SHOSHONE-BANNOCK TRIBES AIR QUALITY MONITORING PROGRAM

Quality Assurance Project Plan

Shoshone-Bannock Tribes
Land Use Department

Air Quality Program

Revision 5

April 1, 2025

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Revision History	
Revision (Date)	**Comments**
1 (5/2003)	Original category 1 QAPP included two PM2.5 federal reference monitors and formal data quality objectives.
2 (6/2009)	A category 3 QAPP. All references to the FRM monitors were removed. Included QA activities associated with the E-samplers (portable, non-FRM instruments for PM2.5 measurements) and detailed data handling.
3 (4/2013)	Removal of TEOM 1022a.
4 (7/2019)	Equipment changes for PM2.5 (BAM 1020 or EBAM replacing the TEOM 1400a), removal of meteorological equipment at Reubens, and new data acquisition system.
5 (2/2025)	Complete revision of the QAPP to EPA standard.

Title: SBT PM_{10} Air Quality Monitoring Quality Assurance Project Plan (QAPP)

Region/Division: Shoshone-Bannock Tribes

Version Number: 5.0

Date: April 1, 2025

Approval Signatures

Note: This QAPP becomes effective on the date of the last approval signature.

Quality Assurance Specialist
US EPA Region 10
Signature: JOSEPH RICHARDSON Digitally signed by JOSEPH RICHARDSON Date: 2025.04.21 08:49:39 -07'00' _____ _____

Name: *Cindy Fields* ***Date***
Quality Assurance Manager
US EPA, Region 10

Project Officer
US EPA Region 10
Signature: Carl A Brown 04/21/25

Name: *Carl Brown* ***Date***
Grants Project Officer
US EPA, Region 10

Project Officer
Shoshone-Bannock Tribes
Signature: for RCB 4/16/25

Name: *Preston Buckskin* ***Date***
Director of the Land Use Department
Shoshone-Bannock Tribes

Air Quality Manager
Shoshone-Bannock Tribes
Signature: Shayna Martin 4/16/25

Name: *Shayna Martin* ***Date***
Interim Air Quality Manager
Shoshone-Bannock Tribes

Table of Contents

Document Control

The Tribal Air Quality Manager is tasked with maintaining the official, approved version of the Quality Assurance Project Plan. This document will be updated as necessary to reflect changes in project specifications, personnel, or operational procedures. Further details, including specific operational protocols and contact information for each role, will be integrated into the final document.

Abbreviations, Acronyms, and Symbols

AQI	Air Quality Index
AQS	Air Quality System
BAM	Beta Attenuation Monitor
CFR	Code of Federal Regulation
COC	Chain of Custody
DAS	Data Acquisition System
DQA	Data Quality Audit
DQI	Data Quality Indicators
DQO	Data Quality Objective
EPA	Environmental Protection Agency
MDL	Method Detection Limits
MQO	Measurement Quality Objectives
NAAQS	National Ambient Air Quality Standards
NIST	National Institute of Standards and Technology
O_3	Ozone
PQAO	Primary Quality Assurance Organization
PAMS	Photochemical Assessment Monitoring Stations
PEP	Performance Evaluation Program
$PM_{2.5}$	particulate matter with diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with diameter less than or equal to 10 microns
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
QMS	Quality Management System
SCC	Sharp Cut Cyclone
SLAMS	State and Local Air Monitoring Stations
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
SPMS	Special Purpose Monitoring Stations
UV	Ultraviolet

1. Distribution List

The following individuals and/or organizations will receive copies of the approved QAPP and any subsequent revisions:

- Shoshone-Bannock (Tribes)
  - Shayna Martin, Interim Air Quality Manager*
  - Preston Buckskin, Director of the SBT Land Use Department
  - SBT Land Use Commission
  - Joey De La Cruz, Air Quality Field Technician
- US Environmental Protection Agency, Region 10
  - Cindy Fields, Quality Assurance Manager, EPA, Region 10
  - Carl Brown, Grants Project Officer, EPA, Region 10

* *Indicates individual who will maintain the official, approved QAPP*

2. Project/Task Organization

The Shoshone-Bannock Tribes' Tribal Air Quality Department is the principal agency leading the particulate matter monitoring project. This section delineates the responsibilities and organizational structure of key personnel involved in ensuring the project meets the regulatory standards and environmental goals established by the Fort Hall Business Council and United States Environmental Protection Agency (EPA).

