

***Report on Quarterly Air Monitoring,  
Area IV, Second Quarter 2023***

***Santa Susana Field Laboratory  
Ventura County, California***



***Prepared for:  
United States  
Department of Energy***

***Prepared by:  
North Wind Portage, Inc.***

(This page intentionally left blank)

**REPORT ON QUARTERLY AIR MONITORING, AREA IV,  
SECOND QUARTER 2023, SANTA SUSANA FIELD  
LABORATORY, VENTURA COUNTY, CA**

**October 2023**

**Contract No. DE-EM0000837-DT0007583**

**Prepared for:**

U.S. Department of Energy  
4100 Guardian Street, Suite 160  
Simi Valley, California 93063

**Prepared by:**

North Wind Portage, Inc.  
1425 Higham Street  
Idaho Falls, Idaho 83402

(This page intentionally left blank)

## EXECUTIVE SUMMARY

This report summarizes the United States Department of Energy (DOE) air monitoring activities conducted during the second quarter of 2023, which is the twenty-first quarter (Q21) of the monitoring period (April 1, 2023, to June 30, 2023) at Area IV within the Santa Susana Field Laboratory (SSFL), located in Ventura County, California. The area specifically discussed within this report is the DOE portion, Area IV of SSFL, known as the Energy Technology Engineering Center (ETEC). Year one of the Baseline Air Monitoring Program consisted of Quarter 1 through Quarter 4. Year two consisted of Quarter 5 through Quarter 7. Year 3 consisted of Quarter 8 through Quarter 11. Year 4 consisted of Quarter 12 through Quarter 15. Year 5 consisted of Quarter 16 through Quarter 19. The program is continuing for a sixth year, which consists of Quarter 20 through Quarter 23.

This quarterly report has been developed by North Wind Portage, Inc., on behalf of DOE in cooperation with The Boeing Company (Boeing) and the National Aeronautics and Space Administration (NASA), as part of the Baseline Air Monitoring Program.

In accordance with the *Final Baseline Air Monitoring Work Plan, Santa Susana Field Laboratory, Ventura County, California* (NASA 2017), the responsible parties are monitoring for particulate matter between 2.5 and 10 microns in aerodynamic diameter (PM<sub>10</sub>), volatile organic compounds (VOCs), and radionuclides at air monitoring stations DOE-1, DOE-2, DOE-3, and DOE-4 encompassing the ETEC, Area IV portion of SSFL. Having developed the baseline levels for PM<sub>10</sub>, VOCs, and radionuclides helps distinguish between levels that naturally occur or were previously present at the ETEC site and if onsite remediation activities produce elevated results. Air monitoring will be continued throughout remediation activities to be able to compare results from onsite remediation activities to baseline data in the Annual Air Monitoring Reports.

The following air monitoring activities conducted during 2023, Q2, by DOE within Area IV are summarized in this report:

- Collected meteorological data from one location (DOE-4);
- Collected PM<sub>10</sub> data from four locations (DOE-1 through DOE-4);
- Collected air samples from four locations (DOE-1 through DOE-4) for VOC laboratory analysis; and
- Collected radionuclide samples for laboratory analysis from four locations (DOE-1 through DOE-4).

Meteorological data, PM<sub>10</sub>, and radionuclide data all met the data completeness goal of 80%, and VOC data met the completeness goal of 85% for Q21. The twenty-second quarter of the Air Monitoring Program will begin July 1, 2023.

The following site activities were conducted during Q21 by DOE within Area IV:

- Quarterly site-wide groundwater level monitoring
- CDM Smith conducted groundwater sampling activities at the Former Sodium Disposal Facility as a part of groundwater interim measures
- Surveillance and maintenance.

## CONTENTS

EXECUTIVE SUMMARY .....	v
ACRONYMS AND ABBREVIATIONS .....	viii
1. INTRODUCTION .....	1-1
1.1 Regional Climate and Wind Direction .....	1-2
2. SUMMARY .....	2-1
3. ANALYTICAL SAMPLING EVENTS.....	3-1
4. DATA.....	4-1
4.1 Meteorological Data .....	4-1
4.2 PM <sub>10</sub> Data .....	4-4
4.3 Volatile Organic Compound Data .....	4-5
4.4 Radionuclide Data .....	4-6
5. QA/QC ACTIVITIES.....	5-1
5.1 Field QA/QC .....	5-1
5.2 Laboratory QA/QC.....	5-4
5.3 Audit Results .....	5-4
6. REFERENCES .....	6-1

## FIGURES

Figure 1 – SSFL Air Monitoring Locations

Figure 2 – DOE Air Monitoring Locations

Figure 3 – DOE Quarterly Wind Rose

## TABLES

Table 1. Data screening quality control codes for meteorological data.....	4-1
Table 2. Data screening summary for monitored meteorological parameters.....	4-3
Table 3. PM <sub>10</sub> data completeness for April 1, 2023, to June 30, 2023.....	4-4
Table 4. Top five PM <sub>10</sub> 24-hour average concentration days for Q21.....	4-5
Table 5. Ambient air VOC data completeness.....	4-5

Table 6. Gross alpha and beta-gamma average results for Q21.....4-7

Table 7. Meteorological sensor recommended maintenance frequency (Met One).....5-4

Table 8. PM<sub>10</sub> audit completeness. ....5-5

## APPENDICES

Appendix A – PM<sub>10</sub> Daily Averages and Monthly Statistics

Appendix B – Analytical Results for Ambient Air VOCs

Appendix C – Radionuclide Results

Appendix D – PM<sub>10</sub> Monthly Audit Reports and Flow Verification Results

## ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
μCi	microcurie(s)
μg/m <sup>3</sup>	microgram(s) per cubic meter
Boeing	The Boeing Company
CAAQS	California Ambient Air Quality Standards
CFR	Code of Federal Regulations
DASC	Data Assessment Statistical Calculator
DOE	U.S. Department of Energy
DTSC	State of California Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ETEC	Energy Technology Engineering Center
GC	gas chromatography
Hg	mercury
HHRA	Human Health Risk Assessment
m	meter(s)
m/sec	meter(s) per second
mb	millibar(s)
MDC	minimum detectable concentration
mL	milliliter(s)
mph	miles per hour
MS	mass spectrometry
MDL	method detection limit
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NIST	National Institute of Standards and Technology
pCi	picocurie(s)
PM <sub>10</sub>	particulate matter less than 10 microns in aerodynamic diameter
Q21	twenty-first quarter
QA	quality assurance
QC	quality control
RAWS	Remote Automatic Weather Stations
RPD	relative percent difference
SDG	sample delivery group
SSFL	Santa Susana Field Laboratory
VOC	volatile organic compound

## 1. INTRODUCTION

National Aeronautics and Space Administration (NASA), The Boeing Company (Boeing), and the U.S. Department of Energy (DOE), also known as the responsible parties, are performing air monitoring at the Santa Susana Field Laboratory (SSFL) site located in Ventura County, California. The SSFL is a business segment of Boeing. SSFL operates the 2,849-acre site located atop a range of hills between the Simi and San Fernando valleys, north of Los Angeles. The westernmost 290 acres of the SSFL, known as Area IV, contains both DOE and Boeing facilities. The DOE portion is mainly contained within the 90 acres known as the Energy Technology Engineering Center (ETEC).

When opened in the late 1950s, ETEC was ideally remote from population centers to enable development of security-sensitive projects. These projects supported research for DOE and its predecessor agencies for nuclear research and energy development. Area IV includes buildings that house test apparatus for large-scale heat transfer and fluid mechanics experiments, mechanical and chemical test facilities, office buildings, and auxiliary facilities.

Air monitoring is being conducted in accordance with the *Final Baseline Air Monitoring Work Plan, Santa Susana Field Laboratory, Ventura County, California* (NASA 2017), which was submitted to the State of California Department of Toxic Substances Control (DTSC) on September 21, 2017. DTSC approved the Work Plan. Final locations of the air monitoring locations were approved by DTSC on January 30, 2018 (DTSC 2018).

The objective of the Air Monitoring Program is to evaluate project conditions and provide a basis for determining the magnitude of deviation from those baseline conditions that may result from onsite remediation activities at SSFL. Responsible parties are monitoring for particulate matter between 2.5 and 10 microns in aerodynamic diameter (PM<sub>10</sub>), and volatile organic compounds (VOCs), at 14 locations at SSFL. Data was collected for four perimeter samplers (DOE-1 through DOE-4) and analyzed for gross alpha and gross beta. Individual radionuclide concentrations were determined by analysis at an offsite laboratory for these same four locations. Meteorological data is also collected as a part of the Air Monitoring Program.

Figure 1 shows the air monitoring locations for the Air Monitoring Program. These locations were selected based on the areas to be remediated, with consideration of winds in the area, topographic features, and accessibility. The air monitoring sites were also selected based on guidance obtained from the U.S. Environmental Protection Agency's (EPA's) *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, Ambient Air Monitoring Program* (EPA 2017) and *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (EPA 2000). Sites were evaluated per 40 Code of Federal Regulations (CFR) 58, Appendix C – Ambient Air Quality Monitoring Methodology. DOE is responsible for DOE-1, DOE-2, DOE-3, and DOE-4 of the 14 monitoring locations, represented in Figure 1. VOCs, PM<sub>10</sub>, and radionuclides are monitored at the four DOE monitoring locations, and meteorological conditions are monitored at the DOE-4 location. The DOE monitoring locations DOE-1 through DOE-4 are shown in Figure 2.

This report summarizes the results and quality assurance (QA) activities performed during the second quarter of 2023, which was from April 1, 2023, through June 30, 2023. This represents the twenty-first quarter (Q21) of the monitoring period.

## **1.1 Regional Climate and Wind Direction**

The climate in the SSFL area is characterized as “Mediterranean.” The mean temperature during the winter months is approximately 50 degrees Fahrenheit (°F) and the mean temperature in the summer months is approximately 70°F. Based on climate data for 2021 and 2022 from Weather Currents, average rainfall is on the order of 12.01 inches per year. The majority of the rainfall occurs between December and April with January and February being the wettest months.

Through the second quarter in 2023, the Simi Valley received approximately 0.83 inches of rainfall.

The average hourly wind speed in Simi Valley varies significantly by season. The more turbulent part of the year lasts for 6 months, from November to April, with average western wind speeds of more than 7 miles per hour (mph). The calmer time of year lasts for 6 months, with northerly winds from May to October.

During the fall, winter, and spring, Santa Ana winds can blow from the north or northeast in excess of 35 mph.

## 2. SUMMARY

This report summarizes the air monitoring data collected during the Q21 reporting period (April 1, 2023, through June 30, 2023).

Quality objectives and data completeness were met for all meteorological, PM<sub>10</sub>, VOC, and radionuclide data for Q21 of the Air Monitoring Program.

Urban background data compared with air monitoring data indicate that the PM<sub>10</sub> concentrations measured at stations DOE-1, DOE-2, DOE-3, and DOE-4 during Q21 are comparable to the PM<sub>10</sub> concentrations measured at stations characterizing urban background. Other sources that emit VOC characteristics are motor vehicle emissions, fossil fuel combustion, and wildfires. The results are reflected when considering SSFL site's urban background and relatively remote location from vehicle traffic. PM<sub>10</sub> concentrations exceeded the California Ambient Air Quality Standard (CAAQS; 50 micrograms per cubic meter [ $\mu\text{g}/\text{m}^3$ ]) twice at DOE-3 during Q21, but the concentrations were below the National Ambient Air Quality Standard (NAAQS; 150  $\mu\text{g}/\text{m}^3$ ).

During Q21 the unit at DOE-1 (X16067) went down on April 12, 2023; the sample nozzle and vane were cleaned and the unit was back up on April 14, 2023. The unit at DOE-2 (W23313) was down from April 1, 2023, to April 2, 2023, and from April 15, 2023, to April 16, 2023, and completely stopped working on May 5, 2023; the E-BAM unit W23313 was switched with unit Y12096 on May 5, 2023, and the unit was back up and running. The unit at DOE-4 (W23310) stopped functioning on May 5, 2023; the pump and seals were replaced with unit B18932 and the unit was up and running on May 8, 2023; the unit at DOE-4 (B18932) completely stopped functioning on June 30, 2023 due to battery and power issues. Program staff is working to address these issues.

During Q21 no VOC analytes were detected above the EPA regional screening level (RSL). By using the results from the baseline Air Monitoring Program, along with other site characterization information, analytes were selected for routine air monitoring during soil disturbances. Establishing sources for specific contaminants, or performing source apportionment was not a requirement for identifying remedial air quality impacts, nor was it within the scope or data quality objectives of the Air Monitoring Program.

Data collected during Q21 agrees with data collected, analyzed, and reported by the State of California DTSC, Los Angeles County Emergency Response Organization, the DOE Emergency Response organization, or other Multi-Agency Task Forces. Air monitoring at Area IV of the SSFL is to be continued starting July 1, 2023, for the twenty-second quarter of the Air Monitoring Program.

Site activities during Q21 included quarterly site-wide groundwater level monitoring, surveillance and maintenance, and groundwater sampling activities conducted by CDM Smith at the Former Sodium Disposal Facility as part of the groundwater interim measures.

(This page intentionally left blank)

### 3. ANALYTICAL SAMPLING EVENTS

VOCs are collected according to the EPA Toxic Compendium Method TO-15, *Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* (EPA 1999). Twenty-four-hour time-integrated samples are collected into Summa canisters via a flow controller and sent to an offsite laboratory for analysis. VOCs are collected every other week. There were six VOC sampling events with six field duplicate samples collected during this reporting period.

During Q21, radionuclide samples were collected at four perimeter sampler locations, DOE-1 through DOE-4. These samples were collected on glass fiber (Type A/E) filters that are changed twice a week. After a minimum 120-hour holding time to allow the decay of short-lived radon and thoron daughter products, the samples are simultaneously counted for gross alpha and beta activity with a low-background, thin-window, gas-flow proportional-counting system continually purged with P-10 argon/methane counting gas over a preset time interval. There were 104 airborne radioactivity filter samples collected in Q21 — 26 each for DOE-1, DOE-2, DOE-3, and DOE-4. Following analysis for gross alpha and gross beta radiation, sample filters were combined to form one composite sample representative of each location. The four composite samples were then analyzed for individual radionuclides at an offsite laboratory.

(This page intentionally left blank)

## 4. DATA

Sections 4.1 through 4.4 discuss Q21 air monitoring data.

### 4.1 Meteorological Data

#### General Summary

Meteorological data, also called weather data, is being collected as part of the ETEC cleanup and restoration effort. This information, particularly the wind direction and wind speed, can be used to help understand how dust and other air pollutants from the site are carried by the wind to possibly affect nearby public and residential areas. This is especially important when the E-BAM particulate monitors at the site detect higher-than-normal amounts of dust in the air. Scientific computer models can be used with this weather data in association with the particulate monitoring data to describe the air quality for the communities near the ETEC site. However, before the weather data can be used with the computer models it must first be tested for completeness and accuracy. A detailed description of the weather data collection and quality testing is provided in the following paragraphs.

Monitored meteorology parameters at the DOE-4 station included wind speed, wind direction, air temperature at 2 meters (m) and 10 m, relative humidity, precipitation, barometric pressure, and solar radiation. In addition, statistical parameters provided by the data logger included delta temperature (i.e., the 10-m temperature minus the 2-m temperature), maximum wind speed (i.e., wind gust), and standard deviation of wind direction. Observations were recorded at 15-minute intervals corresponding to minutes :00, :15, :30, and :45 each hour. There were 91 days in this reporting period (Quarter 21 or Q21) from April 1, 2023, through June 30, 2023, with a total of 8,736 possible 15-minute observations. This is the second quarter of Year 6 of the baseline monitoring.

