EMISSIONS TEST PROTOCOL

AMERITIES WEST, LLC

THERMAL OXIDIZER INITIAL CERTIFICATION, EMISSION FACTOR VERIFICATION & RETORT BUILDING VERIFICATION OF PERMANENT TOTAL ENCLOSURE

Oregon Department of Environmental Quality
Oregon Standard Air Contaminant Discharge
Permit: 33-0003-ST-01

Prepared for:

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Prepared by:

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STAC STACK TESTING ACCREDITATION COUNCIL
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: Lance Bliss

Title: Plant Manager

Signature:

Date: 6/23/21

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: Kelly Dorsi, PhD

Title: Quality Manager / Atmospheric Scientist

Signature: 

Date: 6/23/2021

1.0 INTRODUCTION

AmeriTies West, LLC (AmeriTies) has contracted Bison Engineering, Inc. (Bison) to perform emissions testing on a newly installed regenerative thermal oxidizer (RTO). The RTO was installed to control volatile emissions released upon opening the retort cylinders, after completing each wood treatment cycle, housed in the facility's wood preservation treatment building (retort building) at 100 Tie Plant Road in The Dalles, Oregon.

This facility is subject to the provisions of Oregon Department of Environmental Quality (ODEQ) Standard Air Contaminant Discharge Permit (ACDP) permit number 33-0003-ST-01. Construction, start-up and testing of the new RTO follows the stipulations outlined in Notice of Intent to Construction (NOIC) number 32430 issued by ODEQ on June 3, 2020, and ODEQ's associated follow-up approval letter dated January 22, 2021.

As requested by ODEQ communications for the initial test, the pollutants to be measured include dioxins, furans, polycyclic aromatic hydrocarbons (PAHs), PAH-derivatives, total non-methane volatile organic compounds (NM-VOCs), oxides of nitrogen (NO_X), carbon monoxide (CO), methane (CH_4) and particulate matter (PM). Oxygen (O_2), carbon dioxide (CO_2), flue gas moisture and flow rate will also be measured and used to determine pollutant mass emission rates. Bison will also perform United States Environmental Protection Agency (EPA) Method 204 to assess whether the retort building meets the criteria to be considered a permanent total enclosure (PTE).

Testing will be performed in accordance with the EPA testing methodology outlined in this protocol and the Oregon Source Sampling Manual Volume I. Table 1 presents the test emission limits.

Table 1: Source Test Pollutants

AmeriTies West, LLC The Dalles, Oregon		
Source	**Pollutant**	**Reporting Units**
RTO inlet	NM-VOCs	ppmvw, lb/hr
RTO outlet	Total PM*	gr/dscf, lb/hr, and lb/ft^3 of treated wood
	NO_x	ppmvd or ppmvw, lb/hr and lb/ft^3 of treated wood
	CO	
	NM-VOCs	
	CH_4	
	Dioxins/Furans	ng/dscm, lb/hr and lb/ft^3 of treated wood
	PAHs	
	PAH-derivatives	

lb/hr - pounds per hour
lb/ft^3 of treated wood – pounds per pound of cubic foot of treated wood
gr/dscf – grains per dry standard cubic foot
ppmvd or ppmvw – parts per million by volume dry or wet
ng/dscm – nanogram per dry standard cubic meter.
*Total PM consists of filterable and condensable PM

2.0 KEY PERSONNEL AND CONTACT INFORMATION

Emissions testing will be performed by Bison's Helena, Montana-based source testing team. Kelly Dorsi, PhD, Quality Manger / Atmospheric Scientist 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. Adam Bender, QI, Project Scientist and Jacob Rankin, QI, Staff Engineer will assist Mr. Fox on-site. Lynn Dunnington, Environmental Analyst, will process the test data and draft the test report. Bo Wilkins, Helena Source Team Coordinator, will perform a quality assurance review of all test data and the report. Ms. Dorsi will perform the project manager's review and submit the final report.

Facility:	**AmeriTies West, LLC**
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3.0 SUMMARY OF TEST PROGRAM

3.1 Facility Description

AmeriTies owns and operates a wood preservation facility in The Dalles, Oregon. The facility treats railroad ties (referred to as "cross-ties"), bridge timbers, and poles under high pressure and temperature using wood preservative solutions. The wood preservative solution used by the facility is typically an even blend of creosote and oil or, less frequently, a copper naphthenate (CN) solution.

Untreated cross-ties, bridge timbers, and poles are delivered to the facility from off-site locations via the adjacent railroad. The majority of facility production is dedicated to treating cross-ties for use by the railroad industry. It is important to note that bridge timbers and poles are treated less often and are not specifically mentioned below in section 3.2, but both are processed in a similar manner to cross-ties. The facility is permitted to operate 24 hours a day, throughout the year, but actual days of operation correspond to demand for product.

During this test campaign, emissions from the retort building and RTO will be quantified. The RTO to be tested is adjacent to the retort building and located near the facility's southern property boundary.

3.2 Process Information

The treatment process begins by packing untreated cross-ties into bundles on a tram. The typical bundle configuration consists of 49 individual cross-ties. The maximum tram load contains 15 bundles on individual carts. After cart loading is complete, the entire tram is rolled into one of five wood treating cylinders (referred to as "retorts") and sealed. After loading each retort, a large mega-pack door is used to seal the front of the retort building to create an enclosure (roughly 60 by 15 by 25 feet). The enclosure is kept under negative pressure. A collection hood, mounted on the roof near the center of the enclosure, is connected, via ductwork, to the RTO. The RTO is utilized to control volatile emissions released after opening each retort after completing the treating cycles.

After the retort is sealed, wood preservative solution is pumped from storage tanks to fill the retort. Once filling is complete, the retort is placed under high pressure and temperature, or "charged". The increased pressure and temperature force the wood preservative solution into the open pores of the untreated wood. A boiler is used to supply steam for heating the wood treatment process. After pressure treating is complete, the retort is drained, and the final vacuum system is initiated to further extract excess wood preservative solution for re-use.

Once the final vacuum system is complete, the RTO is switched from idle-mode to run-mode at around 2:00am local time with the mega-pack door still in the closed position. When the RTO reaches an operating temperature of 1,500 degrees Fahrenheit (°F) (around 3:00am), plant personnel begin the process of opening each retort door in staggered 15-minute intervals. Fugitive vapors released upon opening each retort, are captured by the collection hood and routed to the RTO for control of VOC and hazardous air pollutant (HAP) emissions. The retort doors are left open, with the fresh charge gradually cooling inside the retort cylinder, until the day shift arrives at 6:00am.

At that time, the day shift decides which retort to unload first. The decision is made based on temperature, product demand and other factors. During unloading, each retort door is in the closed position, except for the retort to be emptied. The mega-pack door is briefly opened to roll the charge (i.e., treated wood bundles on trams) onto the drip pad, then immediately closed again. This process is repeated for each retort in succession with the empty retort being left in the open position for reloading. For the remaining retorts, the mega-pack door is briefly opened, the empty retort is loaded with an untreated tram, the next retort is unloaded, and the mega-pack door is closed. The mega-pack door is opened for roughly 5 minutes for the first retort unloading period, then for about 10 minutes during each subsequent pull/re-load process. This sequence repeats until all the retorts have been emptied and re-loaded, which is typically completed by 2:00pm. The RTO is then switched from run to idle mode. Thus, the RTO typically operates daily between 3:00am and 2:00pm and the mega-pack door is normally closed between 2:00pm and 6:00am.

The treated tram is rolled onto the drip pad to further air dry after the initial pre-cooling period within the retort cylinder in the enclosure. Treated bundles are then preferentially loaded onto outbound trains for customers. If no orders are awaiting shipping, treated bundles are moved to the storage yard for future shipment offsite.

3.3 Emission Source Description

As described in the NOIC submitted to ODEQ, AmeriTies has installed a Reeco model RL15-V2-85 natural gas-fired rotary RTO unit (serial number 1236) to control volatile emissions from the opening of each retort within the retort building enclosure. The RTO unit is located to the south of the retort building, about 37 feet from the building's exterior. Captured emissions are routed into a collection hood and though ductwork to the ground-level RTO for control of VOC and HAP emissions, as mentioned above. The RTO exhausts through a vertically-oriented, rectangular exhaust stack as shown in Figure 1 below. The exhaust stack is approximately 20 feet tall and the rectangular dimensions are expected to be 30 inches by 53 inches. The stack outlet does not have a platform or ladder, so the five sampling ports will be accessed via a lift provided by AmeriTies.

Sampling on the inlet side of the RTO will likely be conducted from a ladder. No sampling ports exist at this time. Two orthogonal sampling ports will be installed on a section of inlet ductwork that is approximately 36 inches in diameter in a location that meets EPA Method 1 requirements. The inlet ductwork is shown on the right-hand side in Figure 2 shown below.

The RTO unit is designed to operate with an inlet gas flow rate of 15,000 standard cubic feet per minute (scfm). Flow velocity through the outlet ductwork is expected to be similar to the flow at the inlet. Although the RTO operates at 1,500 °F, temperatures of the inlet and outlet exhaust gases are expected to be less than 400 °F based on manufacture's specifications and the maximum treating temperature at the facility.

EPA Methods 1 and 2 will be used to verify all testing locations and flows are appropriate for sampling prior to testing.

