative solution remaining in the retort. The volume of air removed by the vacuum pump is routed to the downstream condenser, similar to the conditioning process described above.

During heavy oil treatment cycles, process exhaust during steam cleanup is routed to the live steam pot. The live steam pot is used to condense process liquids, which are routed to the heavy oil recovery tank for re-use. Exhaust from the live steam pot is routed to the headspace of work tank no. 4. The presence of the downstream control device (i.e., the VPC ventilation system), which is connected to the headspace of work tank no. 4, causes a negative pressure in the vacuum system. The negative pressure prevents the last remaining preservative solution in the retort from being collected. The negative pressure is released during the final five to 10 minutes of the steam cleanup cycle to allow for the collection of the last remaining preservative solution in the retort. During this time, exhaust from the live steam pot is routed to the bypass vent stack.

After steam cleanup of the retort is complete, the final vacuum system is initiated by turning on the vacuum pump to further extract excess preservative solution for re-use. Once the final vacuum is released, the retort doors are cracked open and the vacuum pump is then turned on. The vacuum pump pulls in fresh air allowing for the charge to cool inside the retort. This process is referred to as the “crack-and-vac” cycle. The volume of air displaced by the vacuum pump is routed to the downstream condenser, similar to the conditioning process described above.

Next, the cooled tram is rolled onto the drip pad to air dry until the treatment engineer certifies that the charge is no longer dripping. Treated bundles are loaded onto outbound trucks or trains for customers. If no orders are awaiting shipment, treated bundles are moved to designated areas

in the storage yard for future shipment offsite. The facility is permitted to operate 24 hours a day, throughout the year, but actual days of operation correspond to demand for product.

3.3 Emission Source Descriptions

3.3.1 VPC Emission Unit

The VPC stack is in the southern tank farm area and serves as the exhaust for the vapor phase carbon unit.

Emissions from Retorts 81 and 83, as well as fumes from tanks 2, 3, 4, 7, and 27 are routed through the ductwork to the ground-level carbon adsorption unit for control of VOC emissions. The carbon adsorption unit exhausts through a vertical, circular exhaust stack. The stack is 10.25 inches in diameter and flow rates are expected to be around 1,800 actual cubic feet per minute (acfm). The stack outlet will be accessed via scaffolding built specifically for this testing. Suitable sampling ports free from equipment obstruction will be installed by Baxter prior to testing. Bison proposed the addition of a three foot stack extension on the VPC outlet to improve the potential for meeting Method 1A specifications. This proposed extension and port placement is displayed in Figure 1. Bison will take flow measurements from the top ports, 50 inches up, and sample for target pollutants at the ports 30 inches up.

Sampling ports on the inlet side of the carbon adsorption unit will likely be accessed from the ground. No inlet sampling ports exist at this time. Two orthogonal sampling ports will be installed on a section of inlet ductwork that is approximately 12 inches in diameter and in a location that meets EPA Method 1A requirements. The inlet ductwork is shown in Figure 2, below. The yellow arrow indicates the proposed location for the inlet sampling ports.

