LA-UR-24-30248

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Title:	AI 856 NSR Permit No. 632-M1 Target Fabrication Facility Beryllium Machining Lathe TA-35-213-2 Stack Test Report 9-2024
Author(s):	Carretti, Vincent Anthony
Intended for:	Environmental Regulatory Document
Issued:	2024-09-26 (rev.1)

Los Alamos NATIONAL LABORATORY

Memorandum

Environmental Protection and Compliance Division
Compliance Programs Group

To: Sarah S. Holcomb, EPC-CP, MS K490
Through: Heather C. Seus, EPC-CP, *HCS* MS J978
From: Vincent A. Carretti, EPC-CP, MS *VAC* J978
Phone: 505-665-1658
Symbol: EPC-DO: 24-274
LA-UR: 24-30248
Date: SEP 25 2024

Subject: AI 856 NSR Permit No. 632-M1 Target Fabrication Facility Beryllium Machining Lathe TA-35-213-2 Stack Test Report 9-2024

Los Alamos National Laboratory (LANL) is submitting the final report for the Target Fabrication Facility Beryllium Machining Lathe TA-35-213-2 Stack Test completed August 20-21, 2024. The testing was completed by a subcontractor, Compliance Services and Testing, LLC. The Emission Stack Test is required per NSR Permit No. 632-M1 Condition A600.B "Monitoring." The stack test results show that the emissions are below the permit limit. This report will be submitted through the NMED-AQB Secure Extranet Portal and in the Semi-Annual Monitoring Report for July-December 2024.

Attachment(s): Attachment 1 - AI 856 NSR Permit No. 632-M1 Target Fabrication Facility Beryllium Machining Lathe TA-35-213-2 Stack Test Report 9-2024

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ATTACHMENT 1

AI 856 NSR Permit No. 632-M1 Target Fabrication Facility Beryllium Machining Lathe TA-35-213-2 Stack Test Report 9-2024

EPC-DO: 24-274

LA-UR: 24-30248

Date: SEP 25 2024

New Mexico Environment Department
525 Camino de los Marquez, Suite 1
Santa Fe, NM 87505
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Version 11/18/2022

NMED USE ONLY	
DTS	
TEMPO	

UNIVERSAL STACK TEST NOTIFICATION, PROTOCOL AND REPORT FORM

NMED USE ONLY	
Staff	
Admin	

Submit to: AQBCR

I. DATABASE HEADER INFORMATION (drop down menus in bold)

a. AI#		
856	**Test Report**	**Initial Compliance Test**

d. Company Name:	e. Facility Name:
Los Alamos National Laboratory	**TA-35-213 Target Fabrication Facility**
f. Emission Unit Numbers: **TA-35-213-2**	g. Emission Unit Description (boiler, Waukesha 7042, etc) **Beryllium Machining Lathe**

h. Reports - Tracking Number from notification response:	i. Proposed Test Date:	j. Actual test date:
CMT	**Week of 6-24-24**	**8/20-21/24**

k. Reason for test (name permit requirement, NSPS, MACT, consent decree, etc. Indicate here is this notification is a revised test date only)
NSR Permit No. 632-M1 Condition A600.B "Monitoring"

II. GENERAL COMPANY AND FACILITY INFORMATION

a.Company Address:			k.. Facility Address:		
P.O. Box 1663, MS K490			**P.O. Box 1663, MS J978**		
b. City: **Los Alamos**	c. State: **NM**	d. Zip: **8 7 5 4 5**	l. City: **Los Alamos**	m. State: **NM**	n. Zip: **87545**
e. Environmental Contact: **Sarah Holcomb**	f. Title: **Group Leader**		o. Facility Contact: **Heather Seus**	p. Title: **Team Leader**	
g. Phone Number: **(505) 396-0866**	h. Cell Number: **(505) 396-0866**		q. Phone Number: **(505) 412-8832**	r. Cell Number: **(505) 412-8832**	
i. Email Address: **sholcomb@lanl.gov**			s. Email Address: **heatherseus@lanl.gov**		
j. Title V Permit Number: **P100-R2M5**			t. NSR Permit Number: **632-M1**		

u. Detailed driving directions from nearest New Mexico town:
Enter Los Alamos National Laboratory from East Jemez Road. Turn Left on Diamond Drive. Turn left at Pajarito Road. Turn left on Pecos Drive. Building TA-35-213 is approximately 0.5 miles on the left.

III. TESTING FIRM

a. Company:			g. Contact:	
Compliance Services & Testing			**Chris Spencer**	
b. Address 1: **7108 Washington St. NE, Ste. A**			h. Title: **Director**	
c. Address 2: **PO Box 94191 - 87199**			i. Office Phone: **505-681-4909**	j. Cell Phone: **505-681-4909**
d. City: **Albuquerque**	e. State: **NM**	f. Zip: **81709**	k. Email Address: **cspencer@comptesting.com**	

UNIVERSAL STACK TEST NOTIFICATION, PROTOCOL AND REPORT FORM

IV. EMISSION UNIT

a. Emission Unit Number:	b. Make & Model Number
TA-35-213-2	**Moore Nanotech 650FG V2**
c. Serial Number:	d. Permitted Capacity:
2021-215-UFG	**0.060 gm/hr Be removal rate**

e Exceptions: Explain if test is late, rescheduled, related to an enforcement action:
N/A

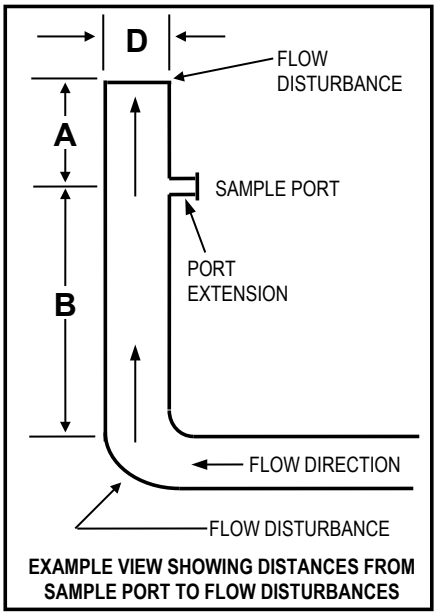
g. Emission Unit Description and brief process name or description:
Beryllium Machining Lathe for micro-scale precision machining to create small laser targets for use in the Department of Energy's National Inertial Confinement Fusion (ICF) program.

h. Installation Date:	i. Startup Date:	k. Date Reached Max. Capacity:
March 2024	**August 20, 2024**	**August 20, 2024**

l. Control Equipment Description as listed in permit (model, ser. # etc. if applicable):
HEPA Filter (HEPA-1)

STACK PARAMETERS

m. Velocity (ft/sec):	**24.3**
n. Temperature (ºC):	**70-F**
o. Stack Diameter, D (in.):	**12**
p. Distance to Stack Bends or Obstructions:	
Upstream, Distance A (in.):	**> 1/2D**
Downstream, Distance B (in.):	**> 2D**



EXAMPLE VIEW SHOWING DISTANCES FROM SAMPLE PORT TO FLOW DISTURBANCES

Attach an explanation or drawing to explain any difficult or unusual stack geometry or parameters.

V. POLLUTANTS AND PROPOSED TEST METHODS

Pollutant or Parameter:		Proposed Test Methods (Deviations from approved methods require supporting documentation and prior authorization)	Deviation to Test Method Requested
☐	**Portable Analyzer Methods for NOx, CO, SO_2**		☐
☐	**NOx**	**EPA Method 7E**	☐
☐	**CO**	**EPA Method 10**	☐
☐	**SO2**	**EPA Method 6**	☐
☐	**VOCs**	**(Specify)**	☐
☐	**HAPs**	**(Specify)**	☐
☒	**PM (TSP)**	**EPA Method 5**	☐
☐	**PM10**	**EPA Method 201**	☐
☐	**PM2.5**	**(Specify)**	☐
☐	**Opacity**	**EPA Method 9**	☐
☐	**Visual E.**	**EPA Method 22**	☐
☒	**Stack Flow**	**EPA Methods 1 - 3**	☐
☒	**Moisture**	**EPA Method 4**	☐
☒	**Other**	**(Specify) EPA Method 29 for Metals - Beryllium**	☐
☐	**Other**	**(Specify)**	☐

List Specific VOC's and HAP's: N/A

VI. PROPOSED TEST RUN AND TEST LOAD INFORMATION

a. Number of Test Runs:	b. Run Duration	c. Required by (regulation or permit number):	d. Specific Condition or Section:
3	**240**	**N/A**	**N/A**

PLEASE NOTE – Default run duration is 60 minutes, unless otherwise specified by an applicable regulation.

e. Expected Load:	f. Percent of Permitted Capacity:	g. Is this an opacity test?	h. If yes, no. of observation pts.:
Maximum available	**100%**	**Yes** ☐ **No** ☒	**N/A**

i. If expected load during test is less than 90% of capacity, explain**:**

N/A

NOTE – Failure to test at 90-100% of permitted load will limit unit operation to 110% of tested load until a new initial compliance test is conducted.

PLANT OR UNIT OPERATING PARAMETERS TO BE MONITORED

j. List and explain the plant operating parameters that will be monitored and applicable permit conditions or regulatory standards.

N/A

VII. ADDITIONAL DETAILS (where applicable)

RATA and INSTRUMENTAL ANALYZER CALIBRATION PROCEDURES

a. Do any of the methods you are proposing utilize instrumental analyzers (i.e.; EPA Methods 3A, 6C, 7E, 10, 18, 25/25A, 320 etc.)? If yes, briefly describe analyzer calibration procedures and/or calibration standard procedures. Enter the highest pollutant concentration expected and the proposed concentrations of calibration gases.	☐ Yes	☒ No

No gaseous sampling of combustion or production byproducts.

SAMPLING TRAIN LEAK CHECK PROCEDURES

b. Do any of the methods you are proposing utilize the EPA Method 5 sampling train (i.e.; EPA Methods 1-4, 5, 17, 26/26A, 29, etc.)? If yes, briefly describe sampling train and pitot tube leak check procedures:	☒ Yes	☐ No

As described in methods 2 (Pitot tube), 4 (moisture), and 5 (particulate matter).

EPA METHOD 19 IN LIEU OF EPA METHODS 1-4

c. Are you proposing to utilize EPA Method 19 in lieu of EPA Methods 1-4?	☐ Yes	☒ No

PLEASE NOTE – EPA Method 19 may be utilized in lieu of EPA Methods 1-4, subject to the approval of the Department. If you are proposing to utilize EPA Method 19 in lieu of EPA Methods 1-4, you MUST include a recent fuel gas heating value analysis as well as a recent fuel flow meter calibration certificate, preferably conducted on the day of the test, but no earlier than three months prior to the test date. If the analyses have been conducted prior to the test date, you MUST append the certificates to the protocol. If conducted on the day of the test, you MUST append the certificates to the final test report.

UNIVERSAL STACK TEST NOTIFICATION, PROTOCOL AND REPORT FORM

VIII. ATTACHMENTS (as needed to support proposed test; check all that apply)		
NOTIFICATION/PROTOCOL ATTACHMENTS		
☐	Road Map Indicating Directions from Nearest New Mexico Town to Facility	
☐	Schematic of process being tested showing emission points, sampling sites and stack cross-section	
☐	Copy of proposed test methods (except for those promulgated test methods found in 40 CFR 51, 60, 61 and 63)	
☐	Fuel Heating Value Analysis	
☐	Fuel Flow Meter Calibration Certificate	
☐	Other:	
☐	Other:	
TEST REPORT ATTACHMENTS		
☒	**Section 2. Tables of Results**	
☒	**Supporting Documents (Specify) Test Report**	
Retain Report Section 3 - Test Procedures, Data, Calculations, Appendices – 2 years NSR permits, 5 years TV		

NEW MEXICO ENVIRONMENT DEPARTMENT
AIR QUALITY BUREAU
NSR PERMIT NUMBER 632-M1

COMPLIANCE TEST REPORT
ON:
EXHAUST EMISSIONS

FROM A:
LATHE MACHINE (UNIT #1 AND 2)

LOCATED AT THE:
TA-35-213 BUILDING

PREPARED FOR:
LOS ALAMOS NATIONAL LABORATORY

TEST DATE:
AUGUST 20-21, 2024

PREPARED BY:
COMPLIANCE SERVICES AND TESTING, LLC

PROJECT NUMBER:
2634

CST
COMPLIANCE SERVICES & TESTING
P.O. Box 94191-87199
7108 Washington St. NE
Suite A
Albuquerque, NM 87109
(505) 681-4909 Phone
www.comptesting.com

Table of Contents

Introduction

Los Alamos National Laboratory (LANL) contracted Compliance Services and Testing (CST) to perform an emissions test on the existing lathe (#1) and a new lathe (#2) in service at Building TA-35-213. The building is located within the boundary of LANL, located in Los Alamos, New Mexico in Los Alamos County.

The testing was to show compliance with the NSR permit issued to this facility and followed procedures with the NMED protocol. The testing procedures are found in the Code of Federal Regulations, Title 40, Part 60, Appendix A, Method 1 for sampling locations, Method 2 for velocity determination, Method 4 for moisture content (H_2O), Method 5 for Isokinetic Sampling, and Method 29 for Metals Emissions, in particular, beryllium emissions. The diluent concentrations for oxygen (O_2) and carbon dioxide (CO_2) were considered ambient in lieu of Method 3A due to the source being a non-combustion type.

The information contained in this report has been reviewed and approved as being truthful, accurate, and complete.

Table 1 - Background Data

Source Operator:	**Los Alamos National Laboratory (LANL)** Attn: Vincent Carretti P.O. Box 1663, MS J978 Los Alamos, NM 87545
Test Contractor:	**Compliance Services and Testing (CST)** Attn: Chris Spencer 7108 Washington NE Ste. A Albuquerque, New Mexico 87109 Phone: (505) 681-4909
Test Participants:	**CST** Chris Spencer – Director Matt Magee – Environmental Scientist **LANL** Derek Schmidt – Engineering Team Leader
Test Dates:	August 20-21, 2024
Location:	TA-35 is located within Los Alamos National Laboratory, Los Alamos, New Mexico
Test Methods:	**Title 40 of the Code of Federal Regulations, Part 60, Appendix A** Methods 1,2,4,5 for Isokinetic Sampling Methods Method 29 for Metals Emissions
Regulatory Permit:	NMED-AQB NSR Permit #632-M1

Summary of Results

The beryllium particulate emissions emitted from two lathes were tested to demonstrate initial compliance with the permit in place for this facility. Even though the calculated beryllium removal rates indicate each lathe was operating at 50% of the permit limit (0.030 gm/hr actual vs 0.060 gm/hr permitted), the lathe operators indicated that the lathes were processing the maximum amount of beryllium achievable, and at a maximum rate achievable, during the testing. As such, it has been determined that the lathes were operating at 100% load/maximum production. The lathes could not operate at a higher amount and rate without risking the beryllium breaking. Additionally, both lathes operated during the entire 4-hour test without downtime. The results of the testing show the particulate matter emissions are below the permit limit. A summary of the test results is listed below.

Table 2 – Summarized Emission Results

	Beryllium (Be)	***% Load***
Lathe Unit #	**gm/hr**	**%**
Limits	***6.25E-5***	***≥90%***
1 & 2	^2.55E-5	100.0

*gm/hr = grams per hour
^Value based on minimum detection limit.

Example calculations are included in Appendix C to give examples of how raw data was used to determine stack conditions.

Process Description and Sampling Location

The emissions pass through a 99.95% efficient HEPA associated with the fume hood used to capture the particulate matter and vent the emissions through the exhaust stack to the atmosphere. The exhaust temperature is at room temperature so neither the probe nor filter were heated. An ice-bathed cooled impinger train was used to collect the gaseous sample content that passed through the filter.

This diagram represents a general process description and is not to scale. This representation is the equipment being utilized and the placement order of that equipment. The values presented are not of stack conditions during the testing event.

The sampling took place from two exhaust stack ports, separated by 90° and placed 18 feet and 21 feet downstream and upstream from the nearest flow disturbances in the exhaust stack. A Method 1 Sampling Traverse Point worksheet is included in Appendix A along with the results of the cyclonic flow test recorded during the preliminary stack flow test.

Analytical Technique

An emissions test was performed from an exhaust stack associated with the vent of two lathes in use at Los Alamos National Laboratory. The test procedures utilized are outlined in the Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 1-5 and 29. The sampling time was 240 minutes for each of the three test runs.

EPA Method 1--Sample and Velocity Traverses for Stationary Sources: The sampling locations and traverse points met Method 1 distance requirements to enhance the quality of the data obtained. A cyclonic flow check was performed during the preliminary investigation by measuring the yaw angle at each sampling point. The results of that test found no cyclonic flow in the stack, therefore there is no stratification present.

EPA Method 2--Determination of Stack Gas Velocity and Volumetric Flow Rate (Standard Pitot Tube): The velocity of the stack gas was constantly measured using a S-type Pitot tube at the sampling points. The Pitot tube is a component of the Method 5 probe assembly probe and is located on the sampling pane along with the thermometer and sampling nozzle. The Pitot measures the velocity of the stack gas by measuring the impact and wake-side pressures and creating a differential reading measured in inches water. The values obtained were factors in calculating the exhaust flow rate and sampling rates.