Figure 1: RTO Outlet Exhaust Stack and Sampling Ports.

Figure 2: RTO Inlet Ductwork Photo.

3.4 Test Plan

Testing will be performed in general accordance with EPA testing methodology and with the Oregon Source Sampling Manual. Emissions testing will follow the methods listed in table 2. During testing, the RTO will be fired on natural gas. Simultaneous inlet/outlet testing will be conducted while the RTO is operating normally and when retort building operations are at normal maximum. Normal maximum production is defined as all five retort cylinders in use, with four cylinders treating with an even blend of creosote and oil, and one retort cylinder (number 3 only) treating with CN. Retorts 1, 2, 4 and 5 have an average charge capacity of approximately 2,700 ft^3. Retort 3 average charge is approximately 1,350 ft^3.

AmeriTies' The Dalles facility produces preserved wood products with various specifications. As per ODEQ's NOIC approval letter dated January 22, 2021, testing will be conducted with Retort 3 operating with CN treatment solution, and the remaining retorts operating with an equal blend of creosote and oil treatment solutions for each day of testing.

Table 2: Test Matrix

AmeriTies West, LLC Retort Building – RTO Unit			
Source	**Method**	**Parameter**	**Details**
RTO inlet	Method 1	Sampling location	One measurement per source prior to sampling.
	Method 2	Volumetric flow	One measurement per outlet sampling run.
	Method 4	Moisture	Three 3-hour test runs concurrent to Method 25A.
	Method 25A	NM-VOCs	Three 3-hour test runs. Simultaneous to the first three hours of outlet Method 23 runs.
RTO outlet	Method 1	Sampling location and traverse points	One measurement per source prior to sampling.
	Method 2	Volumetric flow	Incorporated with Methods 23 and 5.
	Method 3A	O_2, CO_2, molecular weight	Concurrent to Method 23.
	Method 4	Moisture	Incorporated with Methods 23 and 5.
	ODEQ 5	PM	Three 3-hour test runs. Simultaneous to the first three hours of Method 23 runs.
	Method 7E	NO_x	
	Method 10	CO	
	Method 25A	NM-VOCs, CH_4	
	Modified Method 23	Dioxins/Furans/PAHs/ PAH-derivatives	Three ~11-hr test runs (actual runtime to coincide with start and end of daily RTO operation).
	Method 205	Gas dilution system verification	Performed once prior to sampling.
Retort Building	Method 204	Verification of capture efficiency (CE)	Conducted once during Method 23 sampling. Determine distances from VOC emitting points to any natural draft openings, differential pressure and air flow direction.

3.4.1 RTO Inlet/Outlet Test Plan

A modified EPA Method 23 sampling train is proposed to quantify dioxins, furans, PAHs and PAH-derivatives at the RTO stack outlet. The list of toxic air contaminant (TAC) target analytes (Appendix B) was derived from Oregon Administrative Rule OAR 340-245-8020, Table 2.

As per ODEQ's NOIC letter, 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) 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 be 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 analytes requested for this testing; 10 of the PAH-derivatives they do not have standards for and will not be quantified during this test campaign. The 10 PAH-derivatives they do not offer have been highlighted in the Appendix B analyte list.

The recommended minimum sample volume for Method 23 is 2.5 dry standard cubic meters (dscm); this volume will be met and surpassed during the proposed 11-hour 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 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 refresh train silica gel halfway through the run to avoid over-expansion and breakage of the silica gel impingers.

Bison will follow ODEQ Method 5 to quantify filterable and condensable PM at the outlet of the RTO. PM levels at the outlet of a well-functioning RTO are not expected to be significant and meeting the stated method detection limit of 7 milligrams will likely be difficult or impossible. For this reason, we have proposed ODEQ sampling runs of 3-hours in duration. These runs will coincide with the first three hours of RTO operations in the morning, which should be representative of the highest expected particulate concentrations during daily operation.

Inlet/outlet NM-VOC and outlet only CH_4 measurements will be conducted via EPA Method 25A. Owing to the proximity of the inlet and outlet sampling locations, two separate analyzers will be run simultaneously from a single trailer. Bison's Method 25A analyzers operate on the principal of flame ionization detection (FID). These instruments have a separate channel for methane that will be calibrated independently. There will be a several minute break in the NM-VOC and CH_4 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 destruction efficiency of the RTO on a mass basis. Bison will use an assumed ambient molecular weight at the RTO inlet. Therefore, Method 3A will be conducted at the outlet only.

3.4.1 Retort Building Enclosure Capture Verification of PTE

Bison will follow EPA Method 204 to determine whether the capture efficiency (CE) of emissions in the retort building enclosure, when the mega-pack door is closed, can be assumed to be 100 percent (%). If the Method 204 criteria are met, and if all exhaust gases from the enclosure are ducted to the RTO, then CE can be assumed to be 100% and need not be measured. Table 3 summarizes the Method 204 criteria used to evaluate PTE.

Table 3: PTE Evaluation Criteria

AmeriTies West, LLC Retort Building PTE Verification Criteria		
Parameter	**Units**	**Limit**
NEAR Ratio	%	≤ 5
FV (via differential pressure measurement approach)*	fpm	≥ 200
Distances to NDO	Feet	At least four equivalent opening diameters from each VOC emitting point to any NDO.
Inward direction of airflow	NA	If the FV is less than 500 fpm, the inward direction of flow will be monitored for at least 1 hour. This verification will be documented photographically using streamers at 10-minute intervals.

NEAR – natural draft opening to enclosure area ratio
FV- facial velocity
NDO – natural draft opening
fpm – feet per minute
NA – not applicable
*Environmental Protection Agency Method 204, Section 8.3, states that FV shall be at least 3,600 meters/hour (m/hr) which is equivalent to 200 feet per minute (fpm). Alternatively, pressure differential across the enclosure may be measured. A pressure drop of 0.013 millimeters mercury (0.007 inches water) corresponds to a FV of 3,600 m/hr (200 fpm).

ODEQ has mandated that direct measurements of differential pressure be used in lieu of a calculated FV. Direct measurements of pressure differential will be made using a Shortridge ADM-850L micromanometer with a four decimal place display and current calibration certificate demonstrating instrument accuracy to differential pressures as low as 0.01 inches of water. A copy of the most recent calibration certificate for the Shortridge unit has been attached as Appendix C to this protocol.

A map depicting four proposed locations for differential pressure measurements is provided as an attachment in Appendix D. Differential pressure will be measured at least 15 times per location. Measurements will be recorded in a series of five rounds; one round per every 2 hours during one of the 11-hour Method 23 sampling runs. During each round, three differential pressure measurements will be recorded per location and averaged. ODEQ's stance is that 100% of the measurements must indicate a pressure drop of at least 0.007 inches of water to demonstrate containment.

Direction of air flow will be monitored every ten minutes for one hour of the PTE verification using streamers to show the inward direction of airflow at any NDO locations. Bison will also verify there is at least four equivalent opening diameters from each VOC emitting point to any NDO.

The retort building PTE is not designed for when the mega-pack door is open. That time is considered normal operation. The facility limits the amount of time the mega-pack door is open to the extent feasible.

If the Method 204 PTE test fails, a much more rigorous series of tests will be required that would be covered under a separate test protocol and mobilization.

3.5 Test Schedule

Emissions testing is scheduled to take place starting July 20, 2021. Testing is expected to follow a schedule similar to the one in Table 4.

Table 4: Test Schedule

AmeriTies West LLC 2021 Emissions Testing Proposed Test Schedule			
Day	**Date**	**Details**	
1	7/18/2021	Travel Helena, Montana, to The Dalles, Oregon.	
2	7/19/2021	On-site set-up, calibrations, and preparations.	
3	7/20/2021	RTO Unit	Run 1 (~3AM – 2PM). Retort building verification of PTE.
4	7/21/2021	RTO Unit	Run 2 (~3AM – 2PM).
5	7/22/2021	RTO Unit	Run 3 (~3AM – 2PM).
6	7/23/2021	Return travel The Dalles, Oregon, to Helena, Montana.	

The schedule above assumes that testing proceeds as planned with minimal interruptions or process downtime. The start of replicate runs will be separated by a time duration of 24 hours due to the inherent daily nature of the process being sampled. Bison will inform ODEQ 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 ODEQ on or before 60 days after the conclusion of testing.

3.6 Responsibilities of Plant

AmeriTies will be responsible for:

- Assuring 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.
- AmeriTies personnel will collect and record all pertinent process data at 15-minute intervals during test runs and provide them to Bison for use in post-test calculations.

Operational parameters to be recorded include: RTO natural gas usage in million British thermal units per hour (MMBtu/hr), RTO combustion chamber temperature, RTO cycle time, untreated wood volume in cubic foot per charge (ft^3/charge), volume of preservative solution (gal/charge) per charge, temperature of the ties from the front and rear of the tram when they are removed from the retort, and number of charges per day.