#### Data Validation and Statistics

Data validation screening was performed on the recorded meteorological observations pursuant to EPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (EPA 2000) Table 8-4 (Suggested Data Screening Criteria) and Table 8-3 (Suggested Quality Control Codes). Validation screening provided the basis for evaluating data completeness and for determining sensor performance and/or maintenance status. Validation was performed following each weekly data download. Data validation quality control codes applied to the meteorological observations are defined in Table 1.

Table 1. Data screening quality control codes for meteorological data.

Code	Meaning	Description (as used for ETEC meteorological data validation)
0	Valid	PASS – Observation is accurate within the performance limits of the instrument (i.e., value passes all data validation screening criteria).
3	Acceptable	PASS – Observation originally failed initial quality control (QC) check (see Code 6), but additional review using other independent data and meteorological judgment support final validity.
6	Failed initial QC check	FAIL – Observation did not pass data validation screening criteria.
7	Suspect	FAIL – Observation failed initial data validation QC check (see Code 6) and could not be verified through additional review using other independent data.
8	Invalid	FAIL – Observation judged to be inaccurate or in error, and the cause is known.
9	Missing	FAIL – Observation was not collected.

The validation screening involved comparing, on an individual parameter basis, the recorded values (i.e., observations) against the EPA screening criteria shown in Table 2. The data validation procedure involved an initial automated review to apply a first-level QC Code of 0 (valid), 6 (failed), or 9 (missing) as defined in Table 1. Observations initially flagged with a QC Code = 6 were then manually (i.e., second-level) reviewed by a project meteorologist. The procedure is outlined below:

- Values meeting all screening criteria for the respective meteorological parameter were automatically considered “valid” (QC Code = 0).
- Values not meeting a screening criterion were automatically flagged as “failed initial QC” (QC Code = 6). These values were subjected to second-level manual meteorological review using other available observations (e.g., 2-m vs. 10-m temperature at DOE-4 or from nearby Remote Automatic Weather Stations [RAWS] meteorological station CEEC1 in the Cheeseboro Canyon, California, area located 2.6 miles south of the DOE-4 site), and meteorological judgment:
  - Values confirmed by second-level review were deemed “acceptable” (final QC Code = 3).
  - Otherwise, the values were deemed “suspect” (final QC Code = 7).
- Observations known to be inaccurate (QC Code = 8).
- Missing observations were automatically flagged as “missing” (QC Code = 9).

Values that pass validation with a final QC Code of 0 or 3 are included in the data completeness statistics and the final validated meteorological data set. Values with a final QC Code of 7, 8, or 9 are excluded from the final dataset and counted against the data completeness percentage. Quarterly data statistics for the meteorological parameters are listed in Table 2 along with year-to-date and project-to-date results. Year-to-date and project-to-date percentages are calculated as total valid observations through the completed quarters for the year divided by the total possible observations through this same period.

The completeness goal for meteorological data is 80% on an annual basis. Data completeness statistics for all completed reporting quarters in Year 6 of the Air Monitoring Program are presented in Table 2.

### **Wind Rose**

The final validated 15-minute meteorological dataset was used to develop the wind rose for Q21 as presented in Figure 3. A wind rose is a graphical representation of wind speed and direction distribution (or wind climatology) for the period of interest. The frequency of winds blowing from specific directions are shown as petals on the wind rose, with the frequency of wind speeds depicted by color bands. Calm winds are identified as being less than 0.5 meters per second (m/sec).

During Q21, data capture for wind speed and direction at DOE-4 was 100%. The average and maximum wind speeds were 3.16 m/sec and 11.5 m/s, respectively. The maximum recorded wind gust was 16.5 m/sec. The predominant wind directions this quarter were from the east-southeast (ESE) and northeast (NE).

Table 2. Data screening summary for monitored meteorological parameters.

Meteorological Parameter	Screening Criteria <sup>(1)</sup> (for valid sensor responses)	Data Completeness Percent (%) <sup>(2)</sup>		
		Q21	Year 6 to Date	Project to Date
Wind Speed	between 0 and 25 m/sec	100	99.99	95.10
	> 0.1 m/sec variation over 3 hours			
	> 0.5 m/sec variation over 12 hours			
Wind Direction	between 0 and 360 degrees	100	99.99	95.86
	> 1 degree variation over 3 hours			
	> 10 degree variation over 12 hours			
Standard Deviation of Wind Direction	Inherits the completeness stats of Wind Direction	100	99.99	95.86
Temperature @ 2 m	≤ local record high (monthly basis)	100	99.99	95.86
	≥ local record low (monthly basis)			
	> 0.5°C variation over 12 hours			
Temperature @ 10 m	≤ local record high (monthly basis)	100	99.99	95.86
	≥ local record low (monthly basis)			
	> 0.5°C variation over 12 hours			
Delta Temperature	≤ 0.1°C during daytime	100	99.99	95.86
	≥ -0.1°C during nighttime			
	between -3.0 and 5.0°C			
Relative Humidity (and Dewpoint Temperature)	relative humidity between 0-100%	100	99.99	91.14
	dew point T ≤ ambient T			
	dew point T ≤ 5.0°C variation over 1 hour			
	dew point T > 0.5°C variation over 12 hours			
Precipitation	≤ 1 inch in 1 hour	100	99.99	95.85
	≤ 4 inches in 24 hours			
	≥ 2 inches in 3 months			
Barometric Pressure	between 871 and 982 mb (local) (i.e., between 940 and 1060 mb sea level)	100	99.99	95.86
	≤ 6 mb variation over 3 hours			
Solar Radiation	> 0 at night	100	99.99	95.81
	≤ maximum possible for date, time, lat/long			

(1) Screening criteria from EPA Meteorological Monitoring Guidance (EPA 2000), Table 8-4.

(2) Data Completeness % = [Observations Passing] / [Possible Observations].

- Missing or suspect observations count against data completeness statistics.
- Year Two is an abbreviated data collection year spanning the period Apr 15–Dec 31, 2019 (i.e., Quarters 5, 6, and 7). This was done to synchronize future data collection years with calendar years.
- Last column in this table represents the cumulative Completeness % for all completed quarterly reporting periods.

(3) The number of possible 15-minute observations in the completed reporting periods:

• Q01 = 8,736	• Q02 = 8,832	• Q03 = 8,832	• Q04 = 8,640	• Year One = 35,040
• Q05 = 8,736	• Q06 = 8,832	• Q07 = 7,488	(only 3 quarters)	• Year Two = 25,056 (abbreviated)
• Q08 = 8,736	• Q09 = 8,736	• Q10 = 8,832	• Q11 = 8,832	• Year Three = 35,136
• Q12 = 8,640	• Q13 = 8,736	• Q14 = 8,832	• Q15 = 8,832	• Year Four = 35,040
• Q16 = 8,640	• Q17 = 8,736	• Q18 = 8,832	• Q19 = 8,832	• Year Five = 35,040
• Q20 = 8,640	• Q21 = 8,736			• Project = 182,688 (to-date)

## 4.2 PM<sub>10</sub> Data

PM<sub>10</sub> data, defined as coarse particles between 2.5 and 10 microns in aerodynamic diameter, are measured at the ETEC site. Sources of particulate matter can be naturally occurring or caused by human activity. The air monitoring conducted at ETEC is used to determine if any suspended particles are from activities conducted onsite or if they are consistent with surrounding air quality data. Some of the naturally occurring particles can originate from high winds, forest or grass fires, burning of fossil fuels in vehicles, or stirred-up road dust.

PM<sub>10</sub> data are collected with Met One E-BAM monitors at four monitoring locations. The Met One E-BAM uses the principle of beta attenuation to provide a determination of mass concentration. Twenty-four-hour concentrations are calculated from the hourly concentrations. There were 91 days in this reporting period.

- DOE-1 had valid readings 90 out of 91 days.
- DOE-2 had valid readings 87 out of 91 days.
- DOE-3 had valid readings all 91 days.
- DOE-4 had valid readings 89 out of 91 days.

DOE-3 had 100% data completeness for PM<sub>10</sub> in Q21. DOE-1 had a completeness of 99%, DOE-2 had a completeness of 96%, and DOE-4 had a completeness of 98%, for a total data completeness of 98.25%, exceeding the project goal of 80% completeness for total samples collected (see Table 3). The complete table of daily averages is presented in Appendix A. The unit at DOE-1 (X16067) went down on April 12, 2023; the sample nozzle and vane were cleaned and the unit was back up on April 14, 2023. The unit at DOE-2 (W23313) was down from April 1, 2023 to April 2, 2023 and on April 15, 2023 to April 16, 2023, and completely stopped working on May 5, 2023; the E-BAM unit W23313 was switched with unit Y12096 on May 5, 2023 and the unit was back up and running. The unit at DOE-4 (W23310) stopped functioning on May 5, 2023; the pump and seals were replaced with unit B18932 and was up and running on May 8, 2023; the unit at DOE-4 (B18932) completely stopped functioning on June 30, 2023 and has not been functioning due to battery and power issues.

Table 3. PM<sub>10</sub> data completeness for April 1, 2023, to June 30, 2023.

Location	Valid Readings (Days)	Possible Readings (Days)	Data Completeness (Percent)
DOE-1	90	91	99%
DOE-2	87	91	96%
DOE-3	91	91	100%
DOE-4	89	91	98%

Average Total Data Completeness 98.25%

The five highest PM<sub>10</sub> results identified for the reporting period are listed in Table 4 along with the CAAQS for PM<sub>10</sub>. PM<sub>10</sub> concentrations were consistent with levels typically found in urban air. Of these top five results, four were recorded at DOE-3 and one was recorded at DOE-4. Two of the five values were above the CAAQS but below the NAAQS of 150 µg/m<sup>3</sup>. All of the Top 5 readings were in May and June 2023. Over these dates truck traffic may have been more active at offsite locations near the sensors and, in combination, elevated winds may have contributed to the elevated readings. From year to year it has been noticeable that there is a direct correlation between high wind speeds and higher PM<sub>10</sub> readings.

Table 4. Top five PM<sub>10</sub> 24-hour average concentration days for Q21.

Date	Location	PM <sub>10</sub> Value (µg/m <sup>3</sup> )	CAAQS (µg/m <sup>3</sup> )
6/25/2023	DOE-3	<b>53.50000</b>	50
5/13/2023	DOE-3	<b>50.50000</b>	50
5/16/2023	DOE-3	33.12500	50
6/3/2023	DOE-3	32.50000	50
5/13/2023	DOE-4	30.50417	50

Note: Bold number and gray shaded indicates value exceeded CAAQS but is below the NAAQS of 150 µg/m<sup>3</sup>.

### 4.3 Volatile Organic Compound Data

VOCs are organic chemicals that have a high vapor pressure, which causes them to evaporate quickly and enter the surrounding air. VOCs can be naturally occurring or man-made. The VOC data collected can help distinguish between man-made detections from onsite activities or naturally existing organic chemicals. The VOC data collected are compared against screening levels. These screening levels are risk-based concentrations derived from standardized equations combining exposure information with toxicity data.

All four DOE locations were sampled during each of the six VOC sampling events this period. Data completeness goals for VOCs exceeded the project goal of 85% (see Table 5).

Table 5. Ambient air VOC data completeness.

Location	Valid Readings (Days)	Possible Readings (Days)	Data Completeness (Percent)
DOE-1	6	6	100%
DOE-2	6	6	100%
DOE-3	6	6	100%
DOE-4	6	6	100%

Average Total Data Completeness 100%

VOC detection results are presented in Table B-1 (Appendix B), including comparison to the April 2019 DTSC Human Health Risk Assessment (HHRA) Note 3 Screening Levels (DTSC 2019) or the EPA RSLs. There were no detections above the HHRA Note 3 Screening Levels or the EPA RSLs during Q21.

Two man-made VOC analytes, dichlorodifluoromethane (freon-12) and ethyl acetate, have been detected routinely at all four monitoring stations, during all quarterly sampling events, and in duplicate samples. These analytes were also detected as estimated values at NASA stations, but were not detected at Boeing stations. Based on laboratory QC data (method blanks, clean canister certifications), the sampling process and laboratory process are not the sources of the two analytes. The onsite source of the analytes is currently unknown.

Neither the establishment of sources for specific contaminants nor the performance of source apportionment was required for identifying remedial air quality impacts, nor was either within the scope or data quality objectives of the Air Monitoring Program.

## 4.4 Radionuclide Data

ETEC continuously monitors air at multiple locations for radioactive particles. This is performed for two reasons: (1) to determine the background airborne radioactivity concentration so that any possible releases from work activities can be detected, and (2) to detect any possible release from existing activities.

There were 104 airborne radioactivity filter samples collected in Q21 — 26 each for DOE-1, DOE-2, DOE-3, and DOE-4. Each sample was collected on a glass-fiber filter (as discussed in Section 3) and was analyzed using a “low background” Protean radiation counter system onsite. These samples included background radioactive materials and the potential of Area IV–specific radioactive materials.

The alpha and beta data are presented in Table C-1 (Appendix C). The onsite analysis determined only “alpha” or “beta/gamma” and did not analyze for specific isotopes. Isotopic analysis was performed later by an offsite laboratory. Each sample produced a gross alpha and beta-gamma count. The analysis compared these values with the background radiation count rates, and using the volume of air collected determined the net counts and the minimum detectable concentration (MDC) for each sampling event. Some results in Table C-1 (Appendix C) are shown as negative values (because detector background is subtracted from the result).

There were no alpha results greater than the MDC. Each MDC was below the airborne effluent limits specified in California regulations. There was no possibility of significant Area IV alpha radioactive material on these filters.

Approximately 84% of the beta samples were below MDC, and the gross (background radioactive material included) samples exceeded the MDC in 16% of samples, indicating the presence of airborne radioactive material (including background materials). The beta-gamma samples greater than the MDC were only slightly above the MDC, and were well below the effluent limits specified in California regulations. The elevated (but still low) results may be due to more airborne dust.

Following collection and onsite analysis, the air filters were composited and analyzed for specific radionuclides by an offsite laboratory. This data is shown in Table C-2 (Appendix C). This laboratory data determined that most radioactive material present was natural in origin, consisting of beryllium-7, polonium-210, potassium-40, combined radium-226 and radium-228, thorium-228, thorium-230, thorium-232, uranium-233/234, uranium-235/236, and uranium-238.

While artificial radionuclides (e.g., cesium-137, strontium-90, plutonium-239) were present in very small amounts, none of the results were above the MDC in Q21. The presence of these radionuclides is considered a part of the normal variation of global fallout and resuspension activities.

A summary of the gross air sampling data is shown in Table 6 below.

Table 6. Gross alpha and beta-gamma average results for Q21.

<b>Location</b>	<b>Average alpha result (μCi/mL)</b>	<b>Average alpha MDC (μCi/mL)</b>	<b>Average beta result (μCi/mL)</b>	<b>Average beta MDC (μCi/mL)</b>
DOE-1	-6.68E-16	5.86E-15	4.68E-15	2.61E-14
DOE-2	-7.52E-16	5.86E-15	1.13E-14	2.61E-14
DOE-3	-1.09E-15	5.91E-15	3.02E-15	2.63E-14
DOE-4	-9.82E-16	5.86E-15	4.12E-15	2.61E-14
Average	-8.73E-16	5.88E-15	5.77E-15	2.61E-14

(This page intentionally left blank)

## 5. QA/QC ACTIVITIES

The following QA/QC activities were conducted for the PM<sub>10</sub>, VOC, radionuclide, and meteorological data collection and analysis.