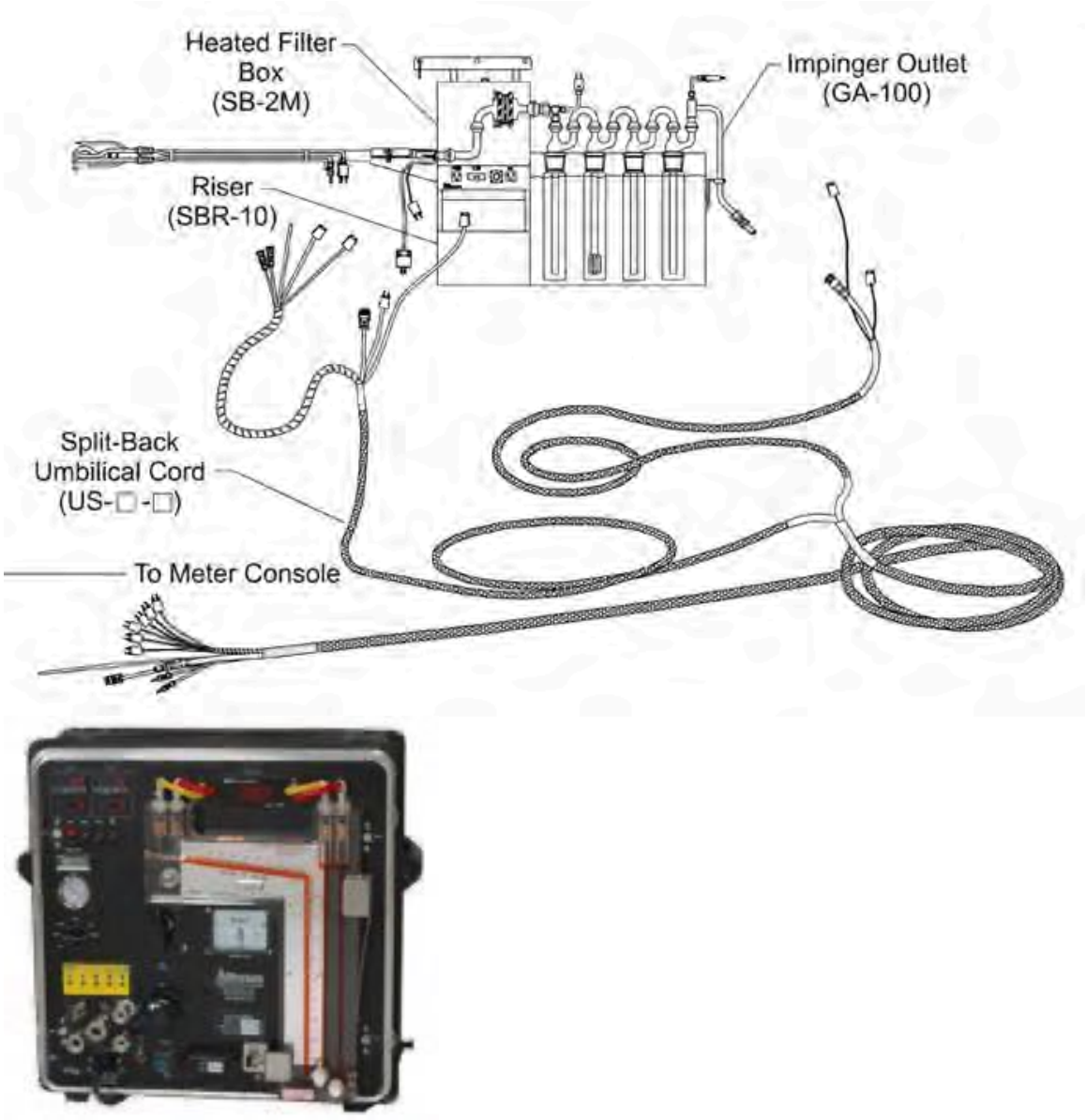
EPA Method 4--Determination of Moisture Content in Stack Gases: The moisture content measurements were made per EPA Method 4 (gravimetric) by pulling stack gas through an impinger train emerged in an ice bath. The impinger train acts as a moisture knockout. The sample then went through a separate stainless steel/Teflon® diaphragm pump and calibrated dry gas meter. The weights of the impingers (four total) were measured using a calibrated scale accurate to 0.1 grams. One moisture sample was collected over a 240-minute period from the stack concurrent with each test run. 100 mL of acidic hydrogen peroxide (5% HNO_3/10% H_2O_2) was placed in the first two impinges and acted as the primary collection media per Method 29.

EPA Method 5--Determination of Particulate Matter Emissions from Stationary Sources: The sampling techniques outlined in Method 5 Isokinetic Sampling were used to collect a gaseous sample at the same flow rate as the exhaust flow rate. To avoid over- or under-sampling of particulate matter, the gas needs to be metered in a manner that captures particulates in a representative

manner. The nozzle diameter, the diluent concentrations, stack and meter box temperatures, along with the sample pump flow rate are all factors in determining the isokinetic rate of sampling. The diluent concentration was ambient air.

EPA Method 29--Determination of Metals Emissions from Stationary Sources: The sampling techniques outlined in Method 5 were used to collect particulate matter on a filter and gaseous emissions are collected in an aqueous acidic solution of hydrogen peroxide. The recovered samples are digested and analyzed for the target compounds by atomic absorption spectroscopy (AA) or inductively coupled argon plasma optical emission spectrometry (ICAP). The aqueous acidic solution is gravimetrically analyzed to determine the moisture content of the stack before being segregated for analysis. The filters and front-half fractions are collected, desiccated, and weighed before and after the tests in the same manner if TSP emissions are to be determined.

Figure 1. Method 5 Console Sampling System



Quality Assurance Activities

The console sampling system was leak checked before and after each test run by demonstrating that a vacuum (10-15" Hg) greater than sampling conditions (0-5" Hg) could be pulled and held for a minute. A leak test was then conducted on each leg of the Pitot tube before use and after use at a pressure greater than 3" for 15 seconds. These tests were conducted to ensure that ambient air had not diluted the sample. If any leaks were found during the pre-test inspection, they were resolved and re-tested until acceptable checks were obtained (<0.02 cf/min). No leaks greater than the allowed were detected on the sampling system during the post-test checks. The dry gas meter incorporated into the metering console was calibrated before the test and verified after per method requirements to ensure that an accurate sample volume was recorded. The console temperature gauges were checked for acceptable tolerance (<2%) prior to and after field use.

The sampling nozzle was measured at three traverse lines before testing to verify nozzle diameter. A stack cyclonic flow check was performed before testing to ensure the gas flow was laminar. The results from that test showed the average of the absolute yaw angle at each sampling point was under 20%, therefore, the stack did not exhibit cyclonic flow. The scale used to weigh the impinges was checked in triplicate with a 1 kg weight and showed variance less than tolerance (<1%). Each filter used was checked for tears or holes by holding each up to a light source to verify integrity. None were found that would comprise the sample collection.

All calibration data and verification checks are contained in Appendix D.

Appendix A:
Tabular Results and Stack Diagram

Summary of Results
LANL, TA35-213 Lathe #1 and Lathe #2

Company: Los Alamos National Laboratory
Location: TA-35-213
Technician: CS, MM
Source: Lathe #1 and Lathe #2
Model: 350 UPL (Lathe #1) and 650FGV2 (Lathe #2)
Source: Ambient

Test Run Number	***1***	***2***	***3***	
Date	8/20/24	8/20/24	8/21/24	
Sampling Time (min)	240.0	240.0	240.0	
Fume Hood Operating Parameters				***Average***
Load (%)	100.0	100.0	100.0	**100.0**
Constants				
Constant K_{1A} (L / g)	1.336	1.336	1.336	**1.336**
Constant K_3 (°R-L / "Hg-cf)	499.7	499.7	499.7	**499.7**
Conversion Factor ("Hg / "H2O)	0.07355	0.07355	0.07355	**0.07355**
Pitot Tube Constant K_P (√(lb/lb.mol-"Hg/°R-"H20)	5129.4	5129.4	5129.4	**5129.4**
STP / Time Constant K_Y (°R-min / "Hg-hr)	1058.8	1058.8	1058.8	**1058.8**
Ambient Conditions				
Pressure Altitude (MSL)	7260	7260	7260	**7260**
Atmospheric Pressure ("Hg)	22.88	22.88	22.88	**22.88**
Average Dry Bulb Temperature (°F)	75	95	90	**86.7**
Average Wet Bulb Temperature (°F)	70	83	80	**77.7**
Humidity (lb/lb air)	0.0190	0.0282	0.0258	**0.0244**
Stack Parameters				
Static Stack Pressure (P_g - "H2O)	-0.16	-0.16	-0.16	**-0.16**
Absolute Stack Pressure (P_s - "Hg)	22.87	22.87	22.87	**22.87**
Average Stack Temperature (T_s - °R)	534.9	535.5	536.9	**535.8**
Stack Moisture (B_{ws} - %)	1.1866	1.2655	1.3209	**1.2576**
Dry Gas Fraction (1-B_{ws})	0.9881	0.9873	0.9868	**0.9874**
Dry Stack Gas Molecular Wt. (M_D - lbs/lb-mole)	28.842	28.842	28.842	**28.842**
Wet Stack Gas Molecular Wt. (M_S - lbs/lb-mole)	28.714	28.705	28.699	**28.706**
Stack Velocity and Flow Rate via Pitot Tube				
Stack Velocity (V_s - ft/sec)	32.04	32.90	33.22	**32.72**
Stack Velocity (V_s - ft/min)	1922.32	1973.94	1993.04	**1963.10**
Stack Flow, wet (Q_a - acf/sec)	25.16	25.84	26.09	**25.70**
Stack Flow, wet (Q_a - acf/min)	1,509.78	1,550.32	1,565.33	**1541.81**
Stack Flow, dry (Q_s - scf/min)	1,125.62	1,153.48	1,161.10	**1146.73**
Stack Flow, dry (Q_s - scf/hr)	67,537	69,209	69,666	**68,804**
Dry Gas Meter Sampling Data				
Corrected Metered Volume ($Vm_{corrected}$ - CF)	176.700	182.135	189.922	**182.919**
Volume of DGM Sample (Vm_{std} - L)	3681.938	3803.847	3921.707	**3802.498**
Corrected Metered Volume (DSCF)	130.593	134.872	139.075	**134.846**
Nozzle Diameter (ft^2)	3.88E-04	3.88E-04	3.88E-04	**3.88E-04**
Isokinetic Rate (%) {90 ≤ I ≤ 110}	97.95	98.71	101.12	**99.26**
Beryllium Data				
^Sample Mass Collected - Front Half (μg)	0.20	0.20	0.20	**0.200**
Sample Mass Collected - Back Half (μg)	0.00	0.00	0.00	**0.000**
*Total Mass Collected (μg)	0.20	0.20	0.20	**0.200**
Be Concentration (g/DSCF)	1.53E-09	1.48E-09	1.44E-09	**1.48E-09**
Be (g/hr) {Permit Limit = 6.25E-5}	***2.59E-05***	***2.57E-05***	***2.50E-05***	***2.55E-05***

g=grams; μg=micrograms
^Sample concentration used is the method detection limit.
*Back-half fraction is non-detect, equal to zero. Front-half fraction less than blank, therefore equal to zero.

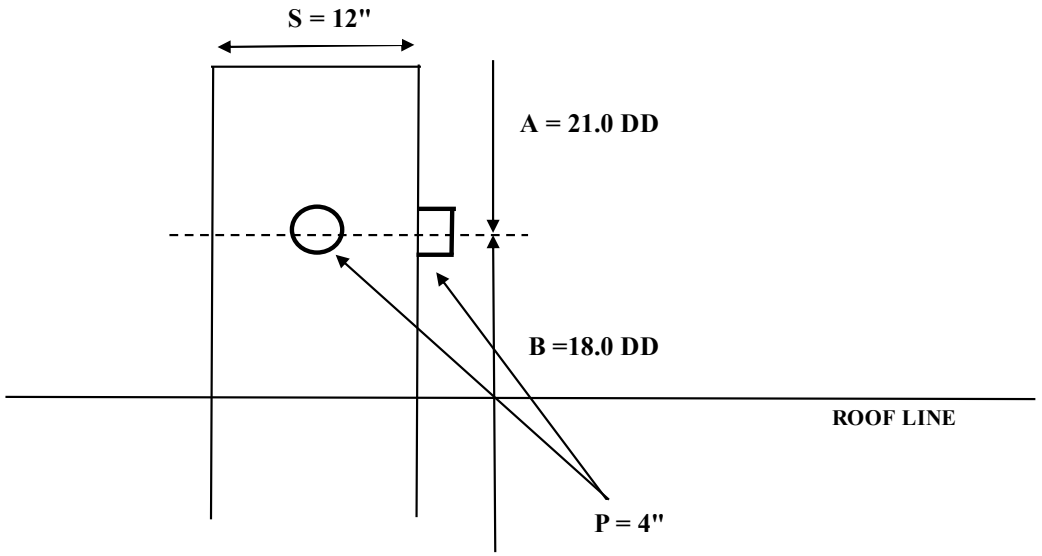
Sampling Traverse Point Layout
TA-35-213 - Lathe #1 and Lathe #2

Date:	8/19/24
Company:	LANL
Location:	TA-35-213
Source:	Lathe #1 and Lathe #2
Technician(s):	CS, MM

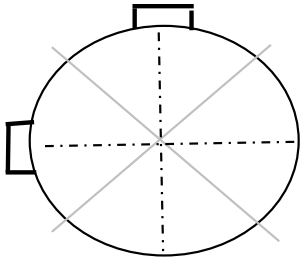
NOTES:

Port + Stack ID (in):	16.00
Port Extension (in):	4.00
Stack ID (in):	12.00
Stack Area (ft2):	0.785
Duct Diameters **upstream** from flow disturbance (A):	21.00
Duct Diameters **downstream** from flow disturbance (B):	18.00
Total Required Traverse Points:	8
No. of Traverse Points per Diameter:	4

Stack Diagram



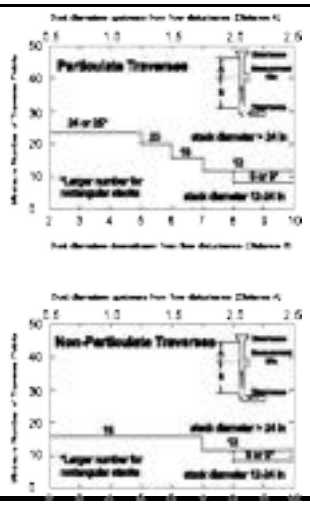
Stack Cross Section



Unit Information

Traverse Point Number	*Number of Traverse Points on a Diameter*					Method 7E Port Length Offset	Method 1 Port Length Offset	Method 5 Port Length Offset
	3	4	6	8	12			
	Percent distances (%)							
1	16.7	6.7	4.4	3.2	2.1			4.80
2	50.0	25.0	14.6	10.5	6.7			7.00
3	83.3	75.0	29.6	19.4	11.8			13.00
4		93.3	70.4	32.3	17.7			15.20
5			85.4	67.7	25.0			
6			95.6	80.6	35.6			
7				89.5	64.4			
8				96.8	75.0			
9					82.3			
10					88.2			
11					93.3			
12					97.9			

**Stack diameters ≤ 24 in shall have no traverse points located w/in 0.5 in of the stack wall*
***Stack diameters > 24 in shall have no traverse points located w/in 1 in of the stack wall*



Traverse Point Layout Calculations
TA-35-213 - Lathe #1 and Lathe #2

Method 1/7E/PS-2 - Traverse Point Layout Calculations

Enter the required information in the appropriate row/columns and the spreadsheet will calculate the required number of traverse points and their locations on the probe/pitot tube.

Use Method 1 or Method 20 For the Non-Particulate Traverse? 1 = use M-1 Min. Traverse Pts. 20 = use M-20 Min. Traverse Pts.	Stack Layout	Stack + Port (in)	Port (in)	Stack ID (in)	Stack Radius (ft)	Stack Area (sq ft)	Distance from flow disturbance upstream to ports. **Distance (ft) Upstream (A)**	Distance from flow disturbance downstream to ports. **Distance (ft) Downstream (B)**	Distance from flow disturbance upstream to ports. Duct Diameters Upstream (A)	Distance from flow disturbance downstream to ports. Duct Diameters Downstream (B)	Meets Method 1 Min. Distance Criteria?	**Method 1 Calculated Min. No. of Traverse Points**	Total # of DIAMETERS Traversed	**Traverse Points per DIAMETER**
Method	**CIRCULAR**	*see Flow Disturbance Diagram below*												
1	Non-Particulate													
NON-PARTICULATE MATTER ONLY!	Particulate	16	4	12	0.50	0.785	21.00	18.00	21.00	18.0	**YES**	**8**	2	**4**

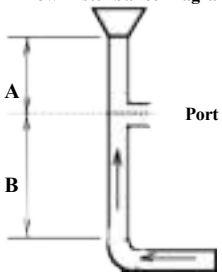
RECTANGULAR	Port (in)	**Length (in)	Width (in)	Eq. Diameter (in)	*Distances in feet*					Rectangular Matrix Layout
Non-Particulate										
Particulate										

NOTE: If needed, you can override the calculation of # of traverse points for rectangular stacks in order to achieve an appropriate matrix.

Method 1
Circular Traverse Point Layout

Traverse Point Number	Non-Particulate: Traverse Pt. Location (in)	Non-Particulate: Traverse Pt. Location + Port (in)	Non-Particulate: *Distance from Stack Wall	Particulate: Traverse Pt. Location (in)	Particulate: Traverse Pt. Location + Port (in)	Particulate: *Distance from Stack Wall
1				0.80	**4.80**	
2				3.00	**7.00**	
3				9.00	**13.00**	
4				11.20	**15.20**	
5						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Flow Disturbance Diagram



*Correct traverse point distances that are too close to stack wall. Select a minimum of 1.0" or 0.5" for stack IDs of >24" and ≤24", respectively.

Note: If traversing large diameter, 4-port stacks with a short probe, simply mark the probe with the first half of the traverse points and traverse each of the 4 ports (which equals the total # of traverse pts.).