- Facility personnel will record the times (open time, close time, and length of time in minutes) each retort is open within the enclosure with the mega-pack door down.
- Facility personnel will record the times (open time, close time, and length of time in minutes) the mega-pack door is opened.
- Shutting down the site boiler after treatment is done to get an accurate reading of fuel use for the RTO unit that is on the same fuel meter as the boiler.
- Recording pertinent process details in support of the Method 204 verification. These records will include times (open time, close time, and length of time in minutes) the mega-pack door is in the open position, and at what height the door is open to. Details may also include fan speeds, fan damper positions, information about door positions as applicable for individual measurement locations.
- Ensure the process is operating normally during testing.
- AmeriTies will ensure safe access to all sampling locations.
- AmeriTies will work with Bison to ensure adequate on-site power is available to support the test campaign.
- Sampling ports at the RTO inlet and outlet will be free of obstructions and comply with EPA Method 1 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 source 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 AmeriTies' 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 the stack outlet, or within the retort building enclosure.

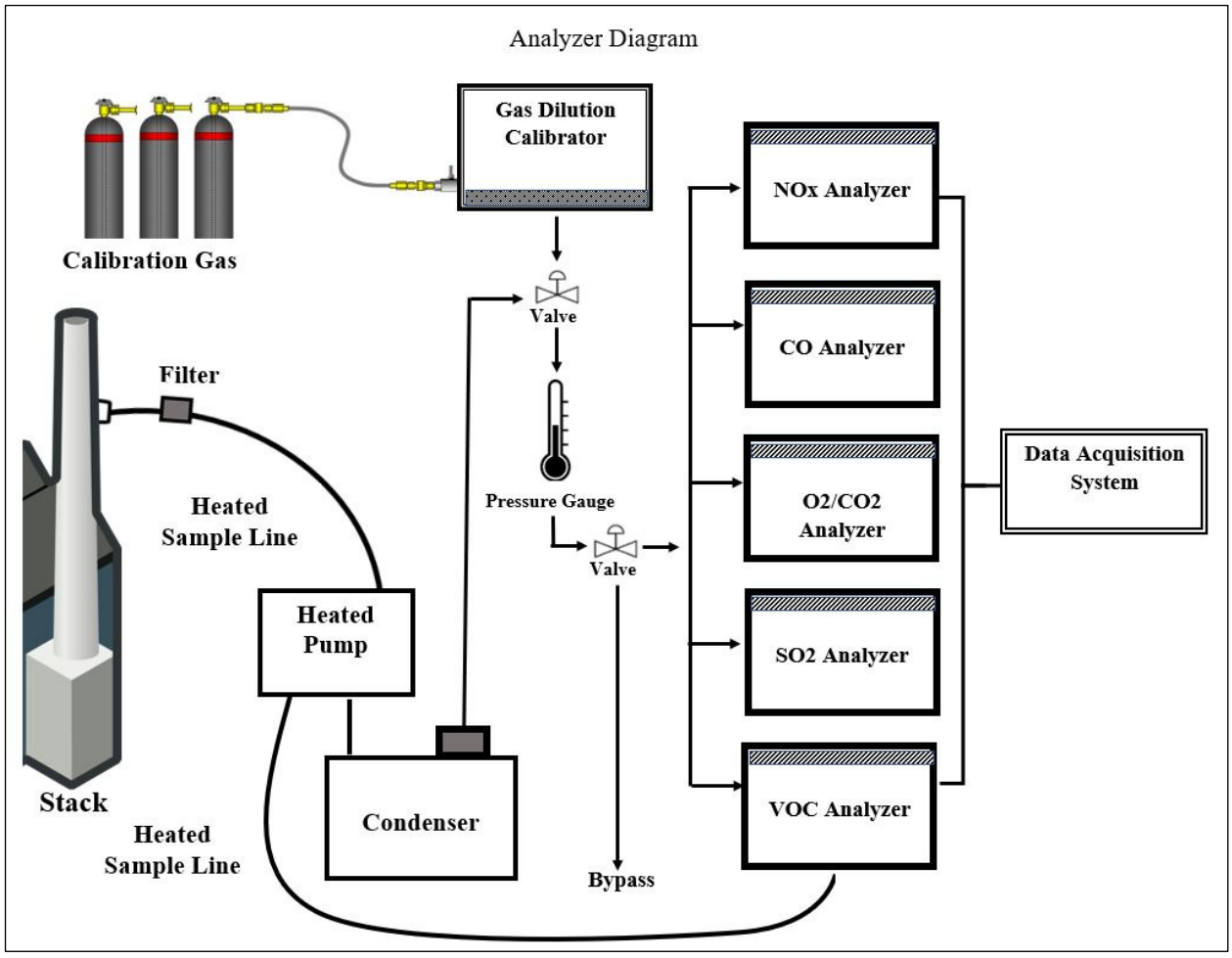
4.0 EMISSION TEST METHODS AND PROCEDURES

4.1 Instrumentation and Equipment

Differential pressure measurements in support of the verification of permanent total enclosure will be made using a calibrated Shortridge ADM-850L digital micromanometer capable of measuring < 0.007 inches of water with a current National Institute of Standards and Technology (NIST) traceable calibration certificate to 0.01 inches of water.

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 3 gives a diagram showing Bison's typical setup for gaseous sampling.

Figure 3: Gaseous Analyzer Schematic



4.2 Test Methods and Descriptions

Testing will be performed using the following EPA test methods as described in Title 40, Code of Federal Regulations (CFR), Part 60, and as approved and adopted by the appropriate regulatory agency.

EPA Reference Method 1, "Sample and Velocity Traverses for Stationary Sources." The objective of Method 1 is to determine a suitable location for testing and to determine the velocity and/or sample points for the source. The results of Method 1 sampling location and sample or velocity point measurement locations are included in the appendices.

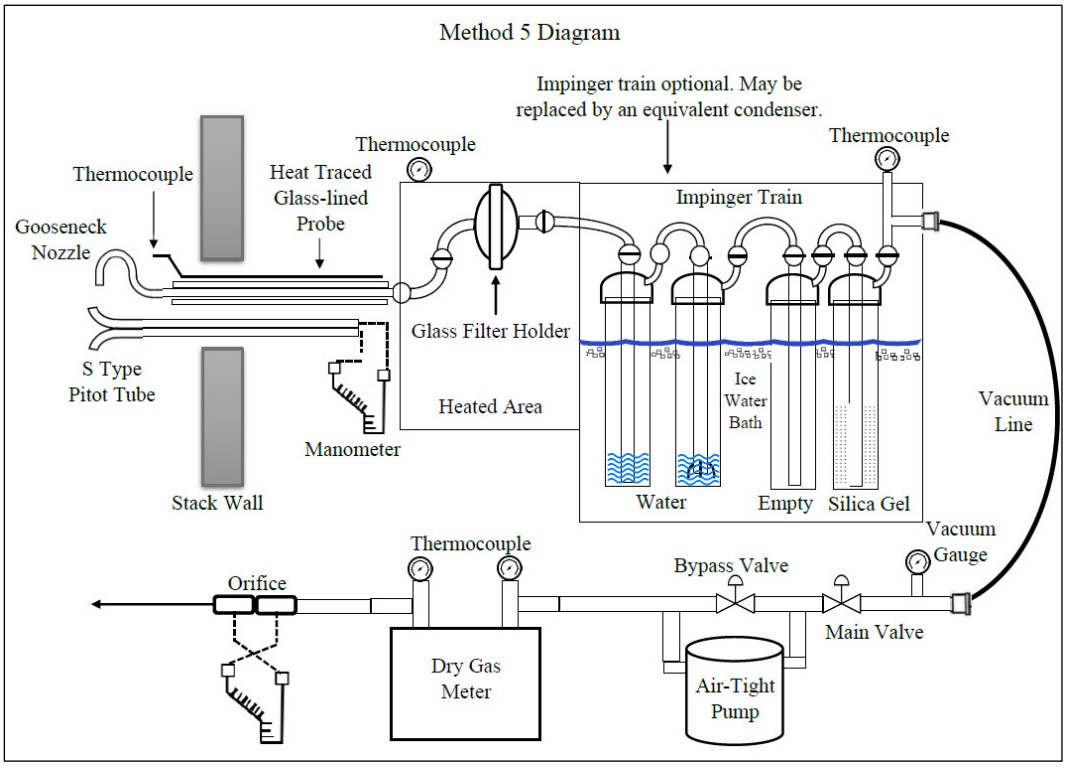
EPA Reference Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type-S Pitot Tube)." The objective of Method 2 is to determine volumetric flow. The average velocity, temperature, static pressure, and source area are used to calculate volumetric flow for the source.

EPA Reference Method 3A, "Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)." The objective of Method 3A is to determine the O_2 and CO_2 concentrations in the stack gas stream.

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.

ODEQ Method 5, "Sampling Particulate Emissions from Stationary Sources." The objective of ODEQ Method 5 is to determine the total particulate matter emissions (filterable and condensable) from a source. Method 5 is an isokinetic sampling method for determination of PM. The exhaust gas stream is sampled along a cross-section of the stack and PM is captured within the nozzle, probe, filter-bell, quartz fiber filter, and glass impingers. Method 5 incorporates Method 2 "velocity measurements" and Method 4 "moisture measurements."