Figure 1: VPC Outlet and Sampling Location

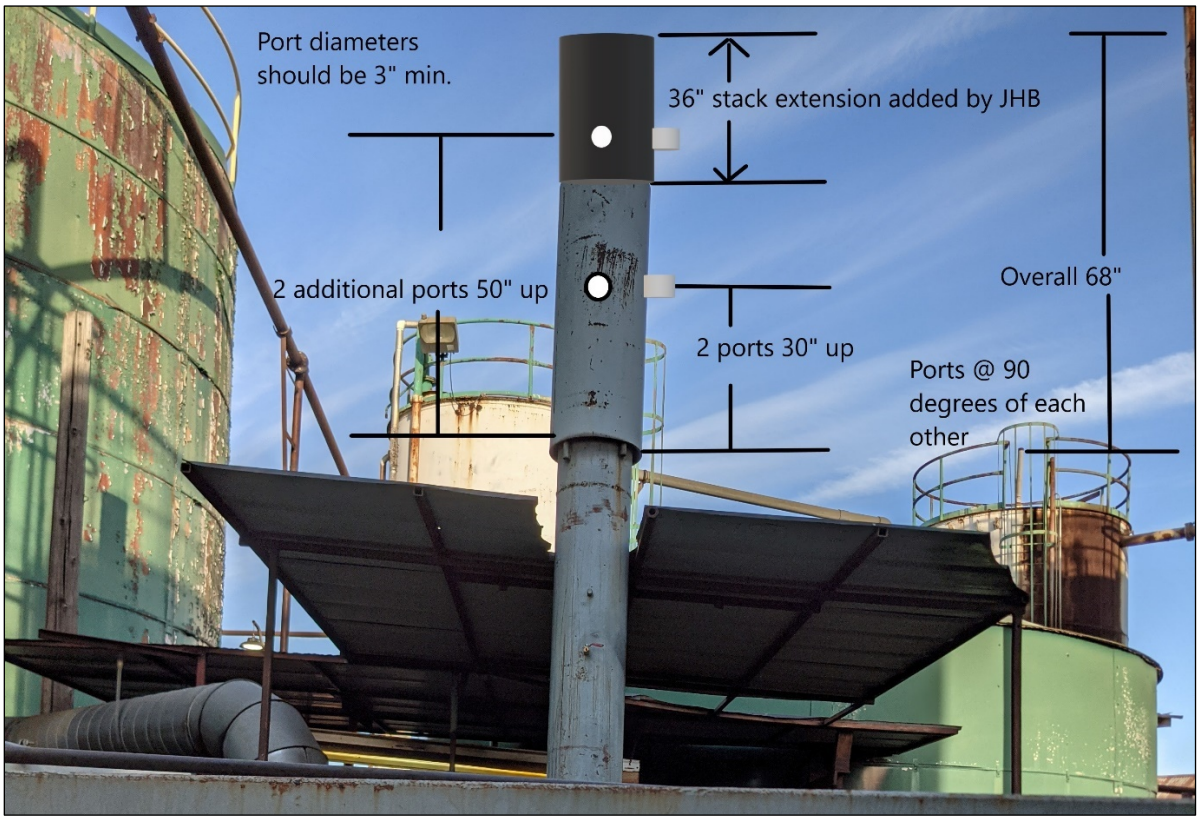


Figure 2: VPC Inlet Ductwork

3.3.2 PCP Emission Source

The PCP stack is located in the north tank farm area. Dried exhaust from the condensers connected to Retorts 82 and 85 are routed to a knock-out drum prior to exhausting to atmosphere through the PCP stack. The PCP stack is vertically oriented with a circular diameter of approximately ten inches. Photos of the PCP stack outlet are provided in Figure 3. The release height of the PCP stack is approximately 25 feet above ground level. Flue gas temperatures will vary per treatment cycle but are expected not to exceed 240°F. Flow rates are unknown and will vary per treatment cycle. Certain treatment cycles will have no associated flow. If there are periods of no flow rate, Bison will pause sampling as it is not possible to perform isokinetic sampling with no flow. Stack access will be very challenging due to multiple obstructions and overhead powerlines. Baxter plans to re-route the PCP stack exhaust using temporary ductwork to a nearby tank roof with side rails, accessible via ladder. Pictures of the sample location and setup will be included in the final report.

Figure 3: PCP Outlet and Sampling Location

3.4 Test Plan

Testing will be performed in general accordance with EPA testing methodology and with the Oregon Source Sampling Manual.

3.4.1 VPC Stack Test Plan

Sampling at the VPC unit inlet and outlet will be conducted according to the test matrix below. Continuous sampling of two complete treatment cycles (i.e., starting with the retort filling treatment cycle and ending after completing the crack-and-vac treatment cycle) will be conducted as two distinct sampling runs. Exact run times will depend on which commodity will be treated and the required treatment cycles. The individual treatment cycles and expected temperatures per treatment cycle are presented in Appendix B, Chart 1.

The VPC stack test will be conducted during a creosote treatment cycle in Retort 83 per the conditions set forth in the LRAPA letter issued to Baxter on January 7, 2021.

The activated carbon housed within the vapor phase carbon unit was last replaced on September 2, 2021. Thus, the carbon bed will be considered appropriately aged (not fresh or within two months of needing replacement) at the time of testing.

Table 2: VPC Test Matrix

J.H. Baxter & Co. VPC Stack Proposed Test Matrix 2021			
Source	**Method**	**Parameter**	**Details**
VPC inlet	Method 1A	Sampling location and arrangement	One measurement per source prior to sampling.
	Method 2C	Volumetric flow	Differential pressure measurements once per hour for duration of treatment cycle.
	Method 4	Moisture	Two test runs simultaneous with Method 25A.
	Method 25A	NM-VOCs	Two test runs (actual run time to coincide with start and end of treatment cycle).
VPC outlet	Method 1A	Sampling location and arrangement	One measurement prior to sampling. Sampling arrangement pertains to Method 23.
	Method 2C	Volumetric flow	Differential pressure measurements simultaneous to Method 23.
	Method 4	Moisture	Incorporated within Method 23.
	Method 25A	NM-VOCs	Two test runs (actual run time to coincide with start and end of treatment cycle).
	Modified Method 23	Dioxins/Furans/ PAHs	
	Method 205	Gas dilution system verification	Performed once prior to sampling.

Bison proposes using a modified EPA Method 23 sampling train to quantify dioxins, furans and PAHs at the VPC stack outlet. The list of TAC target analytes (see Appendix C) was derived from Oregon Administrative Rule (OAR) 340-245-8020, Table 2.

Bison will report results for the 17 individual dioxin/furan congeners known to be hazardous to human health, as well as totals for each of the eight standard classes of congeners (e.g., total tetrachlorodibenzo-p-dioxins, total hexachlorodibenzofurans, etc.) listed in Method 23.

On January 14, 2020, the EPA published a proposed revision to Method 23 that expands the list of target compounds to include PAHs. Although this version of Method 23 has not yet been promulgated, Bison believes this method will become standard practice for PAH source sampling and that it will provide the most reliable results and the best detection limits for the proposed tests. Bison will follow the field sampling portion of the proposed Method 23 during on-site testing. Bison has worked with Ron McLeod of ALS Environmental Ontario, an expert who helped write the new version of Method 23, to come up with a modified Method 23 strategy that will accurately quantify most of the PAH analytes requested for this testing. Ten of the PAH-derivatives in the OAR list are not offered by ALS Environmental and will not be quantified.