Appendix B:
Sampling Data Sheets

Pre-Lim Sampling Time, K Factor, Isokinetic Rates
TA-35-213 - Lathe #1 and Lathe #2

Stack Moisture & Molecular Wt.	*Predicted*
CO2 (%)	0
O2 (%)	20.90
N2 (%)	79.10
DGM Sample Volume (ft3)	180.000
Ending Impinger Wt. (g)	25.0
Dry Gas Meter Factor (Kd)	0.993
Average Dry Gas Meter Temperature (oF)	85
Atmospheric Pressure (in Hg, abs.)	22.88
Stack Gas Moisture (% volume)	0.8828
Dry Gas Fraction	0.991
Stack Gas Molecular Wt. (lbs/lb-mole)	28.74

Stack Parameters		*Temp.*	*Yaw Angle*
ΔP #1	0.27	73	10.00
ΔP #2	0.31	73	8.00
ΔP #3 **(Static Pressure = -0.17)**	0.28	74	-5.00
ΔP #4	0.27	74	-12.00
ΔP #5	0.18	76	-4.00
ΔP #6	0.26	74	-1.00
ΔP #7 **(Static Pressure = -0.15)**	0.31	74	-1.00
ΔP #8	0.25	74	-11.00
Average	**0.266**	**74.0**	**-2.00**

Pitot Tube Factor	0.84
Sum of Square Root of Vertical Component	4.116
Number of Traverse Points	8
Average Square Root of ΔP's	0.515
Average Temperature (°F)	74.0
Static Pressure (in. H2O)	-0.16
Stack Diameter (in.)	12
Stack Area (ft2)	0.785
Stack Velocity	
Stack Velocity (ft/sec @ stack conditions)	33.300
Stack Velocity (ft/min @ stack conditions)	**1,998.02**
Stack Velocity (Std ft/min)	1,496.62
Stack Flow	
Stack Flow,wet (CF/Min)	1,569.24
Stack Flow, wet (Std CF/Hr)	71,154.95
Stack Flow, dry (Std CF/Min)	1,175.45
Stack Flow, dry (Std CF/Hr)	**70,526.83**
Isokinetic Nozzle Selection & K Factor Calculation	
Stack Velocity (ft/min @ stack conditions)	1998.02
Target Sampling Rate (CFM)	**0.70**
Target Nozzle Area (Ft2)	**3.50E-04**
Selected Nozzle Number (xx/32")	0.27
Actual Measured Nozzle Area (Ft2)	3.88E-04
No. of M-5 Traverse Pts	8
Minutes per point (min.)	30.00
Sampling Time (min.) (>60 min)	240.00
Sampling Time (hr)	4.00
Expected Total Sample Vol. (CF)	185.984
Expected Sample Vol. (SCF/Hr) (>30 SCF)	33.105
Sampling Rate (CFM) (using actual nozzle)	0.775
ΔH ("H2O)(see Meter Box Calib Curve)	**1.624**
K-Factor (ΔH/ΔP)	**6.13**

		Nozzle Measurements:	
Permit Limit (g/hr)	6.25E-05		
Sample Rate (ft3/min)	0.775	0.26	inches
Minimum catch size (mg)	0.0001	0.27	inches
Stack Flow Rate (SCF/hr)	70,527	0.27	inches
Minimum Sample Time (min)	**145.62**	**0.000388**	**ft^2**
Minimum Sample Time (hr)	**2.43**		

In-Stack Detection Limit and Test Time Determination
LANL - TA-35-213 Lathe #1 and Lathe #2

TIME = $\dfrac{\text{Stack Flow x Catch Amnt}}{\text{Sample Rate x PL x Conv Fact}}$ $\dfrac{\text{scf - mg - min - hr - g}}{\text{hr - scf - g - mg}}$

Permit Limit	6.25E-05	g/hr	**Catch (mg)**	**Min**	**Hr**	
Permit Limit	1.38E-07	lb/hr	**0.0001**	**157**	**2.6**	**Instrument MDL**
ISCL	9.13E-04	ng/scf				
Sample Rate	0.70	cf/min	**0.001**	**1,565**	**26.8**	**Reportable Limit**
ISCL	0.91271	mg				
Stack Flow Rate	68,483	scf/hr	**0.8896**	**1,392,514**	**23,208.6**	**ISCL (mg/scf)**
Stack Flow Rate	1,141	scf/min				**= PL ÷ SFR x 2.67x10^5**
Conv Fact	1000	mg/g				

In–Stack Detection Limits & Sample Times (NJDEQ)

1) If the in-stack detection limit is higher than the level of the standard, compliance cannot be demonstrated.

2) Actual in-stack method detection limits (ISDL) are based on actual source sampling parameters and analytical results. Actual detection limits can be improved through increased stack gas sampled (sample time), reducing the total volume of the digested samples, improving the analytical detection limits or any combination of the three.

3) The goal of the sample program will be to have the in-stack detection limit at 1/10 the Permit Allowable expressed as the in-stack concentration limit (ISCL). The ratio of ISCL to the ISDL should be >10. The following will detail these determinations and will establish the sampling time.

***Based on the preceding, each sample run will be **180** minutes.

In-Stack Concentration Limit (ISCL): ISCL (ug/scm) = E / F x 2.67E8

Where:

E = Permit allowable (lb/hr) = 1.38E-07 = 6.25E-5 (g/hr) ÷ 453.6 (g/lb)

F = stack flow rate (dscfm) = 1,141

In-stack Detection Limit: ISDL (ug/scm) = [A (mg/mL) x B (mL) ÷ C (scf)]

Where:

A = analytical detection limit:	A=	0.0001	mg/mL
B = volume of analyte collected:	B=	400	mL
C = volume of stack gas sampled:	C=	41.664	scf

PARAMETERS	
22.88	ATM at MSL
75	Stack Temp
1.25E-04	Permit limit (20% overage)
1.04E-04	estimated g/hr per Lathe
400	Approx. mL of sample
28.3168	L/CF
0.0001	mg/mL ICAP MDL
124.991	SCF / 3 Hr
41.66	SCF / Hr of Sample
1.471	Sample Vol (scm/hr)

ISCL (ug/scm) =	**9.13E-04**	**1 x ISCL > ISDL**	**2 x ISCL > ISDL**	**5 x ISCL > ISDL**	**10 x ISCL > ISDL**	**Sample Hours**
ISDL (ug/scm) =	9.60E-04	FALSE	FALSE	FALSE	FALSE	1
ISDL (ug/scm) =	4.80E-04	**TRUE**	FALSE	FALSE	FALSE	**2**
ISDL (ug/scm) =	3.20E-04	TRUE	**TRUE**	FALSE	FALSE	**3**
ISDL (ug/scm) =	2.40E-04	TRUE	TRUE	FALSE	FALSE	4
ISDL (ug/scm) =	1.92E-04	TRUE	TRUE	FALSE	FALSE	5
ISDL (ug/scm) =	1.60E-04	TRUE	TRUE	**TRUE**	FALSE	**6**
ISDL (ug/scm) =	1.37E-04	TRUE	TRUE	TRUE	FALSE	7
ISDL (ug/scm) =	1.20E-04	TRUE	TRUE	TRUE	FALSE	8
ISDL (ug/scm) =	1.07E-04	TRUE	TRUE	TRUE	FALSE	9
ISDL (ug/scm) =	9.60E-05	TRUE	TRUE	TRUE	FALSE	10
ISDL (ug/scm) =	8.73E-05	TRUE	TRUE	TRUE	**TRUE**	**11**
ISDL (ug/scm) =	8.00E-05	TRUE	TRUE	TRUE	TRUE	12
ISDL (ug/scm) =	7.39E-05	TRUE	TRUE	TRUE	TRUE	13
ISDL (ug/scm) =	6.86E-05	TRUE	TRUE	TRUE	TRUE	14
ISDL (ug/scm) =	6.40E-05	TRUE	TRUE	TRUE	TRUE	15
ISDL (ug/scm) =	6.00E-05	TRUE	TRUE	TRUE	TRUE	16

Isokinetic Worksheet
TA 35-213 - Lathe #1 and Lathe #2, Run 1

Date: 8/20/24
Client: LANL
Plant: TA-35-213
Emission Source: Lathe #1 and Lathe #2
Technicians: CS, MM
DGM No: Console 2
DGM Factor, Y: 0.993
ΔH@: 1.624
Stack Diameter ("): 12
Stack Area (ft^2): 0.785

Critical Isokinetic Test Data			Pre-Test Calibration Check		
Atmosph. Press.("Hg)	22.88	**Static P**	Vi	635.094	cf
Pitot Tube Factor, Cp	0.84	**B**	Vf	643.901	cf
Static Pressure (in H2O),Pg	-0.16	-0.17	Vt	8.807	cf
M_s - Molecular Weight (lb/lb-mole)	28.71	**A**	ΔH	1.60	"H20
Dry Gas Fraction, 1-Bws	0.9881	-0.15	Time	10	min
Nozzle Diamter (in)	0.267	**Nozzle (in.)**	Tm	540	R
Nozzle Area (ft^2)	3.88E-04	0.26	Pbar	22.88	"Hg
Total Sample Time (min)	240	0.27	constant	0.0319	"Hg-cfm/R
Number of Points	8	0.27	**Yc**	**0.9852**	
Filter #	QF-15	**0.267**	**ΔH@**	**1.5750**	

Dry Gas Meter Leak Checks			Pitot Tube Leak Check
pre-test	**0.000 cf @**	**15"**	+/- **4.8/4.7**
post-test	**0.002 cf @**	**10"**	+/- **---**

Moisture Data

Run 1	Imp 1	Imp 2	Imp 3	Imp 4	Total Wt
Beginning	713.7	689.2	596.9	971.6	**2971.4**
Ending	714.8	693.0	599.7	997.0	**3004.5**
Total	1.1	3.8	2.8	25.4	**33.1**

Gaseous Data (%)

O2	20.90	CO2	0.04	N2	79.1

Scale Prelim Check (1000g):	1000.0	999.9	1000.0	**999.97**

Start Vol	644.322	Stop Vol	822.268	Actual Volume	177.946	Target	180.000	ACF x Y	176.700	SCF	130.593
Start Time	8:26	Stop Time	12:27	Sample Time per Point	30	K Factor	4.5	Σ√ΔP	3.955	Avg √ΔP	0.249

Isokinetic Rate (%):	**97.95**

Sample Point per Port	Start Meter Time	Observed Clock Time	Observed Meter Reading (ft^3)	Next Point Target (ft^3)	ΔP ("H2O)	ΔH ("H2O)	Desired ΔH ("H2O)	Observed K Factor	Sample Vacuum ("Hg)	DGM Temp. (°F)	Last Imp. (°F)	Filter Temp. (°F)	Probe Temp. (°F)	Stack Temp. (°F)	Point Vol Sampled (DSCF)	Σ - √ΔP ("H2O)	Stack Velocity (ft/s)	Average ISO (%)
1	0.00	8:26	644.322	661.627	0.150	0.913	0.68	6.04	0.50	72.0	43.7	72.7	---	73.7	15.101	0.387	25.07	115.4
2	30.00		664.300	687.085	0.250	1.533	1.13	5.96	1.50	83.3	39.7	77.0	---	73.0	18.932	0.500	32.35	113.5
3	60.00		689.830	715.413	0.310	1.900	1.40	5.89	2.00	89.0	42.0	78.7	---	74.0	21.272	0.557	36.06	113.4
4	90.00		718.780	744.218	0.303	1.600	1.37	5.05	1.67	91.3	43.0	78.7	---	74.0	19.627	0.551	35.67	111.2
5	120.00	10:27	745.631	762.941	0.140	0.700	0.63	4.78	0.50	92.0	42.0	79.3	---	76.7	12.761	0.374	24.29	109.7
6	150.00		763.160	786.022	0.243	0.887	1.10	3.48	1.00	93.0	40.7	80.0	---	76.0	14.564	0.493	32.00	105.9
7	180.00		783.190	808.776	0.303	0.900	1.37	2.83	0.63	94.3	42.7	80.0	---	76.0	14.326	0.551	35.73	101.3
8	210.00		802.940	828.128	0.293	0.850	1.32	2.76	0.63	94.7	44.3	80.7	---	75.7	14.010	0.542	35.13	97.9
Finish	240.00	12:27	822.268	---	---	---	---	---	---	---	---	---	---	---	*Sum*	*Sum*	---	---
	Total	**Total**	**177.946**	*Average*	**0.249**	**1.160**	**1.121**	**4.599**	**1.054**	**88.71**	**42.25**	**78.38**	**---**	**74.88**	**130.5927**	**3.9546**	**32.038**	**108.54**

BG Nozzle Number	1	2	3	4	5	6	7
Nozzle Diameter (in.)	0.125	0.187	0.250	0.312	0.375	0.437	0.500
Nozzle Cross Sectional Area (ft2)	0.000085	0.000191	0.000341	0.000531	0.000767	0.001042	0.001364

* meter box leak check = less than 0.02 cfm at 15 in. Hg or greatest vacuum observed during test.
† pitot tube leak check = hold 3 in. H_2O for at least 15 sec.
ΔH = ΔP x K factor x $[(T_{dgm} + 460)/528]$

	Point	Clock	Meter Reading	K	ΔP	ΔH	Desired ΔH	Vacuum	DGM T	Exit T	Filter T	Probe T	Stack T
PORT A	1-A	8:26	**644.322**	6.0	0.15	0.90	0.90	0.5	66	50	72	---	74
	1-B	8:36	651.200	6.0	0.15	0.92	0.90	0.5	73	41	72		73
	1-C	8:46	657.610	6.0	0.15	0.92	0.90	0.5	77	40	74		74
				6.00	**0.150**	**0.913**	**0.900**	**0.50**	**72.0**	**43.7**	**72.7**		**73.7**
	2-A	8:56	664.300	6.0	0.25	1.50	1.50	1.5	81	40	76		73
	2-B	9:06	672.750	6.0	0.25	1.50	1.50	1.5	83	39	77		73
	2-C	9:16	681.320	6.0	0.25	1.60	1.50	1.5	86	40	78		73
				6.00	**0.250**	**1.533**	**1.500**	**1.50**	**83.3**	**39.7**	**77.0**		**73.0**
	3-A	9:26	689.830	6.0	0.31	1.90	1.86	2.0	88	42	79		74
	3-B	9:36	699.700	5.0	0.31	1.90	1.55	2.0	89	42	79		74
	3-C	9:46	708.920	5.0	0.31	1.90	1.55	2.0	90	42	78		74
				5.33	**0.310**	**1.900**	**1.653**	**2.00**	**89.0**	**42.0**	**78.7**		**74.0**
	4-A	9:56	718.780	5.0	0.30	1.80	1.50	2.0	91	43	78		74
	4-B	10:06	727.860	5.0	0.31	1.50	1.55	1.5	92	43	79		74
	4-C	10:16	736.980	5.0	0.30	1.50	1.50	1.5	91	43	79		74
				5.00	**0.303**	**1.600**	**1.517**	**1.67**	**91.3**	**43.0**	**78.7**		**74.0**
PORT B	5-A	10:27	745.631	5.0	0.14	0.70	0.70	0.5	92	45	79		76
	5-B	10:37	751.460	5.0	0.14	0.70	0.70	0.5	92	41	79		77
	5-C	10:47	757.310	5.0	0.14	0.70	0.70	0.5	92	40	80		77
				5.00	**0.140**	**0.700**	**0.700**	**0.50**	**92.0**	**42.0**	**79.3**		**76.7**
	6-A	10:57	763.160	4.0	0.25	1.00	1.00	1.0	93	40	80		76
	6-B	11:07	770.250	4.0	0.24	0.93	0.96	1.0	93	41	80		76
	6-C	11:17	776.960	3.0	0.24	0.73	0.72	1.0	93	41	80		76
				3.67	**0.243**	**0.887**	**0.893**	**1.00**	**93.0**	**40.7**	**80.0**		**76.0**
	7-A	11:27	783.190	3.0	0.30	0.90	0.90	0.5	94	42	80		76
	7-B	11:37	789.680	3.0	0.30	0.90	0.90	0.7	94	42	80		76
	7-C	11:47	796.320	3.0	0.31	0.90	0.93	0.7	95	44	80		76
				3.00	**0.30**	**0.900**	**0.910**	**0.63**	**94.3**	**42.7**	**80.0**		**76.0**
	8-A	11:57	802.940	3.0	0.29	0.83	0.87	0.6	94	44	80		76
	8-B	12:07	809.280	3.0	0.29	0.82	0.87	0.6	95	44	81		75
	8-C	12:17	815.600	3.0	0.30	0.90	0.90	0.7	95	45	81		76
	Final	**12:27**	**822.268**	**3.00**	**0.29**	**0.850**	**0.880**	**0.63**	**94.7**	**44.3**	**80.7**		**75.7**

Isokinetic Worksheet
TA 35-213 - Lathe #1 and Lathe #2, Run 2

Date: 8/20/24
Client: LANL
Plant: TA-35-213
Emission Source: Lathe #1 and Lathe #2
Technicians: CS, MM
DGM No: Console 2
DGM Factor, Y: 0.993
ΔH@: 1.624
Stack Diameter ("): 12
Stack Area (ft^2): 0.785

Critical Isokinetic Test Data			Pre-Test Calibration Check		
Atmosph. Press.("Hg)	22.88	**Static P**	Vi	635.094	cf
Pitot Tube Factor, Cp	0.84	**B**	Vf	643.901	cf
Static Pressure (in H2O),Pg	-0.16	-0.17	Vt	8.807	cf
M_s - Molecular Weight (lb/lb-mole)	28.71	**A**	ΔH	1.60	"H20
Dry Gas Fraction, 1-Bws	0.9881	-0.15	Time	10	min
Nozzle Diamter (in)	0.267	**Nozzle (in.)**	Tm	540	R
Nozzle Area (ft^2)	3.88E-04	0.26	Pbar	22.88	"Hg
Total Sample Time (min)	240	0.27	constant	0.0319	"Hg-cfm/R
Number of Points	8	0.27	**Yc**	**0.9852**	
Filter #	QF-17	**0.267**	**ΔH@**	**1.5750**	

Dry Gas Meter Leak Checks			Pitot Tube Leak Check
pre-test	**0.003 cf @**	**12"**	+/- **4.8/4.7**
post-test	**0.000 cf @**	**9"**	+/- **---**

Moisture Data

Run 1	Imp 1	Imp 2	Imp 3	Imp 4	Total Wt
Beginning	708.3	703.4	572.2	929.3	**2913.2**
Ending	707.9	705.2	574.2	962.4	**2949.7**
Total	-0.4	1.8	2.0	33.1	**36.5**

Gaseous Data (%)

O2	20.90	CO2	0.04	N2	79.1

Scale Prelim Check (1000g):	1000.0	999.9	1000.0	**999.97**

Start Vol	824.996	Stop Vol	1008.415	Actual Volume	183.419	Target	180.000	ACF x Y	182.135	SCF	134.872
Start Time	13:00	Stop Time	10:07	Sample Time per Point	30	K Factor	5.0	Σ√ΔP	4.058	Avg √ΔP	0.262

Isokinetic Rate (%):	**98.71**

Sample Point per Port	Start Meter Time	Observed Clock Time	Observed Meter Reading (ft^3)	Next Point Target (ft^3)	ΔP ("H2O)	ΔH ("H2O)	Desired ΔH ("H2O)	Observed K Factor	Sample Vacuum ("Hg)	DGM Temp. (°F)	Last Imp. (°F)	Filter Temp. (°F)	Probe Temp. (°F)	Stack Temp. (°F)	Point Vol Sampled (DSCF)	Σ - √ΔP ("H2O)	Stack Velocity (ft/s)	Average ISO (%)
1	0.00	13:00	824.996	843.537	0.160	0.733	0.80	4.37	0.40	94.0	59.7	85.0	---	78.3	12.814	0.400	26.01	95.3
2	30.00		842.660	866.189	0.257	1.175	1.28	4.36	0.47	95.0	47.3	79.3	---	76.7	16.171	0.507	32.89	95.0
3	60.00		864.960	889.732	0.283	1.273	1.42	4.26	0.50	96.7	49.0	77.7	---	77.3	17.104	0.532	34.58	95.2
4	90.00		888.610	913.177	0.277	1.257	1.38	4.29	0.50	99.0	53.0	78.3	---	78.0	16.934	0.526	34.19	95.3
5	120.00	8:07	912.125	930.051	0.163	0.733	0.82	4.49	0.40	68.0	47.0	66.3	---	74.0	13.195	0.404	26.17	95.5
6	150.00		929.460	952.838	0.270	1.383	1.35	5.04	0.70	76.7	45.3	70.0	---	74.0	18.243	0.520	33.65	97.1
7	180.00		953.770	980.295	0.340	1.700	1.70	4.87	1.00	82.3	47.0	71.3	---	72.3	20.375	0.583	37.70	98.1
8	210.00		981.180	1008.078	0.343	1.717	1.72	4.82	1.00	88.0	48.0	72.3	---	73.7	20.036	0.586	37.93	98.6
Finish	240.00	10:07	1008.415	---	---	---	---	---	---	---	---	---	---	---	*Sum*	*Sum*	---	---
	Total	**Total**	**183.419**	*Average*	**0.262**	**1.246**	**1.308**	**4.562**	**0.621**	**87.458**	**49.542**	**75.042**	**---**	**75.542**	**134.8719**	**4.0577**	**32.890**	**96.27**