Figure 4: Particulate Sampling Train

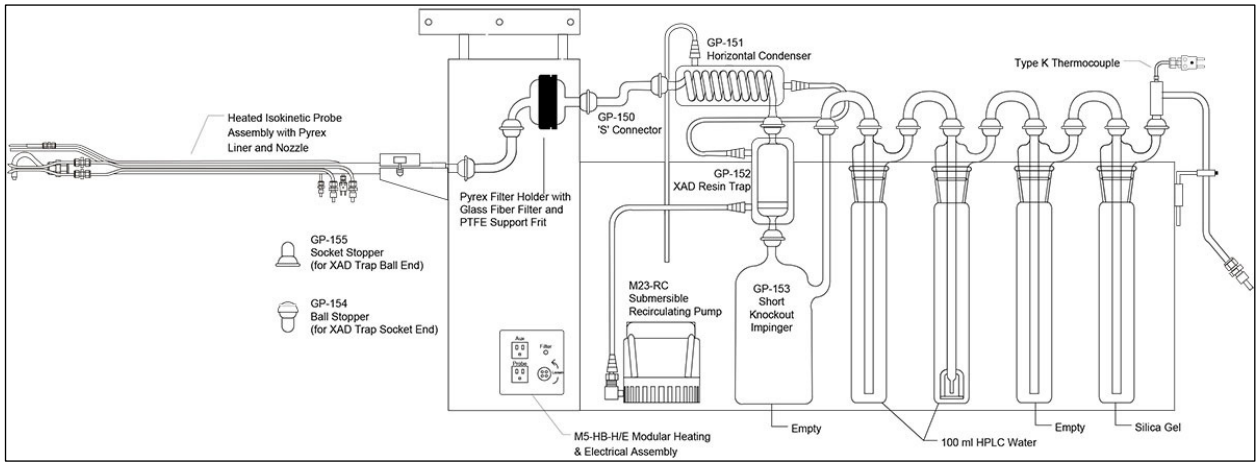


EPA Reference Method 7E, "Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)." The objective of Method 7E is to determine the NO_x concentration from the source.

EPA Reference Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)." The objective of Method 10 is to determine the concentration of CO in the stack gas stream.

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. 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 are extracted from the sample, separated by high resolution gas chromatography, and measured by high resolution mass spectrometry. 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 parts per million by volume wet (ppmvw). Non-methane VOCs and methane are reported as propane (C_3H_8).

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 volatile organic compound capture efficiency (CE) is assumed to be 100 percent.

EPA Reference Method 205, "Verification of Gas Dilution Systems for Field Instrument Calibrations." The objective of Method 205 is to produce a known and verified set of calibration gases that are used in instrumental analysis emission testing.

4.3 Analytical Methods

Eight pre-spiked XAD resin traps for Method 23 analysis will be obtained from ALS Environmental's Ontario, Canada laboratory 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 analysis.

ODEQ 5 PM samples will be transported under chain of custody back to Bison's Helena, Montana laboratory for in-house analysis.

One set of filter and reagent blanks will be collected for each applicable method following method guidelines. Method blanks will be analyzed along with the run samples for each method.

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 or ODEQ 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.

The run number, date, location and source uniquely identify samples obtained in the field. Subdivisions of a sample are labeled and recorded as such (i.e., Sample 1 of 2). Samples are maintained in a manner to prevent deterioration, loss or damage. Samples 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 follows 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 Title 40 Code of Federal Regulations (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 the 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 ATW221577.

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

Oregon
Kate Brown, Governor

Department of Environmental Quality
Agency Headquarters
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5696
FAX (503) 229-6124
TTY 711

January 22, 2021

AmeriTies West LLC
PO Box 1608
The Dalles, OR 97058

Mr. Thompson,

DEQ has reviewed the information and comments submitted by AmeriTies West LLC (AmeriTies) on April 10, 2020 in response to the comment letter issued by DEQ on March 11, 2020 addressing information required for approval of the Emissions Inventory (Inventory) for your facility as required by the Cleaner Air Oregon (CAO) program. DEQ also met with AmeriTies on November 20, 2020 to discuss the status of the Inventory and the source testing required to provide a complete and approvable Inventory for the purposes of the CAO program. DEQ appreciates the continued dialogue on these challenging issues.

Specific Comments

1. DEQ approved the Notice of Intent to Construct #32430 (NC) on June 3, 2020, to construct and operate the proposed capture and control system for the retort operations as described in your April 10, 2020 response letter. The source testing requirements DEQ provided previously in a comment letter on March 11, 2020 have been updated (see below) to reflect those operational changes.
2. DEQ maintains that the theoretical basis and correction factors used to develop the Toxic Air Contaminant (TAC) emissions calculations for the Drip Pad and Storage Yard Toxics Emissions Units (TEUs) at your facility are insufficient for the purposes of assessing risk under the CAO program. Further, DEQ is concerned that the use of these methods would result in substantial under reporting of potential emissions, as highlighted by the significant (approximately 100X) decrease in estimated emissions of naphthalene from these TEUs as reported in the submitted CAO emissions inventory, as compared to the annually reported emissions. DEQ requires that you perform source testing for these TEUs so that these emissions from your facility are quantified in a more verifiably accurate manner. However, given the operational changes proposed in the NC regarding retort door operations, and depending on the proposed source sampling plan, DEQ may allow emissions from the Drip Pad TEU to be included into a single Storage Yard TEU in the CAO emissions inventory.
3. In accordance with the definition of source [OAR 340-200-0020(166)], DEQ requires that TAC emissions from storage of ties in railcars maintained on-site be included in your Inventory, as these products remain under the control of AmeriTies. Please provide a revised Inventory with a new significant TEU for Rail Car Storage fugitive emissions. Also provide the location of this TEU and the configuration of these stored ties, as these data will affect the emission estimates and modeling from this TEU.

Source Testing

DEQ recognizes that significant changes in operating procedures are being implemented at the facility

with the installation of a Regenerative Thermal Oxidizer (RTO) control device and fully enclosing the retort deck area and building (Retort Building). In order to provide a complete CAO Inventory that can be used to more accurately assess risk from your facility, pursuant to OAR 340-212-0120, DEQ requires you to source test the following TEUs at your facility:

i. **Retort Building**:
   a. EPA Method 204 must be performed to establish the Retort Building as a Permanent Total Enclosure (PTE). Because the retort building was not originally designed as a PTE, DEQ requires that the alternative criteria provided in Method 204 (Procedure, Step 8.3), that is based on a pressure drop of 0.013 mm Hg (0.007 in. H2O), must be used to establish the Retort Building as a PTE.
   b. The Retort building must be determined to be a PTE in order to waive the inlet testing to the RTO (see below), as this would ensure no fugitive emissions from retort door openings need to be accounted for in the Inventory.
   c. If the Retort Building is not determined to be a PTE, the actual capture efficiency must be determined using a tracer gas study or other DEQ approved procedure to determine the amount of fugitive emissions from retort door operations.

ii. **RTO**:
   a. Sampling plans must include three (3) sampling events which include one (1) retort operating with copper naphthenate treatment solution, and the remaining retorts operating with creosote treatment solution.
   b. If the Retort Building is not determined to be a PTE (see above in (i)(a)), then the RTO inlet must be sampled using Modified EPA Method 23, or similar method upon DEQ approval, to sample for each PAH and PAH-derivative listed in OAR 340-245-8020 Table 2, in order to assess fugitive emissions from the Retort Building TEU.
   c. The RTO outlet must be tested for the following using Modified EPA Method 23 to sample the following Toxic Air Contaminants (TACs) listed in OAR 340-245-8020 Table 2:
      1. Each dioxin and furan congener, as well as totals for each class of congeners (e.g., Total tetrachlorodibenzo-p-dioxins, Total hexachlorodibenzofurans).
      2. Each PAH and PAH-derivative.

iii. **Treated Tie Storage**: DEQ requires the development of site specific emission factors for the fugitive emissions from the stored ties treated with the creosote treatment solution for PAHs and PAH-derivatives listed in OAR 340-245-8020 Table 2. DEQ understands the complexities involved in sampling these emissions and remains open to discussing different sampling options for these emissions.

iv. **Boiler 2**: Due to the limited amount of distillate fuel usage permitted for use in the boiler, DEQ will not require testing of this TEU.

v. **Diesel Scrubber**: DEQ understands that there are operational modifications occurring at the facility that will change which emissions are routed to the Diesel Scrubber. If these changes do not re-route all of the current emissions to this control device then the Diesel Scrubber will still be a source of TAC emissions that must be tested for PAHs and PAH-derivatives using Modified EPA Method 23, or a DEQ-approved alternative method.

Source testing of the Retort Building, RTO, and the Treated Tie Storage, as stipulated above, must be completed within **90** days from the issuance date of this letter. A source testing plan must be submitted no later than **30** days prior to source testing. Once all operational changes and ductwork has been completed for the installation of the RTO, DEQ will determine if source testing of the Diesel Scrubber is required.

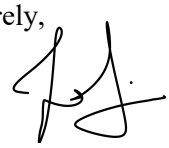
Once DEQ has reviewed and approved the source testing plan, a submittal deadline will be established for

providing the completed Inventory (including information required from Comment #3 above), the Modeling Protocol, and the Risk Assessment Work Plan, if applicable.

Please communicate any questions or clarifications regarding the above comments and source sampling requests proactively in order to provide a timely and satisfactory response. DEQ remains available during this timeframe to discuss the submittal with you and answer any questions you may have. Failure to provide additional information or corrections required by DEQ by this date may result in enforcement.

Please contact me directly at 971.337.4102, (JR.giska@deq.state.or.us), and we look forward to your continued assistance with this process.