### 5.1 Field QA/QC

#### 5.1.1 PM<sub>10</sub>

The 24-hour daily averages for Q21 are presented in Appendix A along with the monthly minimum, maximum, and 95<sup>th</sup> percentile for each station location.

#### Flow Verifications

Functionality of the Met One E-BAM units is verified and recorded monthly during instrument audits; however, the instruments are also checked several times a week for operability. During the monthly audits, the Met One E-BAM temperature, pressure, and flow rate are verified against a National Institute of Standards and Technology (NIST) traceable flowmeter. E-BAM units are occasionally swapped out for maintenance, and preliminary audits of the new units are performed. The Q21 audit results for the four DOE sites showed bias percentages that ranged from -2.45 to -1.56%. None of the results exceeded the flow rate measurement quality objective of +/- 4%.

Complete audit reports and flow verification results for Q21 are presented in Appendix D of this document. The flow rate verifications were based on 40 CFR 58, Appendix A, 3.3.1 and 4.2.2 through 4.2.3, along with the *Guideline on the Meaning and the Use of Precision and Bias Data Required by 40 CFR Part 58 Appendix A* (EPA 2007). The *Data Assessment Statistical Calculator* (DASC) tool, which is an EPA Excel-based software application, was used to perform the necessary statistical calculations based on the flowrate data collected during the monthly audits. Sections 2 and 2.5 of this EPA guidance document (EPA 2007) provide additional information and instruction for using the DASC tool.

#### 5.1.2 VOCs

All data underwent at least two levels of QC review at the laboratory prior to transmission to North Wind. A minimum of 20% of the transmitted VOC results undergo a Level IV third-party data validation, annually. During this quarter, two of the six SDGs, P2301663 and P2302837, underwent the Level IV data validation. The data validation ensures that the required analytical measurement quality objectives are met to ensure the data are of sufficient quality for their intended purpose.

Each location had valid readings on the six sample days for a sample completeness of 100%. Data completeness goals for VOCs exceeded the project goal of 85%.

#### 5.1.3 Field Duplicates

Six field duplicates were collected during this reporting period. Six sampling events were conducted for the Q21 effort. Ethyl acetate in SDGs #PP2301904 and P2302837 was detected in two field duplicates pair that exceeded the quality objective of +/- 15% relative percent difference (RPD). Carbon disulfide in SDG #P2301663 and ethyl acetate in SDGs #P2301663 and P230149 were detected in the parent sample but not the duplicate. However, the absolute difference between the sample result and non-detect were less than the method reporting limit. This meets duplicate criteria components. Fourteen sample and duplicate analyte detections were within the quality objective of +/- 15% RPD. There were no other detections associated with the samples and associated duplicates collected during this reporting period.

#### **5.1.4 Canister Pressure**

Vacuum in the canisters is measured before and after sampling with an analog pressure gauge to ensure proper function. Final canister vacuums ranged from -12.5 inches mercury (Hg) to -1 inches Hg during this reporting period.

#### **5.1.5 Radiological**

The detector for onsite gross alpha and beta sample analysis is calibrated annually by a third-party vendor using sources traceable to the NIST. The detector is checked by counting alpha- and beta-emitting sources at the site when received from the vendor following calibration. This establishes an acceptable performance range for daily source checks. On each day the detector is used, performance is determined with the site source. The detector may be used if the daily check is within the acceptable performance range.

Samples analyzed at the offsite laboratory are QC-checked at the laboratory. These QC checks include blanks, laboratory replicates, matrix spikes, and matrix spike duplicates. Barium, which behaves chemically similar to radium, is used as a carrier to determine the yield of the chemical extraction.

Since Q13, 100% of the radiological analytical results have undergone Level IV, third-party data validation. The data validation ensures that the required analytical measurement quality objectives are met to ensure the data are of sufficient quality for their intended purpose.

#### **5.1.6 Meteorological**

During the reporting period, a weekly data validation screening and review was performed on the monitored meteorological parameters based on the EPA guidance document *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (EPA 2000), Table 8-4 – Suggested Data Screening Criteria, as outlined in Section 4.1. The data validation procedure provided the basis for evaluating data completeness and for determining sensor performance and/or maintenance status.

#### **5.1.7 Maintenance**

Routine visual checks were performed on the meteorological station during weekly data downloading site visits. This included inspection of the meteorological tower sensors, E-BAM monitoring unit wind sensors, and solar-powered batteries to ensure proper functioning.

#### **5.1.8 Corrective Action**

Issues and corrective actions regarding the PM<sub>10</sub> monitors and the meteorological station are noted in Sections 5.1.8.1 and 5.1.8.2, respectively. Issues and corrective actions regarding the E-BAM monitors are noted in Section 4.2. No issues or corrective actions were noted regarding the remaining monitoring equipment or sampling events during this reporting period.

##### **5.1.8.1 PM<sub>10</sub> Monitors**

Refer to Section 4.2 for a detailed description of PM<sub>10</sub> air monitoring equipment issues.

### 5.1.8.2 Meteorological Station

This section covers data quality issues and associated corrective actions that occurred during the current monitoring quarter. Although the data percent completion goal during Q21 was met: (1) the delta temperature calculated by the datalogger continues to be post-processed to resolve a datalogger programming equation where the 10-m and 2-m temperature parameters are reversed, and (2) the recommended sensor maintenance schedule is provided.

#### (1) Delta Temperature Calculation

- Data Quality Issue:
  - For meteorological monitoring, delta temperature should be defined as T at the higher level minus T at the lower level. However, the datalogger was improperly programmed to calculate the inverse of delta temperature when the station was replaced after the Woolsey Wildfire during Q3. Consequently, delta temperature observations are being calculated with an opposite sign compared to the values from the original data logger.
- Corrective Action:
  - Datalogger Equation – Instead of reprogramming the datalogger to correctly calculate delta temperature, an adjustment multiplication factor of “-1” has been applied to the delta temperature values from the new data logger prior to performing the data validation.

Resolution – With application of the “-1” multiplication factor, delta temperature values in the validated project dataset accurately present delta temperature as:

$$\text{Delta Temperature} = [\text{Temperature @ 10 m}] \text{ minus } [\text{Temperature @ 2 m}]$$

#### (2) Recommended Maintenance Schedule:

Although not a corrective action, the manufacturer’s recommended maintenance frequency for meteorological sensors is presented below for information purposes. Proper and timely maintenance of the meteorological sensors is critical for ensuring that the data are not only valid (based on screening criteria) but also accurate. Schedules for maintenance and calibration are provided in the sensor user manuals and based on the in-service time of the sensor. Table 7 lists the recommended maintenance schedules for the Met One sensors installed at the DOE-4 meteorological station.

Table 7. Meteorological sensor recommended maintenance frequency (Met One).

Sensor	Frequency	Maintenance
WS	6–12 Month	Inspect for proper operation (manual check of pulses per revolution, bearing condition, anemometer cup condition, and bearing replacement if warranted)
	12–24 Month	Return to Met One for complete overhaul
WD	6–12 Month	Inspect for proper operation (manual check of sensor readings through 360°)
	6–12 Month	Field calibration
	12–24 month	Replace bearings & potentiometer
T	6–12 Month	Inspect sensor for proper operation (field comparison sensor reading against a precision mercury thermometer)
RH	6–12 Month	Inspect sensor for proper operation (compare sensor reading against local weather service or field psychrometer)
	12 Month	Return sensor to Met One for calibration and replacement of O-rings and filter membrane
Rain Gauge	6 Month	Clean sensor and bucket and field verify proper operation
Pressure	12 Month	Return sensor to Met One for calibration and replacement of O-rings and filter membrane
Radiometer	Monthly	Clean sensor glass dome with clean rag/tissue

Note: Maintenance schedules are as specified in the respective Met One sensor user manuals.

## 5.2 Laboratory QA/QC

This report covers 30 air monitoring samples for VOCs collected and analyzed according to the EPA Toxic Compendium Method TO-15, *Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* (EPA 1999). These samples were reported under six SDGs by the laboratory. All six SDG analyses were performed by ALS in Simi Valley, CA. For each SDG, the laboratory ran continuing calibration verification, a method blank, and laboratory control samples, and verified surrogate recoveries for each sample.

The laboratory provided certified clean canisters for the sampling events. The certification of the canister batch is considered the equipment blank for each sampling event. The ALS case narrative discusses the cleaning of the canisters.

## 5.3 Audit Results

The PM<sub>10</sub> instruments were calibrated at the manufacturer and were functioning properly upon installation. The PM<sub>10</sub> instruments were audited monthly with a secondary NIST traceable flow meter. Although audits occur only monthly, the instruments were checked several times a week to ensure that they were functioning. Table 8 lists the dates for audits conducted in April through June. No flow rate comparisons exceeded the project’s acceptance criterion of +/- 4. The sample nozzles and support vanes were cleaned as needed. Complete audit reports are presented in Appendix D.

Table 8. PM<sub>10</sub> audit completeness.

<b>Location</b>	<b>Met One E-BAM Serial Number</b>	<b>Parameter</b>	<b>Date</b>
DOE-1	X16067	PM <sub>10</sub>	04/24/2023
DOE-2	W23313	PM <sub>10</sub>	04/24/2023
DOE-3	W23314	PM <sub>10</sub>	04/24/2023
DOE-4	W23310	PM <sub>10</sub>	04/24/2023
DOE-1	X16067	PM <sub>10</sub>	05/26/2023
DOE-2	Y12096	PM <sub>10</sub>	05/05/2023
DOE-3	W23314	PM <sub>10</sub>	05/26/2023
DOE-4	B18932	PM <sub>10</sub>	05/08/2023
DOE-1	X16067	PM <sub>10</sub>	06/23/2023
DOE-2	Y12096	PM <sub>10</sub>	06/23/2023
DOE-3	W23314	PM <sub>10</sub>	06/23/2023
DOE-4	B18932	PM <sub>10</sub>	06/23/2023

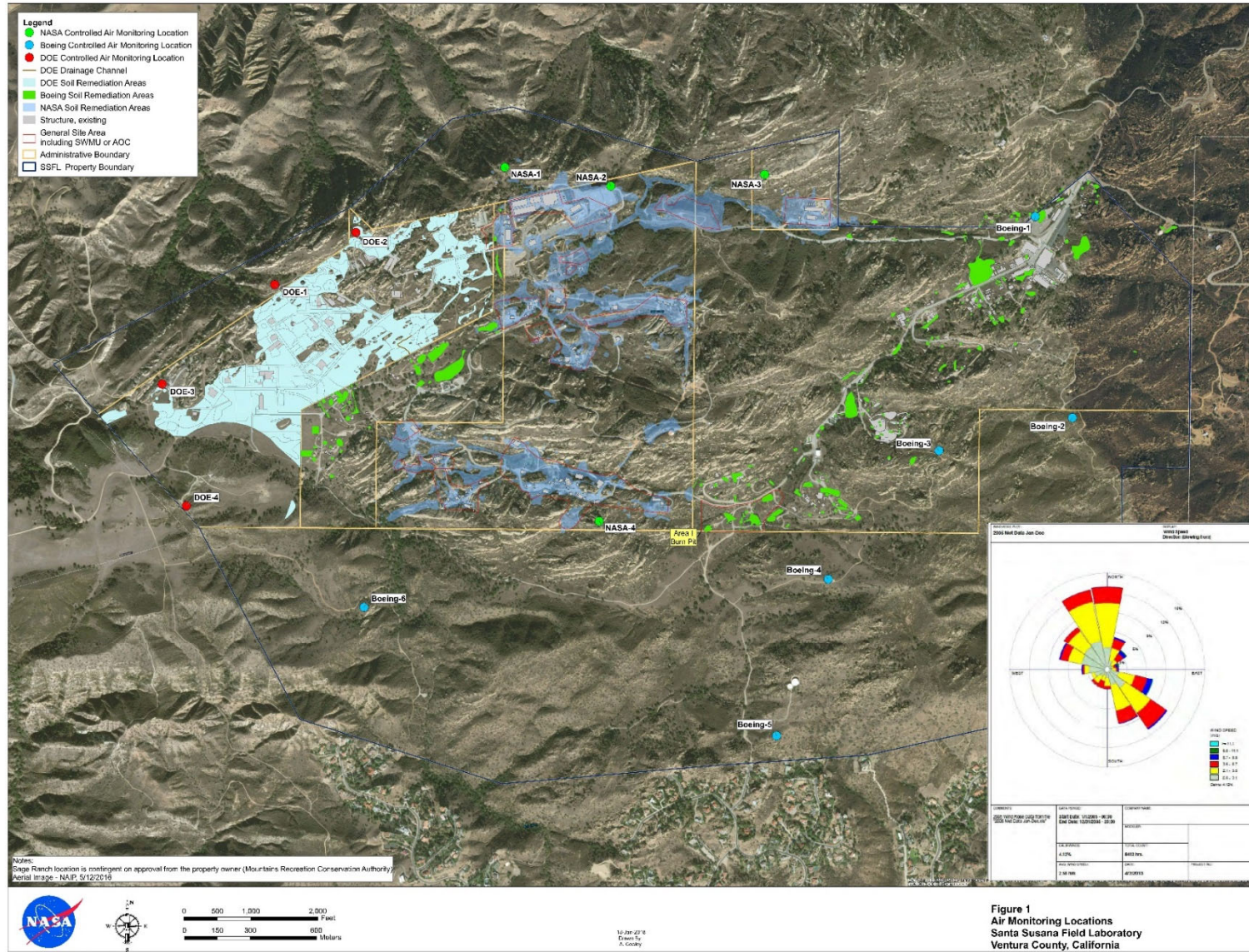
(This page intentionally left blank)