Key Personnel and Groups

Fort Hall Business Council of the Shoshone-Bannock Tribes

Role: Governing body responsible for setting overarching tribal environmental policy and protection of the Shoshone-Bannock community.

Responsibilities: Approves project plans, reviews project outcomes, and ensures that project goals align with Tribal environmental objectives.

Shoshone-Bannock Tribal Land Use Department and Commission

Role: Serves as the environmental administrative board pursuant to the Administrative Procedures Act to hear and decide administrative appeals concerning actions taken by the Air Quality Program.

Responsibilities: Oversees administrative appeals related to air quality actions and ensures compliance with tribal regulations.

Tribal Air Quality Department

Tribal Air Quality Director

Responsibilities: Maintains the official and approved QAPP, oversees all contractor activities, coordinates field activities including calibrations and repairs, and acts as the primary contact for the Tribes with the EPA. Ensures independence in data validation by separating data generation and analysis roles.

Quality Assurance/Quality Control (QA/QC) Manager

Responsibilities: Manages all QA/QC activities, ensuring that procedures conform to standards and that data integrity is maintained throughout the project lifecycle. The QA Manager is independent of the field staff generating the data.

Field Technician

Responsibilities: Service and maintain monitoring sites, operate monitoring equipment, perform routine documentation, and ensure data collection aligns with project standards.

Air Quality Data Specialist

Responsibilities: Oversees data retrieval, operational troubleshooting, data validation, and reporting. Ensures that data systems are compatible with the US EPA Air Quality System (AQS).

Independent Auditor

Role: Conducts impartial audits of the monitoring equipment and processes.

Responsibilities: Reviews calibration and performance of monitoring equipment, ensuring unbiased operation and compliance with established standards.

US EPA Region 10 Responsibilities

Role: Clean Air Act 105 Project Officer (PO)

Responsibilities: Provides technical support and training and performs periodic external audits of project components. Responsible for the following activities in support of this program:

- Responding to requests for technical and policy information and interpretations;
- Evaluating quality system performance through technical systems audits, performance evaluations and network reviews, as appropriate for each grant and the tribal air office; and
- Making available the technical and quality assurance information developed by EPA to the tribal agencies, while making the tribe aware of any unmet quality assurance needs.

Role: EPA Quality Assurance Coordinator

Responsibilities: Reviews and approves the QAPP. Responsible for the following activities in support of this program:

