

***Report on Quarterly Air Monitoring,  
Area IV, Ninth Quarter 2020***

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



September 2020

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

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

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Ninth Quarter 2020**

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

**September 2020**

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

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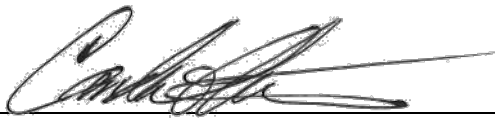
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# PROFESSIONAL CERTIFICATION

**Report on Quarterly Air Monitoring, Area IV, Ninth Quarter 2020  
Santa Susana Field Laboratory  
Ventura County, California**

September 2020

**This report has been prepared by a team of qualified professionals under the supervision of the senior staff whose signatures appear below.**



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## EXECUTIVE SUMMARY

This report summarizes the United States Department of Energy (DOE) air monitoring activities conducted during the ninth quarter (Q9) of the baseline monitoring period (April 1, 2020, to June 30, 2020) 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. The program is continuing for a third year, which consists of Quarter 8 through Quarter 11.

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 a Baseline Air Monitoring Program.

The objective of the Baseline Air Monitoring Program is to evaluate baseline (that is, pre-project) conditions. 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 the SSFL. Determining 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.

The following air monitoring activities conducted during Q9 2020 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 Q9. The baseline air monitoring is to be continued beginning July 1, 2020, with the tenth quarter of year three baseline monitoring. Data collected during remediation activities will be compared to the baseline conditions.

The following site activities were conducted during Q9 by DOE within Area IV:

- Groundwater levels
- Deactivation of CLIN 8, 9 facilities
- Surveillance and maintenance.

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## 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 Standard
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
mph	miles per hour
MS	mass spectrometry
m	meter(s)
m/sec	meter(s) per second
mb	millibar(s)
mL	milliliter(s)
MDC	minimum detectable concentration
NASA	National Aeronautics and Space Administration
NIST	National Institute of Standards and Technology
pCi	picocurie(s)
PM <sub>2.5</sub>	particulate matter less than 2.5 microns in aerodynamic diameter
PM <sub>10</sub>	particulate matter less than 10 microns in aerodynamic diameter
Q1	first quarter
Q2	second quarter
Q3	third quarter
Q4	fourth quarter
Q5	fifth quarter
Q6	sixth quarter
Q7	seventh quarter
Q8	eighth quarter
Q9	ninth quarter
QA	quality assurance
QC	quality control
RAWS	Remote Automatic Weather Stations
RPD	relative percent difference
RSL	regional screening level
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 baseline 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.

Baseline 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 Baseline Air Monitoring Program is to evaluate baseline (that is, pre-project) conditions and provide a basis for determining the magnitude of deviation from those baseline conditions that may result from onsite remediation activities (project) 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 were 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 are also collected as a part of the Baseline Air Monitoring Program.

Figure 1 shows the air monitoring locations for the Baseline 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 Q9 quarterly results and quality assurance (QA) activities performed between April 1, 2020, and June 30, 2020.

## **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 between 2018 and 2019 from Weather Atlas, average rainfall is on the order of 17.9 inches per year. The majority of the rainfall occurs between December and April.

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 Q9 reporting period (April 1, 2020, to June 30, 2020).

Quality objectives and data completeness of 80% were met for all meteorological, PM<sub>10</sub>, and radionuclide data for Q9, and VOC data met the completeness goal of 85% for Q9 of the Baseline Air Monitoring Program.

Urban background data compared with baseline monitoring data indicate that the PM<sub>10</sub> concentrations measured at stations DOE-1, DOE-2, DOE-3, and DOE-4 during Q9 are comparable to the PM<sub>10</sub> concentrations measured at stations characterizing urban background. During Q9, one of the five average daily concentrations exceeded the CAAQS of 50 µg/m<sup>3</sup> or the National Ambient Air Quality Standard of 150 µg/m<sup>3</sup>.

During Q9 four VOC analytes were detected above the EPA Residential Air RSL or the DTSC HHRA. Two analytes were detected during the April 2, 2020, sampling event and two during the May 27, 2020, sampling event. DOE-1 had one detection above the screening level and DOE-2 had three analytes detected above the screening level.

Of the 26 radiological sampling events at DOE-1, DOE-2, DOE-3 and DOE-4 in Q9, all of the detections for gross alpha and gross beta that exceeded the minimum detectable concentration (MDC) are naturally occurring radionuclides. Detections are expected because naturally occurring radioactive materials are always present. No man-made radionuclides that are contaminants of concern at ETEC were detected.

Data collected during the Q9 reporting period agree with data collected, analyzed, and reported by the State of California Department of Toxic Substances Control, 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, 2020, for the tenth quarter of the Baseline Air Monitoring Program.

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### 3. ANALYTICAL SAMPLING EVENTS

VOCs are collected according to the EPA Toxic Compendium Method TO-15, *Determination of Volatile Organic Compounds (VOCs) 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 seven VOC sampling events in this reporting period with six field duplicate samples collected during this reporting period.

During Q9, 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 26 sampling events for air samplers DOE-1, -2, -3 and -4 during this reporting period. 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.

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## 4. DATA

Sections 4.1 through 4.4 discuss Q9 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 and 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., defined as 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 for :00, :15, :30; and :45 minutes each hour. There were 91 days in this reporting period (Q9), which covers April 1, 2020, to June 30, 2020, with a total of 8,736 possible 15-minute observations. This is Q9 in Year 3 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 meteorological data completeness goal is 80% on an annual basis. Data completeness statistics for all completed reporting quarters in Year 3 of the baseline monitoring are presented in Table 2. In summary, the data completeness goal was achieved for all meteorological parameters in Q9.

### **Wind Rose**

The final validated 15-minute meteorological dataset was used to develop the wind rose for Q9 as presented in Figure 3. A wind rose is a graphical representation of wind speed and direction distribution (or climatology) for the period of interest. The frequency of winds blowing from a particular direction is 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 Q9, data capture for wind speed and direction at DOE-4 was 100%. The average and maximum wind speeds were 4.5 m/sec and 16.6 m/s, respectively. The maximum recorded wind gust was 24.2 m/sec. There were two primary predominant wind directions in Q9: from the east-southeast, and clustered around the northwest.

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>			
		Q8	Q9	Year 3 to Date	Project to Date
Wind Speed	between 0 and 25 m/sec	100	100	100	90.25
	> 0.1 m/sec variation over 3 hours				
	> 0.5 m/sec variation over 12 hours				
Wind Direction	between 0 and 360 degrees	100	100	100	90.25
	> 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	100	100	90.25
Temperature @ 2 m	≤ local record high (monthly basis)	100	100	100	90.25
	≥ local record low (monthly basis)				
	> 0.5°C variation over 12 hours				
Temperature @ 10 m	≤ local record high (monthly basis)	100	100	100	90.25
	≥ local record low (monthly basis)				
	> 0.5°C variation over 12 hours				
Delta Temperature	≤ 0.1°C during daytime	100	100	100	90.25
	≥ -0.1°C during nighttime				
	between -3.0 and 5.0°C				
Relative Humidity (and Dewpoint Temperature)	relative humidity between 0-100%	100	100	100	79.13
	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	99.84	100	99.92	90.23
	≤ 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	100	100	90.25
	≤ 6 mb variation over 3 hours				
Solar Radiation	> 0 at night	99.74	99.31	99.52	90.12
	≤ maximum possible for date and latitude				

(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.

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

- Q1 = 8,736      • Q2 = 8,832      • Q3 = 8,832      • Q4 = 8,640      • Year One = 35,040
- Q5 = 8,736      • Q6 = 8,832      • Q7 = 7,488      (only 3 quarters)      • Year Two = 25,056 (abbreviated)
- Q8 = 8,736      • Q9 = 8,736                                                   • Year Three = (in progress)

## 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 all 91 days.
- DOE-2 had valid readings all 91 days.
- DOE-3 had valid readings all 91 days.
- DOE-4 had valid readings all 91 days.

All station units had 100% data completeness for PM<sub>10</sub> for Q9, 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.

Table 3. PM<sub>10</sub> data completeness for April 1, 2020, to June 30, 2020.

Location	Valid Readings (Days)	Possible Readings (Days)	Data Completeness (Percent)
DOE-1	91	91	100
DOE-2	91	91	100
DOE-3	91	91	100
DOE-4	91	91	100
Average Total Data Completeness			100

The five highest PM<sub>10</sub> results identified for the reporting period are listed in Table 4 along with the California Ambient Air Quality Standard (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, three were recorded at DOE-3 and one at DOE-1 and DOE-2. One of the top five values, recorded June 22, 2020, was above the CAAQS and the National Ambient Air Quality Standard of 150 micrograms per cubic meter (µg/m<sup>3</sup>). High winds are known to increase air particulates.

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

Date	Location	PM <sub>10</sub> Value (µg/m <sup>3</sup> )	CAAQS (µg/m <sup>3</sup> )
6/22/2020	DOE-3	<b>62.58300</b>	50
6/23/2020	DOE-3	49.70800	50
6/3/2020	DOE-1	46.41600	50
5/25/2020	DOE-2	41.04100	50
6/4/2020	DOE-3	39.29100	50

Note: The bold number is above CAAQS screening level.

### 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 both 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 the seven 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	7	7	100
DOE-2	7	7	100
DOE-3	7	7	100
DOE-4	7	7	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 May 2018 EPA Residential Air Regional Screening Levels (RSLs) (EPA 2018). Four analytes were detected above the screening levels. Two analytes were detected during the April 2, 2020, sampling event and two during the May 27, 2020, sampling event. Ethyl acetate was detected at 90  $\mu\text{g}/\text{m}^3$  at DOE-1 and 85  $\mu\text{g}/\text{m}^3$  at DOE-2 on May 27, 2020. The remaining two analytes were detected on April 2, 2020: tetrachloroethene was detected at 1.4  $\mu\text{g}/\text{m}^3$  at DOE-2, and trichloroethene was detected at 0.89  $\mu\text{g}/\text{m}^3$  at DOE-2.

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. Ethyl acetate had two separate recordings that exceeded the screening limits. Both of these were detected on May 27, 2020 — one recording at DOE-1 and the other at DOE-2. 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.

### 4.4 Radionuclide Data

EETEC 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. As shown on the trend graphs, the background airborne radioactive contamination continued at low and stable concentrations, and there was no detected release of material.

There were 104 airborne radioactivity filter samples collected in Q9 — 26 each with 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 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).

All but one alpha sample were below the MDC, and 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. The single alpha sample greater than the MDC was only slightly above the MDC, and was well below the effluent limits specified in California regulations.

Although 30% of the beta samples were below MDC, the gross (background radioactive material included) samples exceeded the MDC in 70% 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.

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., Cs-137, Sr-90, Pu-239) were present in very small amounts, none of the results were above the MDC in Q9. 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.

Table 6. Gross alpha and beta-gamma average results for Q9.