## 6. REFERENCES

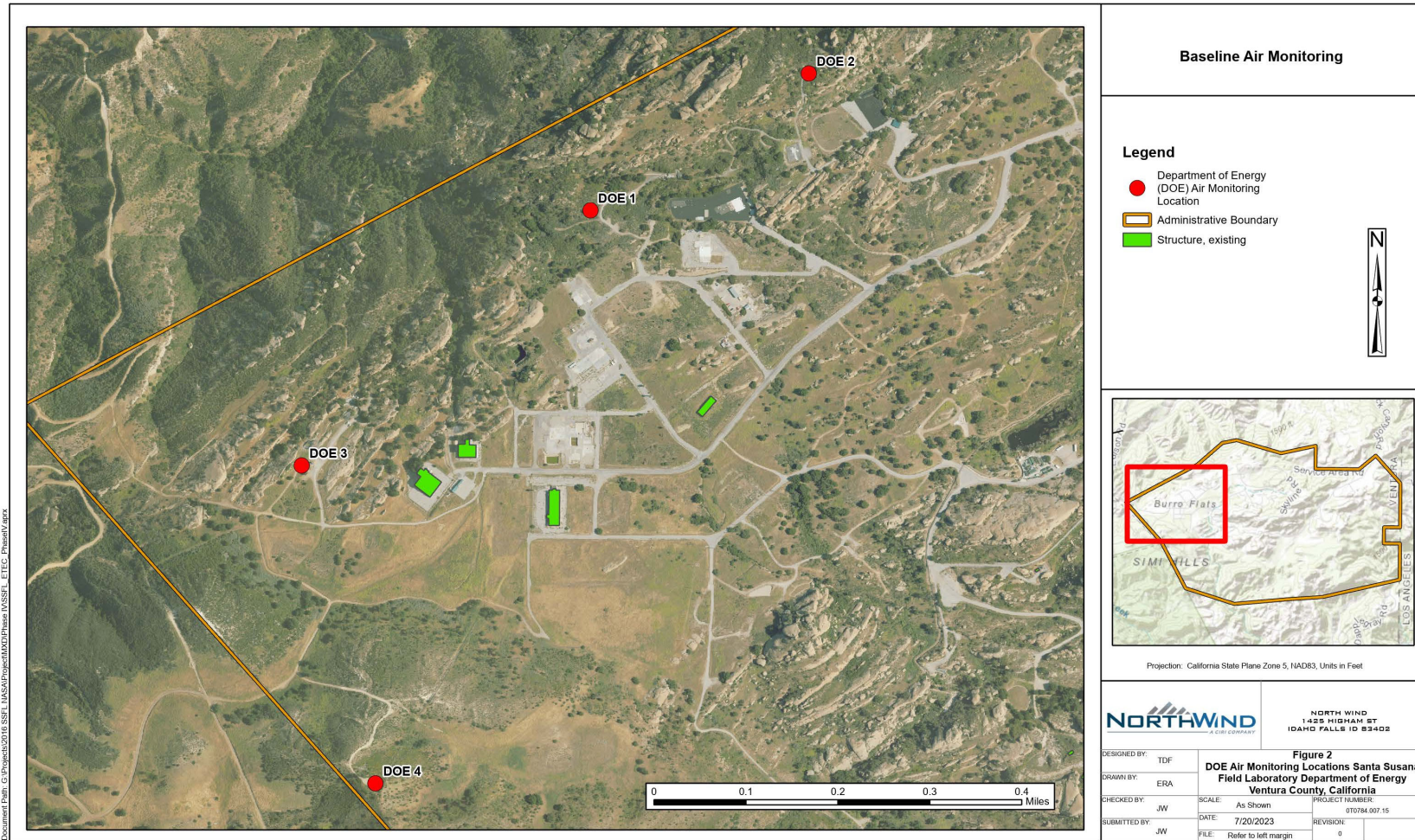
- 10 Code of Federal Regulations (CFR) 20, Appendix B, “Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage,” Table 2.
- 40 CFR 58, Appendix C – Ambient Air Quality Monitoring Methodology.
- 40 CFR 136, Appendix B – Definition and Procedure for the Determination of the Method Detection Limit.
- California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 2018. *Approval of the Final Air Monitoring Station Locations for the Santa Susana Field Laboratory, Ventura County, California*. January.
- California Environmental Protection Agency, DTSC. 2022. Human and Ecological Risk Office Human Health Risk Assessment Note Number 3, DTSC-modified Screening Levels. April. Available online at: [Human Health Risk Assessment Note 3 -June 2020 revised May 2022 \(ca.gov\)](#) and [HHRA-Note-3-Tables-June2020-Revised-May2022A.xlsx \(live.com\)](#).
- National Aeronautics and Space Administration (NASA). 2017. *Baseline Air Monitoring Work Plan, Santa Susana Field Laboratory, Ventura County, California*. Prepared for California Department of Toxic Substances Control. Prepared on behalf of National Aeronautics and Space Administration, George C. Marshall Space Flight Center, The Boeing Company, and Department of Energy, Energy Technology and Engineering Center. September. Available online at: [SSFL Baseline Air Monitoring Work Plan](#)
- U.S. Environmental Protection Agency (EPA). 1999. *Air Method, Toxic Organics-15 (TO-15), Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)*. EPA 625/R-96/010b. January. Available online at: <https://www.epa.gov/homeland-security-research/epa-air-method-toxic-organics-15-15-determination-volatile-organic>
- U.S. Environmental Protection Agency (EPA). 2000. *Meteorological Monitoring Guidance for Regulatory Modeling Applications, United State Environmental Protection Agency, Office of Air Quality Planning and Standards*. EPA-454/R-99-005. February.
- U.S. Environmental Protection Agency (EPA). 2007. *Guideline on the Meaning and the Use of Precision and Bias Data Required by 40 CFR Part 58 Appendix A, Version 1.1*. EPA-454/B-07-001. October.
- U.S. Environmental Protection Agency (EPA). 2017. *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, Ambient Air Monitoring Program*. EPA-454/B-17-001. January.
- U.S. EPA. 2023. Regional Screening Levels – Generic Tables. <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>. May.

(This page intentionally left blank)

# Figure 1 –SSFL Air Monitoring Locations

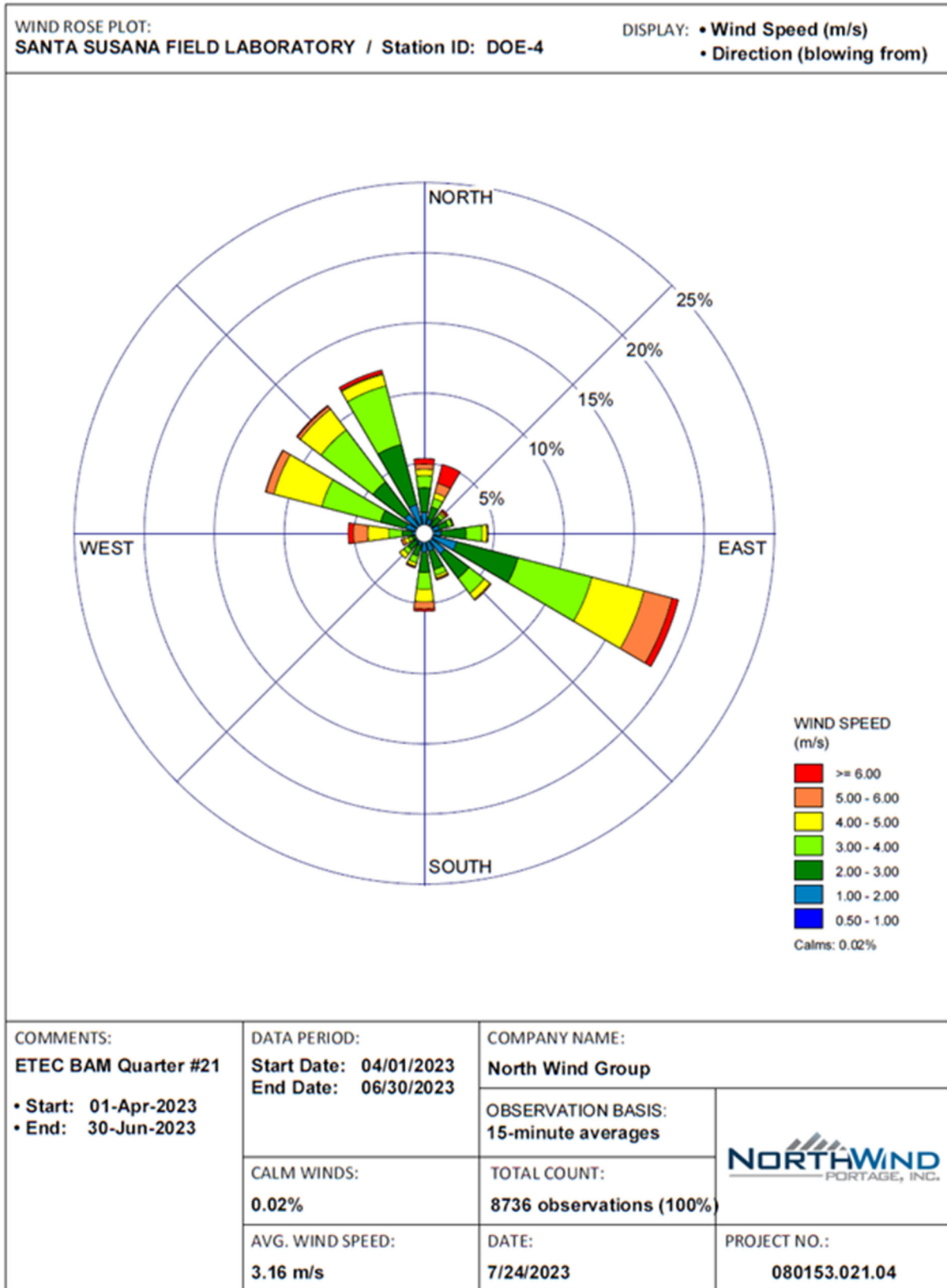


### Figure 2 –DOE Air Monitoring Locations



Document Path: G:\Projects\2018\_SSEL\_LAS\Map\Project\MXD\Phase IV\SSFL\_ETEC\_PhaseIV.aprx

**Figure 3 – DOE Quarterly Wind Rose**



(This page intentionally left blank)

## APPENDIX A

### PM<sub>10</sub> Daily Averages and Monthly Statistics

(This page intentionally left blank)

**PM<sub>10</sub> Daily Averages**

Site ID	DOE-1	DOE-2	DOE-3	DOE-4
Sample Date	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )
04/01/23	5.125	—	8.5	5.666
04/02/23	9.833	—	14.208	12.875
04/03/23	8.458	12.916	9.875	8.916
04/04/23	4.375	4.833	6.375	5.083
04/05/23	5.791	6.166	6.125	7
04/06/23	6.791	5.625	7.375	8.041
04/07/23	11.875	10.583	13.333	13.416
04/08/23	7.333	9.75	10.375	7.583
04/09/23	9.458	-5	11.041	11.125
04/10/23	13.5	7.583	14.125	13.875
04/11/23	15.125	14.333	17	17.375
04/12/23	5.25	10.958	18.083	9.416
04/13/23	—	4.083	6.458	5.666
04/14/23	7.041	11.75	14.375	12.166
04/15/23	12.25	—	18.5	19.75
04/16/23	14.416	—	18.75	15.75
04/17/23	12.583	7.833	21.375	12.583
04/18/23	17.333	16.416	21.041	18.458
04/19/23	15.833	16.083	17.666	17.416
04/20/23	15.041	14.875	15.458	18.083
04/21/23	10.708	10.75	11.75	10.916
04/22/23	10.083	9.833	10.75	10.083
04/23/23	16.833	15.208	18.208	19.958
04/24/23	11.875	22.291	25.041	15.583
04/25/23	15.25	19.166	24.125	16.083
04/26/23	15.208	15.541	18.666	18.416
04/27/23	15.5	16.958	19	15.708
04/28/23	15.416	15.375	23.166	16.5
04/29/23	15.583	14.291	21.208	20.833
04/30/23	15.666	12.791	20.416	19.041
05/01/23	7.125	6.166	16.666	7.5
05/02/23	4.5	3.583	8.416	6.125
05/03/23	4.5	3.541	6.833	8.458
05/04/23	2.416	-0.916	4.75	7.416
05/05/23	2.708	1.478	4.375	20.333
05/06/23	4.708	5.041	6.166	—

Site ID	DOE-1	DOE-2	DOE-3	DOE-4
Sample Date	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )
05/07/23	6.75	7.166	13	—
05/08/23	10.041	10.083	12.875	19.555
05/09/23	10.375	10.916	19.208	7.946
05/10/23	9.416	9.958	17.541	7.604
05/11/23	10.041	10.208	16	9.596
05/12/23	15.833	17.291	28.125	14.238
05/13/23	20.083	20.625	50.5	30.504
05/14/23	13.833	14.083	26.25	9.429
05/15/23	12.416	12.916	21.75	10.104
05/16/23	10.916	13.458	33.125	13.883
05/17/23	14.083	14.75	28.458	13.029
05/18/23	19.333	19.125	29.5	16.988
05/19/23	10.5	11.125	18.375	8.571
05/20/23	12.75	12.083	16.5	11.367
05/21/23	12.375	9.875	12.166	12.296
05/22/23	11.916	10.416	16.625	7.925
05/23/23	5.041	5.291	9.875	4.067
05/24/23	7.333	8.5	11.333	5.458
05/25/23	9.083	9.958	11.958	5.463
05/26/23	8.083	7.541	13.958	6.938
05/27/23	13.416	8.708	21.666	8.017
05/28/23	10.125	10.208	14.916	6.558
05/29/23	7.833	7.125	10.291	5.479
05/30/23	5.958	5.25	11.166	5.371
05/31/23	8.458	4.916	7.5	4.275
06/01/23	8.958	8.125	11.291	7.050
06/02/23	17.416	11.458	27.416	10.092
06/03/23	21.166	16.458	32.5	13.333
06/04/23	18.541	11.25	21.625	8.217
06/05/23	6.875	6.916	9.625	5.017
06/06/23	10.916	8.583	17.541	6.883
06/07/23	10.375	4.5	6.791	3.121
06/08/23	6.833	6.75	14.916	5.950
06/09/23	7.583	7.458	8.958	5.558
06/10/23	8.708	7.75	10.291	5.571
06/11/23	5	6.208	7.291	3.538

Site ID	DOE-1	DOE-2	DOE-3	DOE-4
Sample Date	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> ) (CAAQS 50 µg/m <sup>3</sup> )
06/12/23	3.208	4.166	6.875	3.017
06/13/23	6.791	5.416	11.5	4.383
06/14/23	10.791	8.708	10.541	6.000
06/15/23	7.75	7.708	8.208	4.475
06/16/23	8.5	9.333	13.208	7.613
06/17/23	12.125	12.708	26.666	11.213
06/18/23	11.916	11.625	12.916	8.238
06/19/23	11.041	10.25	16.833	7.550
06/20/23	14.166	12.125	26	12.504
06/21/23	19.541	15.166	30.458	15.500
06/22/23	23.708	18.25	21.375	17.938
06/23/23	15.041	13.75	20.708	11.725
06/24/23	16.041	14.625	20.916	14.996
06/25/23	13.583	12.291	53.5	9.546
06/26/23	16.25	19.75	20.416	15.338
06/27/23	15.541	15.916	24.416	12.521
06/28/23	14.791	15.833	17.791	14.296
06/29/23	19.041	17.166	20.208	13.483
06/30/23	19.208	20.125	8.666	14.467

Notes:

Gray-shaded boxes indicate a filter sensor pressure failure.

Bold number indicates value exceeded CAAQS but is below the NAAQS of 150 µg/m<sup>3</sup>.

### PM<sub>10</sub> Monthly Statistics

Location ID	April 2023			May 2023			June 2023		
	PM <sub>10</sub>			PM <sub>10</sub>			PM <sub>10</sub>		
	High	Low	95th PCTL	High	Low	95th PCTL	High	Low	95th PCTL
DOE-1	17.33300	4.37500	16.43300	20.08300	2.41600	17.58300	23.70800	3.20800	20.43475
DOE-2	22.29100	-5.00000	18.61400	20.62500	-0.91600	18.20800	20.12500	4.16600	19.07500
DOE-3	25.04100	6.12500	23.69345	50.50000	4.37500	31.31250	53.50000	6.79100	31.58110
DOE-4	20.83300	5.08300	19.86440	30.50417	4.06667	20.02180	17.93750	3.01667	15.42688

PCTL = percentile

## **APPENDIX B**

### **Analytical Results for Ambient Air VOCs**

(This page intentionally left blank)

Table B-1. Ambient air VOC detection results compared to Screening Level Values.