- Reviewing, aiding with, and approving this QAPP

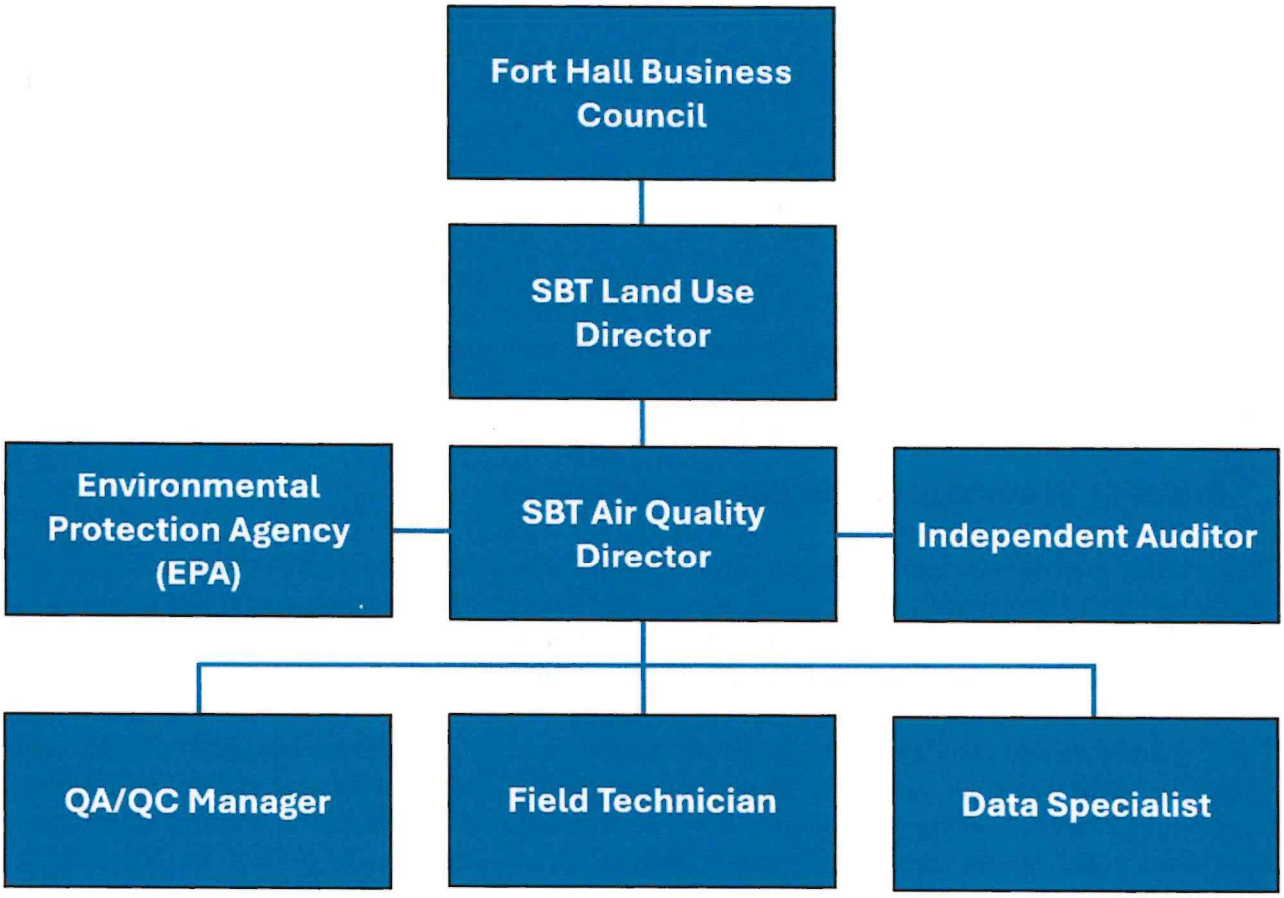

Figure 1: Project Partners and Representatives - Organizational Chart

3. Problem Definition/Background

The Shoshone-Bannock Tribes oversee an extensive air quality monitoring program on the Fort Hall Reservation in Southeast Idaho. This region, characterized by its rural landscape with major geographical features like Ferry Butte, the Fort Hall Bottoms, and the Snake River, is crucial for agricultural activities that form the backbone of the local economy and culture. Initiated in October 1996, the Shoshone-Bannock Tribes/EPA Particulate Monitoring Program aims to ensure compliance with National Ambient Air Quality Standards (NAAQS) for particulate matter.

Over the years, the program has evolved significantly, with key updates such as the installation of TEOM continuous particulate samplers in 1998 and the addition of gas monitoring equipment in 2002. Several monitoring sites were decommissioned or restructured, including the shutdown of the Background Site in 2000 and the relocation of the Primary Site to Ballard Road in 2010. PM_{10} monitoring equipment was modernized in 2019, reflecting ongoing efforts to enhance air quality data collection and management.

Problem Statement and Expected Outcomes

The primary goal of this monitoring initiative is to evaluate compliance with NAAQS for PM_{10} (particulate matter less than 10 microns in diameter). This program focuses on particulate matter that can pose significant health risks. The Ballard Road site, situated in a rural housing area within the northeastern section of the Nonattainment area, is one of the key monitoring locations.

These guidelines and standards help to ensure that the data collected are robust and reliable, enabling the Tribes to make informed decisions regarding air quality management and public health policies. By establishing baseline data and monitoring long-term trends, the Tribes aim to identify significant changes in or risks posed by air quality and enact effective control strategies to protect the community and the environment.

Project Background and Context

The Shoshone-Bannock Tribes/EPA Particulate Monitoring Program began in October 1996. Below is a timeline of the project to provide background and context.

Table 1. Timeline of the Shoshone-Bannock Tribes/EPA Particulate Monitoring Network

Date	Monitoring Network Event
October, 1996	October 1996 Original Monitoring Network Installed **Primary Monitoring Site (Located at Hwy 91 and Ballard Rd.)**: (3) High Volume PM_{10} samplers – 24 hour particulate samples – 7 days/week (1) Collocated High Volume PM_{10} sampler – 24 hour particulate samples – every third day. (1) Dichotomous sampler – 24 hour samples of PM_{10} and $PM_{2.5}$ every third