Location	Average alpha Result (μCi/mL)	Average alpha MDC (μCi/mL)	Average beta Result (μCi/mL)	Average beta MDC (μCi/mL)
DOE 1	5.19E-16	6.39E-15	3.81E-14	2.46E-14
DOE 2	2.42E-16	6.39E-15	4.00E-14	2.46E-14
DOE 3	8.02E-17	6.37E-15	2.52E-14	2.45E-14
DOE 4	8.7E-16	6.31E-15	3.76E-14	2.43E-14
Average	4.28 E-16	6.37E-15	3.5E-14	2.45E-14

## 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 Q9 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 Q9 monthly audit results for the four E-BAM units demonstrated a flow rate percent bias that ranged from -2.06 to +0.72%. None of the results exceeded the flow rate measurement quality objective of +/- 4%.

Complete audit reports and flow verification results for Q9 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 input audit data. 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

A minimum of 20% of the VOC results are undergoing third-party data validation, annually. During this quarter, one of the seven sample delivery groups (SDGs), SDG P2002926, underwent 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 all seven 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, which had seven sampling events. SDG P2001837 did not have a field duplicate due to a regulator (air flow controller) malfunction between 04/01/2020 and 04/02/2020. This malfunction prohibited collecting a field duplicate for that sampling event. Ethyl acetate (in SDGs P2000072, P2000340, P2000652, and P2000961) was detected in five field duplicate pairs, exceeding the quality objective of +/- 15% relative percent difference (RPD). For SDG P2000961, analytes MEK, THF, and toluene were detected. For SDG P2000652, the analyte toluene was detected at levels higher than the RL in either the sample or duplicate, and in comparison, were reported as a non-detect in the associated sample or duplicate and exceeded the quality objective of +/- 15% RPD. For SDG P20001318, the analyte toluene was detected at a level less than 2 × instrument detection limit and the absolute difference between the two results was less than 2 × required detection limit and

exceeded the quality objective of +/- 15% RPD. Fifteen 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 -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.

A minimum of 20% of the annual radiological analytical results are undergoing third-party data validation. The SDG from Q9 underwent the annual data validation for Year 3, exceeding the minimum of 20%.

#### **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. 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

Although there were no unresolved data quality issues impacting the data completion goal during Q9, the solar radiometer continues to record values that exceed the daily screening criteria. Also, the improperly programmed data logger continues to affect the calculation of delta temperature (i.e., temperature difference between 2 m and 10 m).

Solar Radiometer – The solar radiometer continues to occasionally record observations that exceed the maximum possible for the date, latitude, and time of day (i.e., the Level 1 screening criteria from Table 2). These exceedances continue to occur within 1 hour before and after solar noon. The maximum possible values are determined from the Bird Clear Sky Radiation Model (SERI 1981) and represent theoretical maximums that can occur under the clearest sky conditions. Level 2 screening has been unable to resolve these recurring events. These observations are flagged with QC Code = 7 (i.e., suspect) and excluded from the final validated dataset. Site investigations performed during this and previous quarters have not identified the cause. Since this has not yet resulted in a negative impact on achieving the data completeness goal, no further corrective actions are being considered at this time. However, North Wind continues to monitor this situation with each weekly data download and review. Should the situation worsen, a sensor audit with an NIST-traceable standard and/or sensor replacement will be considered.

Delta Temperature Calculation – As stated in the corrective actions section of the Q3 air monitoring report (North Wind, Inc. 2019), the replacement data logger installed in December 2018 (due to Woolsey Fire wildfire damage on November 8, 2018) was improperly programmed to calculate delta temperature inversely to how it had been calculated in the original data logger. Consequently, the delta temperature observations are now being calculated with an opposite sign compared to the values from the original data logger.

The equations below represent the before and after delta temperature calculations:

- Prior to November 7, 2018 (correct calculation):

$$\text{Delta Temperature} = [\text{Temperature @ 10 m}] \text{ minus } [\text{Temperature @ 2 m}] \quad (\text{Eq. 4-1})$$

- November 7 to December 18, 2018:

*Station DOE-4 inoperable due to wildfire damage*

- After December 18, 2018 (incorrect calculation):

$$\text{Delta Temperature} = [\text{Temperature @ 2 m}] \text{ minus } [\text{Temperature @ 10 m}] \quad (\text{Eq. 4-2})$$

For consistency with the initial data collection quarters when delta temperature was correctly recorded by the original data logger, the incorrect delta temperature calculations from the replacement data logger continue to be adjusted through postprocessing to conform with Equation 4-1. The adjustment is simply a multiplication factor of “-1” applied to the delta temperature values from the new data logger prior to performing the data validation.

Meteorological Data Sensor Maintenance – Although not a corrective action, the manufacturer’s recommended maintenance frequency for meteorological sensors is presented below. 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 listed in the sensor user manuals and are based on the service time of the sensor. Table 7 lists the 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 as specified in the respective Met One sensor user manuals.

## 5.2 Laboratory QA/QC

This report covers 34 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 seven SDGs by the laboratory. All seven 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. Complete audit reports are presented in Appendix D.

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

Location	Met One E-BAM Serial Number	Parameter	Date
DOE-1	W23310	PM <sub>10</sub>	04/16/2020
DOE-2	Y12096	PM <sub>10</sub>	04/16/2020
DOE-3	W23313	PM <sub>10</sub>	04/16/2020
DOE-4	W23314	PM <sub>10</sub>	04/16/2020
DOE-1	W23310	PM <sub>10</sub>	05/15/2020
DOE-2	Y12096	PM <sub>10</sub>	05/15/2020
DOE-3	W23313	PM <sub>10</sub>	05/15/2020
DOE-4	W23314	PM <sub>10</sub>	05/15/2020
DOE-1	W23310	PM <sub>10</sub>	06/16/2020
DOE-2	Y12096	PM <sub>10</sub>	06/16/2020
DOE-3	W23313	PM <sub>10</sub>	06/16/2020
DOE-4	W23314	PM <sub>10</sub>	06/16/2020

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## 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.
- 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. 2019. Human and Ecological Risk Office Human Health Risk Assessment Note Number 3, DTSC-modified Screening Levels. April. <https://www.dtsc.ca.gov/AssessingRisk/upload/HHRA-Note-3-April-2019.pdf>.
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- 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 2007.
- 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. Environmental Protection Agency (EPA). 2018. Regional Screening Levels – Generic Tables. <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>. May.
- Solar Energy Research Institute (SERI). 1981. *A Simplified Clear Sky Model for Direct and Diffuse Insolation on Horizontal Surfaces*. SERI/TR-642-761. February 1981.

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Figure 1 – SSFL Air Monitoring Locations