Location ID	Sample Date	Analyte	Method Detection Limit	Result	Screening Level Value	SL Source
DOE-1	04/12/2023	2-butanone	0.14	1.6	5200	US EPA RSL
DOE-1	04/12/2023	Dichlorodifluoromethane	0.11	2.6	100	US EPA RSL
DOE-1	04/12/2023	Isopropanol	0.28	1.9	210	US EPA RSL
DOE-1	04/12/2023	Toluene	0.081	0.92	310	DTSC HHRA NOTE 3
DOE-1	04/12/2023	Trichlorofluoromethane	0.1	1.3	1300	DTSC HHRA NOTE 3
DOE-2	04/12/2023	Dichlorodifluoromethane	0.15	2.6	100	US EPA RSL
DOE-2	04/12/2023	Trichlorofluoromethane	0.14	1.2	1300	DTSC HHRA NOTE 3
DOE-3	04/12/2023	Dichlorodifluoromethane	0.19	2.6	100	US EPA RSL
DOE-3	04/12/2023	Trichlorofluoromethane	0.17	1.3	1300	DTSC HHRA NOTE 3
DOE-4	04/12/2023	Dichlorodifluoromethane	0.15	2.6	100	US EPA RSL
DOE-4	04/12/2023	Trichlorofluoromethane	0.14	1.3	1300	DTSC HHRA NOTE 3
DOE-1	04/27/2023	Dichlorodifluoromethane	0.12	2.3	100	US EPA RSL
DOE-1	04/27/2023	Ethyl acetate	0.39	13	73	US EPA RSL
DOE-1	04/27/2023	Trichlorofluoromethane	0.11	1.2	1300	DTSC HHRA NOTE 3
DOE-2	04/27/2023	Dichlorodifluoromethane	0.13	2.4	100	US EPA RSL
DOE-2	04/27/2023	Ethyl acetate	0.41	14	73	US EPA RSL
DOE-2	04/27/2023	Trichlorofluoromethane	0.12	1.2	1300	DTSC HHRA NOTE 3
DOE-3	04/27/2023	Dichlorodifluoromethane	0.11	2.4	100	US EPA RSL
DOE-3	04/27/2023	Ethyl acetate	0.36	5.6	73	US EPA RSL
DOE-3	04/27/2023	Toluene	0.085	0.71	310	DTSC HHRA NOTE 3
DOE-3	04/27/2023	Trichlorofluoromethane	0.11	1.2	1300	DTSC HHRA NOTE 3
DOE-4	04/27/2023	Dichlorodifluoromethane	0.12	2.3	100	US EPA RSL
DOE-4	04/27/2023	Ethyl acetate	0.38	9.6	73	US EPA RSL
DOE-4	04/27/2023	Trichlorofluoromethane	0.11	1.2	1300	DTSC HHRA NOTE 3
DOE-1	05/12/2023	Dichlorodifluoromethane	0.12	1.9	100	US EPA RSL
DOE-1	05/12/2023	Ethyl acetate	0.39	52	73	US EPA RSL
DOE-1	05/12/2023	Trichlorofluoromethane	0.11	0.95	1300	DTSC HHRA NOTE 3
DOE-2	05/12/2023	Carbon disulfide	0.23	1.8	730	US EPA RSL
DOE-2	05/12/2023	Dichlorodifluoromethane	0.12	2.0	100	US EPA RSL
DOE-2	05/12/2023	Ethyl acetate	0.40	3.3	73	US EPA RSL
DOE-2	05/12/2023	Trichlorofluoromethane	0.12	0.97	1300	DTSC HHRA NOTE 3
DOE-3	05/12/2023	Dichlorodifluoromethane	0.12	2.0	100	US EPA RSL
DOE-3	05/12/2023	Ethyl acetate	0.39	55	73	US EPA RSL
DOE-3	05/12/2023	Toluene	0.090	0.80	310	DTSC HHRA NOTE 3
DOE-3	05/12/2023	Trichlorofluoromethane	0.11	1.0	1300	DTSC HHRA NOTE 3
DOE-4	05/12/2023	Dichlorodifluoromethane	0.13	2.0	100	US EPA RSL
DOE-4	05/12/2023	Ethyl acetate	0.41	8.0	73	US EPA RSL
DOE-4	05/12/2023	Trichlorofluoromethane	0.12	0.98	1300	DTSC HHRA NOTE 3
DOE-1	05/26/2023	Dichlorodifluoromethane	0.12	1.6	100	US EPA RSL
DOE-1	05/26/2023	Ethyl acetate	0.40	61	73	US EPA RSL
DOE-2	05/26/2023	Dichlorodifluoromethane	0.13	1.6	100	US EPA RSL
DOE-2	05/26/2023	Ethyl acetate	0.43	53	73	US EPA RSL

Location ID	Sample Date	Analyte	Method Detection Limit	Result	Screening Level Value	SL Source
DOE-3	05/26/2023	Carbon disulfide	0.21	1.6	730	US EPA RSL
DOE-3	05/26/2023	Dichlorodifluoromethane	0.11	1.7	100	US EPA RSL
DOE-3	05/26/2023	Ethyl acetate	0.36	64	73	US EPA RSL
DOE-3	05/26/2023	Toluene	0.084	0.80	310	DTSC HHRA NOTE 3
DOE-3	05/26/2023	Trichlorofluoromethane	0.10	0.79	1300	DTSC HHRA NOTE 3
DOE-4	05/26/2023	Dichlorodifluoromethane	0.11	1.6	100	US EPA RSL
DOE-4	05/26/2023	Ethyl acetate	0.36	41	73	US EPA RSL
DOE-4	05/26/2023	Trichlorofluoromethane	0.10	0.76	1300	DTSC HHRA NOTE 3
DOE-1	06/08/2023	Dichlorodifluoromethane	0.12	2.4	100	US EPA RSL
DOE-1	06/08/2023	Ethyl acetate	0.39	12	73	US EPA RSL
DOE-1	06/08/2023	Trichlorofluoromethane	0.11	1.2	1300	DTSC HHRA NOTE 3
DOE-2	06/08/2023	Dichlorodifluoromethane	0.13	2.4	100	US EPA RSL
DOE-2	06/08/2023	Trichlorofluoromethane	0.12	1.2	1300	DTSC HHRA NOTE 3
DOE-3	06/08/2023	Dichlorodifluoromethane	0.12	2.4	100	US EPA RSL
DOE-3	06/08/2023	Trichlorofluoromethane	0.11	1.2	1300	DTSC HHRA NOTE 3
DOE-4	06/08/2023	Dichlorodifluoromethane	0.13	2.5	100	US EPA RSL
DOE-4	06/08/2023	Trichlorofluoromethane	0.12	1.2	1300	DTSC HHRA NOTE 3
DOE-1	06/21/2023	Ethyl acetate	0.35	8.7	73	US EPA RSL
DOE-1	06/21/2023	Trichlorofluoromethane	0.1	1.1	1300	DTSC HHRA NOTE 3
DOE-2	06/21/2023	Ethyl acetate	0.39	5.4	73	US EPA RSL
DOE-2	06/21/2023	Trichlorofluoromethane	0.11	1.1	1300	DTSC HHRA NOTE 3
DOE-3	06/21/2023	Ethyl acetate	0.39	3.5 (;J)	73	US EPA RSL
DOE-3	06/21/2023	Trichlorofluoromethane	0.11	1.2	1300	DTSC HHRA NOTE 3
DOE-4	06/21/2023	Ethyl acetate	0.38	25	73	US EPA RSL
DOE-4	06/21/2023	Trichlorofluoromethane	0.11	1.2	1300	DTSC HHRA NOTE 3

Notes:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

**APPENDIX C**  
**Radionuclide Results**

(This page intentionally left blank)

Table C-1. Gross alpha and gross beta air sample results for air samplers.

Sample Collection Date	Result Alpha (mCi/mL)	MDC – Alpha (mCi/mL)	Result Beta (mCi/mL)	MDC – Beta (mCi/mL)
<b>Sample location DOE-1</b>				
4/4/2023	-1.28E-15	4.94E-15	-1.14E-15	2.22E-14
4/7/2023	-1.68E-15	6.47E-15	-8.27E-15	2.91E-14
4/10/2023	1.25E-15	6.13E-15	3.17E-14	2.76E-14
4/14/2023	1.31E-15	5.12E-15	1.12E-14	2.31E-14
4/17/2023	-6.56E-16	6.24E-15	1.33E-14	2.81E-14
4/21/2023	2.42E-15	4.73E-15	1.97E-14	2.13E-14
4/24/2023	9.63E-16	6.32E-15	1.52E-14	2.84E-14
4/28/2023	-2.71E-16	5.06E-15	3.87E-14	2.27E-14
5/2/2023	-1.70E-15	4.85E-15	-1.43E-15	2.16E-14
5/5/2023	3.07E-16	6.72E-15	-1.78E-14	2.99E-14
5/8/2023	-6.90E-16	6.69E-15	-3.52E-14	2.98E-14
5/12/2023	-1.31E-15	5.19E-15	6.88E-16	2.31E-14
5/15/2023	6.22E-16	6.52E-15	7.84E-15	2.91E-14
5/19/2023	-1.27E-15	5.04E-15	2.41E-14	2.25E-14
5/22/2023	-2.35E-15	6.68E-15	1.71E-16	2.98E-14
5/26/2023	-1.04E-15	5.11E-15	2.83E-14	2.28E-14
5/30/2023	-1.94E-15	4.84E-15	3.75E-15	2.16E-14
6/2/2023	-3.74E-15	7.13E-15	-1.23E-14	3.13E-14
6/5/2023	-1.60E-15	6.82E-15	-6.12E-15	2.99E-14
6/8/2023	-6.28E-16	6.94E-15	5.92E-15	3.05E-14
6/12/2023	-3.11E-15	5.43E-15	-5.44E-15	2.39E-14
6/16/2023	2.30E-15	5.23E-15	-5.23E-15	2.30E-14
6/19/2023	7.15E-16	7.00E-15	5.61E-15	3.07E-14
6/23/2023	-6.74E-16	4.86E-15	-5.86E-15	2.13E-14
6/26/2023	-2.29E-15	6.90E-15	1.55E-14	3.03E-14
6/30/2023	-1.03E-15	5.52E-15	-1.26E-15	2.42E-14

Sample Collection Date	Result Alpha (mCi/mL)	MDC – Alpha (mCi/mL)	Result Beta (mCi/mL)	MDC – Beta (mCi/mL)
<b>Sample location DOE-2</b>				
4/4/2023	2.28E-15	4.94E-15	-1.56E-14	2.22E-14
4/7/2023	6.52E-16	6.46E-15	2.77E-14	2.91E-14
4/10/2023	2.83E-15	6.13E-15	4.79E-14	2.76E-14
4/14/2023	-8.02E-16	5.13E-15	3.92E-14	2.31E-14
4/17/2023	-2.90E-15	6.23E-15	1.71E-14	2.81E-14
4/21/2023	2.34E-16	4.73E-15	3.59E-14	2.13E-14
4/24/2023	-1.96E-15	6.32E-15	-8.77E-15	2.84E-14
4/28/2023	-7.91E-16	5.05E-15	1.34E-15	2.27E-14
5/2/2023	-2.60E-16	4.85E-15	3.49E-14	2.16E-14
5/5/2023	-1.69E-15	6.72E-15	-4.85E-15	2.99E-14
5/8/2023	3.05E-16	6.68E-15	1.37E-14	2.98E-14
5/12/2023	-2.59E-15	5.17E-15	2.67E-14	2.31E-14
5/15/2023	1.27E-15	6.53E-15	-6.47E-15	2.91E-14
5/19/2023	-2.52E-15	5.04E-15	1.17E-14	2.25E-14
5/22/2023	-3.34E-15	6.68E-15	-1.98E-14	2.97E-14
5/26/2023	3.79E-15	5.11E-15	1.16E-14	2.28E-14
5/30/2023	-2.60E-16	4.85E-15	1.26E-14	2.16E-14
6/2/2023	-2.70E-15	7.12E-15	6.44E-15	3.13E-14
6/5/2023	3.94E-17	6.82E-15	1.92E-14	3.00E-14
6/8/2023	7.09E-16	6.94E-15	2.09E-14	3.05E-14
6/12/2023	-4.92E-16	5.43E-15	3.12E-14	2.39E-14
6/16/2023	-2.23E-15	5.22E-15	-1.20E-14	2.29E-14
6/19/2023	-3.67E-15	7.00E-15	-1.53E-14	3.07E-14
6/23/2023	-1.84E-15	4.86E-15	5.64E-15	2.13E-14
6/26/2023	-9.56E-16	6.89E-15	1.99E-16	3.03E-14
6/30/2023	-2.62E-15	5.51E-15	1.15E-14	2.42E-14

Sample Collection Date	Result Alpha (mCi/mL)	MDC – Alpha (mCi/mL)	Result Beta (mCi/mL)	MDC – Beta (mCi/mL)
<b>Sample location DOE-3</b>				
4/4/2023	-1.29E-15	4.96E-15	2.81E-14	2.23E-14
4/7/2023	9.84E-16	6.46E-15	9.89E-15	2.90E-14
4/10/2023	-1.26E-17	6.14E-15	1.35E-14	2.76E-14
4/14/2023	-1.60E-15	5.13E-15	2.85E-14	2.31E-14
4/17/2023	-6.55E-16	6.23E-15	2.98E-14	2.80E-14
4/21/2023	2.34E-16	4.73E-15	8.29E-15	2.13E-14
4/24/2023	-3.26E-15	6.32E-15	6.19E-15	2.84E-14
4/28/2023	-7.91E-16	5.05E-15	1.75E-14	2.27E-14
5/2/2023	-1.22E-15	4.85E-15	-2.99E-15	2.16E-14
5/5/2023	-4.42E-15	8.04E-15	-7.10E-15	3.58E-14
5/8/2023	-2.01E-15	6.66E-15	1.76E-14	2.97E-14
5/12/2023	-1.31E-15	5.19E-15	-3.47E-15	2.31E-14
5/15/2023	-1.65E-15	6.54E-15	1.22E-15	2.91E-14
5/19/2023	1.48E-15	5.04E-15	1.58E-14	2.25E-14
5/22/2023	-3.01E-15	6.68E-15	-1.66E-14	2.98E-14
5/26/2023	-5.28E-16	5.11E-15	-5.34E-15	2.28E-14
5/30/2023	-2.91E-15	4.85E-15	4.01E-15	2.16E-14
6/2/2023	-3.02E-16	7.12E-15	-2.47E-14	3.13E-14
6/5/2023	-9.46E-16	6.82E-15	-3.32E-15	3.00E-14
6/8/2023	1.38E-15	6.94E-15	2.17E-14	3.05E-14
6/12/2023	-2.30E-16	5.43E-15	7.16E-16	2.39E-14
6/16/2023	-7.25E-16	5.22E-15	-2.08E-14	2.29E-14
6/19/2023	-9.71E-16	7.00E-15	-4.85E-15	3.08E-14
6/23/2023	-1.61E-15	4.86E-15	-2.06E-14	2.13E-14
6/26/2023	-6.24E-16	6.89E-15	-1.19E-14	3.03E-14
6/30/2023	-2.35E-15	5.50E-15	-2.39E-15	2.42E-14