Sincerely,



J.R. Giska
DEQ CAO Program Engineer

Cc: Lance Bliss, AmeriTies West, LLC.
Tom Woods, Stoel-Rives
Keith Johnson, DEQ
Mark Bailey, DEQ
Frank Messina, DEQ
Thomas Rhodes, DEQ
File

Oregon
Kate Brown, Governor

Department of Environmental Quality
Eastern Region Bend Office
475 NE Bellevue Drive, Suite 110
Bend, OR 97701
(541) 388-6146
FAX (541) 388-8283
TTY 711

CERTIFIED MAIL NO.: 7015 1520 0001 7834 9489

June 3 , 2020

AmeriTies West, LLC
Lance Bliss, Plant Manager
100 Tie Road
The Dalles, Oregon 97058

Re: Order Approving NC #32430
Source Number 33-0003
Wasco County

Attention: Lance Bliss

DEQ has taken action on your Type 2 Notice of Intent to Construct approval request.

Project Location	Project Description	Plans and Specifications Identification
AmeriTies West Standard ACDP 33-0003	Construction of an emissions control system [Rotary Regenerative Thermal Oxidizer (RTO)] to be used on emissions of the retort door opening operations	NC #32430

PLANS AND SPECIFICATIONS AND CONSTRUCTION APPROVAL

Pursuant to ORS 468A.055(3), this is an order **approving** the proposed construction in NC #32430. The approved construction must comply with the plans, specifications and any corrections or revisions thereto, submitted to obtain this approval.

In accordance with OAR 340-210-0250(2), operation of the source or approved changes to the source, as submitted in the application and approved by this order, must comply with the following conditions, including the general conditions included below:

1. The natural gas usage on the RTO must be included in the monthly calculations to demonstrate compliance with the facility's PSEL. AmeriTies must utilize the natural gas combustion emission factors in the current permit to accomplish these PSEL calculations.

2. Unless DEQ agrees to an alternative date, AmeriTies must submit to DEQ for approval, a detailed Standard Operating Procedure (SOP). The SOP must incorporate the RTO and retort door operations. AmeriTies must submit the SOP to DEQ at least 30 days prior to beginning operation of the RTO. Once approved, AmeriTies must comply with the SOP. Unless notified by DEQ of an alternative date, AmeriTies must submit a revised SOP no later than six months after start-up of the RTO. The SOP must address these minimum operating and documentation requirements:

    - AmeriTies must conduct start-up and shutdown procedures in a manner that minimizes emissions to the greatest extent possible. SOP should explain in detail how emissions are to be minimized during start-up and shutdown of the RTO.
    - Identifying optimal treated wood charge conditions before removing treated wood to the drip pad;
    - Identifying procedures for retort door openings before, during and after removal of treated wood charges;
    - Identifying procedures for Mega Pack door opening before, during, and after removal of treated wood charges;
    - The SOP must address documenting wood charge conditions (visible dripping and off gassing) on the drip pad, and include the length of time retort door was opened before wood charge is placed on drip pad.
    - Include procedures for monitoring and documenting pressure within Mega Pack containment building during RTO operation.
    - Include monitoring and documenting procedures for operating temperature of RTO. AmeriTies must keep records on-site and available for review.
    - The SOP must address corrective actions and practices if the RTO malfunctions.
    - The SOP must incorporate how the facility intends to operate the RTO and retorts during periods of natural gas curtailment

3. AmeriTies must maintain a continuous temperature monitoring system on the RTO operation. AmeriTies must ensure the RTO is operating at a minimum 1,500 degrees F while controlling emissions from the retort door openings. AmeriTies must operate the RTO with a minimum residence time of 0.5 seconds for controlling the emissions.

4. AmeriTies must ensure the RTO is up to the minimum operating temperature (identified in paragraph 3 above) when the retort doors are first opened post treatment and for a defined period of time thereafter, as established in the SOP. The SOP identifies the monitoring and recordkeeping requirements.

5. AmeriTies must operate and maintain air pollution control devices and emission reduction processes at the highest reasonable efficiency and effectiveness to minimize emissions. Air pollution control devices, including the RTO and components, must be in operation and functioning properly at all times when the associated emission source is operating. [OAR 340-226-0120]

6. Unless DEQ agrees to an alternative date, AmeriTies must conduct a source test on the completed emissions control system including the RTO operations within three months of start-up. Testing must be conducted while controlling retort door opening emissions and must include the following:
   - A capture efficiency demonstration of the control system:
   - Sampling for specified criteria pollutants
   - Sampling for air toxics required to complete the Cleaner Air Oregon emission inventory and analysis.

   AmeriTies must submit the associated source test plan 45 days prior to conducting the test. If DEQ agrees to an alternative test date, AmeriTies must test no later than the agreed-upon alternative date.

7. AmeriTies must notify DEQ in writing of the date the facility starts the RTO emissions control system. The notification must be submitted no later than seven (7) days after startup.

8. AmeriTies must operate the RTO only using natural gas.

9. AmeriTies must ensure it has land-use approval for the new RTO emissions control system before beginning operation of the RTO.

10. AmeriTies must submit a (proposed) update to the Mutual Agreement and Order Odor Action Plan (Table 1) to DEQ for approval identifying additional steps AmeriTies will take to reduce odor emissions at the facility. This update must include construction and operation of the RTO and Mega Pack building. In addition, it must include an evaluation for potentially routing retort process emissions to the RTO. AmeriTies must submit the proposed changes to DEQ by July 9, 2020.

In accordance with OAR 340-210-0240(3), AmeriTies must notify DEQ of completion and startup within 30 days after completing the construction or modification. Please complete the enclosed Notice of Approved Construction Completion form and return it to:

Eastern Region Bend Office
Attn: Permit Coordinator
475 NE Bellevue Drive, Suite 110
Bend, OR 97701

Pursuant to ORS 468A.055(5), you have a right to request a contested case hearing on this order **within 20 calendar days** from the date this order was mailed. The contested case hearing must be requested, and will be conducted, in accordance with ORS Chapter 183, OAR Chapter 137, division 003 and OAR Chapter 340, division 011.[1] You must send your written request to: Office of Director, DEQ, 700 NE Multnomah Street, Suite 600, Portland, Oregon 97232. If you fail to file a timely request for hearing, this order will become a final order by default without further action by DEQ, as per OAR 340-011-0535(1).

If you have questions, please contact the permit writer, Frank Messina, at (541) 633-2019.

Sincerely,

Mark W. Bailey
DEQ Eastern Region AQ Manager

Enclosure: Notice of Approved Construction Completion form

[1] Active duty service members have a right to stay proceedings under the federal Service Members Civil Relief Act. For more information, contact the Oregon State Bar at 1-800-452-8260, the Oregon Military Department at 503-584-3571, or the nearest United States Armed Forces Legal Assistance Office through http://legalassistance.law.af.mil. The Oregon Military Department does not have a toll free telephone number.

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

1435 Norjohn Court, Burlington ON, L7L 0E6

PROJECT QUOTATION

Quoted by: Ron McLeod/Ancy Sebastian
Phone #: 905-331-3111/905 340 0838
Quote #: **ALSEQ20-202**
Date of Issue: 2020-Aug-07
Expiry Date: 2021-Dec-31

Client Contact: Kelly Dorsi
Client: Bison Engineering
3134 E Lyndale Ave,
Helena MT 59601
406-442-5768
Kdorsi@bison-eng.com

Project: Natural Gas Fired RTO	Unit Price (US $)	Est # of Units	Extended Price (US$)	Notes
Semi-Volatile Organics				
SVOC Train				
Extraction - sequential DCM & Toluene	175	4	700	(1)
PCDD/F via M 23	450	4	1800	(2)
PAH/SVOC via mod. CARB 429 LRMS SIM	645	4	2580	(3)
XAD (pre-cleaned and certified)	100	5	500	
Field Spikes (PCDD/PCDF and PAH)	40	5	200	
Pre-Extract/clean Filters	10	5	50	
Bottles (500mL - case of 12)	35	per case	Option	
Extimated Discounted Project Total			**5830**	

NOTES:
(1) Low molecular wt targets like cresols are susceptible to losses using toluene as the extracting solvent. Therefore a 1st extraction with DCM is recommended for the SVOCs as per 0010. Combined DCM and toluene for the PCDD/F targets (toluene as per M23).
(2) Including uniquely resolved 2,3,7,8-TCDD and 2,3,7,8-TCDF via DB5MS analysis.
(3) Using all of the CARB 429 extraction/internal standards for recovery corrected data while applying the best available labelled target to correct for the targeted compound. The calibration mix employed for a multi-point calibration has all targets except for cresols and dibenzofuran. These two latter targets will be calibrated relative to a single point calibration.

TERMS & CONDITIONS:
(001) Unless contracted otherwise, ALS will follow the version of the above referenced analytical methods as defined in the ALS Standard Operating Procedures (SOPs). These SOPs often include minor modifications to the reference methods
(002) Taxes not included
(003) Standard Turn-Around-Time (TAT) is 10 (inorganics) 15 (organics) working days (WD)
(004) Pricing assumes standard TAT. Surcharges apply for expedited TAT.
(005) Assuming a minimum order of 3 samples, then the lab QC (lab method blank, LCS etc.) are included in the price. Field QC (eg. field blanks, reagent blanks etc) are billed on a per unit basis.
(006) see also attachment

We do not offer

2-Acetylaminofluorene	53-96-3
2-Aminoanthraquinone	117-79-3
Carbaryl	63-25-2
1,6-Dinitropyrene	42397-64-8
1,8-Dinitropyrene	42397-65-9
5-Nitroacenaphthene	602-87-9
6-Nitrochrysene	2/8/7496
2-Nitrofluorene	607-57-8
1-Nitropyrene	5522-43-0
4-Nitropyrene	57835-92-4

AmeriTies West, LLC
The Dalles, 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,
test method per the DEQ source testing request.
Not offered at this time

AmeriTies West, LLC
The Dalles, 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

AmeriTies West, LLC
The Dalles, OR

In-Stack Detection Limits (ISDL) for Wet Chemistry Methods

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 =	5 dscm

Assumptions/Estimates:

Outlet stack area:	11.042	sq. ft		
RTO estimated flow:	15,000	scfm		
Estimated sample volume:	17.5	dscf/hr	=	192.5 dscf/11-hr run
Best estimate of actual sample volume:				5.45 dscm/11-hr run

Estimated sample volume is based on 16% assumed moisture, 400 °F assumed stack temperature, assumed O_2 = 17%, CO_2 = 2%, typical nozzle size = 0.3 inches.

RTO 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 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	5	1	1.00E-03
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	20	4.00	4.00E-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 1,2,3,4,6,7,8-Heptachlorodibenzofuran 1,2,3,4,7,8,9-Heptachlorodibenzofuran Total Tetrachlorodibenzofuran Total Pentachlorodibenzofuran Total Hexachlorodibenzofuran Total Heptachlorodibenzofuran	5	1	1.00E-03
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	20	4.00	4.00E-03

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In-Stack Detection Limits (ISDL) for Wet Chemistry Methods

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	1.20
Anthracene	10	2.00
Acenaphthene Acenaphthylene Fluoranthene Fluorene Pyrene	30	6.00
2-Methylnaphthalene Phenanthrene	60	12.00
Naphthalene	150	30.00

ODEQ Method 5
Total Particulate Matter

Estimated sample volume:	17.5 dscf/hr	=	52.5	dscf/3-hr run
			1.49	dscm/3-hr run

ISDL = (A*B)/C		ISDL =	4.71	mg/dscm
A =	Analytical detection limit	A =	7	mg
B =	Quantity of sample matrix	B =	1	sample train
C =	Volume of stack gas sampled	C =	1.49	dscm

APPENDIX C: SHORTRIDGE MICROMANOMETER CALIBRATION

AIRDATA MULTIMETER CERTIFICATE OF RECALIBRATION

Customer ID: 022037 S/N: M16654
Customer: BISON ENGINEERING, INC. City: HELENA State: MT
As-Received Model #: ADM-850L Converted to Model #: Order #: R200125
PO #: Customer Eqpt ID#: Calibration Due Date: 01/2022

This instrument has been calibrated using Calibration Standards which are traceable to NIST (National Institute of Standards and Technology). Test accuracy ratio is 4:1 for pressures and temperature. Quality Assurance Program and calibration procedures meet the requirements for ANSI/NCSL Z540-1, ISO 17025, MIL-STD 45662A and manufacturer's specifications. Calibration accuracy is certified when meters are used with properly functioning accessories only. All Uncertainties are expressed in expanded terms (twice the calculated uncertainty). This report shall not be reproduced, except in full, without the written approval of Shortridge Instruments, Inc. Results relate only to the item calibrated. For limitations on use, see Shortridge Instruments, Inc. Instruction Manual for the use of AirData Multimeters. Procedure used: Procedure for Differential Pressure, Absolute Pressure and Temperature Recalibration of AirData Multimeters SIP-CP02 Revision: 30 Dated: 04/04/16

Calibration Technician(s): M. LaBash D. Babb Calibration Date: 01/23/2020
Calibration Approved by: J. Laulemeier Title: Cal Mgr Date: 01/24/2020

AS-Received By ML	FINAL Test By DB	Test By
Date 01/17/2020 Rh 35 %	Date 01/23/2020 Rh 31 %	Date Rh %
Ambient Temperature 74 °F	Ambient Temperature 76 °F	Ambient Temperature °F
Barometric Pressure 25.51 in Hg	Barometric Pressure 28.48 in Hg	Barometric Pressure NA in Hg
All within spec (YES) NO NA	All within spec (YES) NO	All within spec YES NO

ABSOLUTE PRESSURE TEST (in Hg)

TEST METER TOLERANCE = ± 2.0 % ± .1 in Hg AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A See Notes

Pressure Standard: Heise #02-R	S/N: 41741/42451	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #12A-R	S/N: 45605/48491	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #04-R	S/N: 41743/42453	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #14-R	S/N: 43412/45043-2	(As-Rcvd)	Test 2	Test 3
Pressure Standard: Heise #06-R	S/N: 41742/42452-1	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #16-R	S/N: 43413/45044	As-Rcvd	(Test 2)	Test 3
Pressure Standard: Heise #08-R	S/N: 42186/43328	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #18-R	S/N: 44581/46845	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #10-R	S/N: 42203/43352	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #20-R	S/N: 44582/46847	As-Rcvd	Test 2	Test 3

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff
14.0	14.07	14.1	.21	14.22	14.2	-.14			
28.4	28.51	28.6	.32	28.48	28.5	.07		NA	
40.0	40.13	40.2	.17	40.10	40.1	0			

DIFFERENTIAL PRESSURE TEST (in wc)

TEST METER TOLERANCE = ± 2.0 % ± 0.001 in wc AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A See Notes

Pressure Standard: Heise #01-L	S/N: 41739/42449	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #11-L	S/N: 43165/44551-1	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #01-R	S/N: 41739/42446	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #11-R	S/N: 43165/44730	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #02-L	S/N: 41741/42454	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #12A-L	S/N: 45605/48490	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #03A-L	S/N: 45570/48461	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #13-L	S/N: 43415/45041	(As-Rcvd)	Test 2	Test 3
Pressure Standard: Heise #03A-R	S/N: 45570/48460	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #13-R	S/N: 43415/45039	(As-Rcvd)	Test 2	Test 3
Pressure Standard: Heise #04-L	S/N: 41743/42456	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #14-L	S/N: 43412/45045	(As-Rcvd)	Test 2	Test 3
Pressure Standard: Heise #05-L	S/N: 41740/42450	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #15-L	S/N: 43416/45042	As-Rcvd	(Test 2)	Test 3
Pressure Standard: Heise #05-R	S/N: 41740/42447	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #15-R	S/N: 43416/45040	As-Rcvd	(Test 2)	Test 3
Pressure Standard: Heise #06-L	S/N: 41742/42455	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #16-L	S/N: 43413/45046	As-Rcvd	(Test 2)	Test 3
Pressure Standard: Heise #07-L	S/N: 42185/42186	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #17-L	S/N: 44579/46842	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #07-R	S/N: 42185/43326	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #17-R	S/N: 44579/46841	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #08-L	S/N: 42186/43329	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #18-L	S/N: 44581/46846	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #09-L	S/N: 42202/43351	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #19-L	S/N: 44580/46844	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #09-R	S/N: 42202/43350	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #19-R	S/N: 44580/46843	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #10-L	S/N: 42203/43353	As-Rcvd	Test 2	Test 3	Pressure Standard: Heise #20-L	S/N: 44582/46848	As-Rcvd	Test 2	Test 3

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff
0.0100	.0100	.0101	1.00	.0103	.0103	0			
0.0200	.0200	.0200	0	.0202	.0202	0			
0.0300	.0300	.0300	0	.0304	.0304	0			
0.0400	.0400	.0400	0	.0402	.0402	0			
0.0500	.0501	.0501	0	.0502	.0502	0			
0.1250	.1252	.1251	-.08	.1258	.1257	-.08			
0.2250	.2259	.2256	-.13	.2258	.2256	-.09		NA	
1.000	1.019	1.015	-.39	1.015	1.014	-.10			
2.000	2.010	2.005	-.25	2.006	2.002	-.20			
3.600	3.622	3.617	-.14	3.606	3.590	-.44			
4.400	4.419	4.428	.20	4.410	4.417	.16			
27.00	27.16	27.17	.04	27.15	27.17	.07			
50.00	50.26	50.15	-.22	50.14	49.98	-.32			
Overange	NA	✓	NA	NA	✓	NA	NA		NA

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ATW221577

CO ID: 022037 MULTITEMP AND/OR TEMPROBE RECALIBRATION TEST REPORT Order #: R200125

Customer: BISON ENGINEERING, INC. City: HELENA State: MT

Procedure used: Procedure for Calibration/Recalibration of MultiTemps and/or TemProbes SIP-CP14 Rev: 03 Dated: 07/31/14

Equipment Being Tested: MultiTemp and TemProbes _____ TemProbe(s) ✓

AS-RECEIVED TEMPERATURE TEST (° F)
MULTITEMP TOLERANCE (MULTITEMP AND TEMPROBES TESTED AS A UNIT) = ± 0.5° F
TEMPROBE TOLERANCE = ± 0.3° F

Thermometer #1 S/N 8A089 / Thermistor S/N A410660	Set Point: 35° F	95° F	155° F
Thermometer #2 S/N 8B104 / Thermistor S/N 871507	Set Point: 35° F	(95° F)	155° F
Thermometer #5 S/N B11780 / Thermistor S/N B10505	Set Point: 35° F	95° F	(155° F)
Thermometer #6 S/N B11782 / Thermistor S/N B10509	Set Point: (35° F)	95° F	155° F
Thermometer #7 S/N B49938 / Thermistor S/N B482202	Set Point: 35° F	95° F	155° F
Temperature Standard AirData Multimeter S/N M00136	Set Point: 35° F	95° F	155° F
Temperature Standard AirData Multimeter S/N M96100	Set Point: (35° F)	(95° F)	(155° F)

Test By: J.M. LaBash Date: 01/17/2020 Rh: 32 % Ambient Temperature: 75 °F Barometric Pressure: 28.47 in Hg

Approx Set Point	Temp Standard	Test Probe #1 ADT- 442	Test Probe #2 ADT- 446	Test Probe #3 ADT-	Test Probe #4 ADT-	Test Probe #5 ADT- NA	Test Probe #6 ADT-	Test Probe #7 ADT-	Test Probe #8 ADT-
35°	35.0	35.0	35.2						
95°	95.0	95.0	95.1				NA		
155°	155.0	155.1	155.0						

A check in the box to the right of a TemProbe reading indicates that the reading is Out Of Specification.