BG Nozzle Number	1	2	3	4	5	6	7
Nozzle Diameter (in.)	0.125	0.187	0.250	0.312	0.375	0.437	0.500
Nozzle Cross Sectional Area (ft2)	0.000085	0.000191	0.000341	0.000531	0.000767	0.001042	0.001364

* meter box leak check = less than 0.02 cfm at 15 in. Hg or greatest vacuum observed during test.
† pitot tube leak check = hold 3 in. H_2O for at least 15 sec.
$\Delta H = \Delta P \times$ K factor $\times [(T_{dgm} + 460)/528]$

	Point	Clock	Meter Reading	K	ΔP	ΔH	Desired ΔH	Vacuum	DGM T	Exit T	Filter T	Probe T	Stack T
PORT A	1-A	13:00	**824.996**	4.5	0.15	0.70	0.68	0.4	94	78	89	---	80
	1-B	13:10	830.670	4.5	0.17	0.77	0.77	0.4	94	53	84		78
	1-C	13:20	836.765	4.5	0.16	0.73	0.72	0.4	94	48	82		77
				4.50	**0.160**	**0.733**	**0.720**	**0.40**	**94.0**	**59.7**	**85.0**		**78.3**
	2-A	13:30	842.660	4.5	0.25	1.13	1.13	0.4	94	47	81		76
	2-B	13:40	849.810	4.5	0.26	1.20	1.17	0.5	96	47	79		77
	2-C	13:50	857.300	4.5	0.26	1.20	1.17	0.5	95	48	78		77
				4.50	**0.257**	**1.175**	**1.155**	**0.47**	**95.0**	**47.3**	**79.3**		**76.7**
	3-A	14:00	864.960	4.5	0.29	1.30	1.31	0.5	96	48	77		77
	3-B	14:10	872.715	4.5	0.28	1.26	1.26	0.5	96	48	77		77
	3-C	14:20	880.590	4.5	0.28	1.26	1.26	0.5	98	51	79		78
				4.50	**0.283**	**1.273**	**1.275**	**0.50**	**96.7**	**49.0**	**77.7**		**77.3**
	4-A	14:30	888.610	4.5	0.28	1.26	1.26	0.5	98	52	79		78
	4-B	14:40	896.335	4.5	0.27	1.25	1.22	0.5	100	53	79		78
	4-C	14:50	904.225	4.5	0.28	1.26	1.26	0.5	99	54	77		78
				4.50	**0.277**	**1.257**	**1.245**	**0.50**	**99.0**	**53.0**	**78.3**		**78.0**
PORT B	5-A	8:07	912.125	4.5	0.16	0.72	0.72	0.4	65	52	63		73
	5-B	8:17	917.910	4.5	0.16	0.72	0.72	0.4	68	45	67		74
	5-C	8:27	923.670	4.5	0.17	0.76	0.77	0.4	71	44	69		75
				4.50	**0.163**	**0.733**	**0.735**	**0.40**	**68.0**	**47.0**	**66.3**		**74.0**
	6-A	8:37	929.460	5.0	0.27	1.35	1.35	0.6	74	43	69		74
	6-B	8:47	937.370	5.0	0.27	1.40	1.35	0.7	77	46	70		74
	6-C	8:57	945.560	5.0	0.27	1.40	1.35	0.8	79	47	71		74
				5.00	**0.270**	**1.383**	**1.350**	**0.70**	**76.7**	**45.3**	**70.0**		**74.0**
	7-A	9:07	953.770	5.0	0.34	1.70	1.70	1.0	81	47	70		74
	7-B	9:17	963.100	5.0	0.34	1.70	1.70	1.0	82	47	73		70
	7-C	9:27	971.950	5.0	0.34	1.70	1.70	1.0	84	47	71		73
				5.00	**0.34**	**1.700**	**1.700**	**1.00**	**82.3**	**47.0**	**71.3**		**72.3**
	8-A	9:37	981.180	5.0	0.35	1.75	1.75	1.0	87	48	72		74
	8-B	9:47	990.280	5.0	0.34	1.70	1.70	1.0	88	48	72		73
	8-C	9:57	999.340	5.0	0.34	1.70	1.70	1.0	89	48	73		74
	Final	**10:07**	**1008.415**	**5.00**	**0.34**	**1.717**	**1.717**	**1.00**	**88.0**	**48.0**	**72.3**		**73.7**

Isokinetic Worksheet
TA 35-213 - Lathe #1 and Lathe #2, Run 3

Date: 8/21/24
Client: LANL
Plant: TA-35-213
Emission Source: Lathe #1 and Lathe #2
Technicians: CS, MM
DGM No: Console 2
DGM Factor, Y: 0.993
ΔH@: 1.624
Stack Diameter ("): 12
Stack Area (ft^2): 0.785

Critical Isokinetic Test Data			Pre-Test Calibration Check		
Atmosph. Press.("Hg)	22.88	**Static P**	Vi	635.094	cf
Pitot Tube Factor, Cp	0.84	**B**	Vf	643.901	cf
Static Pressure (in H2O),Pg	-0.16	-0.17	Vt	8.807	cf
M_s - Molecular Weight (lb/lb-mole)	28.71	**A**	ΔH	1.60	"H20
Dry Gas Fraction, 1-Bws	0.9881	-0.15	Time	10	min
Nozzle Diamter (in)	0.267	**Nozzle (in.)**	Tm	540	R
Nozzle Area (ft^2)	3.88E-04	0.26	Pbar	22.88	"Hg
Total Sample Time (min)	240	0.27	constant	0.0319	"Hg-cfm/R
Number of Points	8	0.27	**Yc**	**0.9852**	
Filter #	QF-18	**0.267**	**ΔH@**	**1.5750**	

Dry Gas Meter Leak Checks			Pitot Tube Leak Check
pre-test	**0.002 cf @**	**14"**	+/- **4.8/4.7**
post-test	**0.001 cf @**	**8"**	+/- **---**

Moisture Data

Run 1	Imp 1	Imp 2	Imp 3	Imp 4	Total Wt
Beginning	715.1	689.5	597.0	949.1	**2950.7**
Ending	717.6	691.9	597.8	982.7	**2990.0**
Total	2.5	2.4	0.8	33.6	**39.3**

Gaseous Data (%)

O2	20.90	CO2	0.04	N2	79.1

Scale Prelim Check (1000g): 1000.0 999.9 1000.0 **999.97**

Start Vol	1008.710	Stop Vol	1199.971	Actual Volume	191.261	Target	180.000	ACF x Y	189.922	SCF	139.075
Start Time	10:27	Stop Time	12:59	Sample Time per Point	30	K Factor	5.0	Σ√ΔP	4.091	Avg √ΔP	0.265

Isokinetic Rate (%): 101.12

Sample Point per Port	Start Meter Time	Observed Clock Time	Observed Meter Reading (ft^3)	Next Point Target (ft^3)	ΔP ("H2O)	ΔH ("H2O)	Desired ΔH ("H2O)	Observed K Factor	Sample Vacuum ("Hg)	DGM Temp. (°F)	Last Imp. (°F)	Filter Temp. (°F)	Probe Temp. (°F)	Stack Temp. (°F)	Point Vol Sampled (DSCF)	Σ - √ΔP ("H2O)	Stack Velocity (ft/s)	Average ISO (%)
1	0.00	10:27	1008.710	1027.694	0.170	0.850	0.85	4.80	0.50	89.7	48.3	77.3	---	76.7	14.043	0.412	26.77	101.1
2	30.00		1027.910	1051.496	0.263	1.317	1.32	4.81	0.67	89.3	43.7	77.3	---	76.3	17.419	0.513	33.30	100.9
3	60.00		1051.675	1077.904	0.323	1.617	1.62	4.79	1.13	91.7	45.3	78.7	---	76.0	19.382	0.569	36.89	101.0
4	90.00		1078.205	1105.062	0.337	1.683	1.68	4.77	1.37	93.0	47.3	80.7	---	74.7	19.747	0.580	37.60	101.0
5	120.00	12:29	1105.295	1124.388	0.170	0.850	0.85	4.77	0.63	94.0	49.0	81.3	---	79.0	14.082	0.412	26.83	101.1
6	150.00		1124.700	1148.094	0.253	1.300	1.27	4.87	1.00	96.0	55.3	81.7	---	77.3	17.263	0.503	32.70	101.2
7	180.00		1148.540	1174.035	0.300	1.500	1.50	4.74	1.00	97.0	49.7	77.3	---	77.0	18.560	0.548	35.57	101.2
8	210.00		1174.200	1200.039	0.307	1.567	1.53	4.83	1.03	99.0	50.7	79.3	---	78.0	18.577	0.554	36.00	101.0
Finish	240.00	12:59	1199.971	---	---	---	---	---	---	---	---	---	---	---	*Sum*	*Sum*	---	---
	Total	**Total**	**191.261**	*Average*	**0.265**	**1.335**	**1.327**	**4.796**	**0.917**	**93.708**	**48.667**	**79.208**	**---**	**76.875**	**139.0746**	**4.0915**	**33.206**	**101.07**

BG Nozzle Number	1	2	3	4	5	6	7
Nozzle Diameter (in.)	0.125	0.187	0.250	0.312	0.375	0.437	0.500
Nozzle Cross Sectional Area (ft2)	0.000085	0.000191	0.000341	0.000531	0.000767	0.001042	0.001364

* meter box leak check = less than 0.02 cfm at 15 in. Hg or greatest vacuum observed during test.
† pitot tube leak check = hold 3 in. H_2O for at least 15 sec.
$\Delta H = \Delta P \times$ K factor $\times [(T_{dgm} + 460)/528]$

	Point	Clock	Meter Reading	K	ΔP	ΔH	Desired ΔH	Vacuum	DGM T	Exit T	Filter T	Probe T	Stack T
PORT A	1-A	10:27	**1008.710**	5.0	0.17	0.85	0.85	0.5	90	56	78	---	76
	1-B	10:37	1015.150	5.0	0.17	0.85	0.85	0.5	90	45	77		77
	1-C	10:47	1021.515	5.0	0.17	0.85	0.85	0.5	89	44	77		77
				5.00	**0.170**	**0.850**	**0.850**	**0.50**	**89.7**	**48.3**	**77.3**		**76.7**
	2-A	10:57	1027.910	5.0	0.25	1.25	1.25	0.5	89	44	77		77
	2-B	11:07	1035.550	5.0	0.27	1.35	1.35	0.5	89	43	77		76
	2-C	11:17	1043.600	5.0	0.27	1.35	1.35	1.0	90	44	78		76
				5.00	**0.263**	**1.317**	**1.317**	**0.67**	**89.3**	**43.7**	**77.3**		**76.3**
	3-A	11:27	1051.675	5.0	0.32	1.60	1.60	1.0	91	45	79		76
	3-B	11:37	1060.420	5.0	0.33	1.65	1.65	1.2	92	45	79		76
	3-C	11:47	1069.420	5.0	0.32	1.60	1.60	1.2	92	46	78		76
				5.00	**0.323**	**1.617**	**1.617**	**1.13**	**91.7**	**45.3**	**78.7**		**76.0**
	4-A	11:57	1078.205	5.0	0.34	1.70	1.70	1.4	93	47	80		76
	4-B	12:07	1087.270	5.0	0.33	1.65	1.65	1.4	93	47	81		72
	4-C	12:17	1096.250	5.0	0.34	1.70	1.70	1.3	93	48	81		76
				5.00	**0.337**	**1.683**	**1.683**	**1.37**	**93.0**	**47.3**	**80.7**		**74.7**
PORT B	5-A	12:29	1105.295	5.0	0.17	0.85	0.85	0.5	94	48	82		79
	5-B	12:39	1110.730	5.0	0.17	0.85	0.85	0.7	94	49	81		79
	5-C	12:49	1116.170	5.0	0.17	0.85	0.85	0.7	94	50	81		79
				5.00	**0.170**	**0.850**	**0.850**	**0.63**	**94.0**	**49.0**	**81.3**		**79.0**
	6-A	12:59	1124.700	5.0	0.26	1.30	1.30	1.0	95	52	82		77
	6-B	13:09	1132.685	5.0	0.25	1.30	1.25	1.0	96	56	83		77
	6-C	13:19	1140.600	5.0	0.25	1.30	1.25	1.0	97	58	80		78
				5.00	**0.253**	**1.300**	**1.267**	**1.00**	**96.0**	**55.3**	**81.7**		**77.3**
	7-A	13:29	1148.540	5.0	0.30	1.50	1.50	1.0	97	51	78		77
	7-B	13:39	1157.030	5.0	0.30	1.50	1.50	1.0	97	49	78		77
	7-C	13:49	1166.000	5.0	0.30	1.50	1.50	1.0	97	49	76		77
				5.00	**0.30**	**1.500**	**1.500**	**1.00**	**97.0**	**49.7**	**77.3**		**77.0**
	8-A	13:59	1174.200	5.0	0.30	1.50	1.50	1.0	98	50	77		78
	8-B	14:09	1182.860	5.0	0.31	1.60	1.55	1.1	99	50	80		78
	8-C	14:19	1191.525	5.0	0.31	1.60	1.55	1.0	100	52	81		78
	Final	**14:29**	**1200.416**	**5.00**	**0.31**	**1.567**	**1.533**	**1.03**	**99.0**	**50.7**	**79.3**		**78.0**

Appendix C:
Example Calculations

Example Calculations
Moisture Content and Stack Molecular Weight

Moisture Content Determination

Moisture Content via EPA Method 4 - Run 1

V_1	=	Initial dry gas meter reading	=	644.322	ft3
V_2	=	Final dry gas meter reading	=	822.268	ft3
V_M	=	Total cubic meters of stack gas metered (V_2-V_1)	=	**177.946**	**ft3**
Y	=	Dry gas meter correction factor	=	0.9930	unitless
$V_{M\ (corr)}$	=	Corrected DGM volume to cubic feet (V_M x Y)	=	**176.700**	**ft3**
W_I	=	Initial weight of impinger train	=	2971.4	grams
W_F	=	Final weight of impinger train	=	3004.5	grams
W_{TOT}	=	Total weight gain of impinger train (W_F-W_I)	=	**33.1**	**grams**
K_1	=	Conversion factor	=	1.333	L_{H20}
1 m3/mL	=	Conversion factor	=	1 x e 6	
D_{H_20}	=	Density of water	=	998.2	L/g
K1A	=	Conv. factor x density of water @ EPA STP	=	1.336	L/g
K_3	=	$\frac{528°R \times 28.316\ L/ft3}{29.92\ "\ Hg}$ @ EPA STP	=	499.7	$\frac{°R - L}{"Hg\text{-}ft3}$
P_{ATM}	=	Atmospheric Pressure	=	**22.88**	**"Hg**
T °F	=	Average temperature of dry gas meter	=	88.71	°F
T °R	=	Avg. temperature of dry gas meter + 460°	=	**548.71**	**°R**

Formulas and Calculations (Equation 4-4)

$V_{M\ (std)}$ = Volume of gas metered @ EPA STP =

$$\mathbf{V_{M\ (std)}} = \frac{176.700 \times 22.88 \times 499.7}{548.71} \text{ @ EPA STP} = \mathbf{3681.938\ L}$$

B_{WS} = Moisture content by volume =

$$\mathbf{B_{WS}} = \frac{(33.10 \times 1.336)}{(33.10 \times 1.336) + 3681.94} = 0.011866$$

x 100 = **1.19%** **Moisture**

Stack Gas Molecular Weight

MW_{H20}	=	Molecular weight of water	=	18	lb/lb-mol
MW_{O2}	=	Molecular weight of oxygen	=	32	lb/lb-mol
MW_{CO2}	=	Molecular weight of carbon dioxide	=	44	lb/lb-mol
MW_{N2}	=	Molecular weight of nitrogen	=	28	lb/lb-mol
C_{O2}	=	Volume fraction of corrected oxygen	=	0.2090	O2
C_{CO2}	=	Volume fraction of corrected carbon dioxide	=	0.0004	CO2
C_{N2}	=	Volume fraction of nitrogen = 1-(C_{O2} + C_{CO2})	=	0.7906	N2
1-B_{WS}	=	Dry gas fraction = (1 - B_{WS})	=	0.9881	Dry Exhaust

Formulas and Calculations (Equations 3-1 and 2-5)

M_S = Wet molecular weight of stack gas lb/lb-mol

M_D = Dry molecular weight of stack gas lb/lb-mol

$$\mathbf{M_D} = (MW_{O2} \times C_{O2}) + (MW_{CO2} \times C_{CO2}) + (MW_{N2} \times C_{N2})$$

$$= 6.688 + 0.018 + 22.137 = \mathbf{28.842\ lb/lb\text{-}mol}$$

$$\mathbf{M_S} = (18 \times B_{WS}) + [(1\text{-}B_{WS}) \times M_D]$$

$$= 0.214 + 28.500 = \mathbf{28.714\ lb/lb\text{-}mol}$$

Example Calculations
Exhaust Flow Rates

Stack Gas Velocity Determination

Velocity and stack flow rate via Pitot tube (Equations 2-6, 2-8, 2-9, 2-10)

C_P	=	S-Type Pitot Tube Coefficient (dimensionless)	=	**0.84**	
ΔP	=	Differential Pressure Measured by Pitot Tube	=	"H20	
$\sqrt{\Delta P}_{avg}$	=	Average Square Root of ΔP's	=	**0.494**	**"H20**
$T_{S-°F}$	=	Average Temperature (measured)	=	74.9	°F
$T_{S-°R}$	=	Absolute Temperature (°R) = (T_S + 460)	=	**534.9**	**°R**
1-B_{WS}	=	Dry Gas Fraction (unitless)	=	0.9881	
M_S	=	Molecular Weight of Stack Gas, wet	=	28.71	lbs/lbs-mol
K_P	=	Pitot Tube Constant in Minutes	=	**5129.4**	**ft/min**
K_Y	=	Standard Pressure/Temperature Coefficient	=	°R-min/"Hg-hr	
	=	528º R ÷ 29.92 "Hg x 60 min ÷ 1 hr	=	1058.8	$\frac{°R\text{-}min}{"Hg\text{-}hr}$
P_B	=	Atmospheric Pressure ("Hg)	=	22.88	"Hg
P_G	=	Static Pressure ("H2O)	=	-0.16	"H20
P_S	=	Absolute Pressure	=	"Hg	
P_S	=	$P_B + \frac{P_G}{13.6\ ("H2O/"Hg)}$	=	**22.87**	**"Hg**
D	=	Stack Diameter	=	1.00	feet
A_S	=	Area of Stack (ft2) = $\pi \times d_i^2 \div 4$	=	**0.79**	**ft2**
V_S	=	Stack Velocity	=	ft/min	
	=	$K_P \times C_P \times \sqrt{\Delta P}_{avg} \times$	=	ft/min	
V_S	=	$4308.7 \times 0.49 \times \frac{535}{656.64}$	=	1922.32	ft/min
Q_A	=	Volumetric Flow Rate = $V_S \times A_S$	=	**1,509.78**	**ft3/min**
Q_D	=	Stack flow rate on a dry basis and standard conditions			
Q_{STD}	=	Volumetric Flow Rate on a Dry Basis			
	=	$Q_A \times (1\text{-}B_{WS}) \times K_Y \times P_S \div T_S$			
Q_{STD}	=	$1{,}509.78 \times 1046.3 \times \frac{22.87}{534.9}$	=	**67,537**	**DSCF/H**

Example Calculations
Concentration and Mass Emission Rates

Calculated Emissions

Determination of Be Concentrations and Mass Emission Rates

$Q_{S\ M1-4}$ =	Measured Stack Flow Rate	=	67,537	SCF/H Dry
V_{M-DRY} =	Dry Standard Metered Volume	=	130.593	SCF Dry
Be Mass =	Mass of Be Collected (Blank Corrected)	=	0.20	μg
C_{F2} =	Conversion from micrograms to grams	=	1.00E-06	g / μg
C_{F3} =	Conversion from grains to pounds	=	453.6	gr/lb
C_{F4} =	Conversion from sample time to hr	=	0.25	hr

Concentration (g/DSCF) = $\dfrac{\text{mass collected } (\mu\text{g}) \times C_{F2}}{V_{M-DRY}\ \text{(SCF)}}$

Be $_{CONC}$ = $\dfrac{0.20 \times 1.00\text{E-}06}{130.593}$ = **1.53E-09 gr/DSCF**

Mass Emissions (lbs/hr) = $TSP_{CONC} \div C_{F3} \times C_{F4} \times QS_{M1-4}$

BE $_{g/hr}$ = 1.53E-09 x 67,537 x 0.25 = **2.59E-05 g/hr**

Determination of Isokinetics Conditions

V_{M-DRY} =	Dry Standard Metered Volume	=	130.593	SCF Dry
θ =	Total Sampling Time	=	240	min
K_5 =	Atmospheric Sampling Standard	=	0.0945	"Hg-min/ºR-sec
V_S =	Stack Gas Velocity	=	32.04	ft/sec
T_S =	Absolute Stack Temperature	=	534.88	ºR-sec
P_S =	Absolute Stack Pressure	=	22.87	"Hg
A_N =	Area of Nozzle Diameter	=	3.88E-04	ft^2
1-B_{WS} =	Dry Gas Fraction (unitless)	=	0.9881	

Isokinetic Variation (%) = $\dfrac{K_5 \times T_S \times V_{m\text{-}std}}{P_S \times V_S \times A_N \times \theta \times (1\text{-}B_{WS})}$

I (%) = $\dfrac{6600.90}{67.391}$ = **97.95 %**

Appendix D:
QA/QC Activities and Equipment Calibration Results

APEX INSTRUMENTS METHOD 5 PRE-TEST CONSOLE CALIBRATION

USING CALIBRATED CRITICAL ORIFICES

5-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	MC522 #2
Console Serial Number	1205014
DGM Model Number	MS-4
DGM Serial Number	30-Nov-24

Calibration Conditions			
Date	Time	8/5/24	14:00:00
Barometric Pressure		25.0	in Hg
Theoretical Critical Vacuum[1]		11.8	in Hg
Calibration Technician		SV	

Factors/Conversions	
Std Temp	528
Std Press	29.92
K_1	17.647

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*{}^oR^{1/2})/(in.Hg*min)$.

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
15.0	0.28	615.364	620.332	84	85	TC 40	0.2536	86	86	21
11.0	0.56	620.332	625.735	85	85	TC 48	0.3690	86	86	20
8.0	0.97	625.735	630.985	85	85	TC 55	0.4930	86	88	19
6.0	1.70	630.985	636.213	85	86	TC 63	0.6550	88	88	17
5.0	2.80	636.213	641.924	86	86	TC 73	0.8580	88	88	16

Results								
Standardized Data				Dry Gas Meter				
Dry Gas Meter		Critical Orifice		Calibration Factor		Flowrate	ΔH @	
				Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
4.029	0.269	4.070	0.271	1.010	0.018	0.271	1.738	0.113
4.381	0.398	4.343	0.395	0.991	-0.001	0.395	1.643	0.019
4.262	0.533	4.216	0.527	0.989	-0.003	0.527	1.601	-0.023
4.249	0.708	4.197	0.700	0.988	-0.005	0.700	1.598	-0.027
4.653	0.931	4.581	0.916	0.985	-0.008	0.916	1.542	-0.082
				0.993	Y Average		1.624	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature _____ Date _____

APEX INSTRUMENTS METHOD 5 POST-TEST CONSOLE CALIBRATION

USING CALIBRATED CRITICAL ORIFICES

3-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	MC522 #2
Console Serial Number	1205014
DGM Model Number	MS-4
DGM Serial Number	1506596

Calibration Conditions			
Date	**Time**	8/22/24	10:52
Barometric Pressure		25.0	in Hg
Theoretical Critical Vacuum[1]		11.8	in Hg
Calibration Technician		MM	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

[1]**For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.**

[2]**The Critical Orifice Coefficient, K', must be entered in English units, (ft^3*°$R^{1/2}$)/(in.Hg*min).**

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
8.0	0.970	1200.579	1205.787	80	81	55	0.493	83	83	19.0
8.0	0.970	1205.787	1211.018	81	81	55	0.493	83	83	19.0
8.0	0.970	1211.018	1216.238	81	81	55	0.493	83	83	19.0

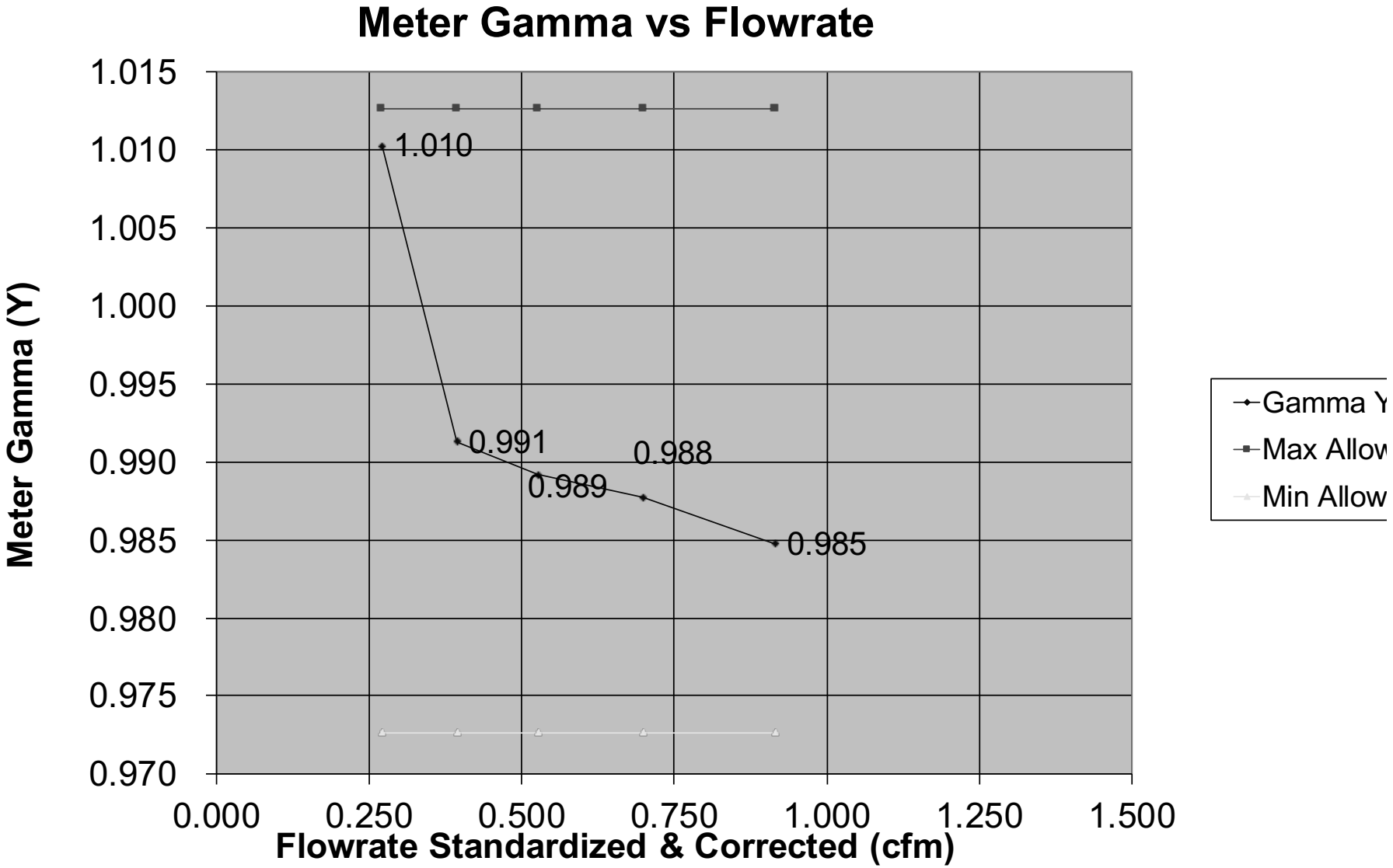
Results

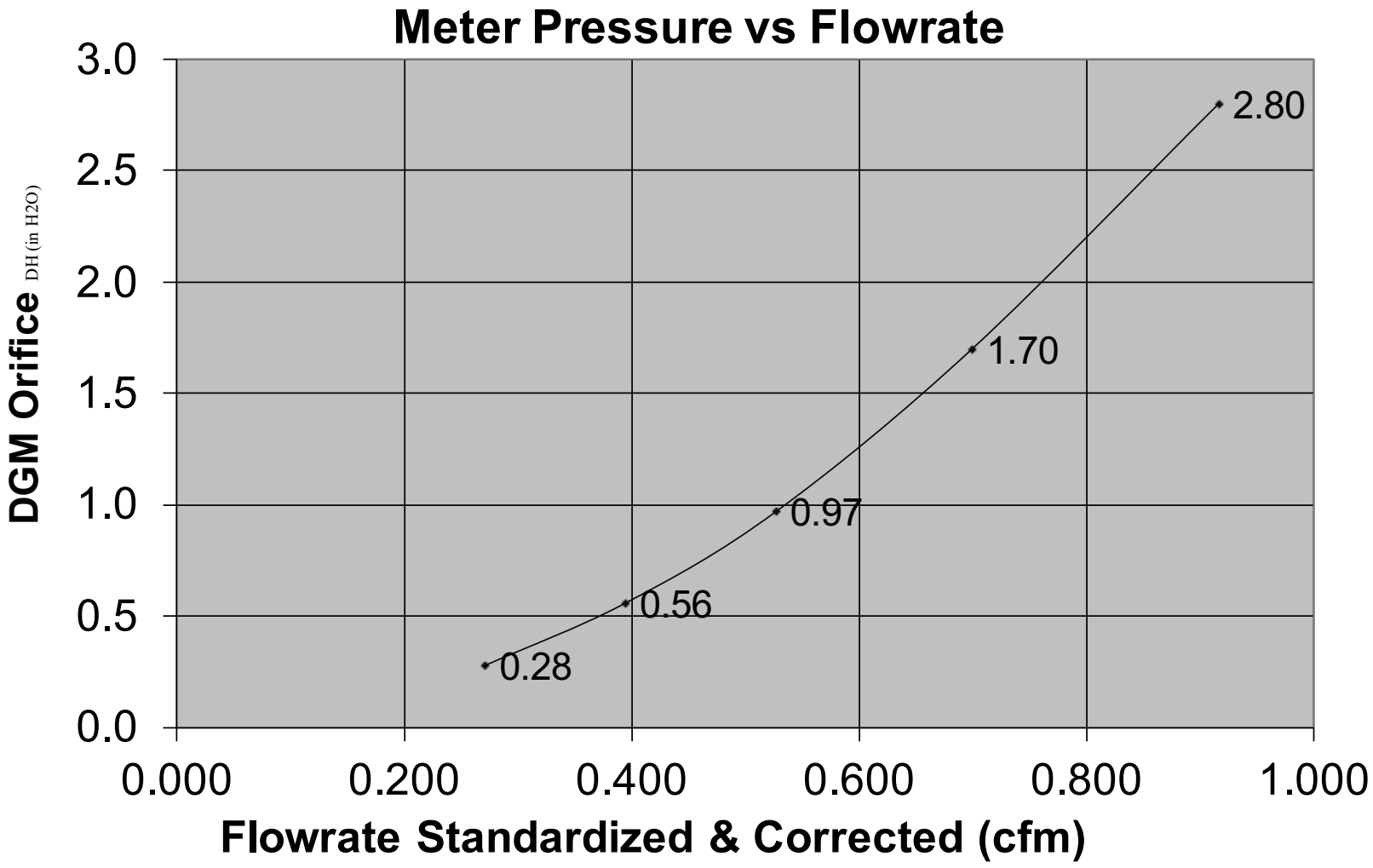
Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
4.263	0.535	4.217	0.529	0.989	-0.001	0.529	1.601	0.001
4.278	0.535	4.233	0.529	0.990	-0.001	0.529	1.599	0.000
4.269	0.534	4.233	0.529	0.992	0.001	0.529	1.599	0.000
Pretest Gamma	0.989	**% Deviation**	0.117	0.990	Y Average		1.600	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature _____ Date _____


Meter Gamma vs Flowrate
Meter Gamma (Y)
1.015
1.010
1.005
1.000
0.995
0.990
0.985
0.980
0.975
0.970
1.010
0.991
0.989
0.988
0.985
0.000
0.250
0.500
0.750
1.000
1.250
1.500
Flowrate Standardized & Corrected (cfm)
Gamma Y
Max Allow
Min Allow


Meter Pressure vs Flowrate
DGM Orifice DH (in H2O)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.000
0.200
0.400
0.600
0.800
1.000
Flowrate Standardized & Corrected (cfm)
2.80
1.70
0.97
0.56
0.28

Metering Console Thermocouple Calibration

Date: 8/22/24
Technician: MM
Meter ID: Apex XC522 Console #2

Thermocouple ID: Alltec Series 22 TC Source #8766041
Thermocouple: PT-8-1
Ambient Temp.: 82.5

STANDARD TEMP. (°R)	AUX		STACK		PROBE		OVEN		FILTER		EXIT		AVERAGE DIFF. (%)
	Rdg °R	Diff.%	Rdg °R	Diff.%	Rdg °R	Diff.%	Rdg °R	Diff.%	Rdg °R	Diff.%	Rdg °R	Diff.%	
560	555	0.01	556	0.01	555	0.01	557	0.01	555	0.01	556	0.01	0.01
760	757	0.00	758	0.00	757	0.00	755	0.01	757	0.00	757	0.00	0.00
960	954	0.01	955	0.01	954	0.01	952	0.01	953	0.01	955	0.01	0.01
1160	1156	0.00	1156	0.00	1156	0.00	1157	0.00	1153	0.01	1157	0.00	0.00
1360	1356	0.00	1355	0.00	1357	0.00	1355	0.00	1356	0.00	1357	0.00	0.00
1560	1556	0.00	1555	0.00	1557	0.00	1555	0.00	1556	0.00	1557	0.00	0.00
1760	1755	0.00	1746	0.01	1756	0.00	1754	0.00	1751	0.01	1756	0.00	0.00
1960	1947	0.01	1955	0.00	1956	0.00	1954	0.00	1955	0.00	1956	0.00	0.00
2160	2153	0.00	2154	0.00	2156	0.00	2155	0.00	2154	0.00	2156	0.00	0.00
2360	2351	0.00	2350	0.00	2356	0.00	2349	0.00	2355	0.00	2355	0.00	0.00

Standard Temp. °R = °F + 460°

Average Percent Error = 0.00%

Percent Error = $\frac{\text{Standard Temp. - Measured Temp.}}{\text{Standard Temp.}}$ **X 100**

Tolerance ± 1.5%

Temperature Sensor Calibration Data Sheet

Thermocouple Calibration			
Method: 2 Section 10.3.1 *Frequency: After each field use* *Criteria: < 1.5 % Absolute Temperature*			
Altitude (ft): 5087 Pressure ("Hg): 24.81 Boiling Point @ Alt.: 202.81		Calibration Date: 8/22/24 Technician: MM Thermocouple ID: PT 3-1	
Water Temperature Range	***Freezing***	***Room***	***Boiling***
Reference Thermometer (°F) Probe Thermometer (°F)		84.2 84.0	
Reference Thermometer (°R) Probe Thermometer (°R)	460.0 460.0	544.2 544.0	460.0 460.0
Absolute Temperature Difference	**0.0%**	**0.04%**	**0.00%**
Absolute Temp. (°R) = 460+°F Alt. Correction for Water Boiling Point = 49.161*Ln(I"Hg)+44.932 Pressure ("Hg) = 29.921*(1-6.8753e-6*alt)^5.2559			

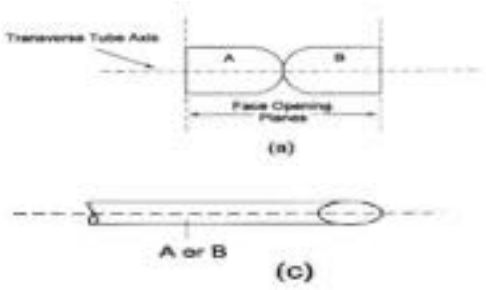
S-Type Pitot Tube Calibration

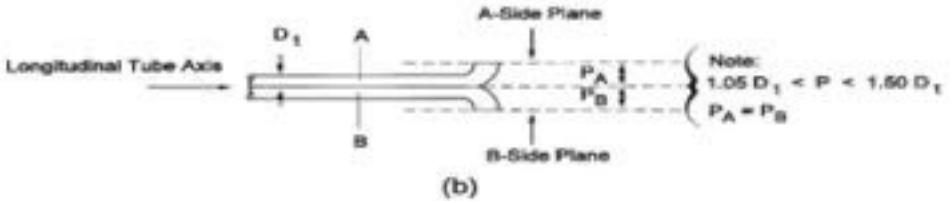
Date: 8/22/24
Technician: MM
Pitot Tube ID: PT-3-1 Assembly
Pitot Tube Type: Method 5 Assembly S-Type - 3'

(a) end view; face opening planes perpendicular to transverse axis;

(b) top view; face opening planes parallel to longitudinal axis;

(c) side view; both legs of equal length and centerlines coincident, when viewed fromboth sides. Baseline coefficient values of 0.84 may be assigned to pitot tubes constructed this way.





Dt-a =	0.375	"
Dt-b =	0.375	"
Pa =	0.472	"
Pb =	0.472	"
P =	0.944	"

1.05Dt	Pa	1.5Dt
0.3938	0.472	0.5625

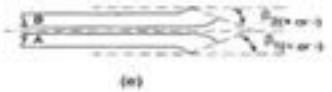
1.05Dt	Pb	1.5Dt
0.3938	0.472	0.5625

Method 2 - 10.1:
Coefficient = **0.84** *if:*
0.188'' ≤ Dt ≤ 0.375'' and if **Pa=Pb** and **1.05Dt < Pa/2Dt < 1.50Dt.**

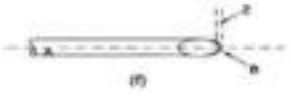
The types of face-opening misalignment shown above will not affect the baseline value of $C_{ps(s)}$ so long as α_1 and $\alpha_2 \leq 10°$, β_1 and $\beta_2 \leq 5°$, $z \leq 0.32$ cm (1/8 in.), and $w \leq 0.08$ cm (1/32 in.) (Reference 11.0 in Section 16.0)

α-1= 0°
α-2= 0°

ℬ-1+= 2°
ℬ-2+= 2°



ℬ-1-= 0°
ℬ-2-= 0°



z= 0.00" Z ≤

Wt= 0.00 " W ≤

Appendix E:
Laboratory Analysis Report and Chain of Custody

COMPLIANCE SERVICES & TESTING

PROJECT: LANL TA-35

CLIENT # C062
REPORT # 24-512

SUBMITTED BY:
Alliance Technical Group
12242 S.W. GARDEN PLACE
TIGARD, OR 97223
(503) 624-2183

12242 SW Garden Place ❖ Tigard, OR 97223-8246 ❖ (503) 624-2183

Case Narrative

Date: September 5, 2024

General Information

Client:	Compliance Services & Testing
Client Number:	C062
Report Number:	24-512
Sample Description:	Impinger Trains
Sample Numbers:	24-S2462 – 24-S2470

Analysis

Analytes:	Be
Analytical Protocols:	EPA Method 29 (8/2/17 version)
Analytical Notes:	No problems were encountered during the analyses. The back samples consisted of impinger catches and nitric rinses. The results are not blank corrected.
QA/QC Review:	All the data have been reviewed by the analysts performing the analyses and the project manager. All the quality control and sample-specific information in this package is complete and meets or exceeds the minimum requirements for acceptability.
Comments:	If you have any questions or concerns regarding this analysis, please feel free to contact the project manager.
Disclaimer:	This report shall not be reproduced, except in full, without the written approval of the laboratory. The results only represent those of the samples as received into the laboratory. All data are reported to the detection limit. Results <5x DL must be considered to have a higher degree of uncertainty associated with them. Due to the statistical process of detection limit determination, data in this report should not be used for statistical analysis as the data has been censored in such a manner as to bias statistical analyses high.

_____

Project Manager
Paul Duda

Client: C062 - Compliance Services & Testing
Report Number: 24-512

Lab ID: 24-S2462
Client ID: Run 1 Front Half
Site: LANL TA-35
Sample Date: 8/20/24

Analyte	Result	DL	Units
Beryllium, ICP	5.96	0.050	µg/sample

Lab ID: 24-S2463
Client ID: Run 1 Back Half
Site: LANL TA-35
Sample Date: 8/20/24

Analyte	Result	DL	Units
Beryllium, ICP	< DL	0.020	µg/sample

Lab ID: 24-S2464
Client ID: Run 2 Front Half
Site: LANL TA-35
Sample Date: 8/21/24

Analyte	Result	DL	Units
Beryllium, ICP	5.94	0.050	µg/sample

Lab ID: 24-S2465
Client ID: Run 2 Back Half
Site: LANL TA-35
Sample Date: 8/21/24

Analyte	Result	DL	Units
Beryllium, ICP	< DL	0.020	µg/sample

Lab ID: 24-S2466
Client ID: Run 3 Front Half
Site: LANL TA-35
Sample Date: 8/21/24

Analyte	Result	DL	Units
Beryllium, ICP	5.94	0.050	µg/sample

Lab ID: 24-S2467
Client ID: Run 3 Back Half
Site: LANL TA-35
Sample Date: 8/21/24

Analyte	Result	DL	Units
Beryllium, ICP	< DL	0.020	µg/sample

Client: C062 - Compliance Services & Testing
Report Number: 24-512

Lab ID: 24-S2468
Client ID: C12 Filter Blank
Site: LANL TA-35
Sample Date: 8/20/24

Analyte	Result	DL	Units
Beryllium, ICP	6.01	0.050	µg/sample

Lab ID: 24-S2469
Client ID: C8A HNO3 Blank
Site: LANL TA-35
Sample Date: 8/20/24

Analyte	Result	DL	Units
Beryllium, ICP	< DL	0.050	µg/sample

Lab ID: 24-S2470
Client ID: C9 5%/10% Blank
Site: LANL TA-35
Sample Date: 8/20/24

Analyte	Result	DL	Units
Beryllium, ICP	< DL	0.020	µg/sample

QA/QC Report

Client Name: Compliance Services & Testing
Project Number: C062
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: Method 29 Front Half
Report Number: 24-512

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Be	ICB	< DL	0.200
Be	Meth_Blk	< DL	0.200
Be	CCB	< DL	0.200
Be	CCB	< DL	0.200

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Be	ICV	2500.	2549.	102.0
Be	LL-CCV	1.000	1.031	103.1
Be	LL-LCS	0.500	0.541	108.2
Be	CCV	2500.	2553.	102.1
Be	CCV	2500.	2534.	101.4

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Replicate Data

Analyte	Sample ID	Sample Conc. µg/L	Replicate Conc. µg/L	RPD
Be	24-S2462	23.9	24.0	0.67

RPD = {(sample-replicate)/[(sample+replicate)/2]}x100
N/C: RPD is not calculated when sample or replicate is below detection limit
Replicate Limit: 20% RPD
*: per EPA CLP protocol, control limits do not apply if sample and/or replicate concentration is less than 5x the detection limit

Laboratory Control Sample/Matrix Post Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Be	LCS	< 0.2	1050.	1000	105.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

QA/QC Report

Client Name: Compliance Services & Testing
Project Number: C062
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: Method 29 Front Half
Report Number: 24-512

Laboratory Control Sample/Matrix Post Spike Analysis (continued)

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Be	LCS-Duplicate	< 0.2	1077.	1000	108.
Be	24-S2464	23.77	932.5	1000	90.9

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

LCS Duplicate Data

Analyte	Sample ID	Original Conc. µg/L	Replicate Conc. µg/L	RPD
Be	LCS-Duplicate	1050.	1077.	2.54

RPD = {(sample-duplicate)/[(sample+duplicate)/2]}x100 Duplicate Limit: 20% RPD

QA/QC Report

Client Name: Compliance Services & Testing
Project Number: C062
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: Method 29 Back Half
Report Number: 24-512

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Be	ICB	< DL	0.200
Be	Meth_Blk	< DL	0.200
Be	CCB	< DL	0.200
Be	CCB	< DL	0.200

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Be	ICV	2500.	2471.	98.8
Be	LL-CCV	1.000	0.979	97.9
Be	LL-LCS	0.500	0.444	88.8
Be	CCV	2500.	2476.	99.0
Be	CCV	2500.	2490.	99.6

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Replicate Data

Analyte	Sample ID	Sample Conc. µg/L	Replicate Conc. µg/L	RPD
Be	24-S2463	< 0.2	< 0.2	N/C *

RPD = {(sample-replicate)/[(sample+replicate)/2]}x100
N/C: RPD is not calculated when sample or replicate is below detection limit
Replicate Limit: 20% RPD
*: per EPA CLP protocol, control limits do not apply if sample and/or replicate concentration is less than 5x the detection limit

Laboratory Control Sample/Matrix Post Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Be	LCS	< 0.2	973.9	1000	97.4

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

QA/QC Report

Client Name: Compliance Services & Testing
Project Number: C062
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: Method 29 Back Half
Report Number: 24-512

Laboratory Control Sample/Matrix Post Spike Analysis (continued)

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Be	LCS-Duplicate	< 0.2	971.5	1000	97.2
Be	24-S2465	< 0.2	930.3	1000	93.0

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

LCS Duplicate Data

Analyte	Sample ID	Original Conc. µg/L	Replicate Conc. µg/L	RPD
Be	LCS-Duplicate	973.9	971.5	0.25

RPD = {(sample-duplicate)/[(sample+duplicate)/2]}x100 Duplicate Limit: 20% RPD

Alliance Technical Group

SOURCE SAMPLE RECEIPT CHECKLIST

Client	Compliance Services & Testing	Date	8/23/2024
# Runs	3 + blanks	Report #	24-512

Package intact?	✓	
Chain-of-Custody form inspected	✓	
CoC present with samples?	✓	
CoC indicates analytical methodology to be used? (eg M29, etc.)	M29	!!
Has CoC been signed by client?	✓	
Custody release date and time noted on CoC?	✓	
All sample containers inspected	✓	
Does number of samples match number on CoC form?	✓	!!
Do all sample ID numbers match those on the CoC form?	✓	!!
Did client mark sample volumes prior to shipment?	NO	
Sample temperature recorded?	Ambient	
Are the sample containers intact?	✓	!!
If present, Audit Sample intact?	n/a	!!
Are signs of leakage present?	None	*
Chain-of-Custody form signed and dated by CLN	✓	

Corrective actions	
Client contacted due to mismatching sample ID numbers	
Client contacted due to broken sample container(s)	
Client contacted due to leaking sample container(s)	
Client contacted for verification of methodology?	
Corrective actions documented?	
Corrective actions accomplished?	

*Items marked !! shall be addressed **prior to any analytical work being started**.*
*Items marked * shall be **noted in case narrative** upon reporting of results to client.*

Signed _____

Notes _____

Alliance TECHNICAL GROUP

12242 SW Garden Place
Tigard, OR 97223
(503) 624-2183

CHAIN-OF-CUSTODY RECORD

For use by Lab:
Report #: 24-512

Page 1 of 1 COCs

CLIENT INFORMATION

Company Name: Compliance Services & Testing (CST)
Contact: CHRIS SPENCER Email: cspencer@compliancetesting.com
Cell: 503-691-4909 Office: SAME
Report To: SAME email
Billing Address: SAME

Project Name: LANL TA-35
PO#: 2634
Quote Number:

Turn Around Time Requested
☐ Standard
☐ Rush (Specify)

LOWEST DETECTION LIMITS

Lab ID	Field Sample ID	Site	Sample Date	Volume (m^3)	Particle Size	Gravimetry	XRF	IC	ICP Method 29	OC/EC	Cr VI			Sample Specific Notes
QF-16	FILTER BLANK	#2 unit	8-20-24	N/A	N/A	24-S2467			✓					
QF-15	RUN 1		8-20-24						✓					
QF-17	RUN 2		8-21-24						✓					
QF-18	RUN 3		8-21-24	↓					✓					
A	5%HNO3/10%H2O2	BLANK	8-20-24	100mL		24-S2470								5% HNO3 / 10% H2O2 / 85% DI
B	0.1N HNO3	BLANK	8-20-24	100mL		24-S2469								
1A	0.1N NITRIC RINSE	RUN #1		TBD		24-S2462								
1B	0.1N NITRIC RISE			↓		24-S2463								
1C	IMPINGER CATCH	↓		↓	↓									HNO3/H2O2 IMP CATCH + SAME 0.1N HNO3 RINSE
—	—	—	—	—	—									

Do the samples pose any potential hazards? ☐ Yes ☒ No
If yes please explain:

Are samples for compliance? ☒ Yes ☐ No

Special Instructions/QC Requirements & Comments:

Relinquished by	Date/Time	Received By	Date/Time/Temp
CHRIS SPENCER	8-22-2024		
Relinquished by:	Date/Time	Received By	8/23/24 9:05

Laboratory Receipt Comments:

Alliance TECHNICAL GROUP

12242 SW Garden Place
Tigard, OR 97223
(503) 624-2183

CHAIN-OF-CUSTODY RECORD

For use by Lab:
Report #: 24-512

Page 2 of 2 COCs

CLIENT INFORMATION

Company Name: CST
Contact: CHRIS SPENCER Email: cspencer@comptesting.com
Cell: 925-681-4909 Office: SAME
Report To: SAME Billing Address: SAME

Project Name: LANL TA-33
Quote Number:
PO#: 2634

Turn Around Time Requested
☑ Standard
☐ Rush (Specify)

Lab ID	Field Sample ID	Site	Sample Date	Volume (m^3)	Particle Size	Gravimetry	XRF	IC	ICP METHOD 29	OC/EC	Cr VI			Sample Specific Notes:
2A	NITRIC RINSE	RUN 2	5-21-24	TBD	#10	24-S2464								0.1N HNO3
2B	NITRIC RINSE	↓	↓	↓	↓	24-S2465								(6.3mL of 70% HNO3 → 1L DI)
2C	IMPINGER	↓	↓	↓	↓									5% HNO3 / 10% H2O2
3A	NITRIC RINSE	RUN 3	↓	↓	↓	24-S2466								0.1N HNO3
3B	NITRIC RINSE	↓	↓	↓	↓	24-S2467								0.1N HNO3
3C	IMPINGER	↓	↓	↓	↓									5% HNO3 / 10% H2O2 / 85% DI

Do the samples pose any potential hazards? ☐ Yes ☒ No
If yes please explain:

Are samples for compliance? ☒ Yes ☐ No

Special Instructions/QC Requirements & Comments:

Relinquished by:	Date/Time: 08-22-2024	Received By:	Date/Time/Temp: 8/23/24 9:05
Relinquished by:	Date/Time:	Received By:	Date/Time/Temp:

Laboratory Receipt Comments:

Method 29 Digestion Worklist Number: 2834 Label QC by: 8-26-24 SG
Report #: 24-512 Client: C062 Compliance Services & Testing
Digestion Date:

Bomb		Sample ID	Client ID	Digestate Volume (ml)	pH	Notes
15	1.	MethBlk		250		
18	2.	LL-LCS19				2.5 mL 248.63.5 X:11.11.24
19	3.	LCS19				2.5 mL 100ppm ICHP 19
21	4.	LCS_Dup19				2.5mL 100ppm ICHP 19
22	5.	24-S2462	Run 1 C1&3			
23	6.	24-S2464	Run 2 C1&3			
24	7.	24-S2466	Run 3 C1&3			
25	8.	24-S2468	C12 Filter Blan			100 mL used
26	9.	24-S2469	C8A HNO3 Blank			100 mL used

Be

•4mL HF per bomb

Digestion Method: (M29_FH) M29_BH CARB436_Combined Other: _____

Volumetrics: HNO3 10-2, 5.0 [illegible], 5.0G, HF250-1, HF250-2

Evap Start: 8-26-24 SG

Evap End: 8-27-24 SG

Digest: 8-28-24 KH

Dilute: 8-28-24 KH

HNO3 Lot: Omni trace 63320 X:NG

H2O2 Lot: _____

HF Lot: CP V093001 X:9-4-25

Spike Std: AccuStd 223055011 X:6.4.25

Q C O/C
8.30.24

ICP Worklist Number: 2944 Date Requested: 8/29/24
Client: C062 Compliance Services & Testing
Report #: 24-512 Analysis Date: 8/29/24

Lab ID	Analyte	Results in ug/L		
1. kv:ICV	Be	2549.	Expected 2500.	% Recovery 101.96
2. bl:ICB	Be	< 0.2		
3. kv:LL-CCV	Be	1.031	Expected 1.000	% Recovery 103.10
4. bl:Meth_Blk	Be	< 0.2		
5. kv:LL-LCS	Be	0.541	Expected 0.500	% Recovery 108.20
6. Spike of 4	Be	1050.	Spk Amount 1000.	Spike Rec. 105.00
7. MSD of 6	Be	1077.	Recovery 107.70	RPD 2.54
8. 24-S2462 Run 1 C1&3	Be	23.86		
9. Dup of 8	Be	24.02	Difference 0.160	RPD 0.67
10. 24-S2464 Run 2 C1&3	Be	23.77		
11. Spike of 10	Be	932.5	Spk Amount 1000.	Spike Rec. 90.87
12. 24-S2466 Run 3 C1&3	Be	23.77		
13. kv:CCV	Be	2553.	Expected 2500.	% Recovery 102.12
14. bl:CCB	Be	< 0.2		
15. 24-S2468 C12 Filter Bl	Be	24.05		
16. 24-S2469 C8A HNO3 Blan	Be	< 0.2		
17. kv:CCV	Be	2534.	Expected 2500.	% Recovery 101.36
18. bl:CCB	Be	< 0.2		

Sequence No.: 1
Sample ID: Calib Blank 1
Analyst:
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 1
Date Collected: 8/29/2024 2:03:37 PM
Data Type: Reprocessed on 8/29/2024 6:54:31 PM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: Calib Blank 1

Analyte	Back Pressure	Flow
All	343.0 kPa	0.65 L/min

Replicate Data: Calib Blank 1

Repl#	Analyte	Net Intensity	Corrected Intensity	Conc.	Calib. Units	Analysis Time
1	Be 313.107	997.6	997.6	[0.00]	mg/L	2:04:28 PM
2	Be 313.107	942.5	942.5	[0.00]	mg/L	2:04:40 PM
3	Be 313.107	909.0	909.0	[0.00]	mg/L	2:04:52 PM

Mean Data: Calib Blank 1

Analyte	Mean Corrected Intensity	Std.Dev.	RSD	Conc.	Calib Units
Be 313.107	949.7	44.76	4.71%	[0.00]	mg/L

Sequence No.: 2
Sample ID: Calib Std 1
Analyst:
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 2
Date Collected: 8/29/2024 2:07:40 PM
Data Type: Reprocessed on 8/29/2024 6:54:31 PM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: Calib Std 1

Analyte	Back Pressure	Flow
All	343.0 kPa	0.65 L/min

Replicate Data: Calib Std 1

Repl#	Analyte	Net Intensity	Corrected Intensity	Conc.	Calib. Units	Analysis Time
1	Be 313.107	22564802.8	22563853.1	[5.0000]	mg/L	2:08:33 PM
2	Be 313.107	22185037.1	22184087.4	[5.0000]	mg/L	2:08:44 PM
3	Be 313.107	22352199.7	22351250.0	[5.0000]	mg/L	2:08:54 PM

Mean Data: Calib Std 1

Analyte	Mean Corrected Intensity	Std.Dev.	RSD	Conc.	Calib Units
Be 313.107	22366396.8	190335.40	0.85%	[5.0000]	mg/L

Calibration Summary

Analyte	Stds.	Equation	Intercept	Slope	Curvature	Corr. Coef.	Reslope
Be 313.107	1	Lin, Calc Int	0.0	4473000	0.00000	1.000000	

Sequence No.: 3
Sample ID: ICV
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 3
Date Collected: 8/29/2024 2:11:38 PM
Data Type: Reprocessed on 8/29/2024 6:54:31 PM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: ICV

Analyte	Back Pressure	Flow
All	343.0 kPa	0.65 L/min

Replicate Data: ICV

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	11553278.2	11552328.5	2.583	mg/L	2583	ug/L	2:12:30 PM
2	Be 313.107	11409894.8	11408945.2	2.550	mg/L	2550	ug/L	2:12:46 PM
3	Be 313.107	11241825.9	11240876.2	2.513	mg/L	2513	ug/L	2:13:03 PM

Mean Data: ICV

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	11400716.6	2.549	mg/L	0.0348	2549	ug/L	34.85	1.37%

QC value within limits for Be 313.107 Recovery = 101.95%
All analyte(s) passed QC.