	day **Sho-Ban Monitoring Site (Located near the Casino/Hotel):** (3) High Volume PM_{10} samplers – 24 hour particulate samples – 7 days/week **Background Monitoring Site (Located west of Pocatello and north of Simplot):** (3) High Volume PM_{10} samplers – 24 hour particulate samples – 7 days/week Meteorological data was obtained from two nearby monitoring sites.
November 1998	**New Equipment Installed** Two TEOM Continuous particulate samplers were installed at the Primary Site. The TEOMs measure PM_{10} and $PM_{2.5}$ continuously.
February 1998	**Monitoring Equipment Installed** One dichotomous sampler was installed at the Sho-Ban site. One dichotomous sampler was installed at the Background site. One collocated dichotomous sampler was installed at the Primary site.
July 1998	**Monitoring Equipment Installed and Sampling Schedule Changed** All High Volume PM_{10} samplers - 24 hour particulate samples – every six days. All dichotomous samplers – 24 hour samples of PM_{10} and $PM_{2.5}$ every other day. Meteorological monitoring equipment was installed at the Primary site, including: Wind Monitor, Ambient Temperature/Relative Humidity Sensor, Difference Temperature Sensors, and a pyranometer (solar radiation sensor).
January 2000	**January 2000 Monitoring Equipment Removed** The dichotomous samplers were shut down at Primary, Sho-Ban, and Background monitoring sites.
February 2000	**Background Site Was Shut down**
March 2000	**Monitoring Equipment Installed and New Site Installed** Two Federal Reference Method (FRM) $PM_{2.5}$ samplers began operation at the Primary site. A new site was installed at Fort Hall, ID, that included a High Volume PM_{10} sampler
August 2002	**Gas Monitoring Equipment Installed at Primary Site** For the collection of NO_x and SO_2, the following was installed: The system is a combination of components including: an API model 100A fluorescent analyzer, API model 200A chemiluminescent analyzer, a laminar flow inlet and a CI CR10X data acquisition system.
June 2005	**Monitoring Equipment Removed** Gas monitoring system shut down. Both FRM 2.5 monitors shut down.

	Fort Hall and Ballard site's Monitors removed (Hi-Vols) . Contracted data management cancelled, Tribal staff begin formatting data and submitting to Region 10, who in turn make final revisions and submit to EPA
August 2006	**Saturation Study**- A saturation Study was carried out using PM-10 Mini-vols and operated at several locations on the Reservation.
January 2007	Tribes operate only at Primary Site, with two PM TEOMS, and two co-located FRM PM-10 "Hi-Vols", along with meteorological station. Data gathered and formatted by Tribal staff, sent to Region 10 EPA for final formatting. Expanded the Ballard Site deck and equipped it with two Rupprecht & Patashnick model 2000 instruments and one PM-1- Hi-Vol FRM.
March 2009	Removal of Meteorological equipment at Primary Site
March 2010	Abandonment of Primary Site; re-location to Ballard Road Site
July 2019	PM2.5 monitoring equipment was updated, replacing the TEOM 1400a with BAM 1022 or EBAM units. Meteorological equipment was removed from the Reubens site. A new data acquisition system was implemented.
April 2020	The TEOM 1022a monitoring equipment was removed from the program.

Regulatory Information and Criteria

The monitoring operations are designed to comply with various U.S. Environmental Protection Agency (EPA) guidelines, including:

- 40 CFR 58, Appendix A: Quality Assurance Requirements for State and Local Air Monitoring Stations (SLAMS)
- 40 CFR 58, Appendix B: Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)
- 40 CFR 58, Appendix E: Probe Siting Criteria for Ambient Air Quality Monitoring
- EPA Quality Assurance Handbooks: Covering principles, ambient air specific methods, and quality assurance/quality control (QA/QC) standards to ensure data precision and accuracy.

4. Project / Task Description

General Overview of Project

This The Shoshone-Bannock Tribes employ the BAM 1020 system exclusively for monitoring PM_{10} (particulate matter 10 microns or less in diameter) on the Fort Hall Reservation. This focused approach is essential for maintaining compliance with the National Ambient Air Quality Standards (NAAQS) and

ensuring community health. The project encompasses several structured tasks, designed to achieve consistent and reliable air quality monitoring.