Sample Collection Date	Result Alpha (mCi/mL)	MDC – Alpha (mCi/mL)	Result Beta (mCi/mL)	MDC – Beta (mCi/mL)
<b>Sample location DOE-4</b>				
4/4/2023	1.27E-15	4.96E-15	1.66E-14	2.23E-14
4/7/2023	1.32E-15	6.46E-15	9.18E-15	2.91E-14
4/10/2023	-6.45E-16	6.14E-15	3.38E-14	2.76E-14
4/14/2023	-1.60E-15	5.13E-15	7.29E-15	2.31E-14
4/17/2023	-1.62E-15	6.24E-15	3.50E-14	2.81E-14
4/21/2023	-1.72E-15	4.74E-15	2.06E-14	2.13E-14
4/24/2023	-1.30E-17	6.32E-15	4.27E-14	2.84E-14
4/28/2023	-1.83E-15	5.05E-15	9.41E-15	2.27E-14
5/2/2023	7.03E-16	4.85E-15	-3.94E-16	2.16E-14
5/5/2023	-2.69E-15	6.72E-15	-5.21E-15	2.99E-14
5/8/2023	-6.87E-16	6.66E-15	-1.23E-14	2.97E-14
5/12/2023	-3.62E-15	5.19E-15	2.07E-15	2.31E-14
5/15/2023	-6.76E-16	6.55E-15	-4.38E-15	2.92E-14
5/19/2023	4.81E-16	5.04E-15	1.79E-14	2.25E-14
5/22/2023	-3.58E-16	6.68E-15	2.09E-14	2.98E-14
5/26/2023	-1.80E-15	5.11E-15	-1.16E-14	2.28E-14
5/30/2023	7.03E-16	4.85E-15	8.68E-15	2.16E-14
6/2/2023	3.84E-16	7.12E-15	-2.25E-14	3.13E-14
6/5/2023	-1.60E-15	6.82E-15	9.68E-15	3.00E-14
6/8/2023	-9.63E-16	6.94E-15	-1.16E-14	3.05E-14
6/12/2023	3.14E-17	5.43E-15	2.40E-15	2.39E-14
6/16/2023	-2.49E-15	5.22E-15	-2.16E-14	2.29E-14
6/19/2023	-9.71E-16	7.00E-15	-2.68E-14	3.07E-14
6/23/2023	-4.40E-16	4.86E-15	9.40E-15	2.13E-14
6/26/2023	-4.60E-15	6.89E-15	-2.07E-14	3.02E-14
6/30/2023	-2.09E-15	5.50E-15	-1.26E-15	2.41E-14

Note: Some values are negative after background subtraction.

Table C-2. Individual radionuclide analysis for the composite filter samples.

Radionuclide	Result (pCi/sample)	MDC (pCi/sample)	Data Qualifier	Airborne Concentration (μCi/mL)
<b>Location DOE-1 – Air volume/sample = 9.83E+08</b>				
Cesium-137	-4.04	9.72	U U	-4.110E-15
Strontium-90	0.975	1.19	U U	9.919E-16
Cobalt-60	5.89	17.7	U U	5.992E-15
Potassium-40	25.9	186	U U	2.635E-14
Beryllium-7	127	90.5		1.292E-13
Plutonium-238	0.0318	0.278	U U	3.235E-17
Polonium-210	5.65	0.451	J	5.748E-15
Plutonium-241	-2.21	34.6	U U	-2.248E-15
Thorium-230	0.182	0.505	U U	1.851E-16
Thorium-228	0.466	0.455	UJ	4.741E-16
Actinium-228	10.9	50.8	U U	1.109E-14
Americium-241	0.0321	0.777	U U	3.266E-17
Plutonium-239	0.0301	0.19	U U	3.062E-17
Ra-228 – total	1.76	7.86	U U	1.790E-15
Radium-226, -228 combined	3.56	1.51		3.622E-15
Thorium-232	0.767	0.365	UJ	7.803E-16
Uranium-238	0.342	0.287	UJ	3.479E-16
Uranium-233/234	0.63	0.407	UJ	6.409E-16
Uranium-235/236	0.116	0.174	U U	1.180E-16
<b>Location DOE-2 – Air volume/sample = 9.83E+08</b>				
Cesium-137	5.8	3.99	UI UJ	5.900E-15
Strontium-90	0.789	1.88	U U	8.026E-16
Cobalt-60	2.41	8.27	U U	2.452E-15
Potassium-40	64.2	64.2	UI UJ	6.531E-14
Beryllium-7	62.2	75.2	U U	6.328E-14
Plutonium-238	0.104	0.301	U U	1.058E-16
Polonium-210	7.03	0.524		7.152E-15
Plutonium-241	4.52	37.3	U U	4.598E-15
Thorium-230	0.562	0.539		5.717E-16
Thorium-228	0.539	0.444	UJ	5.483E-16
Actinium-228	9.83	33.4	U U	1.000E-14
Americium-241	-0.363	1.27	U U	-3.693E-16
Plutonium-239	0.00163	0.268	U U	1.658E-18
Ra-228 – total	2.54	3.61	U U	2.584E-15
Radium-226, -228 combined	-0.616	2.98	U U	-6.267E-16
Thorium-232	0.253	0.267	U U	2.574E-16
Uranium-238	0.598	0.327	UJ	6.083E-16

Radionuclide	Result (pCi/sample)	MDC (pCi/sample)	Data Qualifier	Airborne Concentration (µCi/mL)
Uranium-233/234	0.238	0.556	U U	2.421E-16
Uranium-235/236	0.0172	0.375	U U	1.750E-17
<b>Location DOE-3 – Air volume/sample = 9.78E+08</b>				
Cesium-137	-1.87	8.19	U U	-1.895E-15
Strontium-90	0.543	2.84	U U	5.502E-16
Cobalt-60	-2.42	8.78	U U	-2.452E-15
Potassium-40	87.3	148	U U	8.845E-14
Beryllium-7	38.5	72.4	U U	3.901E-14
Plutonium-238	-0.0309	0.352	U U	-3.131E-17
Polonium-210	6.41	0.737	J	6.494E-15
Plutonium-241	0.956	42.1	U U	9.686E-16
Thorium-230	0.794	0.497		8.045E-16
Thorium-228	0.607	0.355	UJ	6.150E-16
Actinium-228	-11.4	41.3	U U	-1.155E-14
Americium-241	-0.199	0.887	U U	-2.016E-16
Plutonium-239	0.0127	0.277	U U	1.287E-17
Ra-228 – total	2.29	3.29	U U	2.320E-15
Radium-226, -228 combined	1.48	2.35	U U	1.499E-15
Thorium-232	0.24	0.255	U U	2.432E-16
Uranium-238	0.307	0.255	UJ	3.110E-16
Uranium-233/234	0.878	0.383	UJ	8.896E-16
Uranium-235/236	0.0342	0.365	U U	3.465E-17
<b>Location DOE-4 – Air volume/sample = 9.83E+08</b>				
Cesium-137	-0.7	6.54	U U	-7.121E-16
Strontium-90	0.229	1.42	U U	2.330E-16
Cobalt-60	-0.114	6.54	U U	-1.160E-16
Potassium-40	131	88.4	UI UJ	1.333E-13
Beryllium-7	69.8	73.1	U U	7.101E-14
Plutonium-238	-0.0648	0.402	U U	-6.592E-17
Polonium-210	6.64	0.375		6.755E-15
Plutonium-241	-11.5	42	U U	-1.170E-14
Thorium-230	0.529	0.588	U U	5.381E-16
Thorium-228	0.257	0.604	U U	2.614E-16
Actinium-228	-14.2	31.6	U U	-1.445E-14
Americium-241	0.0181	1.15	U U	1.841E-17
Plutonium-239	0.037	0.324	U U	3.764E-17
Ra-228 – total	8.61	4.8	UJ	8.759E-15
Radium-226, -228 combined	2.92	3.11	U U	2.970E-15
Thorium-232	0.821	0.305	UJ	8.352E-16

Radionuclide	Result (pCi/sample)	MDC (pCi/sample)	Data Qualifier	Airborne Concentration (μCi/mL)
Uranium-238	0.888	0.24	UJ	9.034E-16
Uranium-233/234	0.443	0.403	UJ	4.507E-16
Uranium-235/236	0.0939	0.342	U U	9.552E-17

Note – Data Qualifier meanings:

**U U** – Analyte was analyzed for but not detected and is qualified as a non-detect.

**UI** – Results are considered a false positive due to high peak-width.

**UJ** – The analyte was not detected; however, the result is estimated because of discrepancies in meeting certain analyte-specific QC criteria.

(This page intentionally left blank)

## **APPENDIX D**

### **PM<sub>10</sub> Monthly Audit Reports and Flow Verification Results**

(This page intentionally left blank)

## One-Point Flow Rate Bias Estimate

--	--

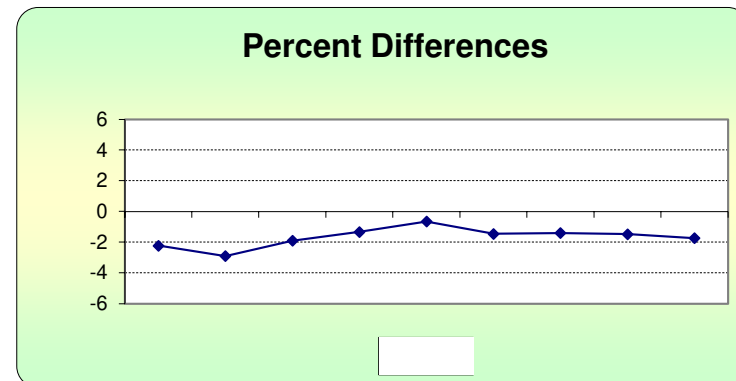
					d (Eqn. 1)	Percentile	d <sup>2</sup>	d	d  <sup>2</sup>
					-2.235		4.994	2.235	4.994
					-2.907	<b>25th</b>	8.451	2.907	8.451
					-1.906	-1.906	3.632	1.906	3.632
					-1.339		1.793	1.339	1.793
					-0.654	<b>75th</b>	0.428	0.654	0.428
					-1.464	-1.408	2.143	1.464	2.143
					-1.408		1.984	1.408	1.984
					-1.475		2.175	1.475	2.175
					-1.741		3.030	1.741	3.030

<b>n</b>	$\sum d $	
9	15.129	
<b>n-1</b>	$\sum d ^2$	
8	28.629	

<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
2.07	FALSE
<b>Signed Bias (%)</b>	Both Signs Negative
-2.07	TRUE

Note: No quality issues reported this quarter.

Reference: U.S. EPA, Ambient Monitoring Technology Information Center (AMTIC)  
 Quality Indicator Assessment Reports  
 Data Assessment Statistical Calculator - Software to calculate precision and bias statistics  
 MS EXCEL filename - "11/3/2017 (dasc)11\_3\_17.xls"  
<https://www3.epa.gov/tnn/amtic/qareport.html>



## One-Point Flow Rate Bias Estimate

--	--

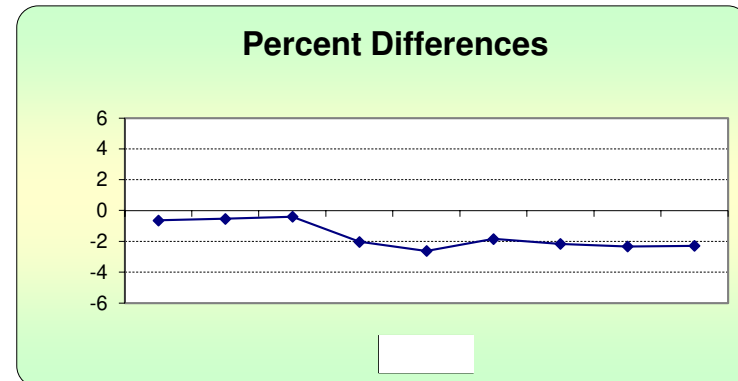
					d (Eqn. 1)	Percentile	d <sup>2</sup>	d	d  <sup>2</sup>
					-0.639		0.408	0.639	0.408
					-0.536	<b>25th</b>	0.287	0.536	0.287
					-0.398	-2.289	0.159	0.398	0.159
					-2.029		4.118	2.029	4.118
					-2.624	<b>75th</b>	6.885	2.624	6.885
					-1.851	-0.639	3.426	1.851	3.426
					-2.166		4.693	2.166	4.693
					-2.339		5.472	2.339	5.472
					-2.289		5.241	2.289	5.241

<b>n</b>	$\sum d $	
9	14.872	
<b>n-1</b>	$\sum d ^2$	
8	30.688	

<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
2.19	FALSE
<b>Signed Bias (%)</b>	Both Signs Negative
-2.19	TRUE

Note: Unit Y12096 replaced W23313 in May 2023 due to nozzle issue.

**Reference:** U.S. EPA, Ambient Monitoring Technology Information Center (AMTIC)  
 Quality Indicator Assessment Reports  
 Data Assessment Statistical Calculator - Software to calculate precision and bias statistics  
 MS EXCEL filename - "11/3/2017 (dasc)11\_3\_17.xls"  
<https://www3.epa.gov/tnn/amtic/qareport.html>



## One-Point Flow Rate Bias Estimate

--	--

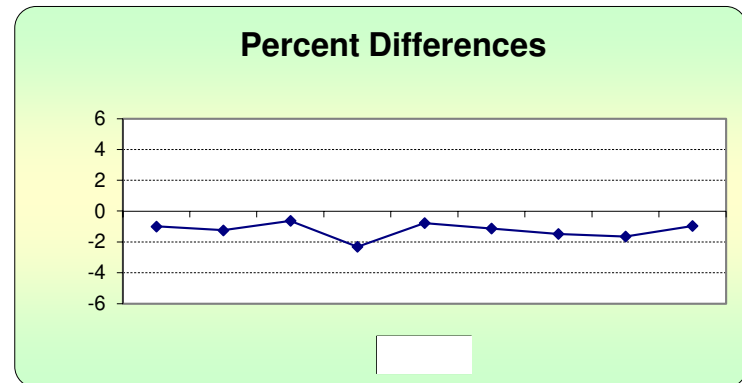
					d (Eqn. 1)	Percentile	d <sup>2</sup>	d	d  <sup>2</sup>
					-0.990		0.980	0.990	0.980
					-1.242	<b>25th</b>	1.542	1.242	1.542
					-0.625	-1.478	0.390	0.625	0.390
					-2.303		5.303	2.303	5.303
					-0.772	<b>75th</b>	0.597	0.772	0.597
					-1.130	-0.962	1.277	1.130	1.277
					-1.478		2.184	1.478	2.184
					-1.649		2.719	1.649	2.719
					-0.962		0.926	0.962	0.926

<b>n</b>	$\sum d $	
9	11.151	
<b>n-1</b>	$\sum d ^2$	
8	15.918	

<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
1.56	FALSE
<b>Signed Bias (%)</b>	Both Signs Negative
-1.56	TRUE

Note: No quality issues reported this quarter.