Sequence No.: 4
Sample ID: ICB
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 4
Date Collected: 8/29/2024 2:15:54 PM
Data Type: Reprocessed on 8/29/2024 6:54:31 PM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: ICB

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: ICB

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	1224.6	274.9	0.000	mg/L	0.061	ug/L	2:16:44 PM
2	Be 313.107	1393.2	443.5	0.000	mg/L	0.099	ug/L	2:16:56 PM
3	Be 313.107	1296.2	346.5	0.000	mg/L	0.077	ug/L	2:17:08 PM

Mean Data: ICB

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	355.0	0.000	mg/L	0.0000	0.079	ug/L	0.0189	23.85%

QC value within limits for Be 313.107 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 5
Sample ID: LL-CCV
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 5
Date Collected: 8/29/2024 2:19:57 PM
Data Type: Reprocessed on 8/29/2024 6:54:31 PM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: LL-CCV

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: LL-CCV

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	5751.5	4801.8	0.001	mg/L	1.073	ug/L	2:20:48 PM
2	Be 313.107	5507.2	4557.5	0.001	mg/L	1.019	ug/L	2:21:00 PM
3	Be 313.107	5422.4	4472.7	0.001	mg/L	1.000	ug/L	2:21:12 PM

Mean Data: LL-CCV

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	4610.7	0.001	mg/L	0.0000	1.031	ug/L	0.0382	3.71%

QC value within limits for Be 313.107 Recovery = 103.07%
All analyte(s) passed QC.

Sequence No.: 6
Sample ID: MB 24-512 FH
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 14
Date Collected: 8/29/2024 2:24:01 PM
Data Type: Reprocessed on 8/29/2024 6:54:31 PM

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: MB 24-512 FH

Analyte	Back Pressure	Flow
All	343.0 kPa	0.65 L/min

Replicate Data: MB 24-512 FH

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	1047.3	97.6	0.000	mg/L	0.022	ug/L	2:24:51 PM
2	Be 313.107	1322.2	372.5	0.000	mg/L	0.083	ug/L	2:25:04 PM
3	Be 313.107	1379.6	429.9	0.000	mg/L	0.096	ug/L	2:25:16 PM

Mean Data: MB 24-512 FH

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	300.0	0.000	mg/L	0.0000	0.067	ug/L	0.0397	59.21%

Sequence No.: 7
Sample ID: LL-LCS 24-512 FH
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 15
Date Collected: 8/29/2024 2:28:04 PM
Data Type: Reprocessed on 8/29/2024 6:54:31 PM

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: LL-LCS 24-512 FH

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: LL-LCS 24-512 FH

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	3379.7	2430.0	0.001	mg/L	0.543	ug/L	2:28:53 PM
2	Be 313.107	3364.3	2414.6	0.001	mg/L	0.540	ug/L	2:29:06 PM
3	Be 313.107	3369.6	2419.9	0.001	mg/L	0.541	ug/L	2:29:18 PM

Mean Data: LL-LCS 24-512 FH

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	2421.5	0.001	mg/L	0.0000	0.541	ug/L	0.0018	0.32%

Sequence No.: 8
Sample ID: LCS 24-512 FH
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:

Autosampler Location: 16
Date Collected: 8/29/2024 2:32:05 PM
Data Type: Reprocessed on 8/29/2024 6:54:32 PM

Initial Sample Vol:
Sample Prep Vol:

Wash Time:

Nebulizer Parameters: LCS 24-512 FH

Analyte	Back Pressure	Flow
All	343.0 kPa	0.65 L/min

Replicate Data: LCS 24-512 FH

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	4714259.1	4713309.4	1.054	mg/L	1054	ug/L	2:32:57 PM
2	Be 313.107	4697560.3	4696610.6	1.050	mg/L	1050	ug/L	2:33:12 PM
3	Be 313.107	4683816.3	4682866.6	1.047	mg/L	1047	ug/L	2:33:27 PM

Mean Data: LCS 24-512 FH

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	4697595.5	1.050	mg/L	0.0034	1050	ug/L	3.41	0.32%

==========

Sequence No.: 9
Sample ID: LCS DUP 24-512 FH
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 17
Date Collected: 8/29/2024 2:36:16 PM
Data Type: Reprocessed on 8/29/2024 6:54:32 PM

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: LCS DUP 24-512 FH

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: LCS DUP 24-512 FH

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	4858463.9	4857514.2	1.086	mg/L	1086	ug/L	2:37:06 PM
2	Be 313.107	4801271.3	4800321.6	1.073	mg/L	1073	ug/L	2:37:23 PM
3	Be 313.107	4797431.2	4796481.5	1.072	mg/L	1072	ug/L	2:37:41 PM

Mean Data: LCS DUP 24-512 FH

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	4818105.8	1.077	mg/L	0.0076	1077	ug/L	7.64	0.71%

==========

Sequence No.: 10
Sample ID: 24-S2462
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 18
Date Collected: 8/29/2024 2:40:32 PM
Data Type: Reprocessed on 8/29/2024 6:54:32 PM

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: 24-S2462

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: 24-S2462

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	108103.8	107154.1	0.024	mg/L	23.95	ug/L	2:41:29 PM
2	Be 313.107	107634.3	106684.6	0.024	mg/L	23.85	ug/L	2:41:47 PM
3	Be 313.107	107283.1	106333.4	0.024	mg/L	23.77	ug/L	2:42:05 PM

Mean Data: 24-S2462

Analyte	Mean Corrected Intensity	Calib. Conc.	Units	Std.Dev.	Sample Conc.	Units	Std.Dev.	RSD
Be 313.107	106724.0	0.024	mg/L	0.0001	23.86	ug/L	0.092	0.39%

Sequence No.: 11
Sample ID: 24-S2462 REP
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 19
Date Collected: 8/29/2024 2:44:52 PM
Data Type: Reprocessed on 8/29/2024 6:54:32 PM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: 24-S2462 REP

Analyte	Back Pressure	Flow
All	341.0 kPa	0.65 L/min

Replicate Data: 24-S2462 REP

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Units	Sample Conc.	Units	Analysis Time
1	Be 313.107	110197.5	109247.8	0.024	mg/L	24.42	ug/L	2:45:49 PM
2	Be 313.107	106958.2	106008.5	0.024	mg/L	23.70	ug/L	2:46:08 PM
3	Be 313.107	108071.2	107121.5	0.024	mg/L	23.95	ug/L	2:46:26 PM

Mean Data: 24-S2462 REP

Analyte	Mean Corrected Intensity	Calib. Conc.	Units	Std.Dev.	Sample Conc.	Units	Std.Dev.	RSD
Be 313.107	107459.3	0.024	mg/L	0.0004	24.02	ug/L	0.368	1.53%

Sequence No.: 12
Sample ID: 24-S2464
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 20
Date Collected: 8/29/2024 2:49:14 PM
Data Type: Reprocessed on 8/29/2024 6:54:32 PM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: 24-S2464

Analyte	Back Pressure	Flow
All	341.0 kPa	0.65 L/min

Replicate Data: 24-S2464

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Units	Sample Conc.	Units	Analysis Time
1	Be 313.107	108637.1	107687.4	0.024	mg/L	24.07	ug/L	2:50:10 PM
2	Be 313.107	106181.8	105232.1	0.024	mg/L	23.52	ug/L	2:50:28 PM
3	Be 313.107	106961.0	106011.3	0.024	mg/L	23.70	ug/L	2:50:46 PM

Mean Data: 24-S2464

Analyte	Mean Corrected Intensity	Calib. Conc.	Units	Std.Dev.	Sample Conc.	Units	Std.Dev.	RSD
Be 313.107	106310.3	0.024	mg/L	0.0003	23.77	ug/L	0.280	1.18%

Sequence No.: 13
Sample ID: 24-S2464 POST SPK
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 21
Date Collected: 8/29/2024 2:53:35 PM
Data Type: Reprocessed on 8/29/2024 6:54:32 PM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: 24-S2464 POST SPK

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: 24-S2464 POST SPK

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	4211283.8	4210334.1	0.941	mg/L	941.2	ug/L	2:54:30 PM
2	Be 313.107	4129196.6	4128246.9	0.923	mg/L	922.9	ug/L	2:54:49 PM
3	Be 313.107	4176321.6	4175371.9	0.933	mg/L	933.4	ug/L	2:55:07 PM

Mean Data: 24-S2464 POST SPK

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	4171317.6	0.932	mg/L	0.0092	932.5	ug/L	9.21	0.99%

==========

Sequence No.: 14
Sample ID: 24-S2466
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 22
Date Collected: 8/29/2024 2:57:57 PM
Data Type: Reprocessed on 8/29/2024 6:54:32 PM

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: 24-S2466

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: 24-S2466

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	108472.7	107523.0	0.024	mg/L	24.04	ug/L	2:58:56 PM
2	Be 313.107	107389.5	106439.8	0.024	mg/L	23.79	ug/L	2:59:14 PM
3	Be 313.107	106041.7	105092.0	0.023	mg/L	23.49	ug/L	2:59:32 PM

Mean Data: 24-S2466

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	106351.6	0.024	mg/L	0.0003	23.77	ug/L	0.272	1.15%

==========

Sequence No.: 15
Sample ID: CCV
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 3
Date Collected: 8/29/2024 3:02:21 PM
Data Type: Reprocessed on 8/29/2024 6:54:32 PM

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: CCV

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: CCV

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	11427928.3	11426978.6	2.554	mg/L	2554	ug/L	3:03:14 PM
2	Be 313.107	11455289.4	11454339.8	2.561	mg/L	2561	ug/L	3:03:31 PM
3	Be 313.107	11375544.1	11374594.4	2.543	mg/L	2543	ug/L	3:03:47 PM

Mean Data: CCV

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	11418637.6	2.553	mg/L	0.0091	2553	ug/L	9.06	0.35%

QC value within limits for Be 313.107 Recovery = 102.11%
All analyte(s) passed QC.

Sequence No.: 16 | **Autosampler Location: 4**
Sample ID: CCB | **Date Collected: 8/29/2024 3:06:38 PM**
Analyst: SG | **Data Type: Reprocessed on 8/29/2024 6:54:33 PM**
Logged In Analyst (Original) : Administrator
Initial Sample Wt: | **Initial Sample Vol:**
Dilution: | **Sample Prep Vol:**
Wash Time:

Nebulizer Parameters: CCB

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: CCB

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	1198.5	248.8	0.000	mg/L	0.056	ug/L	3:07:29 PM
2	Be 313.107	1201.0	251.3	0.000	mg/L	0.056	ug/L	3:07:41 PM
3	Be 313.107	1123.5	173.8	0.000	mg/L	0.039	ug/L	3:07:53 PM

Mean Data: CCB

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	224.6	0.000	mg/L	0.0000	0.050	ug/L	0.0098	19.61%

QC value within limits for Be 313.107 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 17 | **Autosampler Location: 23**
Sample ID: 24-S2468 | **Date Collected: 8/29/2024 3:10:41 PM**
Analyst: SG | **Data Type: Reprocessed on 8/29/2024 6:54:33 PM**
Logged In Analyst (Original) : Administrator
Initial Sample Wt: | **Initial Sample Vol:**
Dilution: | **Sample Prep Vol:**
Wash Time:

Nebulizer Parameters: 24-S2468

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: 24-S2468

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	107574.7	106625.0	0.024	mg/L	23.84	ug/L	3:11:39 PM
2	Be 313.107	109155.3	108205.6	0.024	mg/L	24.19	ug/L	3:11:57 PM
3	Be 313.107	108855.2	107905.6	0.024	mg/L	24.12	ug/L	3:12:15 PM

Mean Data: 24-S2468

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	107578.7	0.024	mg/L	0.0002	24.05	ug/L	0.188	0.78%

Sequence No.: 18 | **Autosampler Location: 24**
Sample ID: 24-S2469 | **Date Collected: 8/29/2024 3:15:03 PM**
Analyst: SG | **Data Type: Reprocessed on 8/29/2024 6:54:33 PM**
Logged In Analyst (Original) : Administrator
Initial Sample Wt: | **Initial Sample Vol:**
Dilution: | **Sample Prep Vol:**
Wash Time:

Nebulizer Parameters: 24-S2469

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: 24-S2469

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	959.7	10.0	0.000	mg/L	0.002	ug/L	3:15:55 PM
2	Be 313.107	994.8	45.1	0.000	mg/L	0.010	ug/L	3:16:07 PM
3	Be 313.107	914.0	-35.7	-0.000	mg/L	-0.008	ug/L	3:16:19 PM

Mean Data: 24-S2469

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	6.5	0.000	mg/L	0.0000	0.001	ug/L	0.0091	626.44%

==========

Sequence No.: 19
Sample ID: CCV
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 3
Date Collected: 8/29/2024 3:19:08 PM
Data Type: Reprocessed on 8/29/2024 6:54:33 PM

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: CCV

Analyte	Back Pressure	Flow
All	343.0 kPa	0.65 L/min

Replicate Data: CCV

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	11403153.5	11402203.8	2.549	mg/L	2549	ug/L	3:19:59 PM
2	Be 313.107	11322732.7	11321783.0	2.531	mg/L	2531	ug/L	3:20:16 PM
3	Be 313.107	11288045.6	11287095.9	2.523	mg/L	2523	ug/L	3:20:32 PM

Mean Data: CCV

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	11337027.6	2.534	mg/L	0.0132	2534	ug/L	13.20	0.52%

QC value within limits for Be 313.107 Recovery = 101.38%
All analyte(s) passed QC.

==========

Sequence No.: 20
Sample ID: CCB
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 4
Date Collected: 8/29/2024 3:23:23 PM
Data Type: Reprocessed on 8/29/2024 6:54:33 PM

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: CCB

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: CCB

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	1198.9	249.2	0.000	mg/L	0.056	ug/L	3:24:15 PM
2	Be 313.107	1102.6	152.9	0.000	mg/L	0.034	ug/L	3:24:27 PM
3	Be 313.107	1121.1	171.4	0.000	mg/L	0.038	ug/L	3:24:39 PM

Mean Data: CCB

Analyte	Mean Corrected	Calib.	Sample

Analyte	Intensity	Conc.	Units	Std.Dev.	Conc.	Units	Std.Dev.	RSD
Be 313.107	191.2	0.000	mg/L	0.0000	0.043	ug/L	0.0114	26.73%

QC value within limits for Be 313.107 Recovery = Not calculated

All analyte(s) passed QC.