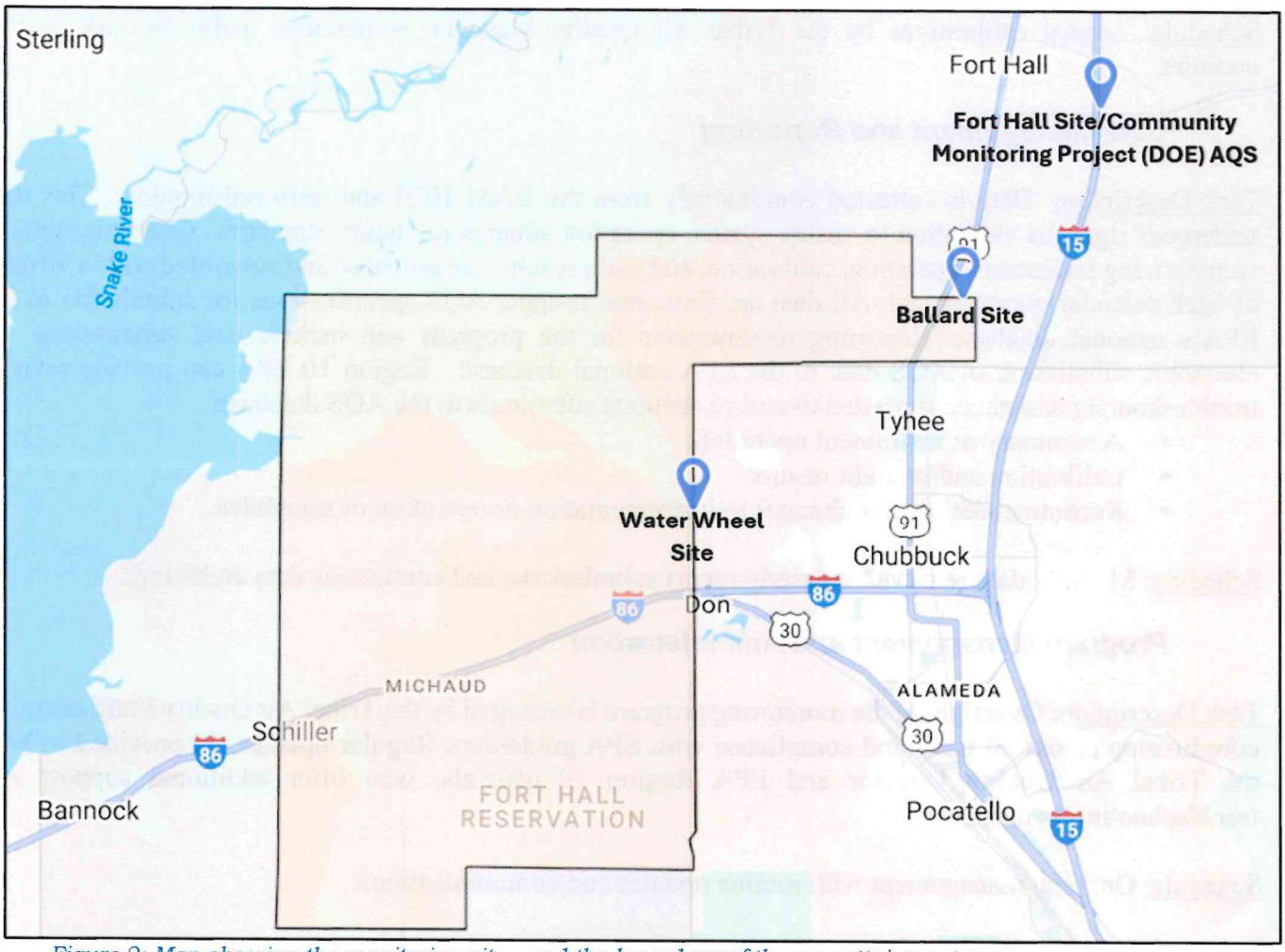

Figure 2: Map showing the monitoring sites and the boundary of the non-attainment area.

Description of Work

Routine Operations

Task Description: The BAM 1020 system is checked weekly by trained tribal field technicians. These technicians perform not only the regular inspections but also the semiannual and required remedial maintenance on all monitoring equipment.

Schedule: Continuous monitoring with weekly operational checks.

Calibrations and Audits

Task Description: Calibration of the BAM 1020 system is crucial for ensuring data accuracy. Annual system calibrations and monthly flow checks are conducted by the Tribal Air Quality Manager. Additionally, independent auditors perform semiannual audits to verify the precision and accuracy of the particulate

samplers based on predefined accuracy goals (± 5% of the audit flow value and ± 5% of the manufacturer's design flow value).

Schedule: Annual calibrations by the Tribal Air Quality Manager; semiannual audits by independent auditors.