Reference: U.S. EPA, Ambient Monitoring Technology Information Center (AMTIC)  
 Quality Indicator Assessment Reports  
 Data Assessment Statistical Calculator - Software to calculate precision and bias statistics  
 MS EXCEL filename - "11/3/2017 (dasc)11\_3\_17.xls"  
<https://www3.epa.gov/tnn/amtic/qareport.html>



## One-Point Flow Rate Bias Estimate

--	--

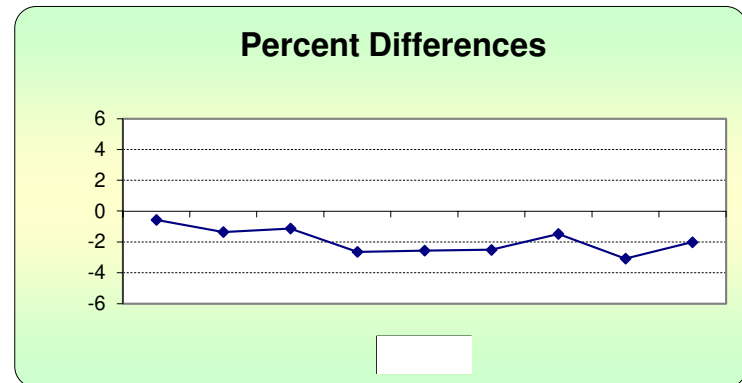
					d (Eqn. 1)	Percentile	d <sup>2</sup>	d	d  <sup>2</sup>
					-0.563		0.317	0.563	0.317
					-1.359	<b>25th</b>	1.846	1.359	1.846
					-1.130	-2.567	1.277	1.130	1.277
					-2.643		6.983	2.643	6.983
					-2.567	<b>75th</b>	6.590	2.567	6.590
					-2.507	-1.359	6.285	2.507	6.285
					-1.478		2.184	1.478	2.184
					-3.076		9.462	3.076	9.462
					-2.016		4.063	2.016	4.063

<b>n</b>	$\sum d $	
9	17.337	
<b>n-1</b>	$\sum d ^2$	
8	39.006	

<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
2.45	FALSE
<b>Signed Bias (%)</b>	Both Signs Negative
-2.45	TRUE

Note: Unit W23310 was replaced with new unit B18932 in May 2023 due to total pump failure on the old unit.

Reference: U.S. EPA, Ambient Monitoring Technology Information Center (AMTIC)  
 Quality Indicator Assessment Reports  
 Data Assessment Statistical Calculator - Software to calculate precision and bias statistics  
 MS EXCEL filename - "11/3/2017 (dasc)11\_3\_17.xls"  
<https://www3.epa.gov/tnn/amtic/qareport.html>





**Baseline Air Monitoring Program - DOE  
E-BAM Monthly Audit and Maintenance**

Station # DOE-1

Audit Date: 4/24/2023

Serial # X16067

Audited By: B.W. Wilford

**Flow Audit**

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/27/2023  
 Leak Check Value: as found: 0.5 as left: 0.5

	E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found: <u>16.1</u> °C	<u>15.5</u> °C	as left:	<u>16.1</u> °C	<u>15.5</u> °C
Barometric Pressure:	as found: <u>712.8</u> mmHg	<u>713.0</u> mmHg	as left:	<u>712.8</u> mmHg	<u>713.0</u> mmHg
16.7 lpm Flow Rate	as found: <u>16.7</u> lpm	<u>17.20</u> lpm	as left:	<u>16.7</u> lpm	<u>17.20</u> lpm
14.0 lpm Flow Rate	as found: <u>14.0</u> lpm	<u>14.32</u> lpm	as left:	<u>14.0</u> lpm	<u>14.32</u> lpm
17.5 lpm Flow Rate	as found: <u>17.5</u> lpm	<u>17.84</u> lpm	as left:	<u>17.5</u> lpm	<u>17.84</u> lpm

**Mechanical Audits (Y = Yes N = No)**

Sample nozzle clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape support vane clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>

**Manual Span Membrane Test**

Expected Span Mass (mg/cm<sup>2</sup>): 0.950

Measured Span Mass (mg/cm<sup>2</sup>): 0.956

Difference (mg/cm<sup>2</sup>): 0.006

% Difference / Pass or Fail: 0.62%

**Pump Test**

Flow Rate	Vacuum Value	Quality Category
14.0 - 15.0 (lpm)	(Hg)	Good / Marginal / Poor
<u>14.9</u>	<u>431.7</u>	<u>Marginal</u>

**Setup and Calibration Values**

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>0816</u>	<u>0816</u>	Analog Mode	Hourly	<u>hourly</u>	Flow Type	Actual	<u>Act</u>
Location	<u>1</u>	<u>1</u>	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5v</u>
Tape Advance	24 hrs	<u>24hr</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60min</u>	Delta T Setpoint	15 C	<u>15C</u>	DAC	8.0 v	<u>8.0v</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>On</u>	RH Connect	No	<u>No</u>
Analog FS	1.0 v	<u>1.0v</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>off</u>

**Last 6 Errors in E-BAM Error Log**

Error	Date	Time	Error	Date	Time
<u>1 Power Outage</u>	<u>4/14/23</u>	<u>0823</u>	4		
2			5		
3			6		

Audit Notes:

---



---



---



---



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-2

Serial # W23313

Audit Date: 4/24/23

Audited By: TB Wiliford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/27/2023

Leak Check Value: as found: 0.5 as left: 0.5

	as found:	E-BAM	Ref. Std.	as left:	E-BAM	Ref. Std.
Ambient Temperature:	as found:	<u>19.5</u> °C	<u>18.6</u> °C	as left:	<u>19.5</u> °C	<u>18.6</u> °C
Barometric Pressure:	as found:	<u>710.0</u> mmHg	<u>710.0</u> mmHg	as left:	<u>710.0</u> mmHg	<u>710.0</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>16.79</u> lpm	as left:	<u>16.7</u> lpm	<u>16.79</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>14.09</u> lpm	as left:	<u>14.0</u> lpm	<u>14.09</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.57</u> lpm	as left:	<u>17.5</u> lpm	<u>17.57</u> lpm

Mechanical Audits ( Y = Yes N = No )

Sample nozzle clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape support vane clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>

Manual Span Membrane Test

Pump Test

Expected Span Mass (mg/cm <sup>2</sup> ):	<u>0.885</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm <sup>2</sup> ):	<u>0.890</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm <sup>2</sup> ):	<u>0.005</u>	(lpm)	(Hg)	
% Difference / Pass or Fail:	<u>0.56%</u>	<u>14.4</u>	<u>416.2</u>	<u>Marginal</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>0859</u>	<u>0859</u>	Analog Mode	Hourly	<u>hourly</u>	Flow Type	Actual	<u>Act</u>
Location	<u>2</u>	<u>2</u>	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5v</u>
Tape Advance	24 hrs	<u>24 hr</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60min</u>	Delta T Setpoint	15 C	<u>15C</u>	DAC	8.0 v	<u>8.0v</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>on</u>	RH Connect	No	<u>NO</u>
Analog FS	1.0 v	<u>1.0v</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>off</u>

Last 6 Errors in E-BAM Error Log

Error	Date	Time	Error	Date	Time
<u>1 No new messages</u>	<u>4/24/23</u>	<u>0911</u>			
<u>2</u>					
<u>3</u>					

Audit Notes:

---



---



---



---



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-3

Serial # W2 3314

Audit Date: 4/24/2023

Audited By: T. S. Williford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/27/2023

Leak Check Value: as found: 0.4 as left: 0.4

		E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found:	<u>18.9</u> °C	<u>17.6</u> °C	as left:	<u>18.9</u> °C	<u>17.6</u> °C
Barometric Pressure:	as found:	<u>709.3</u> mmHg	<u>711.5</u> mmHg	as left:	<u>709.3</u> mmHg	<u>711.5</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>16.91</u> lpm	as left:	<u>16.7</u> lpm	<u>16.91</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>14.14</u> lpm	as left:	<u>14.0</u> lpm	<u>14.14</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.61</u> lpm	as left:	<u>17.5</u> lpm	<u>17.61</u> lpm

Mechanical Audits (Y = Yes N = No)

Sample nozzle clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape support vane clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>

Manual Span Membrane Test

Expected Span Mass (mg/cm2): 0.919

Measured Span Mass (mg/cm2): 0.930

Difference (mg/cm2): 0.011

% Difference / Pass or Fail: 1.20%

Pump Test

Flow Rate	Vacuum Value	Quality Category
14.0 - 15.0 (lpm)	<u>414.6</u> (Hg)	<u>Marginal</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1214</u>	<u>1214</u>	Analog Mode	Hourly	<u>Hourly</u>	Flow Type	Actual	<u>Act</u>
Location	<u>3</u>	<u>3</u>	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5v</u>
Tape Advance	24 hrs	<u>24hr</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60min</u>	Delta T Setpoint	15 C	<u>15C</u>	DAC	8.0 v	<u>8.0v</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>on</u>	RH Connect	No	<u>NO</u>
Analog FS	1.0 v	<u>1.0v</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>off</u>

Last 6 Errors in E-BAM Error Log

Error	Date	Time	Error	Date	Time
<u>1 Power outage</u>	<u>3/30/23</u>	<u>1203</u>			
<u>2 Power outage</u>	<u>3/27/23</u>	<u>1355</u>			
<u>3 Power outage</u>	<u>3/13/23</u>	<u>1050</u>			

Audit Notes:



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-4  
 Audit Date: 4/24/23

Serial # W2 3310  
 Audited By: BSW/ILFond

Flow Audit					
Flow Audit Device Model:	BGI Delta Cal DC-1A	Serial No:	158047	Calibration Date:	2/27/2023
Leak Check Value:	as found: <u>0.4</u>		as left: <u>0.4</u>		
Ambient Temperature:	as found:	E-BAM	Ref. Std.	as left:	E-BAM
Barometric Pressure:	as found:	18.6 °C	17.6 °C	as left:	18.6 °C
16.7 lpm Flow Rate	as found:	702.0 mmHg	703.0 mmHg	as left:	702.0 mmHg
14.0 lpm Flow Rate	as found:	16.7 lpm	16.93 lpm	as left:	16.7 lpm
17.5 lpm Flow Rate	as found:	14.0 lpm	14.22 lpm	as left:	14.0 lpm
	as found:	17.5 lpm	17.70 lpm	as left:	17.5 lpm

Mechanical Audits ( Y = Yes N = No )					
Sample nozzle clean:	as found	<u>Y</u>	as left	<u>Y</u>	
Tape support vane clean:	as found	<u>Y</u>	as left	<u>Y</u>	
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>	

Manual Span Membrane Test	Pump Test		
Expected Span Mass (mg/cm2): <u>0.915</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm2): <u>0.915</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm2): <u>0.000</u>	(lpm)	(Hg)	
% Difference / <u>Pass</u> or Fail: <u>0%</u>	<u>14.6</u>	<u>392.5</u>	<u>Good</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1303</u>	<u>1303</u>	Analog Mode	Hourly	<u>Hourly</u>	Flow Type	Actual	<u>Act</u>
Location	<u>4</u>	<u>4</u>	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5v</u>
Tape Advance	24 hrs	<u>24 hrs</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25 C</u>
Realtime Avg	60 mins	<u>60 min</u>	Delta T Setpoint	15 C	<u>15 C</u>	DAC	8.0 v	<u>8.0 v</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>on</u>	RH Connect	No	<u>No</u>
Analog FS	1.0 v	<u>1.0 v</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>off</u>

Last 6 Errors in E-BAM Error Log					
Error	Date	Time	Error	Date	Time
<u>1 No new Messages</u>	<u>4/24/23</u>	<u>1311</u>			
<u>2</u>					
<u>3</u>					

Audit Notes:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-1 Serial # X 16067  
 Audit Date: 5/26/2023 Audited By: TS Williford

Flow Audit					
Flow Audit Device Model:	<u>BGI Delta Cal DC-1A</u>	Serial No:	<u>158047</u>	Calibration Date:	<u>2/27/2023</u>
Leak Check Value:	as found: <u>0.5</u>			as left: <u>0.5</u>	
	E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found: <u>18.3</u> °C	<u>17.0</u> °C	as left:	<u>18.3</u> °C	<u>17.0</u> °C
Barometric Pressure:	as found: <u>710.5</u> mmHg	<u>710.5</u> mmHg	as left:	<u>710.5</u> mmHg	<u>710.5</u> mmHg
16.7 lpm Flow Rate	as found: <u>16.7</u> lpm	<u>16.81</u> lpm	as left:	<u>16.7</u> lpm	<u>16.81</u> lpm
14.0 lpm Flow Rate	as found: <u>14.0</u> lpm	<u>14.19</u> lpm	as left:	<u>14.0</u> lpm	<u>14.19</u> lpm
17.5 lpm Flow Rate	as found: <u>17.5</u> lpm	<u>17.76</u> lpm	as left:	<u>17.5</u> lpm	<u>17.76</u> lpm

Mechanical Audits (Y = Yes N = No)			
Sample nozzle clean:	as found	<u>Y</u>	as left <u>Y</u>
Tape support vane clean:	as found	<u>Y</u>	as left <u>Y</u>
Tape spool covers tight:	as found	<u>Y</u>	as left <u>Y</u>
PM10 particle trap clean:	as found	<u>N</u>	as left <u>Y</u>
PM10 drip jar empty:	as found	<u>N</u>	as left <u>Y</u>
PM10 bug screen clear:	as found	<u>N</u>	as left <u>Y</u>

Manual Span Membrane Test	Pump Test		
Expected Span Mass (mg/cm <sup>2</sup> ): <u>0.950</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm <sup>2</sup> ): <u>0.952</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm <sup>2</sup> ): <u>0.002</u>	(lpm)	(Hg)	
% Difference <del>Pass</del> or Fail: <u>0.21%</u>	<u>14.8</u>	<u>425.2</u>	<u>Marginal</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>0905</u>	<u>0905</u>	Analog Mode	Hourly	<u>Hourly</u>	Flow Type	Actual	<u>Act</u>
Location	<u>1</u>	<u>1</u>	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5v</u>
Tape Advance	24 hrs	<u>24hrs</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60min</u>	Delta T Setpoint	15 C	<u>15C</u>	DAC	8.0 v	<u>8.0v</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>On</u>	RH Connect	No	<u>No</u>
Analog FS	1.0 v	<u>1.0v</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>off</u>

Last 6 Errors in E-BAM Error Log					
Error	Date	Time	Error	Date	Time
1 <u>No new messages</u>	<u>5/26/23</u>	<u>0914</u>	4		
2			5		
3			6		

Audit Notes:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



**Baseline Air Monitoring Program - DOE  
E-BAM Monthly Audit and Maintenance**

Station # DOE-2 Serial # Y12096  
 Audit Date: 5/5/2023 Audited By: TS w. Li Ford

Flow Audit					
Flow Audit Device Model:	BGI Delta Cal DC-1A	Serial No:	158047	Calibration Date:	2/27/2023
Leak Check Value:	as found: <u>0.4</u>		as left: <u>0.4</u>		
Ambient Temperature:	as found:	E-BAM	Ref. Std.	as left:	E-BAM
Barometric Pressure:	as found:	13.6 °C	13.9 °C	as left:	13.6 °C
16.7 lpm Flow Rate	as found:	711.7 mmHg	712.5 mmHg	as left:	711.7 mmHg
14.0 lpm Flow Rate	as found:	16.7 lpm	17.15 lpm	as left:	16.7 lpm
17.5 lpm Flow Rate	as found:	14.0 lpm	14.29 lpm	as left:	14.0 lpm
	as found:	17.5 lpm	17.83 lpm	as left:	17.5 lpm

Mechanical Audits ( Y = Yes N = No )					
Sample nozzle clean:	as found	<u>Y</u>	as left	<u>Y</u>	
Tape support vane clean:	as found	<u>Y</u>	as left	<u>Y</u>	
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>	

Manual Span Membrane Test	Pump Test		
Expected Span Mass (mg/cm2) : <u>0.891</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm2) : <u>0.890</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm2) : <u>0.001</u>	(lpm)	(Hg)	
% Difference / Pass or Fail: <u>0.11%</u>	<u>14.1</u>	<u>401.6</u>	<u>Marginal</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1043</u>	<u>1043</u>	Analog Mode	Hourly	<u>Hourly</u>	Flow Type	Actual	<u>Act</u>
Location	<u>2</u>	<u>2</u>	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5v</u>
Tape Advance	24 hrs	<u>24hrs</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60min</u>	Delta T Setpoint	15 C	<u>15C</u>	DAC	8.0 v	<u>8.0v</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>on</u>	RH Connect	No	<u>NO</u>
Analog FS	1.0 v	<u>1.0v</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>off</u>

Last 6 Errors in E-BAM Error Log					
Error	Date	Time	Error	Date	Time
1 <u>No messages</u>	<u>5/5/23</u>	<u>1250</u>	4		
2			5		
3			6		

Audit Notes:  
 \* This is the initial audit for Y12096 which replaced unit W23313 which <sup>TSW</sup> W23313 had problem with the nozzle. It would keep going up and down then finally shut off. Sent unit to met-one on 5/6/2023.