The recommended minimum sample volume for Method 23 is 2.5 dry standard cubic meters (dscm); this volume is expected to be met and surpassed during the proposed test runs. Long-duration test runs come with unique challenges. Bison plans to sample at the slowest possible rate while maintaining isokinetic sampling to avoid issues with resin trap saturation and high sample train vacuum. One extra XAD trap per run will be held on-site in case a mid-run swap is necessary. Bison will not perform more than one XAD trap replacement per run to ensure detection limits remain sufficient. Bison also plans to use oversized silica gel impingers to avoid over-expansion and breakage of the glass equipment.

Due to the small diameter of the outlet stack, equipment obstructions and impediments to stack access near the sampling location, stack flue gas for Method 23 analysis will be extracted and transported to the sampling train via a short flexible heated sampling line. The flexible transfer line will be rinsed and the rinsate will be included as part of the front-half sample fraction. Due to the small size of the outlet stack, Bison requests a deviation to conduct Method 23 sampling from a single representative point if the flow profile appears consistent throughout the duct during the pre-test traverse.

Inlet/outlet NM-VOC measurements will be conducted via EPA Method 25A. Due to the close proximity of the inlet and outlet sampling locations, two separate analyzers will be operated simultaneously from a single trailer. Bison's Method 25A analyzers operate on the principal of flame ionization detection (FID). There will be a several minute break in the NM-VOC run data every hour to perform hourly drift checks with zero and mid-level calibration gases as required by Method 25A. Inlet and outlet NM-VOC results will be used in conjunction with flow and moisture data to calculate VOC destruction efficiency of the VPC unit on a mass basis. Bison will use an assumed ambient molecular weight for both the inlet and outlet locations. Due to fire safety concerns on the inlet side, the Method 25A heated probe (250°F) will remain on the outside of the inlet stack. A short section of unheated stainless steel tubing will be attached to the tip of the heated probe for extraction of flue gas.

3.4.2 PCP Stack Test Plan

The proposed test matrix for the PCP stack is given in Table 3. Continuous sampling during two complete PCP treatment cycles will be completed. Exact run times will depend on which commodity will be treated and the required treatment cycles. The individual treatment cycles and expected temperatures and periods of flow per treatment cycles are presented in Appendix B, Chart 2. Sampling will be paused during treatment steps with no flow. Bison's suggested Method 23 sampling strategy is the same for the VPC and PCP stacks. Due to the small diameter of the PCP stack, Bison requests a deviation to conduct Method 23 sampling from a single representative point if the flow profile appears consistent throughout the duct during the pre-test traverse.

Table 3: PCP Stack Test Matrix

J.H. Baxter & Co. PCP Stack Proposed Test Matrix 2021			
Source	**Method**	**Parameter**	**Test Plan and Comments**
PCP Stack	Method 1A	Sampling location and arrangement	One measurement prior to sampling. Sampling arrangement pertains to Method 23.
	Method 2C	Volumetric flow	Differential pressure measurements simultaneous to Method 23. An assumed ambient molecular weight of 29 will be used for flow calculations.
	Method 4	Moisture	Incorporated within Method 23.
	Modified Method 23	Dioxins/Furans/ PAHs	Two test runs (actual run time to coincide with start and end of treatment cycle).

3.4.3 PCP Vacuum System Verification of Permanent Total Enclosure

Bison will perform a visual inspection of the PCP vacuum system and associated ductwork to determine whether the capture efficiency (CE) can be assumed to be 100 percent (%). The PCP vacuum system and supporting ductwork does not represent or include a typical enclosure. As a result, visual inspection of the PCP vacuum system and associated ductwork, and direction of airflow (if any natural draft openings are observed) are the only criteria that can be used to make the permanent total enclosure (PTE) determination. Direction of air flow will be monitored during the PTE verification using smoke to show the direction of airflow during the "crack and vac" cycle of Retort 85 at the retort door location. The "crack and vac" smoke test will be documented by video.

3.5 Test Schedule

Planning is underway for a December 2021 test. Exact test dates are yet to be determined (TBD) and will depend on commodity availability and treatment schedules. Testing is expected to follow a timeline similar to the schedule outlined in Table 4.

Table 4: Test Schedule

J.H. Baxter & Co. December 2021 Emissions Testing Proposed Test Schedule			
Day	**Date**	**Details**	
1	TBD	Begin travel from Helena, Montana, to Eugene, Oregon.	
2	TBD	Finish travel. On-site set-up, calibrations, and preparations.	
3	TBD	VPC	Run 1 (for entire treatment cycle).
4	TBD	VPC	Run 2 (for entire treatment cycle).
		PCP	Run 1 (for entire treatment cycle).
5	TBD	PCP	Run 2 (for entire treatment cycle).
6	TBD	Return travel from Eugene, Oregon, to Helena, Montana.	

The schedule above assumes that testing proceeds as planned with minimal interruptions or process downtime. Bison will inform LRAPA of any changes to the test plan, specified methods and/or schedule ahead of testing. Any deviations from the approved test plan will be explained, along with an evaluation of impact, in the final test report. The final test report will be submitted to LRAPA on or before 60 days after the conclusion of testing.

3.6 Responsibilities of Plant

Baxter will be responsible for:

- Ensuring treatment cycles and production on the scheduled test day are representative of the proposed test program.
- Providing safe and secure access to the sampling ports.
- Collecting and recording all pertinent process data in 15-minute intervals during test runs and providing them to Bison for use in post-test calculations. Operational parameters to be recorded include: treatment cycle start and end times, untreated wood volume in cubic feet per charge (ft^3/charge), the species of wood treated, volume of preservative solution per treatment cycle (gal/cycle), the work tank number that supplied the preservative solution, total volume of preservative solution per charge (gal/charge), and temperature per treatment cycle. This information is typically maintained in the facility treatment record database.
- Ensuring the process operates normally during testing.
- Ensuring safe access to all sampling locations.
- Working with Bison to ensure adequate on-site power is available to support the test campaign.
- Verifying sampling ports at the inlet (VPC stack only) and outlet (both VPC stack and PCP stack) are free of obstructions and have safe access.

Any adjustments to treatment cycles or emission control parameters during the source performance tests, without consulting with source testing personnel, equipment vendors or consultants, may render the performance test invalid.

3.7 Plant Entry and Safety Requirements

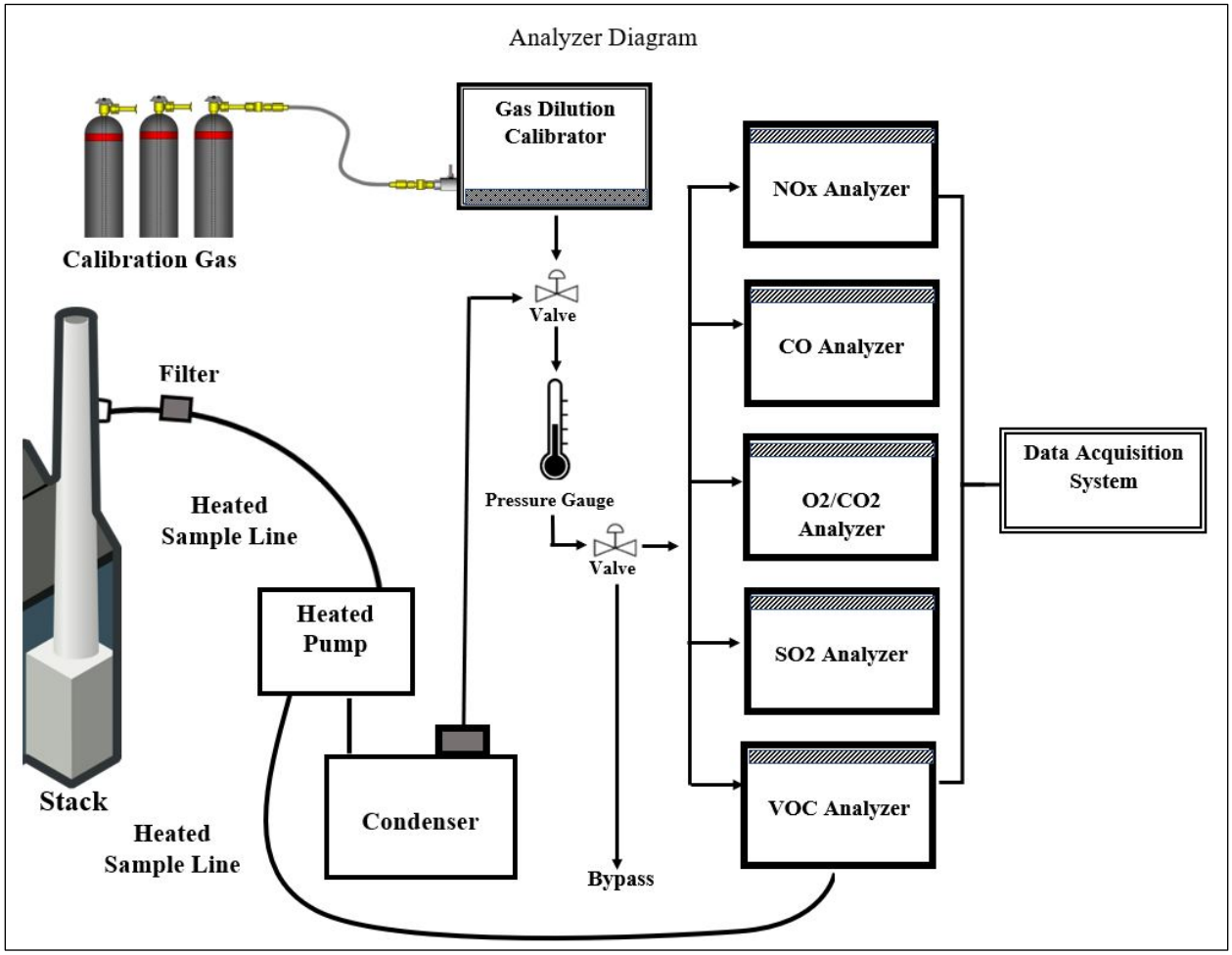
Bison personnel receive annual training on and will adhere to Bison's Safety and Health Management System. They will also comply with all facility safety requirements and will attend Baxter's standard safety briefing for visitors. Bison crew members will complete an on-site job safety analysis prior to the start of work and provide their own personal protective equipment, including hard hats, gloves, long sleeves, high visibility/reflective vests, steel toe boots, safety glasses, and hearing protection. Respirators with combined organic vapor cartridges and particulate filters will be required when source testers are near stack outlets or conducting the PTE test.

4.0 EMISSION TEST METHODS AND PROCEDURES

4.1 Instrumentation and Equipment

Bison will use an Environics gas dilution system for analyzer calibrations. Dilutions are performed according to EPA reference method 205. All analyzers are checked for leaks, system bias and drift, before and after testing. Figure 4 is a diagram of Bison's typical equipment setup for gaseous sampling.

Figure 4: Gaseous Analyzer Schematic



4.2 Test Methods and Descriptions

Testing will be performed using the following EPA test methods as described in 40 CFR 60, and as approved and adopted by the appropriate regulatory agency.

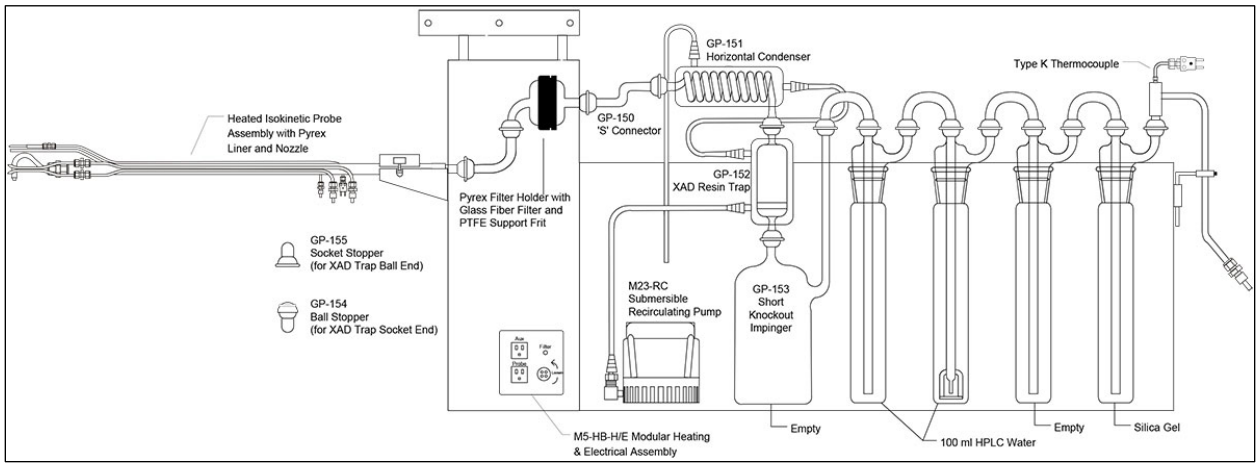
EPA Reference Method 1A, "Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts." The objective of Method 1A is to determine a suitable location for testing and to determine the velocity and/or sample points for the source when the stack/duct is less than 12 but greater than four inches in diameter.

EPA Reference Method 2C, "Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts (Standard Pitot Tube)." The objective of Method 2C is to determine volumetric flow in a source when the stack/duct is less than 12 but greater than four inches in diameter. The average velocity, temperature, static pressure, and source area are used to calculate volumetric flow for the source.

EPA Reference Method 4, "Determination of Moisture Content in the Stack Gases." The objective of Method 4 is to determine the moisture content of a gas stream.

Modified EPA Reference Method 23, "Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans from Stationary Sources." The objective of Method 23 is to determine polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) emissions from a stationary source. Bison proposes using a modified Method 23 sampling strategy to allow accurate quantification of PAHs and PAH-derivatives in addition to PCDD and PCDF. Method 23 is an isokinetic sampling method similar to Method 5. The sample is collected from the probe, on a glass fiber filter and on a resin trap. The PCDD/PCDF and PAHs are extracted from the sample, separated by high resolution gas chromatography, and measured by high resolution mass spectrometry. Results will be reported on individual and total bases. Figure 5 depicts the Method 23 sample train.

Figure 5: Method 23 Sample Train



EPA Reference Method 25A, "Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer." The objective of Method 25A is to determine the concentration of total gaseous organics in the stack gas stream. Method 25A analyzer measurements are in ppmvw. NM-VOCs are reported as propane.

EPA Reference Method 205, "Verification of Gas Dilution Systems for Field Instrument Calibrations." The objective of Method 205 is to verify that a gas dilution system produces predictable gas concentrations spanning a range of concentrations. Protocol gases are diluted to produce calibration gases of known concentrations.

4.3 Analytical Methods

Thirteen pre-treated filters and pre-spiked XAD resin traps for Method 23 analysis will be obtained from ALS Environmental in Ontario, Canada prior to sampling. The exposed sampling media and liquid sample fractions will be stored and shipped under cool and dark conditions per method specifications and returned to ALS for post-test analyses. One Method 23 field train blank will be analyzed along with the run samples.

Sampling procedures are cited in the appropriate methods and there will be no deviation from those methods excepting the modifications to Method 23 described above. All testing will conform to EPA test methodology to the extent possible based on known source parameters. Any method deviations will be described in the final test report.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

5.1 Sampling Protocol and Collection Procedures

All testing will be performed in accordance with the specified test methods and their prescribed quality control procedures. Documentation of the procedures used to ensure that the data is valid for determining source compliance will be provided with the source test report.

The run number, date, location and source will uniquely identify samples obtained in the field. Subdivisions of a sample will be labeled and recorded as such (i.e., Sample 1 of 2). Samples will be maintained in a manner that prevents deterioration, loss or damage. Samples will remain in the control of the emissions testing team until/unless they are released to an outside laboratory for analysis. A chain of custody will be employed for tracking all samples. Sample preservation will follow the applicable method recommendations.

Bison's test, laboratory, reporting, and quality assurance procedures will conform to the requirements specified in Bison's quality manual and ASTM D7036-04. The individual test methods specify handling procedures for physical samples (liquids, traps, etc.). Bison will follow the procedures outlined in the appropriate methods as described in 40 CFR Part 60, Appendix A and Appendix B.

Analyzer test data will be recorded electronically using a data acquisition system. Field data, such as flow measurements, temperatures, moisture weights and volumes, will be entered directly into spreadsheets for subsequent calculations. The data can also be recorded on hand-written datasheets if requested by the client or the regulatory agency.

5.2 Equipment and Instrument Calibration, Audits and Maintenance

Ongoing calibrations and audits of testing equipment comprise a preventive maintenance program. Bison personnel calibrate equipment and instruments according to a set schedule and with standards traceable to the National Institute of Standards and Technology (NIST) All equipment requiring calibration will be calibrated according to the criteria specified in the proposed test methods. Equipment and instrument calibration results will be included in an appendix to the final test report.

5.3 Data Collection, Reduction and Validation

Emissions test data is subject to multiple levels of validation. Bison has self-auditing spreadsheets that alert the field technician when data may be entered incorrectly by flagging calculation results that are outside of expected or reasonable values. Data is also audited during data processing and report generation. Quality assurance and quality control checks associated with testing (such as on-site analyzer calibrations, spikes and pre- or post-test equipment certifications) are audited during the review process.

A final draft of the test report is reviewed for technical content by a member of Bison's quality management team and the project manager. All field data and spreadsheets will be supplied in an appendix to the test report.

5.4 Internal Audits and Corrective Action

When departures from policies or procedures in Bison's quality system or technical operations are identified, Bison's quality management team meets with the personnel involved to evaluate the significance of the non-conforming work and discuss appropriate corrective action. Corrective actions are given the highest priority and determined immediately after identifying non-conforming work. The format for implementing corrective action follows ASTM D7036-04.

5.5 Documentation, Tracking and Certifications

Bison has assigned this project a unique number for document control and record keeping. The tracking number for this project is JHB221625.

Electronic project records are maintained on Bison's server for a minimum of five years. The project manager and a member of the quality management team will sign a certification page to document and authenticate that testing was performed according to the appropriate methods, applicable regulatory requirements and Bison's quality manual. This certification page will accompany the final report.

Should a situation arise that warrants a deviation from the approved protocol, it will be discussed with the client and/or regulatory agency. If necessary, approval to modify the test plan will be obtained from the regulatory agency. Any modification to the test plan or deviation from approved test methods will be documented in the final test report.

5.6 Audit Samples

Use of stationary source audit samples is not currently federally mandated because there is only one independent accredited audit sample provider. While not required, Bison maintains the spirit of the regulation and meets internal quality standards by continuing to obtain audit samples for any testing for which they are available. No audit samples are available for the methods that will be employed during this testing.

APPENDIX A: CORRESPONDENCE

January 7, 2021 **e-mail**

Georgia Baxter
President
J.H. Baxter & Co.
P.O. Box 5902
San Mateo, CA 94402

Re: Cleaner Air Oregon Testing and Sampling

Dear Georgia Baxter:

LRAPA has reviewed the responses and supplemental information submitted by J.H. Baxter (JHB) on October 23, 2020 and is requesting the following changes to the Liquid Sampling Plan, with the addition of source testing to measure specific air toxics and support the facility's emission inventory.

The following is the list of changes to the liquid sampling plan and requests for source testing:

1. Add dioxins to the list of analytes at same locations as pentachlorphenol (PCP) and polycyclic aromatic hydrocarbon (PAH) in the Liquid Sampling Plan using EPA Method 8280B, EPA Method 1613B, or an LRAPA-approved method
2. EPA Method 23 to test vapor carbon unit (VCU) outlet for PAHs and dioxins on creosote condition and EPA Method 204 total enclosure testing
3. EPA Method 23 to test PCP Stack for PAHs and dioxins and EPA Method 204
4. EPA Method 25A VCU inlet/outlet for VOC (as propane) concurrent with routine photoionization detector (PID) in lieu of EPA AP-42 emission factors; JHB may propose alternative(s)
5. BAAQMD ST-1B for ammonia scrubber; JHB may propose alternative(s)

LRAPA acknowledges and appreciates the complexity, cost and time needed to satisfy the items outlined in requests 1through 5 above and is open to considering a flexible timeline for completion.

Please communicate any questions or clarifications regarding the above comments in order to provide timely and complete submittals. LRAPA is available to collaborate with JHB during this timeline to review sequenced sections of the Emission Inventory and underlying preparatory work. ***LRAPA is requesting a response to this letter from JHB by January 22, 2021.***

Let me know if you need anything additionally in the matter.

Sincerely,

Max Hueftle
Permit Section Manager

Cc: Merlyn Hough, LRAPA
John Morrissey, LRAPA
Katie Eagleson, LRAPA
Brian Snuffer Zukas, Maul Foster & Alongi, Inc.
File

APPENDIX B: TREATMENT CYCLE CHARTS

Chart 1
Example Sample Steps for Creosote Treating Cycles
J.H. Baxter & Co.—Eugene, OR

Treatment Step	Step No.	Retort #83 Creosote Preservative Solution Commodity: TBD		
		Cycle Time (min)	Temperature Range (°F)	Flow or No Flow at Stack Outlet?
Fill Retort 1	1	TBD	150-180	Flow
Conditioning	2	TBD	180-190	Flow
Empty Retort 1	3	TBD	150-180	Flow
Air Pressurization	4	TBD	100-150	Flow
Fill Retort 2	5	TBD	150-180	Flow
Press Period	6	TBD	150-180	Flow
Expansion Bath	7	TBD	190-200	Flow
Empty Retort 2	8	TBD	180-200	Flow
Vacuum 3	9	TBD	60-180	Flow
Steam Cleanup	10	TBD	60-240	Flow
Final Vacuum	11	TBD	60-240	Flow
Draw Off Fumes (Crack & Vac)	12	TBD	60-80	Flow
Door Opened	13	NA	--	--
Removed	14	NA	--	--
Total Source Test Time (min)		**TBD**	**--**	**--**
Total Source Test Time (hours)		**TBD**	**--**	**--**

Chart 2
Example Cycle Steps for Penta Treating Cycles
J.H. Baxter & Co.—Eugene, OR

Treatment Step	Step No.	Retort #85 Penta Preservative Solution Commodity: TBD		
		Cycle Time (min)	Temperature Range (°F)	Flow or No Flow at Stack Outlet?
Fill Retort 1	1	TBD	160-180	Flow
Conditioning	2	TBD	180-190	Flow
Empty Retort 1	3	TBD	160-190	No Flow
Air Pressurization	4	TBD	60-160	No Flow
Fill Retort 2	5	TBD	160-180	No Flow
Press Period	6	TBD	150-180	No Flow
Expansion Bath	7	TBD	170-190	Flow
Empty Retort 2	8	TBD	170-190	No Flow
Vacuum 3	9	TBD	60-190	Flow
Steam Cleanup	10	TBD	60-240	Flow
Final Vacuum	11	TBD	60-240	Flow
Draw Off Fumes (Crack & Vac)	12	TBD	60-80	Flow
Door Opened	13	NA	--	--
Removed	14	NA	--	--
Total Source Test Time (min)		**TBD**	**--**	**--**
Total Source Test Time (hours)		**TBD**	**--**	**--**

APPENDIX C: MODIFIED METHOD 23 ANALYTE LIST AND IN-STACK DETECTION LIMITS

J. H. Baxter & Co.
Eugene, OR
Modified Method 23 Analyte List and Analytical Detection Limits

Pollutant	CAS	Analytical Detection Limit (ng)	Category
Acenaphthene	83-32-9	30	PAH
Acenaphthylene	208-96-8	30	PAH
Anthracene	120-12-7	10	PAH
Benz[a]anthracene	56-55-3	6	PAH
Benzo[a]pyrene	50-32-8	6	PAH
Benzo[b]fluoranthene	205-99-2	6	PAH
Benzo[c]fluorene	205-12-9	6	PAH
Benzo[e]pyrene	192-97-2	6	PAH
Benzo[g,h,i]perylene	191-24-2	6	PAH
Benzo[j]fluoranthene	205-82-3	6	PAH
Benzo[k]fluoranthene	207-08-9	6	PAH
Carbazole	86-74-8	6	PAH
Chrysene	218-01-9	6	PAH
Cyclopenta[c,d]pyrene	27208-37-3	6	PAH
Dibenz[a,h]acridine	226-36-8	6	PAH
Dibenz[a,j]acridine	224-42-0	6	PAH
7H-Dibenzo[c,g]carbazole	194-59-2	6	PAH
Dibenz[a,h]anthracene	53-70-3	6	PAH
Dibenzo[a,e]pyrene	192-65-4	6	PAH
Dibenzo[a,h]pyrene	189-64-0	6	PAH
Dibenzo[a,i]pyrene	189-55-9	6	PAH
Dibenzo[a,l]pyrene	191-30-0	6	PAH
Fluoranthene	206-44-0	30	PAH
Fluorene	86-73-7	30	PAH
Indeno[1,2,3-cd]pyrene	193-39-5	6	PAH
2-Methylnaphthalene	91-57-6	60	PAH
Naphthalene	91-20-3	150	PAH
Perylene	198-55-0	6	PAH
Phenanthrene	85-01-8	60	PAH
Pyrene	129-00-0	30	PAH
2-Acetylaminofluorene	53-96-3	NA	PAH-Derivative
2-Aminoanthraquinone	117-79-3	NA	PAH-Derivative
Carbaryl	63-25-2	NA	PAH-Derivative
7,12-Dimethylbenz[a]anthracene	57-97-6	6	PAH-Derivative
1,6-Dinitropyrene	42397-64-8	NA	PAH-Derivative
1,8-Dinitropyrene	42397-65-9	NA	PAH-Derivative
3-Methylcholanthrene	56-49-5	6	PAH-Derivative
5-Methylchrysene	3697-24-3	6	PAH-Derivative
5-Nitroacenaphthene	602-87-9	NA	PAH-Derivative
6-Nitrochrysene	7496-02-8	NA	PAH-Derivative
2-Nitrofluorene	607-57-8	NA	PAH-Derivative
1-Nitropyrene	5522-43-0	NA	PAH-Derivative
4-Nitropyrene	57835-92-4	NA	PAH-Derivative

Notes:
Pollutants listed above are consistent with Oregon Administrative Rule OAR 340-245-8020, Table 2.
Not offered at this time

J. H. Baxter & Co.
Eugene, OR
Modified Method 23 Analyte List and Analytical Detection Limits

Pollutant	CAS	Abbreviation	Analytical Detection Limit (pg)	Category
DIOXINS				
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	TCDD	5	PCDD
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	PeCDD	5	PCDD
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	HxCDD	5	PCDD
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	HxCDD	5	PCDD
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	HxCDD	5	PCDD
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	HpCDD	5	PCDD
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3268-87-9	OCDD	20	PCDD
Total Tetrachlorodibenzo-p-dioxin	41903-57-5	--	5	PCDD
Total Pentachlorodibenzo-p-dioxin	36088-22-9	--	5	PCDD
Total Hexachlorodibenzo-p-dioxin	34465-46-8	--	5	PCDD
Total Heptachlorodibenzo-p-dioxin	37871-00-4	--	5	PCDD
FURANS				
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	TcDF	5	PCDF
1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	PeCDF	5	PCDF
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	PeCDF	5	PCDF
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	HxCDF	5	PCDF
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	HxCDF	5	PCDF
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	HxCDF	5	PCDF
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	HxCDF	5	PCDF
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	HpCDF	5	PCDF
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	HpCDF	5	PCDF
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001-02-0	OCDF	20	PCDF
Total Tetrachlorodibenzofuran	55722-27-5	--	5	PCDF
Total Pentachlorodibenzofuran	30402-15-4	--	5	PCDF
Total Hexachlorodibenzofuran	55684-94-1	--	5	PCDF
Total Heptachlorodibenzofuran	38998-75-3	--	5	PCDF

J. H. Baxter & Co.
Eugene, OR

In-Stack Detection Limits (ISDL) for Modified Method 23

ISDL = (A*B)/C

A =	Analytical detection limit	A =	See Tables
B =	Quantity of sample matrix	B =	1 sampling train
C =	Volume of stack gas sampled	C =	6 dscm

Assumptions/Estimates:
(based on VPC stack only because no previous information is available for the PCP stack)

Outlet stack area:	0.349	sq. ft		
Estimated flow:	2,030	acfm		
Estimated sample volume:	0.56	dscf/min sampling rate	=	235.2 dscf/7-hr run
Best estimate of actual sample volume:				6.66 dscm/7-hr run

Estimated sample volume is based on 8% assumed moisture, 150 °F assumed stack temperature, assumed O_2 = 20.9%, CO_2 = 0%, nozzle size = 0.15 inches.

VPC Outlet

Dioxins	A pg	ISDL pg/dscm	ISDL ng/dscm
2,3,7,8-Tetrachlorodibenzo-p-dioxin			
1,2,3,7,8-Pentachlorodibenzo-p-dioxin			
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin			
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin			
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	5	0.83	8.30E-04
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin			
Total Tetrachlorodibenzo-p-dioxin			
Total Pentachlorodibenzo-p-dioxin			
Total Hexachlorodibenzo-p-dioxin			
Total Heptachlorodibenzo-p-dioxin			
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	20	3.33	3.33E-03

FURANS	A pg	ISDL pg/dscm	ISDL ng/dscm
2,3,7,8-Tetrachlorodibenzofuran			
1,2,3,7,8-Pentachlorodibenzofuran			
2,3,4,7,8-Pentachlorodibenzofuran			
1,2,3,4,7,8-Hexachlorodibenzofuran			
1,2,3,6,7,8-Hexachlorodibenzofuran			
1,2,3,7,8,9-Hexachlorodibenzofuran			
2,3,4,6,7,8-Hexachlorodibenzofuran	5	0.83	8.30E-04
1,2,3,4,6,7,8-Heptachlorodibenzofuran			
1,2,3,4,7,8,9-Heptachlorodibenzofuran			
Total Tetrachlorodibenzofuran			
Total Pentachlorodibenzofuran			
Total Hexachlorodibenzofuran			
Total Heptachlorodibenzofuran			
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	20	3.33	3.33E-03

J. H. Baxter & Co.
Eugene, OR

In-Stack Detection Limits (ISDL) for Modified Method 23

PAHs	A ng	ISDL ng/dscm
Benz[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene Benzo[c]fluorene Benzo[e]pyrene Benzo[g,h,i]perylene Benzo[j]fluoranthene Benzo[k]fluoranthene Carbazole Chrysene Cyclopenta[c,d]pyrene Dibenz[a,h]acridine Dibenz[a,j]acridine 7H-Dibenzo[c,g]carbazole Dibenz[a,h]anthracene Dibenzo[a,e]pyrene Dibenzo[a,h]pyrene Dibenzo[a,i]pyrene Dibenzo[a,l]pyrene Indeno[1,2,3-cd]pyrene Perylene 7,12-Dimethylbenz[a]anthracene 3-Methylcholanthrene 5-Methylchrysene	6	1.00
Anthracene	10	1.67
Acenaphthene Acenaphthylene Fluoranthene Fluorene Pyrene	30	5.00
2-Methylnaphthalene Phenanthrene	60	10.00
Naphthalene	150	25.00

APPENDIX D: EXAMPLE TEST REPORT FORMAT

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