Data Management and Reporting

Task Description: Data is collected continuously from the BAM 1020 and retrieved monthly. This data undergoes rigorous validation to ensure system operation adheres to quality standards. Quarterly reports, summarizing instrument operation, calibration, and audit results, are prepared and submitted within 90 days of each calendar quarter's end. All data are formatted to meet AQS specifications for submission to the EPA's national database. Reporting requirements for the program will include data submissions via electronic submission of AQS data to the EPA national database. Region 10 EPA can provide review, troubleshooting assistance if needed to ensure accurate submittals to the AQS database.

- A summary of instrument operation;
- Calibration and/or audit results;
- Recommendations for changes to instrumentation or operation or schedules.

Schedule: Monthly data retrieval, quarterly report submissions, and continuous data archiving.

Program Management and Administration

Task Description: Oversight of the monitoring program is managed by the Tribal Air Quality Staff, ensuring coordination across all tasks and compliance with EPA guidelines. Regular updates are provided to both the Tribal Air Quality Director and EPA Region 10 officials, who offer additional support and troubleshooting as needed.

Schedule: Ongoing management with routine updates and communications.

Assessment Requirements

Independent Audits: To assure data quality, independent auditors conduct semiannual quality assurance audits of the particulate samplers during the monitoring period. These audits are crucial for maintaining data integrity and are reported in the quarterly project reports to the Shoshone-Bannock Tribes. Since this is a regulatory site under its own PQAO (reporting agency), the EPA will need to conduct Technical Systems Audits on a 3 year basis (Appendix A 40 CFR Part 58).

Resource and Time Constraints

Resources: The project depends heavily on the availability of trained staff and the operational reliability of the BAM 1020 system.

Time Constraints: The scheduling of calibration, audits, and data management activities is critical to the project's success. Delays in these areas could impact overall data integrity and reporting timelines.

The Air Quality program sets forth a clear and structured approach to PM_{10} monitoring using the BAM

1020 system on the Fort Hall Reservation. By adhering to a precise schedule of maintenance, calibration, audits, and data management, the Shoshone-Bannock Tribes aim to continuously monitor and evaluate the air quality, ensuring compliance with environmental standards for the community's health and safety.

Program Schedule

Task Description	**Due Date**
Data Collection	Continuous
Quarterly Reports	Quarterly -within 90 days of the end of each calendar quarter
Maintenance	Weekly inspection by on-Field Tech Quarterly systems calibration and preventative maintenance on particulate samplers by Tribal field technicians Yearly systems calibration and preventative maintenance on particulate samplers. Semiannual audits of particulate samplers by an independent auditor BAM 1020 units are scheduled for yearly calibrations and monthly flow checks; semi-annual audits.
Data Archive	Continuous, with re-formatting toward AQS specifications