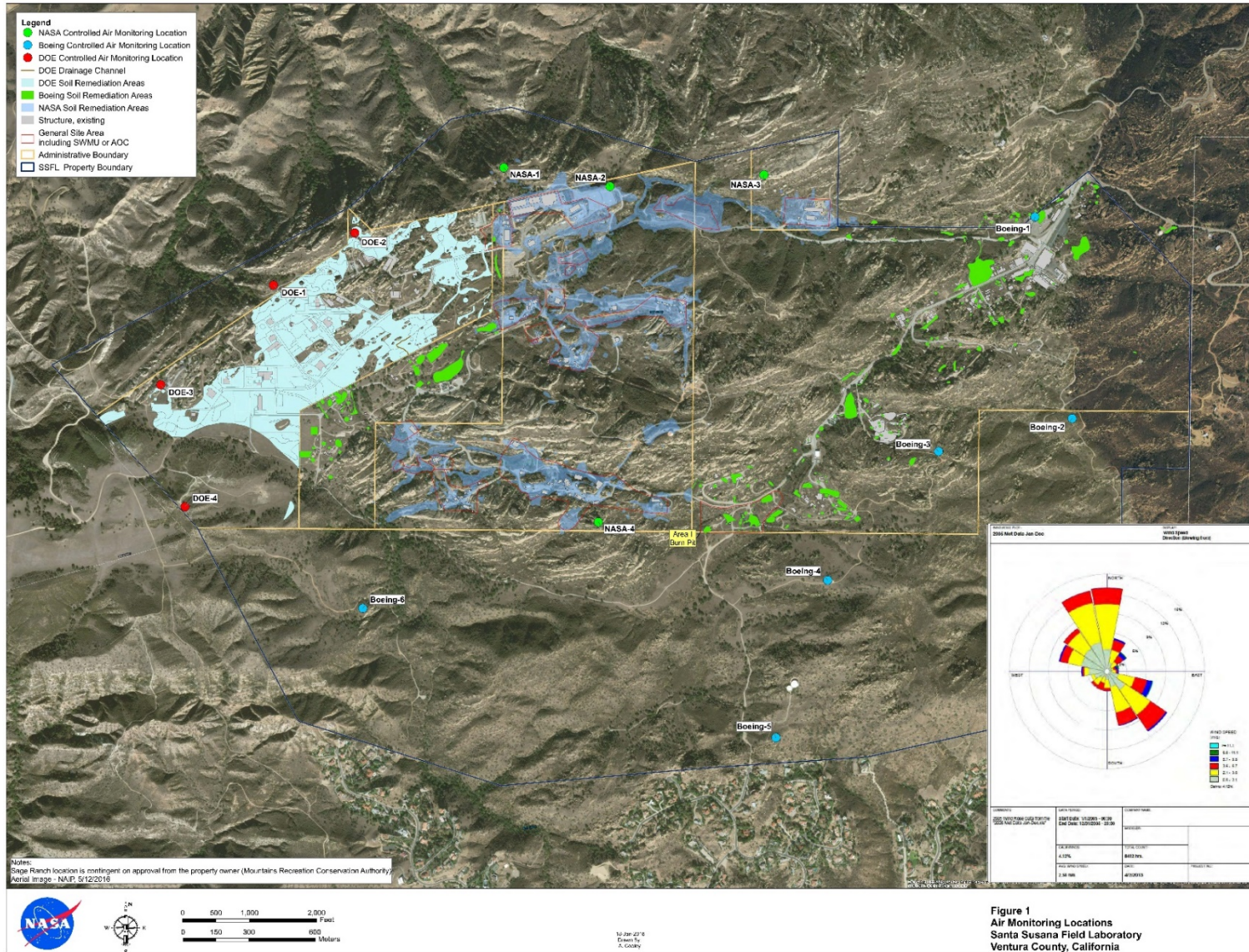
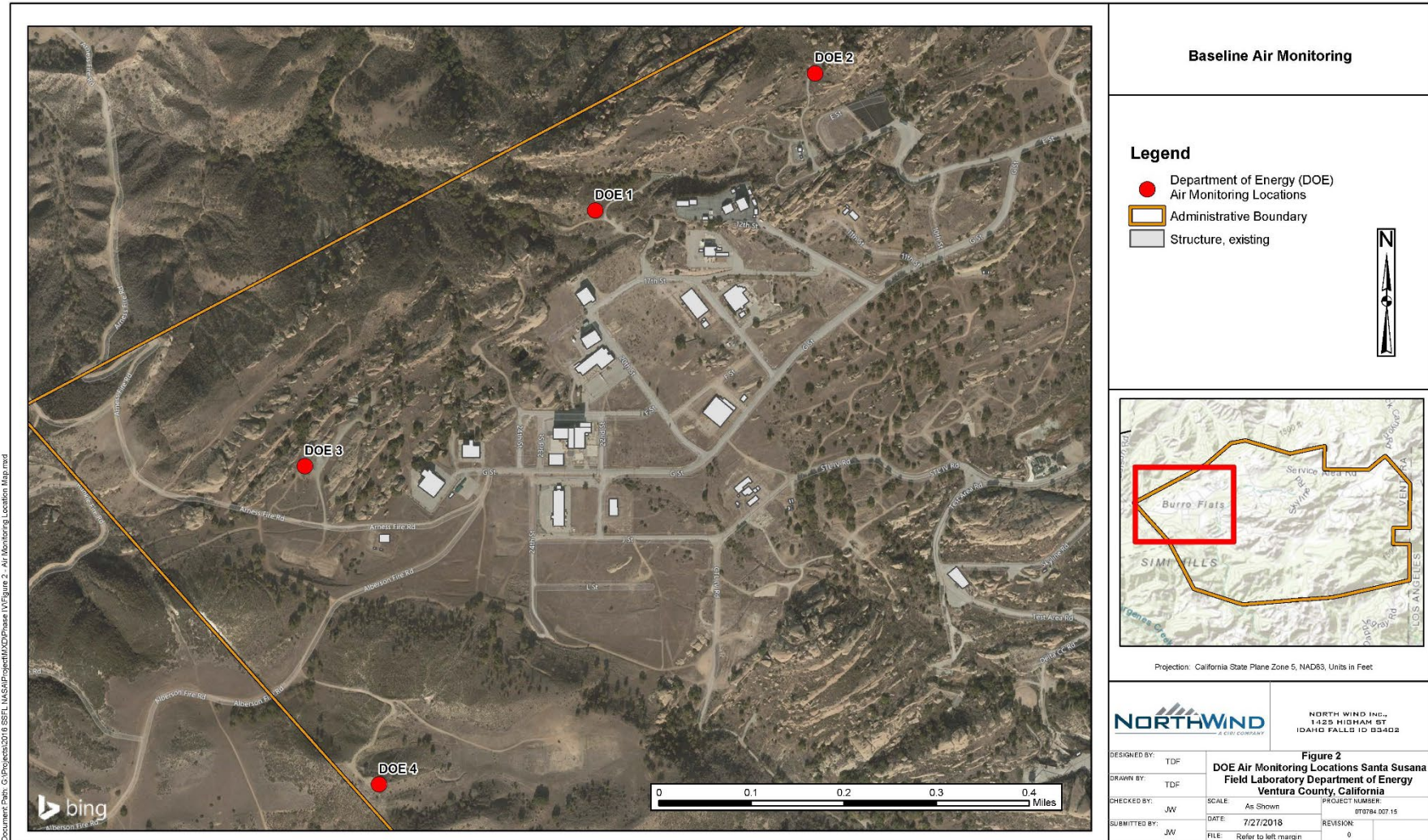
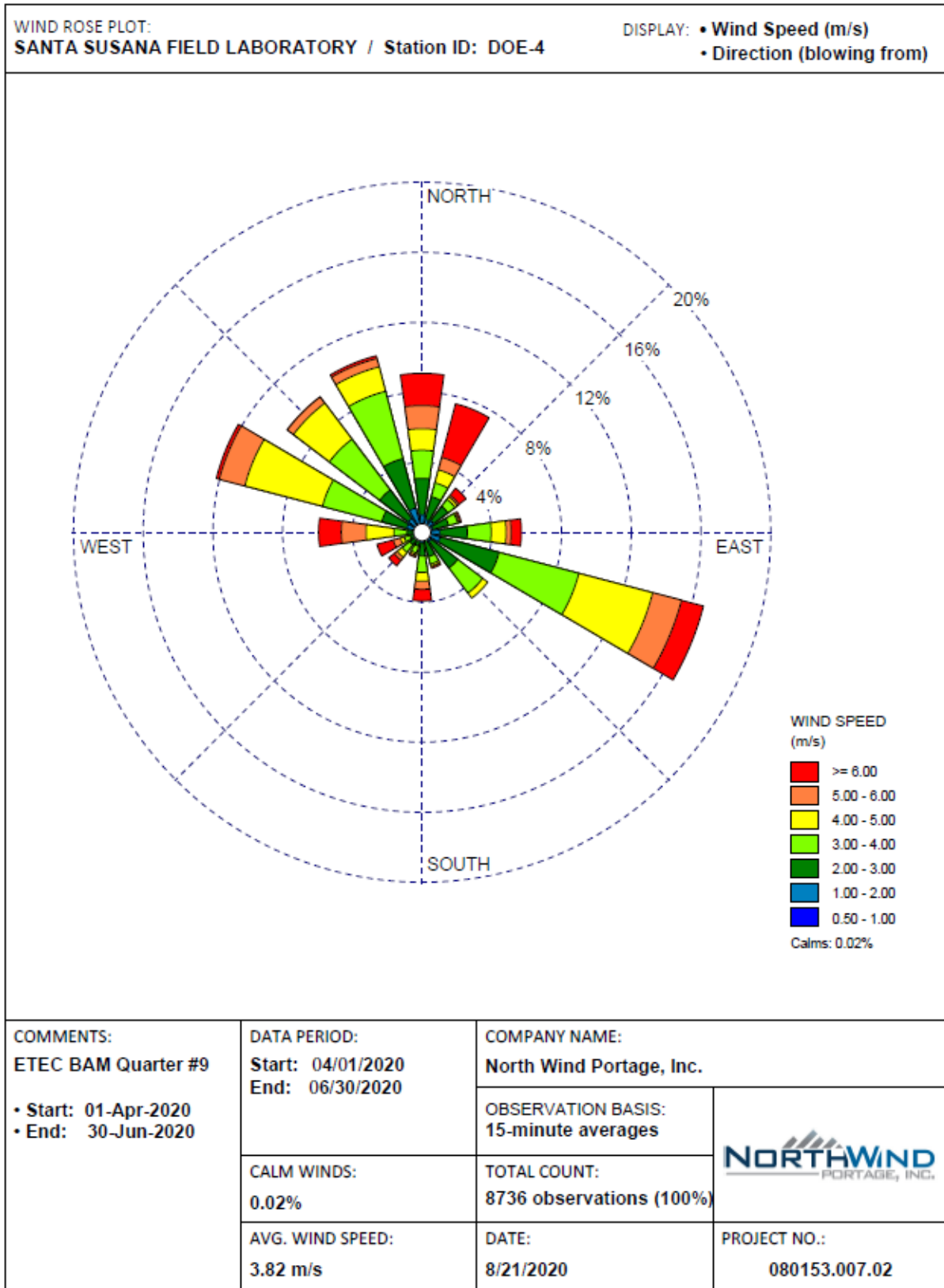


Figure 2 – DOE Air Monitoring Locations



**Figure 3 – DOE Quarterly Wind Rose**



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**APPENDIX A**

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

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**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> )
04/01/20	13.636	12.181	9.181	10.09
04/02/20	13.25	12.5	10.875	10.291
04/03/20	12.166	11.166	14.291	11.5
04/04/20	16.416	14.25	15	13.333
04/05/20	3.625	3.583	4.041	2.375
04/06/20	0.916	2.416	2.083	0.75
04/07/20	2.041	3.416	2.625	2.25
04/08/20	1.25	1.708	1.833	0.75
04/09/20	0.166	1.291	0.75	0.375
04/10/20	0.875	4.125	1.375	1
04/11/20	5.083	9.25	5.25	4.791
04/12/20	6.416	5.125	5.708	4.166
04/13/20	5.333	7.125	5.166	4.458
04/14/20	8.75	11.625	8.75	9.75
04/15/20	8.416	9.791	9.125	9.416
04/16/20	14.375	16.041	14.5	17.125
04/17/20	9.166	8.75	8.666	6.625
04/18/20	4.291	5.125	5.541	5.708
04/19/20	8.083	8.666	7.625	4.125
04/20/20	8.625	8.833	10.833	5.958
04/21/20	8.458	9.541	8.833	7.833
04/22/20	9.083	9.5	9.083	9.25
04/23/20	8.458	9.208	8.916	10.083
04/24/20	11.083	13.5	11.416	12.708
04/25/20	8.625	8.833	9.125	8.041
04/26/20	12.583	12.958	13.375	12.208
04/27/20	13.458	13.875	12.541	11.375
04/28/20	15.958	15.916	15.958	15.166
04/29/20	20.583	25.041	28.041	21.666
04/30/20	14.125	19.875	15.916	14.875
05/01/20	16.166	17.583	14.791	15.333
05/02/20	19.833	21.375	20.041	17.666
05/03/20	15.041	17.583	17.083	13.041
05/04/20	9.791	10.833	11.5	10.333
05/05/20	11.125	11.291	9.875	11.083
05/06/20	14.125	13.708	13.458	12.875

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> )
05/07/20	16.208	16.583	15.25	15.791
05/08/20	21.375	21.625	23.958	24.458
05/09/20	28.041	27.083	33.708	24.083
05/10/20	20.208	18.458	20.791	17.333
05/11/20	13.708	16.291	15.125	11.5
05/12/20	7.708	12.416	10.916	8.125
05/13/20	11.5	10.666	12.333	10.833
05/14/20	12.208	11.708	14.541	10.625
05/15/20	11.875	12.875	14.25	13.333
05/16/20	13.75	21	14.041	15.708
05/17/20	12.041	16.5	17.083	11.166
05/18/20	4.541	5.791	4.208	4.708
05/19/20	9.333	9.541	8.625	6.958
05/20/20	9.708	11.333	10.958	8.291
05/21/20	13.041	27.208	10.208	11.541
05/22/20	22.5	34	22.666	25.458
05/23/20	20.208	21.208	22.958	18.25
05/24/20	23.083	35.916	21.75	16.416
05/25/20	18.875	41.041	20.333	17.791
05/26/20	15.708	27.25	14.541	14.208
05/27/20	22.041	22.583	19.541	17.25
05/28/20	14.875	18.083	14.416	16
05/29/20	12.916	10.875	12.416	11
05/30/20	4.875	6.125	9.333	5.666
05/31/20	13.916	13.708	10.75	15.041
06/01/20	11.208	13.166	12	14
06/02/20	18.375	16.958	19.666	14.166
06/03/20	46.416	14.625	15	13.375
06/04/20	23.625	23.875	39.291	19.833
06/05/20	11.833	10.625	11.708	11.166
06/06/20	11.75	9.416	7.083	9.416
06/07/20	14.958	12.541	13.166	10.291
06/08/20	18	21.583	15.208	25.458
06/09/20	7.041	8.541	5.875	12.083
06/10/20	12.125	12.125	11.333	10.583
06/11/20	13.958	12.541	14	11.458
06/12/20	17.791	22.416	19.25	14.208

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> )
06/13/20	14.291	12.5	12.375	10.291
06/14/20	14.708	20.083	13.666	11.333
06/15/20	15.208	14.875	14.333	13.541
06/16/20	18.333	14.791	17.291	13.875
06/17/20	14.666	13.958	13.791	11.125
06/18/20	13.458	12.625	13.708	11.833
06/19/20	19.25	14.958	10.125	15.083
06/20/20	13.666	13.083	10	7.875
06/21/20	14.791	11.125	10	9.583
06/22/20	14	20.625	62.583	16.208
06/23/20	16.333	18.708	49.708	14
06/24/20	17.5	14.541	28.791	13.791
06/25/20	16.333	14.291	32.208	13.5
06/26/20	12.166	11.75	15.708	11.666
06/27/20	14.375	13.666	14.541	9.875
06/28/20	11.5	8.375	10.208	7.791
06/29/20	11.583	7.541	9.666	8.333
06/30/20	12.615	11	10.307	10

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

Location ID	April 2020			May 2020			June 2020		
	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	20.58300	0.16600	16.20990	28.04100	4.54100	22.79150	46.41600	7.04100	21.65625
DOE-2	25.04100	1.29100	18.14970	41.04100	5.79100	34.95800	23.87500	7.54100	22.04115
DOE-3	28.04100	0.75000	15.93910	33.70800	4.20800	23.45800	62.58300	5.87500	45.02035
DOE-4	21.66600	0.37500	16.24345	25.45800	4.70800	24.27050	25.45800	7.79100	18.20175

PCTL = percentile

**APPENDIX B**

**Analytical Results for Ambient Air VOCs**

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Table B-1. Ambient air VOC detection results compared to RSLs.

Location ID	Sample Date	Analyte	Result (µg/m <sup>3</sup> )	Screening Level Value (µg/m <sup>3</sup> )	SL Source
DOE-1	04/02/2020	Dichlorodifluoromethane	2.3	100	US EPA RSL
DOE-1	04/02/2020	Ethyl acetate	2.4	73	US EPA RSL
DOE-1	04/02/2020	Trichlorofluoromethane	1.3	1300	DTSC HHRA NOTE 3
DOE-2	04/02/2020	Dichlorodifluoromethane	2.4	100	US EPA RSL
DOE-2	04/02/2020	Ethyl acetate	4.3	73	US EPA RSL
DOE-2	04/02/2020	Tetrachloroethene	1.4	0.46	DTSC HHRA NOTE 3
DOE-2	04/02/2020	Trichloroethene	0.89	0.48	US EPA RSL
DOE-2	04/02/2020	Trichlorofluoromethane	1.4	1300	DTSC HHRA NOTE 3
DOE-3	04/02/2020	Dichlorodifluoromethane	2.2	100	US EPA RSL
DOE-3	04/02/2020	Ethyl acetate	9.3	73	US EPA RSL
DOE-3	04/02/2020	Isopropanol	190	210	US EPA RSL
DOE-3	04/02/2020	Trichlorofluoromethane	1.3	1300	DTSC HHRA NOTE 3
DOE-4	04/02/2020	Dichlorodifluoromethane	2.2	100	US EPA RSL
DOE-4	04/02/2020	Ethyl acetate	2.9	73	US EPA RSL
DOE-4	04/02/2020	Trichlorofluoromethane	1.3	1300	DTSC HHRA NOTE 3
DOE-1	04/15/2020	Dichlorodifluoromethane	2.7	100	US EPA RSL
DOE-1	04/15/2020	Ethyl acetate	17	73	US EPA RSL
DOE-1	04/15/2020	Isopropanol	4.4	210	US EPA RSL
DOE-1	04/15/2020	Trichlorofluoromethane	1.4	1300	DTSC HHRA NOTE 3
DOE-2	04/15/2020	Dichlorodifluoromethane	2.7	100	US EPA RSL
DOE-2	04/15/2020	Ethyl acetate	3.8	73	US EPA RSL
DOE-2	04/15/2020	Isopropanol	6.1	210	US EPA RSL
DOE-2	04/15/2020	Trichlorofluoromethane	1.4	1300	DTSC HHRA NOTE 3
DOE-3	04/15/2020	Dichlorodifluoromethane	2.7	100	US EPA RSL
DOE-3	04/15/2020	Ethyl acetate	4.7	73	US EPA RSL
DOE-3	04/15/2020	Isopropanol	4.4	210	US EPA RSL
DOE-3	04/15/2020	Trichlorofluoromethane	1.3	1300	DTSC HHRA NOTE 3
DOE-4	04/15/2020	Dichlorodifluoromethane	2.8	100	US EPA RSL
DOE-4	04/15/2020	Ethyl acetate	5.8	73	US EPA RSL
DOE-4	04/15/2020	Isopropanol	3.3	210	US EPA RSL
DOE-4	04/15/2020	Trichlorofluoromethane	1.4	1300	DTSC HHRA NOTE 3
DOE-1	04/28/2020	Dichlorodifluoromethane	2.2	100	US EPA RSL
DOE-1	04/28/2020	Trichlorofluoromethane	1.2	1300	DTSC HHRA NOTE 3
DOE-2	04/28/2020	Dichlorodifluoromethane	2.2	100	US EPA RSL
DOE-2	04/28/2020	Trichlorofluoromethane	1.1	1300	DTSC HHRA NOTE 3
DOE-3	04/28/2020	Dichlorodifluoromethane	2.5	100	US EPA RSL
DOE-3	04/28/2020	Trichlorofluoromethane	1.2	1300	DTSC HHRA NOTE 3
DOE-4	04/28/2020	Dichlorodifluoromethane	2.3	100	US EPA RSL
DOE-4	04/28/2020	Trichlorofluoromethane	1.3	1300	DTSC HHRA NOTE 3
DOE-1	05/12/2020	Dichlorodifluoromethane	2.2	100	US EPA RSL
DOE-1	05/12/2020	Ethyl acetate	2.0	73	US EPA RSL
DOE-1	05/12/2020	Trichlorofluoromethane	1.1	1300	DTSC HHRA NOTE 3
DOE-2	05/12/2020	Dichlorodifluoromethane	2.2	100	US EPA RSL
DOE-2	05/12/2020	Trichlorofluoromethane	1.3	1300	DTSC HHRA NOTE 3

Location ID	Sample Date	Analyte	Result (µg/m <sup>3</sup> )	Screening Level Value (µg/m <sup>3</sup> )	SL Source
DOE-3	05/12/2020	Dichlorodifluoromethane	2.3	100	US EPA RSL
DOE-3	05/12/2020	Ethyl acetate	2.5	73	US EPA RSL
DOE-3	05/12/2020	Trichlorofluoromethane	1.1	1300	DTSC HHRA NOTE 3
DOE-4	05/12/2020	Dichlorodifluoromethane	2.2	100	US EPA RSL
DOE-4	05/12/2020	Ethyl acetate	1.9	73	US EPA RSL
DOE-4	05/12/2020	Trichlorofluoromethane	1.1	1300	DTSC HHRA NOTE 3
DOE-1	05/27/2020	Dichlorodifluoromethane	2.3	100	US EPA RSL
DOE-1	05/27/2020	Ethyl acetate	90	73	US EPA RSL
DOE-1	05/27/2020	Toluene	2.2	310	DTSC HHRA NOTE 3
DOE-1	05/27/2020	Trichlorofluoromethane	2	1300	DTSC HHRA NOTE 3
DOE-2	05/27/2020	Dichlorodifluoromethane	2.3	100	US EPA RSL
DOE-2	05/27/2020	Ethyl acetate	85	73	US EPA RSL
DOE-2	05/27/2020	Toluene	1.3	310	DTSC HHRA NOTE 3
DOE-2	05/27/2020	Trichlorofluoromethane	1.9	1300	DTSC HHRA NOTE 3
DOE-3	05/27/2020	Dichlorodifluoromethane	2.3	100	US EPA RSL
DOE-3	05/27/2020	Ethyl acetate	28 (;J)	73	US EPA RSL
DOE-3	05/27/2020	Trichlorofluoromethane	1.2	1300	DTSC HHRA NOTE 3
DOE-4	05/27/2020	Dichlorodifluoromethane	2.3	100	US EPA RSL
DOE-4	05/27/2020	Ethyl acetate	27	73	US EPA RSL
DOE-4	05/27/2020	Trichlorofluoromethane	1.2	1300	DTSC HHRA NOTE 3
DOE-1	06/11/2020	Dichlorodifluoromethane	2.1	100	US EPA RSL
DOE-1	06/11/2020	Ethyl acetate	17	73	US EPA RSL
DOE-1	06/11/2020	Tetrahydrofuran	15	2100	US EPA RSL
DOE-1	06/11/2020	Trichlorofluoromethane	1.1	1300	DTSC HHRA NOTE 3
DOE-2	06/11/2020	Dichlorodifluoromethane	2.1	100	US EPA RSL
DOE-2	06/11/2020	Ethyl acetate	16	73	US EPA RSL
DOE-2	06/11/2020	Tetrahydrofuran	3.6	2100	US EPA RSL
DOE-2	06/11/2020	Trichlorofluoromethane	1.1	1300	DTSC HHRA NOTE 3
DOE-3	06/11/2020	Dichlorodifluoromethane	2.1	100	US EPA RSL
DOE-3	06/11/2020	Ethyl acetate	5.7	73	US EPA RSL
DOE-3	06/11/2020	Tetrahydrofuran	1.3	2100	US EPA RSL
DOE-3	06/11/2020	Trichlorofluoromethane	1.1	1300	DTSC HHRA NOTE 3
DOE-4	06/11/2020	Dichlorodifluoromethane	2.2	100	US EPA RSL
DOE-4	06/11/2020	Ethyl acetate	13	73	US EPA RSL
DOE-4	06/11/2020	Trichlorofluoromethane	1.1	1300	DTSC HHRA NOTE 3
DOE-1	06/26/2020	Dichlorodifluoromethane	2.4	100	US EPA RSL
DOE-1	06/26/2020	Ethyl acetate	34	73	US EPA RSL
DOE-1	06/26/2020	Isopropanol	5.3	210	US EPA RSL
DOE-1	06/26/2020	Toluene	1.2	310	DTSC HHRA NOTE 3
DOE-1	06/26/2020	Trichlorofluoromethane	1.2	1300	DTSC HHRA NOTE 3
DOE-2	06/26/2020	Dichlorodifluoromethane	2.4	100	US EPA RSL
DOE-2	06/26/2020	Ethyl acetate	4.2	73	US EPA RSL
DOE-2	06/26/2020	Trichlorofluoromethane	1.2	1300	DTSC HHRA NOTE 3
DOE-3	06/26/2020	Dichlorodifluoromethane	2.4	100	US EPA RSL
DOE-3	06/26/2020	Ethyl acetate	5.1	73	US EPA RSL

<b>Location ID</b>	<b>Sample Date</b>	<b>Analyte</b>	<b>Result (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Screening Level Value (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>SL Source</b>
DOE-3	06/26/2020	Trichlorofluoromethane	1.2	1300	DTSC HHRA NOTE 3
DOE-4	06/26/2020	Dichlorodifluoromethane	2.3	100	US EPA RSL
DOE-4	06/26/2020	Ethyl acetate	4.6	73	US EPA RSL
DOE-4	06/26/2020	Trichlorofluoromethane	1.2	1300	DTSC HHRA NOTE 3

Note: The bold numbers are above the screening levels.

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

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

Air Station ID	Sample Collection Date	Gross Alpha (μCi/mL)	Gross Alpha MDC (μCi/mL)	Gross Beta (μCi/mL)	Gross Beta MDC (μCi/mL)
<b>Sample Location – DOE-1</b>					
DOE-1	4/2/2020	0.00E+00	7.02E-15	1.23E-14	2.71E-14
DOE-1	4/7/2020	1.05E-15	4.38E-15	3.99E-14	1.69E-14
DOE-1	4/10/2020	2.19E-15	9.10E-15	2.66E-14	3.51E-14
DOE-1	4/14/2020	-5.10E-16	5.31E-15	1.83E-14	2.05E-14
DOE-1	4/17/2020	1.08E-15	7.48E-15	3.35E-14	2.89E-14
DOE-1	4/20/2020	-6.73E-16	7.00E-15	1.80E-14	2.70E-14
DOE-1	4/23/2020	3.16E-15	7.31E-15	5.34E-14	2.82E-14
DOE-1	4/27/2020	3.34E-15	5.34E-15	6.40E-14	2.06E-14
DOE-1	4/30/2020	0.00E+00	7.20E-15	3.68E-14	2.78E-14
DOE-1	5/4/2020	1.52E-15	5.29E-15	4.48E-14	2.04E-14
DOE-1	5/8/2020	1.56E-15	5.42E-15	7.42E-14	2.09E-14
DOE-1	5/11/2020	4.13E-15	7.16E-15	5.03E-14	2.76E-14
DOE-1	5/15/2020	-2.59E-16	5.38E-15	2.04E-14	2.08E-14
DOE-1	5/19/2020	-1.54E-15	5.33E-15	3.51E-14	2.06E-14
DOE-1	5/22/2020	2.07E-15	7.18E-15	1.08E-14	2.77E-14
DOE-1	5/26/2020	-1.28E-15	5.31E-15	3.05E-14	2.05E-14
DOE-1	5/29/2020	-1.04E-15	7.24E-15	2.04E-14	2.79E-14
DOE-1	6/1/2020	-3.33E-15	7.14E-15	1.23E-14	2.73E-14
DOE-1	6/5/2020	2.99E-16	5.43E-15	7.23E-14	2.08E-14
DOE-1	6/8/2020	5.45E-17	7.18E-15	5.07E-14	2.75E-14
DOE-1	6/12/2020	5.59E-16	5.45E-15	5.66E-14	2.09E-14
DOE-1	6/15/2020	3.93E-16	7.14E-15	6.35E-14	2.73E-14
DOE-1	6/19/2020	2.86E-15	5.41E-15	4.84E-14	2.07E-14
DOE-1	6/22/2020	1.04E-15	6.92E-15	2.65E-14	2.65E-14
DOE-1	6/25/2020	-6.65E-16	7.62E-15	1.67E-14	2.92E-14
DOE-1	6/29/2020	-2.51E-15	5.38E-15	2.89E-14	2.06E-14
<b>Sample Location – DOE-2</b>					
DOE-2	4/2/2020	1.69E-15	7.02E-15	1.91E-14	2.71E-14
DOE-2	4/7/2020	-4.21E-16	4.38E-15	1.28E-14	1.69E-14
DOE-2	4/10/2020	-2.63E-15	9.10E-15	-1.21E-14	3.51E-14
DOE-2	4/14/2020	1.79E-15	5.31E-15	2.38E-14	2.05E-14
DOE-2	4/17/2020	2.52E-15	7.48E-15	4.19E-14	2.89E-14
DOE-2	4/20/2020	0.00E+00	7.00E-15	5.46E-14	2.70E-14
DOE-2	4/23/2020	1.05E-15	7.31E-15	6.98E-14	2.82E-14
DOE-2	4/27/2020	1.03E-15	5.34E-15	5.91E-14	2.06E-14
DOE-2	4/30/2020	0.00E+00	7.19E-15	5.88E-14	2.77E-14
DOE-2	5/4/2020	2.54E-15	5.29E-15	6.06E-14	2.04E-14

Air Station ID	Sample Collection Date	Gross Alpha (µCi/mL)	Gross Alpha MDC (µCi/mL)	Gross Beta (µCi/mL)	Gross Beta MDC (µCi/mL)
DOE-2	5/8/2020	4.69E-15	5.42E-15	7.80E-14	2.09E-14
DOE-2	5/11/2020	6.89E-16	7.16E-15	6.39E-14	2.76E-14
DOE-2	5/15/2020	-7.76E-16	5.38E-15	3.83E-14	2.08E-14
DOE-2	5/19/2020	2.31E-15	5.33E-15	3.56E-14	2.06E-14
DOE-2	5/22/2020	-2.42E-15	7.18E-15	4.86E-14	2.77E-14
DOE-2	5/26/2020	-1.02E-15	5.31E-15	5.62E-14	2.05E-14
DOE-2	5/29/2020	-1.04E-15	7.24E-15	4.58E-14	2.79E-14
DOE-2	6/1/2020	-4.01E-15	7.15E-15	2.91E-14	2.73E-14
DOE-2	6/5/2020	2.88E-15	5.43E-15	6.19E-14	2.08E-14
DOE-2	6/8/2020	-1.31E-15	7.18E-15	2.68E-14	2.75E-14
DOE-2	6/12/2020	-1.51E-15	5.46E-15	2.09E-14	2.09E-14
DOE-2	6/15/2020	3.93E-16	7.14E-15	3.66E-14	2.73E-14
DOE-2	6/19/2020	2.98E-16	5.41E-15	2.26E-14	2.07E-14
DOE-2	6/22/2020	-6.10E-16	6.98E-15	3.79E-14	2.67E-14
DOE-2	6/25/2020	1.14E-15	7.61E-15	2.30E-14	2.91E-14
DOE-2	6/29/2020	-9.81E-16	5.38E-15	2.56E-14	2.06E-14
Sample Location – DOE-3					
DOE-3	4/2/2020	-3.04E-15	7.02E-15	3.25E-14	2.71E-14
DOE-3	4/7/2020	-2.11E-16	4.38E-15	2.77E-14	1.69E-14
DOE-3	4/10/2020	2.01E-15	6.96E-15	5.29E-14	2.69E-14
DOE-3	4/14/2020	0.00E+00	5.31E-15	-8.60E-15	2.05E-14
DOE-3	4/17/2020	0.00E+00	7.48E-15	3.35E-14	2.89E-14
DOE-3	4/20/2020	2.02E-15	6.99E-15	4.94E-14	2.70E-14
DOE-3	4/23/2020	4.36E-16	9.07E-15	2.34E-14	3.50E-14
DOE-3	4/27/2020	1.03E-15	5.34E-15	1.71E-14	2.06E-14
DOE-3	4/30/2020	2.76E-15	7.19E-15	5.67E-14	2.77E-14
DOE-3	5/4/2020	5.08E-16	5.28E-15	2.44E-14	2.04E-14
DOE-3	5/8/2020	-1.83E-15	5.43E-15	2.01E-14	2.09E-14
DOE-3	5/11/2020	2.07E-15	7.16E-15	5.93E-14	2.76E-14
DOE-3	5/15/2020	2.07E-15	5.38E-15	5.72E-14	2.08E-14
DOE-3	5/19/2020	-1.54E-15	5.33E-15	1.89E-14	2.06E-14
DOE-3	5/22/2020	1.04E-15	7.18E-15	1.50E-14	2.77E-14
DOE-3	5/26/2020	-1.79E-15	5.31E-15	-1.09E-14	2.05E-14
DOE-3	5/29/2020	-3.48E-16	7.23E-15	2.22E-14	2.79E-14
DOE-3	6/1/2020	-9.63E-16	7.15E-15	1.36E-14	2.74E-14
DOE-3	6/5/2020	5.45E-15	5.43E-15	3.44E-14	2.08E-14
DOE-3	6/8/2020	-2.86E-16	7.17E-15	2.96E-14	2.74E-14
DOE-3	6/12/2020	-4.62E-15	5.46E-15	-1.43E-14	2.09E-14
DOE-3	6/15/2020	5.42E-17	7.14E-15	1.98E-14	2.73E-14

Air Station ID	Sample Collection Date	Gross Alpha ( $\mu\text{Ci}/\text{mL}$ )	Gross Alpha MDC ( $\mu\text{Ci}/\text{mL}$ )	Gross Beta ( $\mu\text{Ci}/\text{mL}$ )	Gross Beta MDC ( $\mu\text{Ci}/\text{mL}$ )
DOE-3	6/19/2020	5.55E-16	5.41E-15	1.22E-14	2.07E-14
DOE-3	6/22/2020	-2.89E-15	6.89E-15	2.74E-14	2.64E-14
DOE-3	6/25/2020	5.79E-17	7.63E-15	2.26E-14	2.92E-14
DOE-3	6/29/2020	-4.69E-16	5.38E-15	1.86E-14	2.06E-14
<b>Sample Location – DOE-4</b>					
DOE-4	4/2/2020	-3.04E-15	7.02E-15	3.28E-14	2.71E-14
DOE-4	4/7/2020	1.27E-15	4.39E-15	8.52E-15	1.69E-14
DOE-4	4/10/2020	3.33E-16	6.93E-15	1.95E-14	2.67E-14
DOE-4	4/14/2020	0.00E+00	5.33E-15	5.51E-14	2.06E-14
DOE-4	4/17/2020	2.52E-15	7.48E-15	1.67E-14	2.89E-14
DOE-4	4/20/2020	1.34E-15	6.99E-15	3.92E-14	2.70E-14
DOE-4	4/23/2020	-1.41E-15	7.32E-15	2.60E-14	2.82E-14
DOE-4	4/27/2020	5.14E-16	5.34E-15	4.32E-14	2.06E-14
DOE-4	4/30/2020	3.11E-15	7.19E-15	3.85E-14	2.77E-14
DOE-4	5/4/2020	2.28E-15	5.27E-15	2.10E-14	2.03E-14
DOE-4	5/8/2020	1.57E-15	5.44E-15	4.22E-14	2.10E-14
DOE-4	5/11/2020	3.44E-15	7.16E-15	7.40E-14	2.76E-14
DOE-4	5/15/2020	1.29E-15	5.39E-15	5.14E-14	2.08E-14
DOE-4	5/19/2020	3.08E-15	5.33E-15	2.08E-14	2.06E-14
DOE-4	5/22/2020	-3.45E-16	7.18E-15	3.81E-14	2.77E-14
DOE-4	5/26/2020	-2.55E-16	5.31E-15	3.05E-14	2.05E-14
DOE-4	5/29/2020	0.00E+00	7.21E-15	4.60E-14	2.78E-14
DOE-4	6/1/2020	3.94E-16	7.17E-15	5.74E-15	2.74E-14
DOE-4	6/5/2020	1.85E-15	5.43E-15	3.78E-14	2.08E-14
DOE-4	6/8/2020	7.35E-16	7.17E-15	6.78E-15	2.74E-14
DOE-4	6/12/2020	1.85E-15	5.46E-15	4.17E-14	2.09E-14
DOE-4	6/15/2020	-2.85E-16	7.14E-15	5.63E-14	2.73E-14
DOE-4	6/19/2020	2.35E-15	5.41E-15	5.49E-14	2.07E-14
DOE-4	6/22/2020	-9.27E-16	6.88E-15	6.15E-14	2.63E-14
DOE-4	6/25/2020	2.95E-15	7.63E-15	6.12E-14	2.92E-14
DOE-4	6/29/2020	-2.00E-15	5.38E-15	4.81E-14	2.06E-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 ( $\mu$ Ci/mL)
<b>Location DOE-1 – Air volume/sample = 9.76E8 mL</b>				
Cesium-137	1.40	8.50	U	1.556E-7
Strontium-90	-0.0180	2.89	U	-2.000E-9
Cobalt-60	-0.850	7.66	U	-9.444E-8
Potassium-40	62.1	176	U	6.900E-6
Beryllium-7	176	91.8		1.956E-5
Plutonium-238	-0.0367	0.303	U	-4.078E-9
Polonium-210	3.72	0.554		4.133E-7
Plutonium-241	-0.581	7.41	U	-6.456E-8
Thorium-230	0.536	0.467		5.956E-8
Thorium-228	0.551	0.513		6.122E-8
Actinium-228	2.73	43.9	U	3.033E-7
Americium-241	-0.0657	0.346	U	-7.300E-9
Plutonium-239	0.0855	0.356	U	9.500E-9
Ra-228 - total	0.346	2.06	U	3.844E-8
Radium-226, -228 combined	4.57	3.18		5.078E-7
Thorium-232	0.567	0.356		6.300E-8
Uranium-238	1.14	0.224		1.267E-7
Uranium-233/234	0.706	0.241		7.844E-8
Uranium-235/236	0.163	0.206	U	1.811E-8
<b>Location DOE-2 – Air volume/sample = 9.76E8 mL</b>				
Cesium-137	0.430	8.65	U	4.778E-8
Strontium-90	0.557	2.94	U	6.189E-8
Cobalt-60	-4.28	7.37	U	-4.756E-7
Potassium-40	75.7	86.3	U	8.411E-6
Beryllium-7	131	99.9		1.456E-5
Plutonium-238	-0.0227	0.256	U	-2.522E-9
Polonium-210	4.26	0.521		4.733E-7
Plutonium-241	-0.376	8.19	U	-4.178E-8
Thorium-230	0.934	0.519		1.038E-7
Thorium-228	0.577	0.432		6.411E-8
Actinium-228	38.2	41.0	U	4.244E-6
Americium-241	-0.0257	0.299	U	-2.856E-9
Plutonium-239	-0.0284	0.270	U	-3.156E-9
Ra-228 - total	0.681	2.56	U	7.567E-8
Radium-226, -228 combined	3.04	4.72	U	3.378E-7
Thorium-232	0.967	0.335		1.074E-7
Uranium-238	0.950	0.256		1.056E-7

Radionuclide	Result (pCi/sample)	MDC (pCi/sample)	Data Qualifier	Airborne Concentration ( $\mu$ Ci/mL)
Uranium-233/234	1.04	0.371		1.156E-7
Uranium-235/236	0.000	0.141	U	0.000E+0
<b>Location DOE-3 – Air volume/sample = 9.78E8 mL</b>				
Cesium-137	2.86	8.13	U	3.178E-7
Strontium-90	-0.815	2.96	U	-9.056E-8
Cobalt-60	1.30	10.8	U	1.444E-7
Potassium-40	13.4	141	U	1.489E-6
Beryllium-7	201	70.7		2.233E-5
Plutonium-238	-0.00622	0.218	U	-6.911E-10
Polonium-210	3.76	0.440		4.178E-7
Plutonium-241	-2.32	8.68	U	-2.578E-7
Thorium-230	0.954	0.687		1.060E-7
Thorium-228	0.685	1.05	U	7.611E-8
Actinium-228	3.17	33.9	U	3.522E-7
Americium-241	0.0623	0.398	U	6.922E-9
Plutonium-239	0.0394	0.244	U	4.378E-9
Ra-228 - total	1.84	1.87	U	2.044E-7
Radium-226, -228 combined	3.02	3.72	U	3.356E-7
Thorium-232	0.639	0.367		7.100E-8
Uranium-238	0.348	0.262		3.867E-8
Uranium-233/234	0.910	0.291		1.011E-7
Uranium-235/236	0.0222	0.271	U	2.467E-9
<b>Location DOE-4 – Air volume/sample = 9.84E8 mL</b>				
Cesium-137	-0.824	11.7	U	-9.156E-8
Strontium-90	2.29	2.96	U	2.544E-7
Cobalt-60	1.24	12.6	U	1.378E-7
Potassium-40	103	161	U	1.144E-5
Beryllium-7	150	114		1.667E-5
Plutonium-238	-0.00841	0.295	U	-9.344E-10
Polonium-210	5.85	0.679		6.500E-7
Plutonium-241	-4.19	12.0	U	-4.656E-7
Thorium-230	1.31	1.11		1.456E-7
Thorium-228	0.403	1.05	U	4.478E-8
Actinium-228	6.81	55.1	U	7.567E-7
Americium-241	0.545	1.15	U	6.056E-8
Plutonium-239	-0.0420	0.399	U	-4.667E-9
Ra-228 - total	1.13	3.32	U	1.256E-7
Radium-226, -228 combined	2.94	3.85	U	3.267E-7
Thorium-232	0.646	0.781	U	7.178E-8

<b>Radionuclide</b>	<b>Result (pCi/sample)</b>	<b>MDC (pCi/sample)</b>	<b>Data Qualifier</b>	<b>Airborne Concentration (<math>\mu</math>Ci/mL)</b>
Uranium-238	1.10	0.199		1.222E-7
Uranium-233/234	0.820	0.306		9.111E-8
Uranium-235/236	0.0409	0.123	U	4.544E-9

## **APPENDIX D**

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

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### One-Point Flow Rate Bias Estimate

<b>Site ID: DOE-1</b>	<b>E-BAM Serial #: W23310</b>	<b>Pollutant type: PM10</b>	<b>Bias (%)</b>
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Quarter	Date	Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	Percentile	d <sup>2</sup>	d	d  <sup>2</sup>
9	4/16/2020 (W23310)	14.00	13.90	0.719	25th 0.287	0.518	0.719	0.518
		16.70	16.56	0.845		0.715	0.845	0.715
		17.50	17.33	0.981		0.962	0.981	0.962
9	5/15/2020 (W23310)	14.00	13.99	0.071	75th 0.719	0.005	0.071	0.005
		16.70	16.60	0.602		0.363	0.602	0.363
		17.50	17.39	0.633		0.400	0.633	0.400
9	6/6/2020 (W23310)	14.00	14.02	-0.143	0.020	0.020	0.143	0.020
		16.70	16.63	0.421		0.177	0.421	0.177
		17.50	17.45	0.287		0.082	0.287	0.082

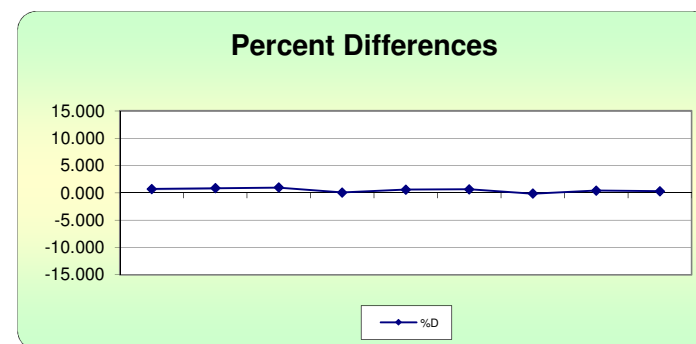
n	Σ d	"AB" (Eqn 4)
9	4.702	0.522
n-1	Σ d  <sup>2</sup>	"AS" (Eqn 5)
8	3.242	0.313

<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
0.72	TRUE
<b>Signed Bias (%)</b>	Both Signs Negative
+0.72	FALSE

**Note:** No issues encountered with this E-BAM unit during this quarter.

Return to Main Menu

Print Worksheet



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) - 11/3/2017 (dasc\_11\_3\_17.xls)  
<https://www3.epa.gov/ttn/amtic/gareport.html>



### One-Point Flow Rate Bias Estimate

<b>Site ID: DOE-2</b>	<b>E-BAM Serial #: Y12096</b>	<b>Pollutant type: PM10</b>	<b>Bias (%)</b>
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Quarter	Date	Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	Percentile	d <sup>2</sup>	d	d  <sup>2</sup>
9	4/16/2020	14.00	14.06	-0.427	25th	0.182	0.427	0.182
		16.70	16.83	-0.772		0.597	0.772	0.597
		17.50	17.63	-0.737		-0.906	0.544	0.737
9	5/15/2020	14.00	14.07	-0.498	75th	0.248	0.498	0.248
		16.70	16.82	-0.713		0.509	0.713	0.509
		17.50	17.60	-0.568		-0.568	0.323	0.568
9	6/16/2020	14.00	14.15	-1.060		1.124	1.060	1.124
		16.70	16.88	-1.066		1.137	1.066	1.137
		17.50	17.66	-0.906		0.821	0.906	0.821

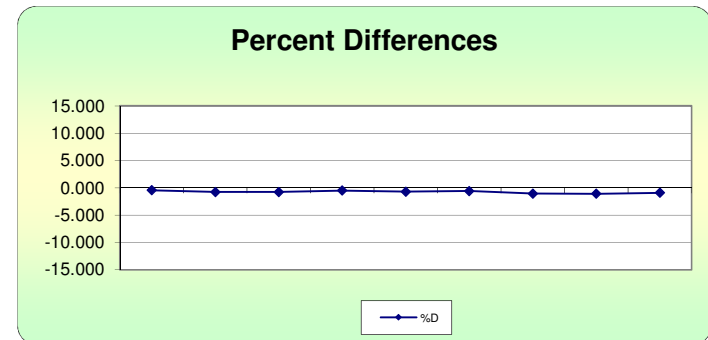
n	Σ d	"AB" (Eqn 4)
9	6.748	0.750
n-1	Σ d  <sup>2</sup>	"AS" (Eqn 5)
8	5.484	0.230

<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
0.89	FALSE
<b>Signed Bias (%)</b>	Both Signs Negative
-0.89	TRUE

**Note:** No issues encountered with this E-BAM unit during this quarter.

Return to Main Menu

Print Worksheet



**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) - 11/3/2017 (dasc\_11\_3\_17.xls)  
<https://www3.epa.gov/ttn/amtic/qareport.html>



### One-Point Flow Rate Bias Estimate

<b>Site ID: DOE-3</b>	<b>E-BAM Serial #: W23313</b>	<b>Pollutant type: PM10</b>	<b>Bias (%)</b>
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Quarter	Date	Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	Percentile	d <sup>2</sup>	d	d  <sup>2</sup>	
9	4/16/2020	14.00	14.10	-0.709	<b>25th</b>	0.503	0.709	0.503	
		16.70	16.77	-0.417		0.174	0.417	0.174	
		17.50	17.55	-0.285		-0.713	0.081	0.285	0.081
9	5/15/2020	14.00	14.11	-0.780	<b>75th</b>	0.608	0.780	0.608	
		16.70	16.82	-0.713		-0.417	0.509	0.713	0.509
		17.50	17.53	-0.171		0.029	0.171	0.029	
9	6/16/2020	14.00	14.20	-1.408		1.984	1.408	1.984	
		16.70	16.80	-0.595		0.354	0.595	0.354	
		17.50	17.58	-0.455		0.207	0.455	0.207	

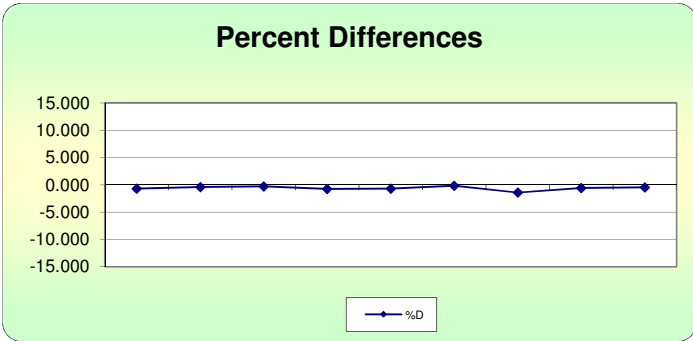
<b>n</b>	<b>Σ d </b>	<b>"AB" (Eqn 4)</b>
9	5.534	0.615
<b>n-1</b>	<b>Σ d <sup>2</sup></b>	<b>"AS" (Eqn 5)</b>
8	4.450	0.362

<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
0.84	FALSE
<b>Signed Bias (%)</b>	Both Signs Negative
-0.84	TRUE

**Note:** No issues encountered with this E-BAM unit during this quarter.

Return to Main Menu

Print Worksheet



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) - 11/3/2017 (dasc\_11\_3\_17.xls)  
<https://www3.epa.gov/ttn/amtic/qareport.html>



### One-Point Flow Rate Bias Estimate

<b>Site ID: DOE-4</b>	<b>E-BAM Serial #: W23314</b>	<b>Pollutant type: PM10</b>	<b>Bias (%)</b>
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Quarter	Date	Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	Percentile	d <sup>2</sup>	d	d  <sup>2</sup>	
9	4/16/2020 (W23314)	14.00	14.30	-2.098	25th	4.401	2.098	4.401	
		16.70	17.06	-2.110		4.453	2.110	4.453	
		17.50	17.81	-1.741		-2.098	3.030	1.741	3.030
9	5/15/2020 (W23314)	14.00	14.20	-1.408	75th	1.984	1.408	1.984	
		16.70	17.01	-1.822		-1.630	3.321	1.822	3.321
		17.50	17.79	-1.630		-1.630	2.657	1.630	2.657
9	6/16/2020 (W23314)	14.00	14.21	-1.478		2.184	1.478	2.184	
		16.70	17.13	-2.510		6.301	2.510	6.301	
		17.50	17.83	-1.851		3.426	1.851	3.426	

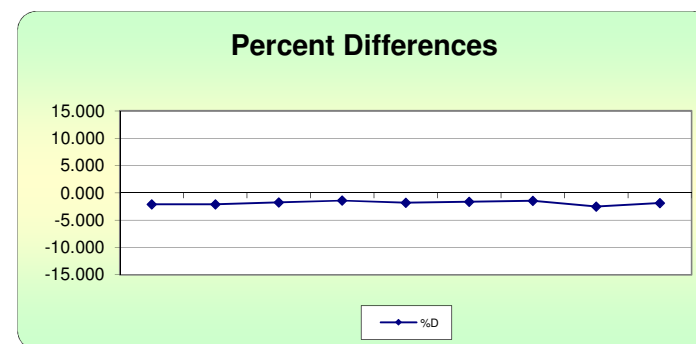
<b>n</b>	<b>Σ d </b>	<b>"AB" (Eqn 4)</b>
9	16.649	1.850
<b>n-1</b>	<b>Σ d <sup>2</sup></b>	<b>"AS" (Eqn 5)</b>
8	31.757	0.346

<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
2.06	FALSE
<b>Signed Bias (%)</b>	Both Signs Negative
-2.06	TRUE

**Note:** No issues encountered with this E-BAM unit during this quarter.

Return to Main Menu

Print Worksheet



**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) - 11/3/2017 (dasc\_11\_3\_17.xls)  
<https://www3.epa.gov/ttn/amtic/qareport.html>



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-1 Serial # W23310  
 Audit Date: 4/16/2020 Audited By: T.S. Williford

Flow Audit					
Flow Audit Device Model:	BGI Delta Cal DC-1A	Serial No:	158047	Calibration Date:	2/5/2020
Leak Check Value:	as found: <u>0.7</u>		as left: <u>0.7</u>		
Ambient Temperature:	as found:	E-BAM	Ref. Std.	as left:	E-BAM
		<u>16.0</u> °C	<u>16.8</u> °C		<u>16.0</u> °C
Barometric Pressure:	as found:	<u>711.0</u> mmHg	<u>711.0</u> mmHg	as left:	<u>711.0</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>16.56</u> lpm	as left:	<u>16.7</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>13.9</u> lpm	as left:	<u>14.0</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.33</u> lpm	as left:	<u>17.5</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>0.915</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm2) : <u>0.922</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm2) : <u>0.007</u>	(lpm)	(Hg)	
% Difference / Pass or Fail: <u>0.76%</u>	<u>14.5</u>	<u>408.7</u>	<u>Good / Marginal</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>0840</u>	<u>0840</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>24 hr</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60 min</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 Message</u>	<u>0845</u>	<u>4/16/20</u>	4			
2			5			
3			6			

Audit Notes:

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Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-2 Serial # Y12096  
 Audit Date: 4/16/2020 Audited By: T.S. Wilford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/5/2020

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

		E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found:	<u>18.4</u> °C	<u>18.5</u> °C	as left:	<u>18.4</u> °C	<u>18.5</u> °C
Barometric Pressure:	as found:	<u>708.0</u> mmHg	<u>708.5</u> mmHg	as left:	<u>708.0</u> mmHg	<u>708.5</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>16.83</u> lpm	as left:	<u>16.7</u> lpm	<u>16.83</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>14.06</u> lpm	as left:	<u>14.0</u> lpm	<u>14.06</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.63</u> lpm	as left:	<u>17.5</u> lpm	<u>17.63</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>0.848</u>	Flow Rate	Vacuum	Quality Category Good / Marginal / Poor
Measured Span Mass (mg/cm2) :	<u>0.878</u>	14.0 - 15.0	Value	
Difference (mg/cm2) :	<u>0.03</u>	(lpm)	(Hg)	
% Difference / Pass or Fail:	<u>3.5%</u>	<u>14.0</u>	<u>396.4</u>	<u>Good</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1014</u>	<u>1014</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>24hr</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60mins</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>4/16/20</u>	<u>1018</u>			
<u>2</u>					
<u>3</u>					

Audit Notes:

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Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-3

Serial # W23313

Audit Date: 4/16/2020

Audited By: T.S. Williford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/5/2020

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

		E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found:	<u>20.1</u> °C	<u>19.1</u> °C	as left:	<u>20.1</u> °C	<u>19.1</u> °C
Barometric Pressure:	as found:	<u>709.8</u> mmHg	<u>710.5</u> mmHg	as left:	<u>709.8</u> mmHg	<u>710.5</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>16.77</u> lpm	as left:	<u>16.7</u> lpm	<u>16.77</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>14.1</u> lpm	as left:	<u>14.0</u> lpm	<u>14.1</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.55</u> lpm	as left:	<u>17.5</u> lpm	<u>17.55</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)	Measured Span Mass (mg/cm2)	Difference (mg/cm2)	% Difference / Pass or Fail:	Flow Rate (lpm)	Vacuum Value (Hg)	Quality Category
<u>0.885</u>	<u>0.888</u>	<u>0.003</u>	<u>0.34%</u>	<u>14.1</u>	<u>406.6</u>	<u>Marginal</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1150</u>	<u>1150</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>24 hrs</u>	RH Setpoint	45%	<u>45%</u>	Std Cond Temp	25 C	<u>25C</u>
Realtime Avg	60 mins	<u>60 min</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>4/16/20</u>	<u>1153</u>			
<u>2</u>					
<u>3</u>					

Audit Notes:

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Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-4

Serial # W23314

Audit Date: 4/16/20

Audited By: T. S. Williford

Flow Audit					
Flow Audit Device Model:	BGI Delta Cal DC-1A	Serial No:	158047	Calibration Date:	2/5/2020
Leak Check Value:	as found: <u>0.4</u>	as left:	<u>0.4</u>		
	E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found: <u>20.8</u> °C	<u>20.1</u> °C	as left:	<u>20.8</u> °C	<u>20.1</u> °C
Barometric Pressure:	as found: <u>704.2</u> mmHg	<u>702.5</u> mmHg	as left:	<u>704.2</u> mmHg	<u>702.5</u> mmHg
16.7 lpm Flow Rate	as found: <u>16.7</u> lpm	<u>17.06</u> lpm	as left:	<u>16.7</u> lpm	<u>17.06</u> lpm
14.0 lpm Flow Rate	as found: <u>14.0</u> lpm	<u>14.3</u> lpm	as left:	<u>14.0</u> lpm	<u>14.3</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>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>0.921 + 0.919</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm2): <u>0.921</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm2): <u>0.003</u>	(lpm)	(Hg)	
% Difference / Pass or Fail: <u>0.33%</u>	<u>14.0</u>	<u>407.9</u>	<u>Marginal</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	1250	1250	Analog Mode	Hourly	<u>hourly</u>	Flow Type	Actual	<u>Act</u>
Location	4	4	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>60 min</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>4/16/20</u>	<u>1254</u>	4			
2			5			
3			6			

Audit Notes:

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

Station # DOE-1 Serial # W23310  
 Audit Date: 5/15/2020 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>2/5/2020</u>
Leak Check Value:	as found: <u>0.6</u>		as left: <u>0.6</u>		
Ambient Temperature:	as found:	<u>15.9</u> °C	<u>16.1</u> °C	as left:	<u>15.9</u> °C <u>16.1</u> °C
Barometric Pressure:	as found:	<u>711.4</u> mmHg	<u>711.5</u> mmHg	as left:	<u>711.4</u> mmHg <u>711.5</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>16.60</u> lpm	as left:	<u>16.7</u> lpm <u>16.60</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>13.99</u> lpm	as left:	<u>14.0</u> lpm <u>13.99</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.39</u> lpm	as left:	<u>17.5</u> lpm <u>17.39</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>0.915</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm2): <u>0.918</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm2): <u>0.003</u>	(lpm)	(Hg)	
% Difference / <u>Pass</u> or Fail: <u>0.33%</u>	<u>15.0</u>	<u>418</u>	<u>Good/Marg</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>0913</u>	<u>0913</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 No new Messages</u>	<u>5/15/20</u>	<u>0920</u>	4		
<u>2</u>			5		
<u>3</u>			6		

Audit Notes:  
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Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-2 Serial # Y12096  
 Audit Date: 5/15/2020 Audited By: T.S. Williford

Flow Audit					
Flow Audit Device Model:	BGI Delta Cal DC-1A	Serial No:	158047	Calibration Date:	2/5/2020
Leak Check Value:	as found: <u>0.4</u>		as left: <u>0.4</u>		
	E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found: <u>18.9</u> °C	<u>19.1</u> °C	as left:	<u>18.1</u> °C	<u>19.1</u> °C
Barometric Pressure:	as found: <u>708.5</u> mmHg	<u>709</u> mmHg	as left:	<u>708.5</u> mmHg	<u>709</u> mmHg
16.7 lpm Flow Rate	as found: <u>16.7</u> lpm	<u>16.82</u> lpm	as left:	<u>16.7</u> lpm	<u>16.82</u> lpm
14.0 lpm Flow Rate	as found: <u>14.0</u> lpm	<u>14.07</u> lpm	as left:	<u>14.0</u> lpm	<u>14.07</u> lpm
17.5 lpm Flow Rate	as found: <u>17.5</u> lpm	<u>17.6</u> lpm	as left:	<u>17.5</u> lpm	<u>17.6</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>0.848</u>	Flow Rate 14.0 - 15.0 (lpm)	Vacuum Value (Hg)	Quality Category Good / Marginal / Poor
Measured Span Mass (mg/cm2): <u>0.876</u>			
Difference (mg/cm2): <u>0.028</u>			
% Difference / <u>Pass</u> or Fail: <u>3.2%</u>	<u>14.3</u>	<u>402.1</u>	<u>Good/Marg</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>0950</u>	<u>0950</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>24hr</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>8.0v</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>5/15/20</u>	<u>1013</u>	<u>4</u>			
<u>2</u>			<u>5</u>			
<u>3</u>			<u>6</u>			

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

Station # DOE-3 Serial # W23313  
 Audit Date: 5/15/2020 Audited By: TS Williford

Flow Audit					
Flow Audit Device Model:	BGI Delta Cal DC-1A	Serial No:	158047	Calibration Date:	2/5/2020
Leak Check Value:	as found: <u>0.5</u>		as left: <u>0.5</u>		
Ambient Temperature:	as found:	E-BAM	Ref. Std.	as left:	E-BAM
Barometric Pressure:	as found:	23.8 °C	23.9 °C	as left:	23.8 °C
16.7 lpm Flow Rate	as found:	709.9 mmHg	710.0 mmHg	as left:	709.9 mmHg
14.0 lpm Flow Rate	as found:	16.7 lpm	16.82 lpm	as left:	16.7 lpm
17.5 lpm Flow Rate	as found:	14.0 lpm	14.11 lpm	as left:	14.0 lpm
	as found:	17.5 lpm	17.53 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/cm <sup>2</sup> ): <u>0.885</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm <sup>2</sup> ): <u>0.879</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm <sup>2</sup> ): <u>0.006</u>	(lpm)	(Hg)	
% Difference <u>Pass</u> or Fail: <u>0.68%</u>	<u>14.4</u>	<u>413.0</u>	<u>Moderate 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>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>25°C</u>
Realtime Avg	60 mins	<u>60min</u>	Delta T Setpoint	15 C	<u>15°C</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>5/15/20</u>	<u>1055</u>	4			
<u>2</u>			5			
<u>3</u>			6			

Audit Notes:  
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Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-4

Serial # WZ3314

Audit Date: 5/15/2020

Audited By: TS W. Niford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/5/2020

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

	as found:	E-BAM	Ref. Std.	as left:	E-BAM	Ref. Std.
Ambient Temperature:		<u>24.1</u> °C	<u>24.2</u> °C		<u>24.1</u> °C	<u>24.2</u> °C
Barometric Pressure:		<u>702.5</u> mmHg	<u>704.3</u> mmHg		<u>702.5</u> mmHg	<u>704.3</u> mmHg
16.7 lpm Flow Rate		<u>16.7</u> lpm	<u>17.01</u> lpm		<u>16.7</u> lpm	<u>17.01</u> lpm
14.0 lpm Flow Rate		<u>14.0</u> lpm	<u>14.20</u> lpm		<u>14.0</u> lpm	<u>14.20</u> lpm
17.5 lpm Flow Rate		<u>17.5</u> lpm	<u>17.79</u> lpm		<u>17.5</u> lpm	<u>17.79</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>0.919</u>	Flow Rate	Vacuum	Quality Category Good / Marginal / Poor
Measured Span Mass (mg/cm <sup>2</sup> ):	<u>0.922</u>	14.0 - 15.0	Value	
Difference (mg/cm <sup>2</sup> ):	<u>0.003</u>	(lpm)	(Hg)	
% Difference / <u>Pass</u> or Fail:	<u>0.32%</u>	<u>14.8</u>	<u>408.3</u>	<u>Good</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1128</u>	<u>1128</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>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>15°C</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>5/15/20</u>	<u>1143</u>			
<u>2</u>					
<u>3</u>					

Audit Notes:



Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-1

Serial # W23310

Audit Date: 6/16/2020

Audited By: 6/16/2020 TSWilkford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/5/2020

Leak Check Value: as found: 0.6 as left: 0.6

		E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found:	<u>19.9</u> °C	<u>20.0</u> °C	as left:	<u>19.9</u> °C	<u>20.0</u> °C
Barometric Pressure:	as found:	<u>711.3</u> mmHg	<u>711.5</u> mmHg	as left:	<u>711.3</u> mmHg	<u>711.5</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>16.63</u> lpm	as left:	<u>16.7</u> lpm	<u>16.63</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>14.02</u> lpm	as left:	<u>14.0</u> lpm	<u>14.02</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.45</u> lpm	as left:	<u>17.5</u> lpm	<u>17.45</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>0.915</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm <sup>2</sup> ):	<u>0.909</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm <sup>2</sup> ):	<u>0.006</u>	(lpm)	(Hg)	
% Difference / (Pass or Fail):	<u>0.66%</u>	<u>14.7</u>	<u>413.8</u>	<u>Marginal</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1314</u>	<u>1314</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>24 hr</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>8.0V</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>1.0 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>6/16/20</u>	<u>1321</u>	4		
2			5		
3			6		

Audit Notes:

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**Baseline Air Monitoring Program - DOE**

**E-BAM Monthly Audit and Maintenance**

Station # DOE-2

Serial # Y12096

Audit Date: 6/16/2020

Audited By: TS W. Heford

Flow Audit					
Flow Audit Device Model:	BGI Delta Cal DC-1A	Serial No:	158047	Calibration Date:	2/5/2020
Leak Check Value:	as found: <u>0.3</u>		as left: <u>0.3</u>		
Ambient Temperature:	as found:	E-BAM	Ref. Std.	as left:	E-BAM
		<u>22.2</u> °C	<u>22.6</u> °C		<u>22.2</u> °C
Barometric Pressure:	as found:	<u>707.8</u> mmHg	<u>708.5</u> mmHg	as left:	<u>707.8</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>16.88</u> lpm	as left:	<u>16.7</u> lpm
14.0 lpm Flow Rate	as found:	<u>14.0</u> lpm	<u>14.15</u> lpm	as left:	<u>14.00</u> lpm
17.5 lpm Flow Rate	as found:	<u>17.5</u> lpm	<u>17.66</u> lpm	as left:	<u>17.5</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>0.848</u>	Flow Rate 14.0 - 15.0 (lpm)	Vacuum Value (Hg)	Quality Category Good / Marginal / Poor
Measured Span Mass (mg/cm2): <u>0.871</u>			
Difference (mg/cm2): <u>0.023</u>			
% Difference <u>Pass</u> or Fail: <u>2.68%</u>	<u>14.6</u>	<u>403.8</u>	<u>Good/Marginal</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1351</u>	<u>1351</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>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>1.0 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>6/16/20</u>	<u>1404</u>			
<u>2</u>					
<u>3</u>					

Audit Notes:

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

Station # DOE-3 Serial # W23313  
 Audit Date: 6/16/2020 Audited By: TS Williford

Flow Audit					
Flow Audit Device Model:	BGI Delta Cal DC-1A	Serial No:	158047	Calibration Date:	2/5/2020
Leak Check Value:	as found: <u>0.5</u>		as left: <u>0.5</u>		
Ambient Temperature:	as found:	E-BAM	Ref. Std.	as left:	E-BAM
Barometric Pressure:	as found:	19.6 °C	19.9 °C	as left:	19.6 °C
16.7 lpm Flow Rate	as found:	710 mmHg	711.3 mmHg	as left:	710 mmHg
14.0 lpm Flow Rate	as found:	16.7 lpm	16.80 lpm	as left:	16.7 lpm
17.5 lpm Flow Rate	as found:	14.0 lpm	14.20 lpm	as left:	14.0 lpm
	as found:	17.5 lpm	17.58 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/cm <sup>2</sup> ): <u>0.885</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm <sup>2</sup> ): <u>0.889</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm <sup>2</sup> ): <u>0.004</u>	(lpm)	(Hg)	
% Difference / <u>Pass</u> or Fail: <u>0.45%</u>	<u>14.5</u>	<u>401.3</u>	<u>Good/Marginal</u>

Setup and Calibration Values								
Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	1436	1436	Analog Mode	Hourly	<u>hourly</u>	Flow Type	Actual	<u>Act</u>
Location	3	3	Baud Rate	9600	<u>9600</u>	Restart Voltage	12.5 v	<u>12.5</u>
Tape Advance	24 hrs	<u>24</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>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	
1 <u>No New Messages</u>	<u>6/16/20</u>	<u>1445</u>				
2						
3						

Audit Notes:  
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Baseline Air Monitoring Program - DOE

E-BAM Monthly Audit and Maintenance

Station # DOE-4 Serial # W23314  
 Audit Date: 6/16/2020 Audited By: TS williford

Flow Audit

Flow Audit Device Model: BGI Delta Cal DC-1A Serial No: 158047 Calibration Date: 2/5/2020  
 Leak Check Value: as found: 0.4 as left: 0.4

		E-BAM	Ref. Std.		E-BAM	Ref. Std.
Ambient Temperature:	as found:	<u>23.6</u> °C	<u>23.6</u> °C	as left:	<u>23.6</u> °C	<u>23.6</u> °C
Barometric Pressure:	as found:	<u>711.5</u> mmHg	<u>712.5</u> mmHg	as left:	<u>711.5</u> mmHg	<u>712.5</u> mmHg
16.7 lpm Flow Rate	as found:	<u>16.7</u> lpm	<u>17.13</u> lpm	as left:	<u>16.7</u> lpm	<u>17.13</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>17.83</u> lpm	as left:	<u>17.5</u> lpm	<u>17.83</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>0.919</u>	Flow Rate	Vacuum	Quality Category
Measured Span Mass (mg/cm <sup>2</sup> ):	<u>0.924</u>	14.0 - 15.0	Value	Good / Marginal / Poor
Difference (mg/cm <sup>2</sup> ):	<u>0.005</u>	(lpm)	(Hg)	
% Difference / <input checked="" type="radio"/> Pass or Fail:	<u>0.54%</u>	<u>14.3</u>	<u>401.8</u>	<u>Good</u>

Setup and Calibration Values

Parameter	Expected	Found	Parameter	Expected	Found	Parameter	Expected	Found
Clock	<u>1513</u>	<u>1513</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>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
1 <u>No New Messages</u>	<u>6/16/20</u>	<u>1526</u>			
2					
3					

Audit Notes:

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