Method 29 Digestion Worklist Number: 2835 Label QC by: B·27·24 SG
Report #: 24-512 Client: C062 Compliance Services & Testing
Digestion Date:

	Sample ID	Client ID	Digestate Volume (ml)	pH	Notes
1.	MethBlk		100		
2.	LL-LCS19				1.0mL 248.67.5 X:11.11.24
3.	LCS19				1.0mL 100ppm ICAP 19
4.	LCS_Dup19				1.0mL 100ppm ICAP 19
5.	24-S2463	Run 1 BH&C4			
6.	24-S2465	Run 2 BH&C4			
7.	24-S2467	Run 3 BH&C4			
8.	24-S2470	C9 5%/10% Blank			

Bc

Digestion Method: M29_FH (M29_BH) CARB436_Combined Other: _____

Volumetrics: HNO3 10-2, 1.0i, M100-1

Evap Start: 8.27.24 SG

Evap End: 9.4.24 SG

Digest: 9.4.24 SG

Dilute: 9.4.24 SG

HNO3 Lot: omni trace 63320 X:NG

H2O2 Lot: CP V029001 X:12.11.24

HF Lot: ~~_____~~

Spike Std: AccuStd 223055011 X:6.4.25

QC11
9.9.24

ICP Worklist Number: 3055 Date Requested: 9/ 5/24
Client: C062 Compliance Services & Testing
Report #: 24-512 Analysis Date: 9/ 5/24

	Lab ID	Analyte	Results in ug/L		
1.	kv:ICV			Expected	% Recovery
		Be	2471.	2500.	98.84
2.	bl:ICB				
		Be	< 0.2		
3.	kv:LL-CCV			Expected	% Recovery
		Be	0.979	1.000	97.90
4.	bl:Meth_Blk				
		Be	< 0.2		
5.	kv:LL-LCS			Expected	% Recovery
		Be	0.444	0.500	88.80
6.	Spike of 4			Spk Amount	Spike Rec.
		Be	973.9	1000.	97.39
7.	MSD of 6			Recovery	RPD
		Be	971.5	97.15	-0.25
8.	24-S2463 Run 1 BH&C4	Be	< 0.2		
9.	Dup of 8			Difference	RPD
		Be	< 0.2		
10.	24-S2465 Run 2 BH&C4	Be	< 0.2		
11.	Spike of 10			Spk Amount	Spike Rec.
		Be	930.3	1000.	93.03
12.	24-S2467 Run 3 BH&C4	Be	< 0.2		
13.	kv:CCV			Expected	% Recovery
		Be	2476.	2500.	99.04
14.	bl:CCB				
		Be	< 0.2		
15.	24-S2470 C9 5%/10% Bla	Be	< 0.2		
16.	kv:CCV			Expected	% Recovery
		Be	2490.	2500.	99.60
17.	bl:CCB				
		Be	< 0.2		

Sequence No.: 1
Sample ID: Calib Blank 1
Analyst:
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 1
Date Collected: 9/5/2024 6:48:34 AM
Data Type: Reprocessed on 9/5/2024 8:32:14 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: Calib Blank 1

Analyte	Back Pressure	Flow
All	339.0 kPa	0.65 L/min

Replicate Data: Calib Blank 1

Repl#	Analyte	Net Intensity	Corrected Intensity	Conc.	Calib. Units	Analysis Time
1	Be 313.107	1131.3	1131.3	[0.00]	mg/L	6:49:23 AM
2	Be 313.107	1204.9	1204.9	[0.00]	mg/L	6:49:35 AM
3	Be 313.107	1163.7	1163.7	[0.00]	mg/L	6:49:47 AM

Mean Data: Calib Blank 1

Analyte	Mean Corrected Intensity	Std.Dev.	RSD	Conc.	Calib Units
Be 313.107	1166.6	36.92	3.16%	[0.00]	mg/L

Sequence No.: 2
Sample ID: Calib Std 1
Analyst:
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 2
Date Collected: 9/5/2024 6:52:35 AM
Data Type: Reprocessed on 9/5/2024 8:32:14 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: Calib Std 1

Analyte	Back Pressure	Flow
All	341.0 kPa	0.65 L/min

Replicate Data: Calib Std 1

Repl#	Analyte	Net Intensity	Corrected Intensity	Conc.	Calib. Units	Analysis Time
1	Be 313.107	23614420.9	23613254.3	[5.0000]	mg/L	6:53:28 AM
2	Be 313.107	23524261.5	23523094.9	[5.0000]	mg/L	6:53:39 AM
3	Be 313.107	23494621.7	23493455.1	[5.0000]	mg/L	6:53:49 AM

Mean Data: Calib Std 1

Analyte	Mean Corrected Intensity	Std.Dev.	RSD	Conc.	Calib Units
Be 313.107	23543268.1	62395.36	0.27%	[5.0000]	mg/L

Calibration Summary

Analyte	Stds.	Equation	Intercept	Slope	Curvature	Corr. Coef.	Reslope
Be 313.107	1	Lin, Calc Int	0.0	4709000	0.00000	1.000000	

Sequence No.: 3
Sample ID: ICV
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 3
Date Collected: 9/5/2024 6:56:33 AM
Data Type: Reprocessed on 9/5/2024 8:32:14 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: ICV

Analyte	Back Pressure	Flow
All	341.0 kPa	0.65 L/min

Replicate Data: ICV

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	11725369.4	11724202.7	2.490	mg/L	2490	ug/L	6:57:25 AM
2	Be 313.107	11620187.9	11619021.3	2.468	mg/L	2468	ug/L	6:57:42 AM
3	Be 313.107	11570045.0	11568878.4	2.457	mg/L	2457	ug/L	6:57:58 AM

Mean Data: ICV

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	11637367.5	2.471	mg/L	0.0168	2471	ug/L	16.84	0.68%

QC value within limits for Be 313.107 Recovery = 98.86%

All analyte(s) passed QC.

Sequence No.: 4
Sample ID: ICB
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 4
Date Collected: 9/5/2024 7:00:49 AM
Data Type: Reprocessed on 9/5/2024 8:32:14 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: ICB

Analyte	Back Pressure	Flow
All	341.0 kPa	0.65 L/min

Replicate Data: ICB

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	1624.2	457.5	0.000	mg/L	0.097	ug/L	7:01:40 AM
2	Be 313.107	1353.8	187.1	0.000	mg/L	0.040	ug/L	7:01:52 AM
3	Be 313.107	1456.9	290.2	0.000	mg/L	0.062	ug/L	7:02:05 AM

Mean Data: ICB

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	311.6	0.000	mg/L	0.0000	0.066	ug/L	0.0290	43.79%

QC value within limits for Be 313.107 Recovery = Not calculated

All analyte(s) passed QC.

Sequence No.: 5
Sample ID: LL-CCV
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 5
Date Collected: 9/5/2024 7:04:53 AM
Data Type: Reprocessed on 9/5/2024 8:32:14 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: LL-CCV

Analyte	Back Pressure	Flow
All	342.0 kPa	0.65 L/min

Replicate Data: LL-CCV

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	5763.0	4596.3	0.001	mg/L	0.976	ug/L	7:05:44 AM
2	Be 313.107	5777.7	4611.0	0.001	mg/L	0.979	ug/L	7:05:57 AM
3	Be 313.107	5789.2	4622.5	0.001	mg/L	0.982	ug/L	7:06:09 AM

Mean Data: LL-CCV

Analyte	Mean Corrected Intensity	Calib. Conc.	Units	Std.Dev.	Sample Conc.	Units	Std.Dev.	RSD
Be 313.107	4610.0	0.001	mg/L	0.0000	0.979	ug/L	0.0028	0.29%

QC value within limits for Be 313.107 Recovery = 97.90%
All analyte(s) passed QC.

==========

Sequence No.: 6
Sample ID: MB 24-512 BH
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 14
Date Collected: 9/5/2024 7:08:58 AM
Data Type: Reprocessed on 9/5/2024 8:32:15 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: MB 24-512 BH

Analyte	Back Pressure	Flow
All	343.0 kPa	0.65 L/min

Replicate Data: MB 24-512 BH

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Units	Sample Conc.	Units	Analysis Time
1	Be 313.107	1123.7	-43.0	-0.000	mg/L	-0.009	ug/L	7:09:47 AM
2	Be 313.107	1006.9	-159.8	-0.000	mg/L	-0.034	ug/L	7:09:59 AM
3	Be 313.107	974.1	-192.5	-0.000	mg/L	-0.041	ug/L	7:10:11 AM

Mean Data: MB 24-512 BH

Analyte	Mean Corrected Intensity	Calib. Conc.	Units	Std.Dev.	Sample Conc.	Units	Std.Dev.	RSD
Be 313.107	-131.8	-0.000	mg/L	0.0000	-0.028	ug/L	0.0167	59.67%

==========

Sequence No.: 7
Sample ID: LL-LCS 24-512 BH
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 15
Date Collected: 9/5/2024 7:12:59 AM
Data Type: Reprocessed on 9/5/2024 8:32:15 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: LL-LCS 24-512 BH

Analyte	Back Pressure	Flow
All	343.0 kPa	0.65 L/min

Replicate Data: LL-LCS 24-512 BH

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Units	Sample Conc.	Units	Analysis Time
1	Be 313.107	3187.0	2020.4	0.000	mg/L	0.429	ug/L	7:13:48 AM
2	Be 313.107	3229.3	2062.6	0.000	mg/L	0.438	ug/L	7:14:00 AM
3	Be 313.107	3349.2	2182.6	0.000	mg/L	0.464	ug/L	7:14:12 AM

Mean Data: LL-LCS 24-512 BH

Analyte	Mean Corrected Intensity	Calib. Conc.	Units	Std.Dev.	Sample Conc.	Units	Std.Dev.	RSD
Be 313.107	2088.5	0.000	mg/L	0.0000	0.444	ug/L	0.0179	4.03%

==========

Sequence No.: 8
Sample ID: LCS 24-512 BH
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:

Autosampler Location: 16
Date Collected: 9/5/2024 7:17:00 AM
Data Type: Reprocessed on 9/5/2024 8:32:15 AM
Initial Sample Vol:
Sample Prep Vol:

Wash Time:

Nebulizer Parameters: LCS 24-512 BH

Analyte	Back Pressure	Flow
All	343.0 kPa	0.65 L/min

Replicate Data: LCS 24-512 BH

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	4649256.8	4648090.2	0.987	mg/L	987.1	ug/L	7:17:50 AM
2	Be 313.107	4555790.2	4554623.6	0.967	mg/L	967.3	ug/L	7:18:05 AM
3	Be 313.107	4556255.2	4555088.6	0.967	mg/L	967.4	ug/L	7:18:20 AM

Mean Data: LCS 24-512 BH

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	4585934.1	0.974	mg/L	0.0114	973.9	ug/L	11.43	1.17%

==========

Sequence No.: 9
Sample ID: LCS DUP 24-512 BH
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 17
Date Collected: 9/5/2024 7:21:10 AM
Data Type: Reprocessed on 9/5/2024 8:32:15 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: LCS DUP 24-512 BH

Analyte	Back Pressure	Flow
All	343.0 kPa	0.65 L/min

Replicate Data: LCS DUP 24-512 BH

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	4601461.5	4600294.8	0.977	mg/L	977.0	ug/L	7:22:00 AM
2	Be 313.107	4541972.3	4540805.7	0.964	mg/L	964.4	ug/L	7:22:15 AM
3	Be 313.107	4582963.0	4581796.4	0.973	mg/L	973.1	ug/L	7:22:30 AM

Mean Data: LCS DUP 24-512 BH

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	4574299.0	0.971	mg/L	0.0065	971.5	ug/L	6.47	0.67%

==========

Sequence No.: 10
Sample ID: 24-S2463
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 18
Date Collected: 9/5/2024 7:25:20 AM
Data Type: Reprocessed on 9/5/2024 8:32:15 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: 24-S2463

Analyte	Back Pressure	Flow
All	344.0 kPa	0.65 L/min

Replicate Data: 24-S2463

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	1095.5	-71.1	-0.000	mg/L	-0.015	ug/L	7:26:14 AM
2	Be 313.107	977.4	-189.3	-0.000	mg/L	-0.040	ug/L	7:26:31 AM
3	Be 313.107	1020.7	-146.0	-0.000	mg/L	-0.031	ug/L	7:26:48 AM

Mean Data: 24-S2463

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	-135.4	-0.000	mg/L	0.0000	-0.029	ug/L	0.0127	44.12%

Sequence No.: 11
Sample ID: 24-S2463 REP
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 19
Date Collected: 9/5/2024 7:29:36 AM
Data Type: Reprocessed on 9/5/2024 8:32:15 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: 24-S2463 REP

Analyte	Back Pressure	Flow
All	344.0 kPa	0.65 L/min

Replicate Data: 24-S2463 REP

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	930.8	-235.8	-0.000	mg/L	-0.050	ug/L	7:30:30 AM
2	Be 313.107	985.2	-181.5	-0.000	mg/L	-0.039	ug/L	7:30:47 AM
3	Be 313.107	1086.3	-80.4	-0.000	mg/L	-0.017	ug/L	7:31:03 AM

Mean Data: 24-S2463 REP

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	-165.9	-0.000	mg/L	0.0000	-0.035	ug/L	0.0168	47.55%

Sequence No.: 12
Sample ID: 24-S2465
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 20
Date Collected: 9/5/2024 7:33:51 AM
Data Type: Reprocessed on 9/5/2024 8:32:15 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: 24-S2465

Analyte	Back Pressure	Flow
All	344.0 kPa	0.65 L/min

Replicate Data: 24-S2465

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	991.4	-175.3	-0.000	mg/L	-0.037	ug/L	7:34:44 AM
2	Be 313.107	888.7	-277.9	-0.000	mg/L	-0.059	ug/L	7:34:58 AM
3	Be 313.107	908.2	-258.4	-0.000	mg/L	-0.055	ug/L	7:35:13 AM

Mean Data: 24-S2465

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	-237.2	-0.000	mg/L	0.0000	-0.050	ug/L	0.0116	22.98%

Sequence No.: 13
Sample ID: 24-S2465 POST SPK
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 21
Date Collected: 9/5/2024 7:38:01 AM
Data Type: Reprocessed on 9/5/2024 8:32:16 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: 24-S2465 POST SPK

Analyte	Back Pressure	Flow
All	344.0 kPa	0.65 L/min

Replicate Data: 24-S2465 POST SPK

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	4388487.5	4387320.8	0.932	mg/L	931.8	ug/L	7:38:53 AM
2	Be 313.107	4355923.2	4354756.6	0.925	mg/L	924.8	ug/L	7:39:10 AM
3	Be 313.107	4400649.9	4399483.3	0.934	mg/L	934.3	ug/L	7:39:27 AM

Mean Data: 24-S2465 POST SPK

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	4380520.2	0.930	mg/L	0.0049	930.3	ug/L	4.91	0.53%

Sequence No.: 14
Sample ID: 24-S2467
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 22
Date Collected: 9/5/2024 7:42:20 AM
Data Type: Reprocessed on 9/5/2024 8:32:16 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: 24-S2467

Analyte	Back Pressure	Flow
All	345.0 kPa	0.65 L/min

Replicate Data: 24-S2467

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	1007.4	-159.3	-0.000	mg/L	-0.034	ug/L	7:43:13 AM
2	Be 313.107	935.1	-231.6	-0.000	mg/L	-0.049	ug/L	7:43:27 AM
3	Be 313.107	919.0	-247.7	-0.000	mg/L	-0.053	ug/L	7:43:41 AM

Mean Data: 24-S2467

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	-212.8	-0.000	mg/L	0.0000	-0.045	ug/L	0.0100	22.12%

Sequence No.: 15
Sample ID: CCV
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 3
Date Collected: 9/5/2024 7:46:29 AM
Data Type: Reprocessed on 9/5/2024 8:32:16 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: CCV

Analyte	Back Pressure	Flow
All	344.0 kPa	0.65 L/min

Replicate Data: CCV

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	11758567.2	11757400.6	2.497	mg/L	2497	ug/L	7:47:22 AM
2	Be 313.107	11744036.7	11742870.0	2.494	mg/L	2494	ug/L	7:47:39 AM
3	Be 313.107	11478341.2	11477174.5	2.437	mg/L	2437	ug/L	7:47:55 AM

Mean Data: CCV

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	11659148.4	2.476	mg/L	0.0335	2476	ug/L	33.50	1.35%

QC value within limits for Be 313.107 Recovery = 99.04%
All analyte(s) passed QC.

Sequence No.: 16 | **Autosampler Location: 4**
Sample ID: CCB | **Date Collected: 9/5/2024 7:50:46 AM**
Analyst: SG | **Data Type: Reprocessed on 9/5/2024 8:32:16 AM**
Logged In Analyst (Original) : Administrator
Initial Sample Wt: | **Initial Sample Vol:**
Dilution: | **Sample Prep Vol:**
Wash Time:

Nebulizer Parameters: CCB

Analyte	Back Pressure	Flow
All	345.0 kPa	0.65 L/min

Replicate Data: CCB

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	1492.9	326.2	0.000	mg/L	0.069	ug/L	7:51:36 AM
2	Be 313.107	1354.2	187.5	0.000	mg/L	0.040	ug/L	7:51:49 AM
3	Be 313.107	1288.9	122.2	0.000	mg/L	0.026	ug/L	7:52:01 AM

Mean Data: CCB

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	212.0	0.000	mg/L	0.0000	0.045	ug/L	0.0221	49.14%

QC value within limits for Be 313.107 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 17 | **Autosampler Location: 23**
Sample ID: 24-S2470 | **Date Collected: 9/5/2024 7:54:50 AM**
Analyst: SG | **Data Type: Reprocessed on 9/5/2024 8:32:16 AM**
Logged In Analyst (Original) : Administrator
Initial Sample Wt: | **Initial Sample Vol:**
Dilution: | **Sample Prep Vol:**
Wash Time:

Nebulizer Parameters: 24-S2470

Analyte	Back Pressure	Flow
All	345.0 kPa	0.65 L/min

Replicate Data: 24-S2470

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	1202.0	35.3	0.000	mg/L	0.008	ug/L	7:55:41 AM
2	Be 313.107	1187.6	21.0	0.000	mg/L	0.004	ug/L	7:55:53 AM
3	Be 313.107	1259.9	93.3	0.000	mg/L	0.020	ug/L	7:56:05 AM

Mean Data: 24-S2470

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	49.9	0.000	mg/L	0.0000	0.011	ug/L	0.0081	76.80%

Sequence No.: 18 | **Autosampler Location: 3**
Sample ID: CCV | **Date Collected: 9/5/2024 7:58:54 AM**
Analyst: SG | **Data Type: Reprocessed on 9/5/2024 8:32:16 AM**
Logged In Analyst (Original) : Administrator
Initial Sample Wt: | **Initial Sample Vol:**
Dilution: | **Sample Prep Vol:**
Wash Time:

Nebulizer Parameters: CCV

Analyte	Back Pressure	Flow
All	345.0 kPa	0.65 L/min

Replicate Data: CCV

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	11734682.6	11733515.9	2.492	mg/L	2492	ug/L	7:59:46 AM
2	Be 313.107	11793228.8	11792062.1	2.504	mg/L	2504	ug/L	8:00:03 AM
3	Be 313.107	11644707.9	11643541.2	2.473	mg/L	2473	ug/L	8:00:19 AM

Mean Data: CCV

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	11723039.8	2.490	mg/L	0.0159	2490	ug/L	15.89	0.64%

QC value within limits for Be 313.107 Recovery = 99.59%
All analyte(s) passed QC.

Sequence No.: 19
Sample ID: CCB
Analyst: SG
Logged In Analyst (Original) : Administrator
Initial Sample Wt:
Dilution:
Wash Time:

Autosampler Location: 4
Date Collected: 9/5/2024 8:03:10 AM
Data Type: Reprocessed on 9/5/2024 8:32:16 AM
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: CCB

Analyte	Back Pressure	Flow
All	345.0 kPa	0.65 L/min

Replicate Data: CCB

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc.	Calib. Units	Sample Conc.	Sample Units	Analysis Time
1	Be 313.107	1266.5	99.9	0.000	mg/L	0.021	ug/L	8:04:01 AM
2	Be 313.107	1341.3	174.7	0.000	mg/L	0.037	ug/L	8:04:13 AM
3	Be 313.107	1390.1	223.5	0.000	mg/L	0.047	ug/L	8:04:25 AM

Mean Data: CCB

Analyte	Mean Corrected Intensity	Calib. Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Std.Dev.	RSD
Be 313.107	166.0	0.000	mg/L	0.0000	0.035	ug/L	0.0132	37.50%

QC value within limits for Be 313.107 Recovery = Not calculated
All analyte(s) passed QC.