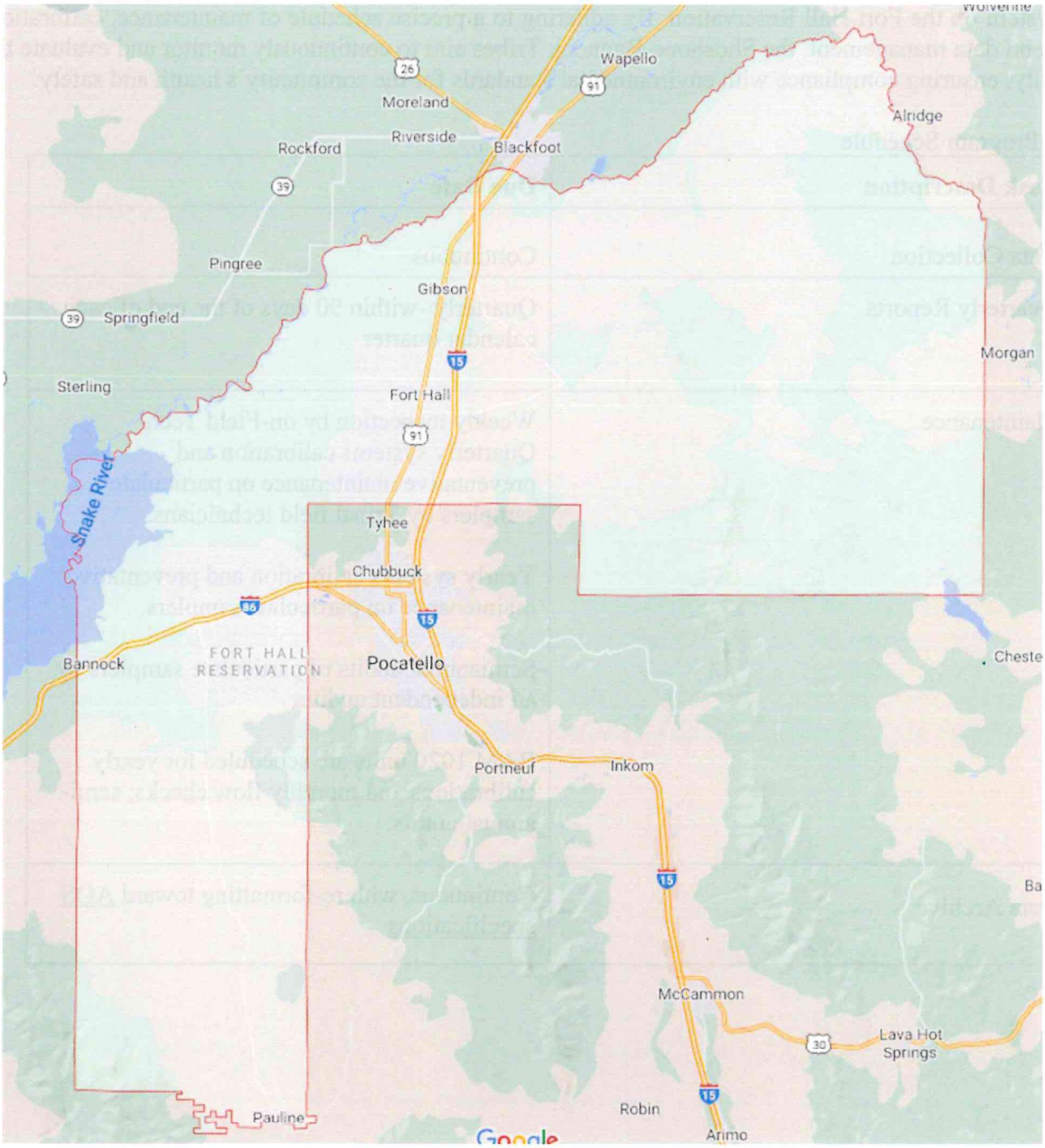

Figure 3. Map of Reservation boundaries.

The Reservation is located in the southeastern part of the State of Idaho. The Fort Hall Indian Reservation occupies four counties: Bingham, Bannock, Caribou, and Power. The Fort Hall Indian Reservation covers approximately 521,519 acres. There are about 4,038 residents living on the reservation.

(See Figure 1, reservation boundaries (Topography), Figure 3. Map of Reservation boundaries. (Satellite).