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-3 Serial # W23314  
 Audit Date: 5/26/2023 Audited By: T.S. Williford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/27/2023

Leak Check Value: as found: 0.4 as left: 0.4

		E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found:	<u>22.5</u> °C	<u>20.9</u> °C	as left:	<u>22.5</u> °C	<u>20.9</u> °C
Barometric Pressure:	as found:	<u>711.5</u> mmHg	<u>712.9</u> mmHg	as left:	<u>711.5</u> mmHg	<u>712.9</u> mmHg
16.7 lpm Flow Rate	as found:	<u>14.7</u> lpm	<u>16.83</u> lpm	as left:	<u>14.7</u> lpm	<u>16.83</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>14.33</u> lpm	as left:	<u>14.0</u> lpm	<u>14.33</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.70</u> lpm	as left:	<u>17.5</u> lpm	<u>17.70</u> lpm

Mechanical Audits (Y = Yes N = No)

Sample nozzle clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape support vane clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>

Manual Span Membrane Test

Manual Span Membrane Test	Pump Test		
Expected Span Mass (mg/cm2) : <u>0.919</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm2) : <u>0.931</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm2) : <u>0.012</u>	(lpm)	(Hg)	
% Difference / Pass or Fail: <u>1.30%</u>	<u>14.0</u>	<u>412.1</u>	<u>Marginal</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>0952</u>	<u>0952</u>	Analog Mode	Hourly	<u>Hourly</u>	Flow Type	Actual	<u>Act</u>
Location	<u>3</u>	<u>3</u>	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5v</u>
Tape Advance	24 hrs	<u>24hr</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60min</u>	Delta T Setpoint	15 C	<u>15C</u>	DAC	8.0 v	<u>8.0v</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>on</u>	RH Connect	No	<u>No</u>
Analog FS	1.0 v	<u>1.0v</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>off</u>

Last 6 Errors in E-BAM Error Log

Error	Date	Time	Error	Date	Time
<u>1 No new messages</u>	<u>5/26/23</u>	<u>1003</u>	4		
<u>2</u>			5		
<u>3</u>			6		

Audit Notes:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-4 Serial # B18932  
 Audit Date: 5/8/23 Audited By: TS Williford

Flow Audit					
Flow Audit Device Model:	BGI Delta Cal DC-1A	Serial No:	158047	Calibration Date:	2/27/2023
Leak Check Value:	as found: <u>0.37</u>		as left: <u>0.37</u>		
	E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found: <u>17.6</u> °C	<u>17.4</u> °C	as left:	<u>17.6</u> °C	<u>17.4</u> °C
Barometric Pressure:	as found: <u>706.6</u> mmHg	<u>706.5</u> mmHg	as left:	<u>706.6</u> mmHg	<u>706.5</u> mmHg
16.7 lpm Flow Rate	as found: <u>16.7</u> lpm	<u>17.14</u> lpm	as left:	<u>16.7</u> lpm	<u>17.14</u> lpm
14.0 lpm Flow Rate	as found: <u>14.0</u> lpm	<u>14.38</u> lpm	as left:	<u>14.0</u> lpm	<u>14.38</u> lpm
17.5 lpm Flow Rate	as found: <u>17.5</u> lpm	<u>17.95</u> lpm	as left:	<u>17.5</u> lpm	<u>17.95</u> lpm

Mechanical Audits ( Y = Yes N = No )					
Sample nozzle clean:	as found	<u>Y</u>	as left	<u>Y</u>	
Tape support vane clean:	as found	<u>Y</u>	as left	<u>Y</u>	
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>	

Manual Span Membrane Test	Pump Test		
Expected Span Mass (mg/cm2) : <u>0.854</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm2) : <u>0.855</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm2) : <u>0.001</u>	(lpm)	(Hg)	
% Difference / Pass or Fail: <u>0.1%</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1226</u>	<u>1226</u>	Analog Mode	Hourly	<u>Hourly</u>	Flow Type	Actual	<u>NA</u>
Location	<u>4</u>	<u>4</u>	Baud Rate	<del>9600</del>	<u>4600</u>	Restart Voltage	12.5 v	<u>12.5V</u>
Tape Advance	24 hrs	<u>24hrs</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25°C</u>
Realtime Avg	60 mins	<u>60min</u>	Delta T Setpoint	15 C	<u>NA</u>	DAC	8.0 v	<u>NA</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>NA</u>	RH Connect	No	<u>NA</u>
Analog FS	1.0 v	<u>1.0V</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>NA</u>

Last 6 Errors in E-BAM Error Log					
Error	Date	Time	Error	Date	Time
1 <u>No new Error Messages</u>	<u>5/8/23</u>	<u>1236</u>	4		
2			5		
3			6		

Audit Notes:

\* This is the initial audit for unit B18932. Unit B18932 is a new, more advance unit than the original five units we started with in 2018. There are some ~~categories~~ <sup>parameters</sup> that are not audited with these units.

For example, there is no audit function for "pump test".

\* This unit is replacing W23310 which had a total pump failure. Sent in unit to metone on 5/10/23.



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-1 Serial # X116067  
 Audit Date: 6/23/2023 Audited By: TS Williford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/27/2023

Leak Check Value: as found: 0.5 as left: 0.5

		E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found:	<u>23.3</u> °C	<u>21.9</u> °C	as left:	<u>23.3</u> °C	<u>21.9</u> °C
Barometric Pressure:	as found:	<u>713.6</u> mmHg	<u>713.5</u> mmHg	as left:	<u>713.6</u> mmHg	<u>713.5</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>16.95</u> lpm	as left:	<u>16.7</u> lpm	<u>16.95</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>14.20</u> lpm	as left:	<u>14.0</u> lpm	<u>14.20</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.81</u> lpm	as left:	<u>17.5</u> lpm	<u>17.81</u> lpm

Mechanical Audits (Y = Yes N = No)

Sample nozzle clean:	as found	<u>N</u>	as left	<u>Y</u>
Tape support vane clean:	as found	<u>N</u>	as left	<u>Y</u>
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>

Manual Span Membrane Test		Pump Test		
Expected Span Mass (mg/cm2):	<u>0.950</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm2):	<u>0.951</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm2):	<u>0.001</u>	(lpm)	(Hg)	
% Difference / Pass or Fail:	<u>0.11%</u>	<u>14.2</u>	<u>418.6</u>	<u>Marginal</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>0805</u>	<u>0805</u>	Analog Mode	Hourly	<u>Hardly</u>	Flow Type	Actual	<u>Act</u>
Location	<u>1</u>	<u>1</u>	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5v</u>
Tape Advance	24 hrs	<u>24hr</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60 mins</u>	Delta T Setpoint	15 C	<u>15C</u>	DAC	8.0 v	<u>8.0v</u>
Machine Type	PM-10	<u>PM10</u>	RH Control	On	<u>on</u>	RH Connect	No	<u>No</u>
Analog FS	1.0 v	<u>1.0v</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>off</u>

Last 6 Errors in E-BAM Error Log

Error	Date	Time	Error	Date	Time
<u>1 No new Messages</u>	<u>0814</u>	<u>6/23/23</u>			
<u>2</u>					
<u>3</u>					

Audit Notes:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

080953 021.15



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-2 Serial # Y12096  
 Audit Date: 6/23/2023 Audited By: TS Williford

Flow Audit					
Flow Audit Device Model:	BGI Delta Cal DC-1A	Serial No:	158047	Calibration Date:	2/27/2023
Leak Check Value:	as found: <u>0.40.3</u>		as left: <u>0.3</u>		
	E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found: <u>24.6</u> °C	<u>23.8</u> °C	as left:	<u>24.6</u> °C	<u>23.8</u> °C
Barometric Pressure:	as found: <u>708.6</u> mmHg	<u>711.0</u> mmHg	as left:	<u>708.6</u> mmHg	<u>711.0</u> mmHg
16.7 lpm Flow Rate	as found: <u>16.7</u> lpm	<u>17.10</u> lpm	as left:	<u>16.7</u> lpm	<u>17.1</u> lpm
14.0 lpm Flow Rate	as found: <u>14.0</u> lpm	<u>14.31</u> lpm	as left:	<u>14.0</u> lpm	<u>14.31</u> lpm
17.5 lpm Flow Rate	as found: <u>17.5</u> lpm	<u>17.91</u> lpm	as left:	<u>17.5</u> lpm	<u>17.91</u> lpm

Mechanical Audits (Y = Yes N = No)					
Sample nozzle clean:	as found	<u>N</u>	as left	<u>Y</u>	
Tape support vane clean:	as found	<u>N</u>	as left	<u>Y</u>	
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>	
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>	

Manual Span Membrane Test	Pump Test		
Expected Span Mass (mg/cm2): <u>0.891</u>	Flow Rate 14.0 - 15.0 (lpm)	Vacuum Value (Hg)	Quality Category Good / Marginal / Poor
Measured Span Mass (mg/cm2): <u>0.874</u>			
Difference (mg/cm2): <u>0.017</u>			
% Difference / <u>Pass</u> or Fail: <u>1.9%</u>	<u>14.4</u>	<u>405.5</u>	<u>Good</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>0853</u>	<u>0853</u>	Analog Mode	Hourly	<u>Hourly</u>	Flow Type	Actual	<u>Act</u>
Location	<u>2</u>	<u>2</u>	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5v</u>
Tape Advance	24 hrs	<u>24 hrs</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60 mins</u>	Delta T Setpoint	15 C	<u>15C</u>	DAC	8.0 v	<u>8.0v</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>on</u>	RH Connect	No	<u>No</u>
Analog FS	1.0 v	<u>1.0v</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>off</u>

Last 6 Errors in E-BAM Error Log					
Error	Date	Time	Error	Date	Time
<u>1 No new messages</u>	<u>6/23/23</u>	<u>0904</u>			
<u>2</u>					
<u>3</u>					

Audit Notes:

---



---



---



---



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-3 Serial # W23314  
 Audit Date: 6/23/2023 Audited By: JS Williford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/27/2023

Leak Check Value: as found: 0.4 as left: 0.4

		E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found:	<u>27.7</u> °C	<u>26.8</u> °C	as left:	<u>27.7</u> °C	<u>26.8</u> °C
Barometric Pressure:	as found:	<u>710.2</u> mmHg	<u>712.5</u> mmHg	as left:	<u>710.2</u> mmHg	<u>712.5</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>16.98</u> lpm	as left:	<u>16.7</u> lpm	<u>16.98</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>14.21</u> lpm	as left:	<u>14.0</u> lpm	<u>14.21</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.67</u> lpm	as left:	<u>17.5</u> lpm	<u>17.67</u> lpm

Mechanical Audits ( Y = Yes N = No )

Sample nozzle clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape support vane clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>

Manual Span Membrane Test		Pump Test		
Expected Span Mass (mg/cm2) :	<u>0.919</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm2) :	<u>0.928</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm2) :	<u>0.009</u>	(lpm)	(Hg)	
% Difference / Pass or Fail:	<u>0.97%</u>	<u>14.7</u>	<u>423.7</u>	<u>Marginal</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>0941</u>	<u>0941</u>	Analog Mode	Hourly	<u>hourly</u>	Flow Type	Actual	<u>Act</u>
Location	<u>3</u>	<u>3</u>	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5V</u>
Tape Advance	24 hrs	<u>24hrs</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60min</u>	Delta T Setpoint	15 C	<u>15C</u>	DAC	8.0 v	<u>8.0V</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>on</u>	RH Connect	No	<u>No</u>
Analog FS	1.0 v	<u>1.0V</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>off</u>

Last 6 Errors in E-BAM Error Log

Error	Date	Time	Error	Date	Time
<u>1 No new Messages</u>	<u>6/23/23</u>	<u>0956</u>	4		
2			5		
3			6		

Audit Notes:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-4

Serial # B18932

Audit Date: 6/23/23

Audited By: F.S. Wilkiford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/27/2023

Leak Check Value: as found: 0.37 as left: 0.37

		E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found:	<u>26.4</u> °C	<u>26.1</u> °C	as left:	<u>26.4</u> °C	<u>26.1</u> °C
Barometric Pressure:	as found:	<u>712.5</u> mmHg	<u>712.5</u> mmHg	as left:	<u>712.5</u> mmHg	<u>712.5</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>17.23</u> lpm	as left:	<u>16.7</u> lpm	<u>17.23</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>14.21</u> lpm	as left:	<u>14.0</u> lpm	<u>14.21</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.86</u> lpm	as left:	<u>17.5</u> lpm	<u>17.86</u> lpm

Mechanical Audits (Y = Yes N = No)

Sample nozzle clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape support vane clean:	as found	<u>Y</u>	as left	<u>Y</u>
Tape spool covers tight:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 particle trap clean:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 drip jar empty:	as found	<u>Y</u>	as left	<u>Y</u>
PM10 bug screen clear:	as found	<u>Y</u>	as left	<u>Y</u>

Manual Span Membrane Test

Pump Test

Expected Span Mass (mg/cm2):	<u>0.854</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm2):	<u>0.856</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm2):	<u>0.002</u>	(lpm)	(Hg)	
% Difference / Pass or Fail:	<u>0.23%</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1044</u>	<u>1044</u>	Analog Mode	Hourly	<u>Hourly</u>	Flow Type	Actual	<u>NA</u>
Location	<u>4</u>	<u>4</u>	Baud Rate	<del>9600</del>	<u>115200</u>	Restart Voltage	12.5 v	<u>12.5v</u>
Tape Advance	24 hrs	<u>24hr</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25°C</u>
Realtime Avg	60 mins	<u>60min</u>	Delta T Setpoint	15 C	<u>NA</u>	DAC	8.0 v	<u>NA</u>
Machine Type	PM-10	<u>PM-10</u>	RH Control	On	<u>NA</u>	RH Connect	No	<u>NA</u>
Analog FS	1.0 v	<u>1.0v</u>	Flow Setpoint	16.7	<u>16.7</u>	Pump Protect	Off	<u>NA</u>

Last 6 Errors in E-BAM Error Log

Error	Date	Time	Error	Date	Time
<u>1 No new messages</u>	<u>1105</u>	<u>6/23/23</u>			
<u>2</u>					
<u>3</u>					

Audit Notes: