EMISSIONS TEST PROTOCOL

J.H. BAXTER & CO.

AMMONIA EMISSIONS TESTING AND VERIFICATION OF PERMANENT TOTAL ENCLOSURE

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:

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Project Number: JHB221625
Protocol Submitted: September 8, 2021

STAC STACK TESTING ACCREDITATION COUNCIL

A2LA ACCREDITED TO ASTM D7036 ONLY CERT #4675.01

BISON ENGINEERING, INC.

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PLANT REPRESENTATIVE ENDORSEMENT

I have reviewed the information being submitted in its entirety and, based on information and belief formed after reasonable inquiry, I certify that the statements and information contained in this submittal are true, accurate, and complete.

Plant Official: ______________________________

Title: ______________________________

Signature: ______________________________

Date: ______________________________

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, QSTI

Title: Source Director

Signature:

Date: 9/8/2021

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.

This 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 for the ACZA scrubber exhaust in the letter sent to Baxter by LRAPA on January 7, 2021. Testing of the VPC unit and PCP stack will occur at a date to be determined and a separate test protocol will be submitted for those sources.

As requested by LRAPA, the ACZA scrubber exhaust will be tested for ammonia. Measured flue gas moistures, flow rates and an assumed ambient molecular weight will be used to determine pollutant mass emission rates. Bison will follow an abbreviated version of United States Environmental Protection Agency (EPA) Method 204 to assess whether the VPC ventilation system and the vacuum system connected to the PCP stack meet the criteria to be considered a permanent total enclosure (PTE). Bison will also assess the "crack-and-vac" cycle on the retorts to visually determine capture efficiency (CE).

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 and reporting units.

Table 1: ACZA Source Test Pollutant and Units

J.H. Baxter & Co. Eugene, Oregon		
Source	**Pollutant**	**Reporting Units**
ACZA scrubber outlet	Ammonia	ppmvw or ppmvd, lb/hr, lb/ft^3 of treated wood and lb/gal of treating solution

lb/ft^3 of treated wood – pounds per cubic foot of treated wood produced
lb/gal of treating solution – pounds per gallon of treating solution used
ppmvw – parts per million by volume wet
ppmvd – parts per million by volume dry
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, Qualified Source Testing Individual (QSTI), will serve as project coordinator and the primary client contact point for this test campaign. Conor Fox, Qualified Individual (QI), Project Scientist, will lead on-site testing. 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
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Contact:	Max Hueftle
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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”. The facility previously used ammonia copper quat, type B (i.e., ACQ) as a preservative; however, this solution has not been used since 2018.

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 what wood treating vessel (referred to as “retorts”) 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 while the vacuum pump is still 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 ACZA Scrubber Stack Description

The ACZA scrubber is located in the north tank farm area. Dried exhausts from the condensers connected to Retorts 82 and 84 are routed to the ACZA scrubber and associated stack prior to release to atmosphere. The ACZA scrubber stack is vertically-oriented with a circular diameter of approximately 10 inches. A photo of the stack and scrubber tank is provided in Figure 1, below. The release height of the stack is approximately 29 feet above ground level and 50 inches above the top of the tank. Adequate sampling ports will be installed prior to the start of the test campaign and accessed via the top of the scrubber tank. Ambient flue gas temperatures are anticipated, except during steam release events which are not expected to exceed 240°F. Flow rates are unknown and will likely vary depending on the treatment cycle at the time.

Figure 1: ACZA Scrubber Stack 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 ACZA Scrubber Stack Emissions Test

Ammonia concentrations and other flue gas characteristics will be measured at the ACZA scrubber exhaust stack outlet. Continuous sampling of one complete ACZA treatment cycle will be achieved in two runs, each nine hours in length, following the treatment step schedule presented in Appendix B, Chart 3. Sampling will be paused during treatment steps that have no flow. The proposed test matrix for the ACZA scrubber stack is provided in Table 2, below.

In their letter dated January 7, 2021, LRAPA suggested that Bay Area Air Quality Management District (BAAQMD) Method ST-1B could be used for quantifying ammonia emissions at the scrubber stack, but they are open to other proposed methodology. Based on previous experience, Bison has found that BAAQMD ST-1B, a wet chemistry method, can have a positive ammonia bias when sampling high moisture stacks. Bison proposes using EPA Method 320, which relies on Fourier Transform Infrared Spectroscopy (FTIR) instead of wet chemistry, as Method 320 may produce more accurate results. Method 320 has the added advantages of providing real time results and flexibility of run length. Bison wrote a justification email to LRAPA for using Method 320 instead of BAAQMD Method ST-1B, that email is included in Appendix A.

The most recent emission test data from the ACZA scrubber stack is from a 1989 source test completed by Omni Environmental Services. Bison reviewed this source test report and found that ammonia concentration was approximately 10,000 ppm during that test. Bison currently has an EPA protocol gas of 100 ppm ammonia and was able to order a low volume 10,000 ppm NIST traceable ammonia tank. Both or one of these gases will be utilized for dynamic spiking during testing of the ACZA scrubber stack depending on stack gas ammonia concentration.

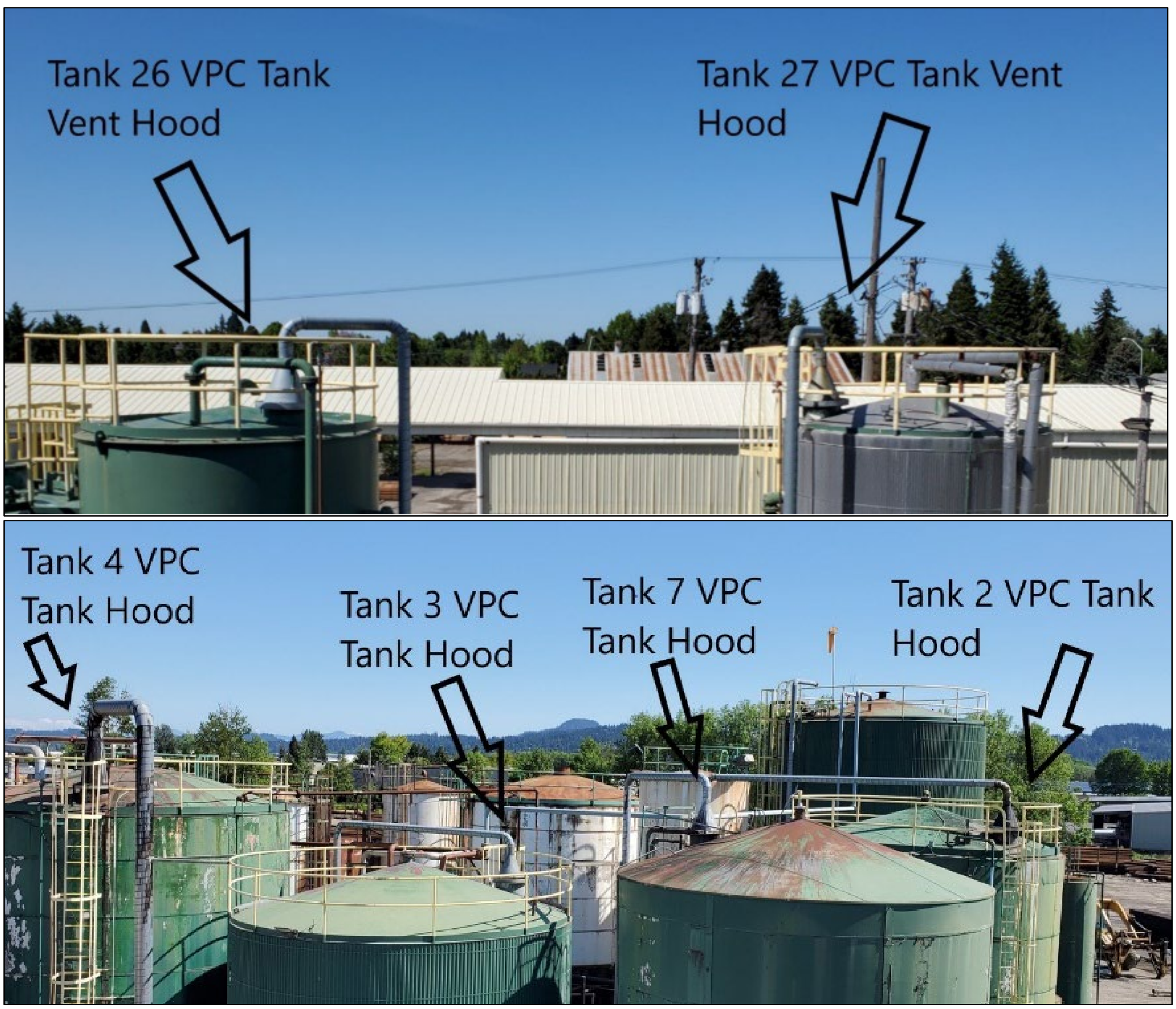
Table 2: ACZA Scrubber Stack Proposed Test Matrix

J.H. Baxter & Co. ACZA Scrubber Stack Proposed Test Matrix 2021			
Source	**Method**	**Parameter**	**Test Plan and Comments**
ACZA Scrubber Stack	Method 1A	Sampling location and traverse points	One measurement per source prior to sampling.
	Method 2C	Volumetric flow	Two flow measurements per sampling run. An assumed ambient molecular weight of 29 will be used for flow calculations.
	Method 320	Ammonia, moisture	Two 9-hour test runs.

3.4.2 VPC Ventilation System and PCP Vacuum System Verification of PTE

Bison will follow an abbreviated version of EPA Method 204 to determine whether the capture efficiency (CE) of vent hoods on the VPC ventilation system and PCP vacuum system can be assumed to be 100 percent (%). As there is not a true enclosure (e.g., a building) to test in these instances, visual inspection of the vacuum systems, capture hoods (VPC stack only) and associated ductwork, and direction of airflow are the only criteria that can be used to make the PTE determination. Visual inspection of the systems will be used to identify any natural draft openings (NDOs). Direction of air flow will be monitored during the PTE verification using smoke to show the direction of airflow at NDO locations. The smoke tests will be documented photographically at 10-minute intervals for one hour. Figure 2 presents photographs of the VPC vent hoods.

Figure 2: VPC Tank Vent Hoods



3.4.3 "Crack and Vac" Verification of PTE

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; retort doors are cracked open while the vacuum pump is still 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. Bison intends to measure the retort opening crack and again use smoke to verify PTE. The crack-and-vac verification will be performed for the applicable retorts connected to the VPC stack and the PCP stack. Video documentation will be utilized to show the amount of time it takes for smoke to be pulled into the retort by the vacuum pump from initial opening of the retort.

3.5 Test Schedule

Testing is scheduled for 9/13/2021 through 9/17/2021 for this initial mobilization. Testing is expected to follow a timeline similar to the schedule outlined in Table 3.

Table 3: Test Schedule

J.H. Baxter & Co. 2021 Emissions Testing Proposed Test Schedule		
Day	**Date**	**Details**
1	9/13/2021	Travel from Helena, Montana, to Eugene, Oregon.
2	9/14/2021	- On-site set-up. - Review access options for PCP stack outlet and VPC stack inlet/outlet - Install VPC inlet/outlet ports and PCP stack outlet ports. - Take preliminary moisture, temperature, and flow measurements on all sources. - Discuss production and process timing on all sources for testing.
3	9/15/2021	ACZA Scrubber Stack Run 1 (9-hours of testing)
4	9/16/2021	ACZA Scrubber Stack Run 2 (9-hours of testing)
5	9/17/2021	Verification of PTE on VPC Ventilation/PCP Vacuum System/Crack and Vac
6	9/18/2021	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 availability of the processes on the scheduled test day as needed to facilitate the test program.
- Providing safe and secure access to the sampling ports.

- Collecting and recording all pertinent process data at 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 foot per charge (ft^3/charge), volume of preservative solution per treatment cycle (gal/cycle), 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 that sampling ports at the inlet and outlet of each source are free of obstructions and comply with EPA Method 1A specifications.

Only regular operating staff may adjust the production process and emission control parameters during the source performance tests and within two hours prior to the tests. Any operating adjustments made during the source performance tests, which are a result of consultation during the tests 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 conduct ammonia sampling using a MKS Multigas model 2030 FTIR spectrometer. The stack gas sample will be extracted for FTIR analysis using a heated probe and sampling umbilical (both 191°C). All sampling systems are checked for leaks before and after testing. Bison plans to perform dynamic spiking on the FTIR sampling system with ammonia calibration gas.

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 4 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 204, "Criteria for and Verification of a Permanent or Temporary Total Enclosure." The objective of Method 204 is to determine whether a permanent or temporary enclosure meets the criteria for being considered a total enclosure. If all the criteria are met, then the VOC capture efficiency is assumed to be 100 percent. For this test an abbreviated methodology will be used requiring only visual inspection and demonstration of airflow direction.

EPA Reference Method 320, "Measurement of Vapor Phase Organic and Inorganic Emissions by Extractive Fourier Transform Infrared (FTIR) Spectroscopy." The objective of Method 320 is to determine the concentrations of vapor phase organic or inorganic compounds, including hazardous air pollutants (HAPs) for which EPA reference spectra have been developed. Ammonia calibration gas will be used for spiking. Dynamic spiking using water or carbon dioxide as a surrogate tracer will be used in lieu of sulfur hexafluoride (SF_6).

4.3 Analytical Methods

Sampling procedures are cited in the appropriate methods and there will be no deviation from those methods. 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 to ensure that the data is valid for determining source compliance will be provided with the source test report.

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

From:	Kelly Dorsi
To:	Max Hueftle; Katie Eagleson
Cc:	Zach Harding; Conor Fox; Brian Snuffer Zukas; Chad Darby; Scott Thielke
Subject:	Ammonia via FTIR vs. BAAQMD ST-1B
Date:	Tuesday, August 24, 2021 4:17:16 PM

Hi Max and Katie,

Thank you for speaking to me this morning regarding ammonia sampling as it pertains to the test plan we provided to you as part of our J.H. Baxter (Baxter) test plan submitted August 6, 2021.

LRAPA's letter to Baxter dated January 7, 2021, suggests method BAAQMD ST-1B be used for ammonia sampling on the ACZA scrubber but leaves open the option for Baxter to propose alternative methods. Bison has proposed the use of EPA Method 320 as a superior alternative method the following reasons.

1. FTIR sampling allows for continuous measurements and real-time results for runs of any length. This seems desirable in the context of the three, 3-hour sampling runs proposed. It saves time, money and risk associated with physical sample shipping, handling and laboratory analysis as well.

2. In the recent past, we have performed side-by-side BAAQMD ST-1B and FTIR sampling at a fertilizer plant in Washington with an ammonia scrubber we believe is similar to the one at Baxter. The side-by-side comparison was performed after repeated inconsistent results were obtained using BAAQMD ST-1B, which was mandated in the facility's permit. The results using FTIR were ultimately found to be much more reliable. We believe the difference was owing to how each method handles moisture. For high moisture sources, such as wet scrubbers, entrained water droplets are not sampled representatively and may lead to problems with consistency of the BAAQMD method. The BAAQMD method calls for an unheated probe with glass wool filter in the nozzle, so droplets will not be vaporized prior to sampling. During FTIR sampling, the entire sampling system, all the way to the instrument's detector, is heated to 191 degrees Celsius. Thus, any droplets are vaporized in the sampling system leading to more consistent results.

3. It is also worth noting that ammonia is an ideal analyte for Method 320 sampling because we can use ammonia calibration gases for pre- and post-test calibration and spiking procedures and do not have to rely on a surrogate compound.

Please don't hesitate to contact me with any further questions regarding these two methods. We appreciate you considering our proposed alternative.

Thanks,

Kelly Dorsi, PhD
Atmospheric Scientist | Quality Manager

APPENDIX B: TREATMENT CYCLE CHARTS

Appendix B, Chart 3
Time Estimates for ACZA Treating Cycles
J.H. Baxter & Co.—Eugene, OR

Treatment Step	Step No.	ACZA Preservative Solution—Retort 84			
		0.4-Lumber Charge (min)	Total Test Run Length (hr)	Temperature Range (°F)	Flow or No Flow at Stack Outlet?
Steam Conditioning	1	180	--	60-240	No Flow
Vacuum	2	150	3	60-240	Flow
Fill Retort 2	3	30		80-100	Flow
Press Period	4	360	--	100-130	No Flow
Empty Retort 2	5	30	--	100-130	No Flow
Vacuum 3	6	180	3	60-130	Flow
Steam Cleanup	7	240	--	60-200	No Flow
Final Vacuum	8	120	3	60-200	Flow
Draw Off Fumes (Crack & Vac)	9	60 (1)		60-80	Flow
Door Opened	10	15	--	--	--
Removed	11	25	--	--	--
Total Source Test Time (min)		**1390**	**540**	--	--
Total Source Test Time (hrs)		**23.2**	**9**	--	--
Test Run 1 (min)		**--**	**180**	**--**	**--**
Test Run 2 (min)		**--**	**180**	**--**	**--**
Test Run 3 (min)		**--**	**180**	**--**	**--**

REFERENCES:

(1) Best Management Practice requirement is 1 hour

APPENDIX D: EXAMPLE TEST REPORT FORMAT

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