If all As-Received readings were within specification, and no repairs were performed, no Final test is required.

NOTES: _____

FINAL TEMPERATURE TEST (° F)
MULTITEMP TOLERANCE (MULTITEMP AND TEMPROBES TESTED AS A UNIT) = ± 0.5° F
TEMPROBE TOLERANCE = ± 0.3° F

Thermometer #1 S/N 8A089 / Thermistor S/N A410660	Set Point: 35° F	95° F	155° F
Thermometer #2 S/N 8B104 / Thermistor S/N 871507	Set Point: 35° F	95° F	155° F
Thermometer #5 S/N B11780 / Thermistor S/N B10505	Set Point: 35° F	95° F	155° F
Thermometer #6 S/N B11782 / Thermistor S/N B10509	Set Point: 35° F	95° F	155° F
Thermometer #7 S/N B49938 / Thermistor S/N B482202	Set Point: 35° F	95° F	155° F
Temperature Standard AirData Multimeter S/N M00136	Set Point: 35° F	95° F	155° F
Temperature Standard AirData Multimeter S/N M96100	Set Point: 35° F	95° F	155° F

Test By: _____ Date: _____ Rh: NA % Ambient Temperature: _____ °F Barometric Pressure: _____ in Hg

Approx Set Point	Temp Standard	Test Probe #1 ADT-	Test Probe #2 ADT-	Test Probe #3 ADT-	Test Probe #4 ADT-	Test Probe #5 ADT- NA	Test Probe #6 ADT-	Test Probe #7 ADT-	Test Probe #8 ADT-
35°									
95°							NA		
155°									

NOTES: _____

Calibration standards used by Shortridge Instruments, Inc. are traceable to NIST (National Institute of Standards and Technology). Calibration is performed in accordance with ANSI/NCSL Z540-1, ISO 17025, MIL-STD 45662A and manufacturer's specifications. Calibration accuracy is certified when meters are used with properly functioning accessories only. This report shall not be reproduced, except in full, without the written approval of Shortridge Instruments, Inc. Results relate only to the item calibrated. Limitations on use: See Shortridge Instruments, Inc. Instruction Manual for the use of AirData Multimeters.

The enclosed ADM or HDM Calibration Standards form(s) is/are an integral part of this calibration and must remain with this Certificate of Calibration. Note: There may be more than one such form included that pertains to this calibration.

Calibration Approved by: Y. Yaulmeen Title: Cal Mgr Date: 01/24/2020

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Shortridge Instruments, Inc. AirData Multimeter Calibration Equipment

Order Number: R200125 Serial Number: M16654 Test Type: Initial As-Received (Final)

ABSOLUTE PRESSURE STANDARDS

ADM #02-R	S/N: 41741/42451	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 04/30/19	Due Date: 04/2020
ADM #04-R	S/N: 41743/42453	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/07/19	Due Date: 11/2020
ADM #06-R	S/N: 41742/42452-1	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/21/19	Due Date: 08/2020
ADM #08-R	S/N: 42186/43328	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/22/19	Due Date: 03/2020
ADM #10-R	S/N: 42203/43352	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/21/19	Due Date: 01/2020
ADM #12A-R	S/N: 45605/48491	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/16/19	Due Date: 07/2020
ADM #14-R	S/N: 43412/45043-2	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 10/07/19	Due Date: 09/2020
ADM #16-R	S/N: 43413/45044	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/20/19	Due Date: 02/2020
ADM #18-R	S/N: 44581/46845	Heise Model: PPM-2	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/17/19	Due Date: 05/2020
ADM #20-R	S/N: 44582/46847	Heise Model: PPM-2	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 06/20/19	Due Date: 06/2020

#02-R, 04-R, 06-R, 08-R, 10-R, 12A-R, 14-R, 16-R	Rated Accuracy: 0.05% fs (0.0305 in Hg)	Range: 0-30 psia	Resolution: 0.01	Uncertainty: < 0.0358
#18-R, 20-R	Rated Accuracy: 0.05% fs (0.0305 in Hg)	Range: 0-60 in Hg	Resolution: 0.001	Uncertainty: < 0.0358

DIFFERENTIAL PRESSURE STANDARDS

ADM #01-L	S/N: 41739/42449	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/01/19	Due Date: 04/2020
ADM #01-R	S/N: 41739/42446	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/01/19	Due Date: 04/2020
ADM #02-L	S/N: 41741/42454	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/01/19	Due Date: 04/2020
ADM #03A-L	S/N: 45570/48461	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/11/19	Due Date: 11/2020
ADM #03A-R	S/N: 45570/48460	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/11/19	Due Date: 11/2020
ADM #04-L	S/N: 41743/42456	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/08/19	Due Date: 11/2020
ADM #05-L	S/N: 41740/42450	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/26/19	Due Date: 08/2020
ADM #05-R	S/N: 41740/42447	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/28/19	Due Date: 08/2020
ADM #06-L	S/N: 41742/42455	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/26/19	Due Date: 08/2020
ADM #07-L	S/N: 42185/42186	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/26/19	Due Date: 03/2020
ADM #07-R	S/N: 42185/43326	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/26/19	Due Date: 03/2020
ADM #08-L	S/N: 42186/43329	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/25/19	Due Date: 03/2020
ADM #09-L	S/N: 42202/43351	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/23/19	Due Date: 01/2020
ADM #09-R	S/N: 42202/43350	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/23/19	Due Date: 01/2020
ADM #10-L	S/N: 42203/43353	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/23/19	Due Date: 01/2020
ADM #11-L	S/N: 43165/44551-1	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/15/19	Due Date: 07/2020
ADM #11-R	S/N: 43165/44730	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/15/19	Due Date: 07/2020
ADM #12A-L	S/N: 45605/48490	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/16/19	Due Date: 07/2020
ADM #13-L	S/N: 43415/45041	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 09/19/19	Due Date: 09/2020
ADM #13-R	S/N: 43415/45039	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 09/19/19	Due Date: 09/2020
ADM #14-L	S/N: 43412/45045	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 09/19/19	Due Date: 09/2020
ADM #15-L	S/N: 43416/45042	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/22/19	Due Date: 02/2020
ADM #15-R	S/N: 43416/45040	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/22/19	Due Date: 02/2020
ADM #16-L	S/N: 43413/45046	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/21/19	Due Date: 02/2020
ADM #17-L	S/N: 44579/46842	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/16/19	Due Date: 05/2020
ADM #17-R	S/N: 44579/46841	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/21/19	Due Date: 05/2020
ADM #18-L	S/N: 44581/46846	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/16/19	Due Date: 05/2020
ADM #19-L	S/N: 44580/46844	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 07/15/19	Due Date: 06/2020
ADM #19-R	S/N: 44580/46843	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 07/15/19	Due Date: 06/2020
ADM #20-L	S/N: 44582/46848	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 06/18/19	Due Date: 06/2020

#01-L, 03A-L, 05-L, 07-L, 09-L, 11-L, 13-L, 15-L, 17-L, 19-L	Rated Accuracy: > 0.07% fs (0.000175 in wc)	Range: 0.0-0.25 in wc	Res.: 0.00001	Uncertainty: < 0.00035
#01-R, 03A-R, 05-R, 07-R, 09-R, 11-R, 13-R, 15-R, 17-R, 19-R	Rated Accuracy: > 0.06% fs (0.003 in wc)	Range: 0.0-5.0 in wc	Res.: 0.0001	Uncertainty: < 0.00348
#02-L, 04-L, 06-L, 08-L, 10-L, 12A-L, 14-L, 16-L, 18-L, 20-L	Rated Accuracy: > 0.06% fs (0.03 in wc)	Range: 0.0-50.0 in wc	Res.: 0.001	Uncertainty: < 0.0346

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Shortridge Instruments, Inc. AirData Multimeter Calibration Equipment

Order Number: R200125 Serial Number: M16654 Test Type: Initial ~~As-Received~~ Final

ABSOLUTE PRESSURE STANDARDS

ADM #02-R	S/N: 41741/42451	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 04/30/19	Due Date: 04/2020
ADM #04-R	S/N: 41743/42453	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/07/19	Due Date: 11/2020
ADM #06-R	S/N: 41742/42452-1	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/21/19	Due Date: 08/2020
ADM #08-R	S/N: 42186/43328	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/22/19	Due Date: 03/2020
ADM #10-R	S/N: 42203/43352	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/21/19	Due Date: 01/2020
ADM #12A-R	S/N: 45605/48491	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/16/19	Due Date: 07/2020
ADM #14-R	S/N: 43412/45043-2	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 10/07/19	Due Date: 09/2020
ADM #16-R	S/N: 43413/45044	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/20/19	Due Date: 02/2020
ADM #18-R	S/N: 44581/46845	Heise Model: PPM-2	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/17/19	Due Date: 05/2020
ADM #20-R	S/N: 44582/46847	Heise Model: PPM-2	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 06/20/19	Due Date: 06/2020

#02-R, 04-R, 06-R, 08-R, 10-R, 12A-R, 14-R, 16-R	Rated Accuracy: 0.05% fs (0.0305 in Hg)	Range: 0-30 psia	Resolution: 0.01	Uncertainty: < 0.0358
#18-R, 20-R	Rated Accuracy: 0.05% fs (0.0305 in Hg)	Range: 0-60 in Hg	Resolution: 0.001	Uncertainty: < 0.0358

DIFFERENTIAL PRESSURE STANDARDS

ADM #01-L	S/N: 41739/42449	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/01/19	Due Date: 04/2020
ADM #01-R	S/N: 41739/42446	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/01/19	Due Date: 04/2020
ADM #02-L	S/N: 41741/42454	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/01/19	Due Date: 04/2020
ADM #03A-L	S/N: 45570/48461	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/11/19	Due Date: 11/2020
ADM #03A-R	S/N: 45570/48460	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/11/19	Due Date: 11/2020
ADM #04-L	S/N: 41743/42456	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/08/19	Due Date: 11/2020
ADM #05-L	S/N: 41740/42450	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/26/19	Due Date: 08/2020
ADM #05-R	S/N: 41740/42447	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/28/19	Due Date: 08/2020
ADM #06-L	S/N: 41742/42455	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/26/19	Due Date: 08/2020
ADM #07-L	S/N: 42185/42186	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/26/19	Due Date: 03/2020
ADM #07-R	S/N: 42185/43326	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/26/19	Due Date: 03/2020
ADM #08-L	S/N: 42186/43329	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/25/19	Due Date: 03/2020
ADM #09-L	S/N: 42202/43351	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/23/19	Due Date: 01/2020
ADM #09-R	S/N: 42202/43350	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/23/19	Due Date: 01/2020
ADM #10-L	S/N: 42203/43353	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/23/19	Due Date: 01/2020
ADM #11-L	S/N: 43165/44551-1	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/15/19	Due Date: 07/2020
ADM #11-R	S/N: 43165/44730	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/15/19	Due Date: 07/2020
ADM #12A-L	S/N: 45605/48490	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/16/19	Due Date: 07/2020
ADM #13-L	S/N: 43415/45041	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 09/19/19	Due Date: 09/2020
ADM #13-R	S/N: 43415/45039	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 09/19/19	Due Date: 09/2020
ADM #14-L	S/N: 43412/45045	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 09/19/19	Due Date: 09/2020
ADM #15-L	S/N: 43416/45042	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/22/19	Due Date: 02/2020
ADM #15-R	S/N: 43416/45040	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/22/19	Due Date: 02/2020
ADM #16-L	S/N: 43413/45046	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/21/19	Due Date: 02/2020
ADM #17-L	S/N: 44579/46842	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/16/19	Due Date: 05/2020
ADM #17-R	S/N: 44579/46841	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/21/19	Due Date: 05/2020
ADM #18-L	S/N: 44581/46846	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/16/19	Due Date: 05/2020
ADM #19-L	S/N: 44580/46844	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 07/15/19	Due Date: 06/2020
ADM #19-R	S/N: 44580/46843	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 07/15/19	Due Date: 06/2020
ADM #20-L	S/N: 44582/46848	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 06/18/19	Due Date: 06/2020

#01-L, 03A-L, 05-L, 07-L, 09-L, 11-L, 13-L, 15-L, 17-L, 19-L	Rated Accuracy: > 0.07% fs (0.000175 in wc)	Range: 0.0-0.25 in wc	Res.: 0.00001	Uncertainty: < 0.00035
#01-R, 03A-R, 05-R, 07-R, 09-R, 11-R, 13-R, 15-R, 17-R, 19-R	Rated Accuracy: > 0.06% fs (0.003 in wc)	Range: 0.0-5.0 in wc	Res.: 0.0001	Uncertainty: < 0.00348
#02-L, 04-L, 06-L, 08-L, 10-L, 12A-L, 14-L, 16-L, 18-L, 20-L	Rated Accuracy: > 0.06% fs (0.03 in wc)	Range: 0.0-50.0 in wc	Res.: 0.001	Uncertainty: < 0.0346

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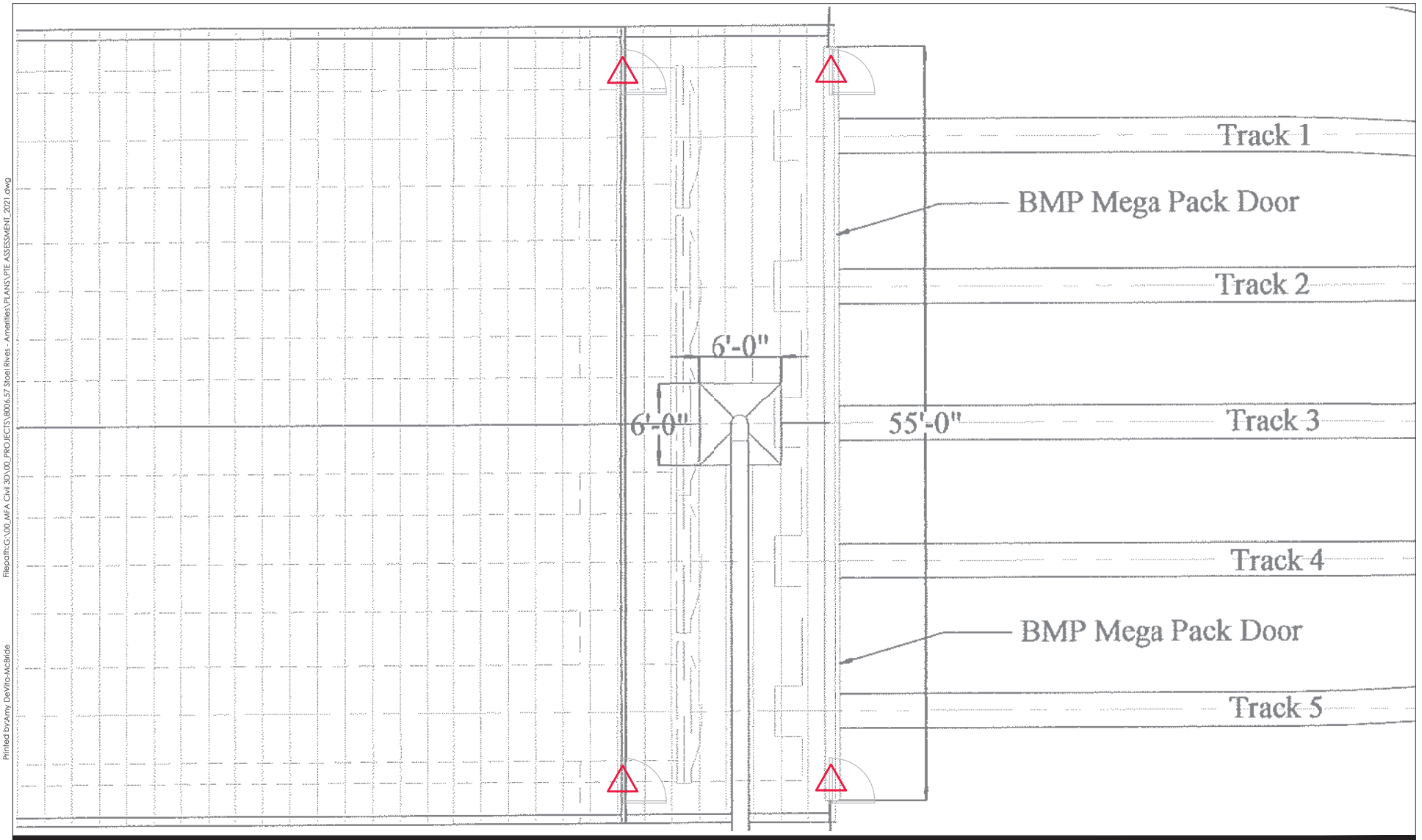
APPENDIX D: MAP OF DIFFERENTIAL PRESSURE MEASUREMENT LOCATIONS



Filepath: G:\00_MFA Civil 3D\00_PROJECTS\8006.57 Stoel Rives - AmeriTies\PLANS\PTE ASSESSMENT_2021.dwg
Printed by: Amy DeVito-McBride
Date: 3/11/2021 3:26:04 PM

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LEGEND

△ DIFFERENTIAL PRESSURE MEASUREMENT LOCATION

Figure 1
Proposed Differential Pressure Measurement Locations
AmeriTies West LLC
The Dalles, OR

APPENDIX E: EXAMPLE TEST REPORT FORMAT

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