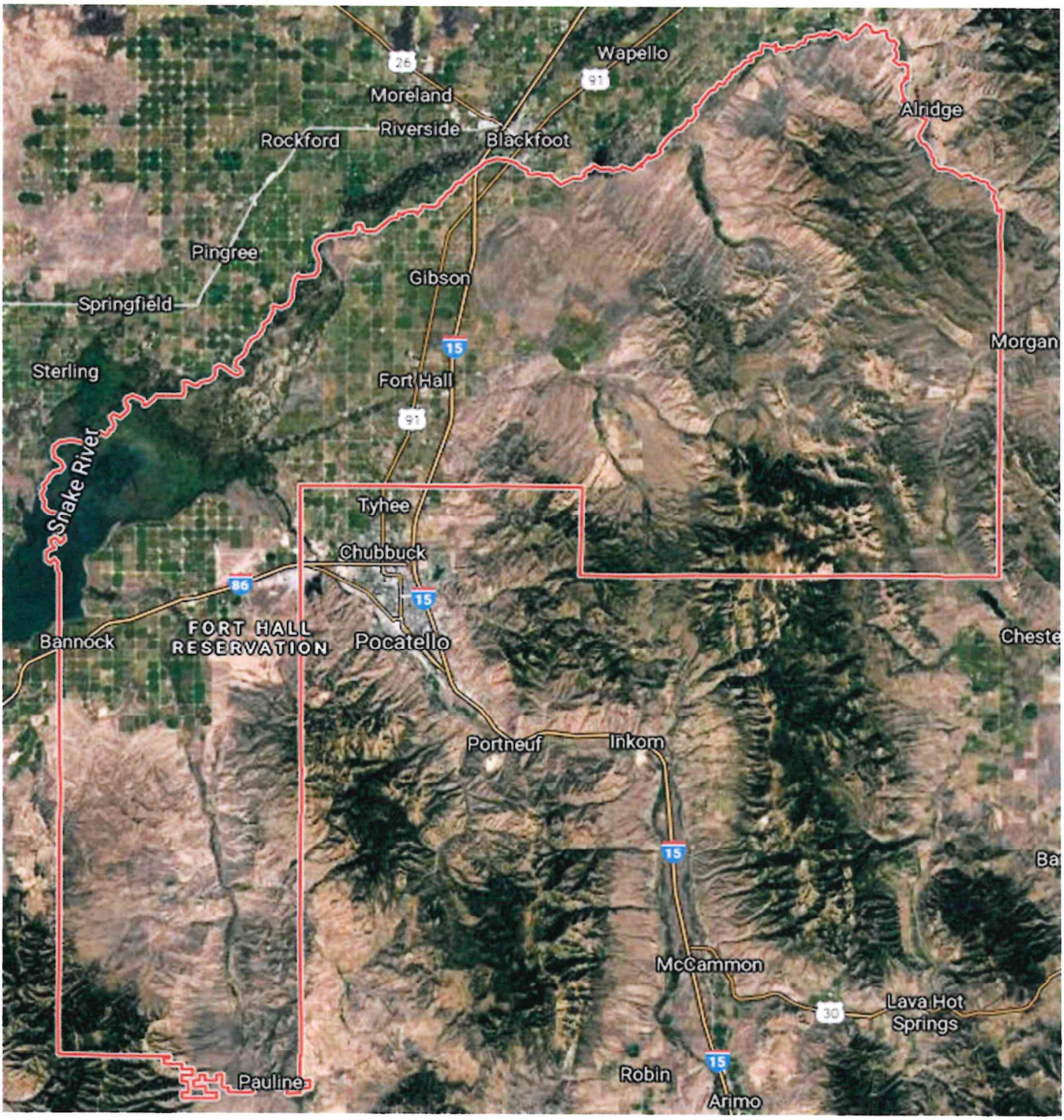

Figure 4. Reservation Boundaries (Satellite image)

5. Quality Objectives and Criteria

This Quality Assurance Project Plan (QAPP) specifically addresses PM_{10} sampling for the Tribes' Ambient Air Quality Monitoring Program, which constitutes the framework for the quality assurance practices of our air pollution measurement systems. Special projects with distinct objectives may require tailored procedures, thus necessitating separate QAPPs designed for those specific projects.

The methodologies for operating air monitoring equipment and managing the resulting data outlined in this QAPP are mandatory for all personnel, contractors, and agencies involved in generating air quality data for regulatory compliance or under the conditions of an air quality permit issued by the Tribes. The following table provides acceptance ranges for this QAPP's Data Quality Objectives.

Goals of the Ambient Air Quality Monitoring Program

- Assess Peak Concentrations: Identify the highest pollutant concentrations that occur within the network's coverage area.
- Source Impact Analysis: Obtain the relevant timeseries data to evaluate the influence on ambient air quality from significant sources or categories of sources.
- Background Levels: Establish the baseline concentration levels for ongoing comparison and assessment.
- Environmental and Health Impacts: Assess the effects of air quality on visibility, vegetation, and overall environmental health in rural and remote areas of the reservation.

Utilization of Data

- Baseline Establishment: Set a historical baseline for natural and anthropogenic air pollutants.
- Dynamic Monitoring: Continuously track the concentrations of these pollutants.
- Regulatory Compliance: Assess compliance with the National Ambient Air Quality Standards (NAAQS).
- Progress Monitoring: Track improvements towards achieving established air quality goals.
- Emergency Responses: Implement emergency controls to mitigate severe pollution episodes.
- Strategy Development: Provide reliable data to formulate long-term air quality management strategies.
- Trend Analysis: Observe and analyze air pollution trends across the region.
- Research Support: Offer a robust database for ongoing research and analysis of air quality effects.

Data Quality Objectives (DQO)

Data quality objectives in this program are designed to:

- Clarify Data Use: Specify the intended uses of the collected data.
- Define Data Needs: Identify the types and quality of data required.
- Limit Decision Errors: Establish tolerable limits for the likelihood of errors due to data uncertainty.

As the complexity and costs of air pollution and meteorological measurement systems increase, it is crucial for the Tribes to employ methodologies that enhance data precision and completeness while reducing bias effectively and cost-efficiently.

After establishing a DQO, the data quality is continuously monitored and maintained within the prescribed acceptance criteria. Measurement Quality Objectives (MQOs) are set to manage all phases of the measurement process—from sampling to analysis—ensuring that total measurement uncertainty remains within the limits defined by the DQOs. These MQOs are further elaborated through the Data Quality Indicators (DQIs), with specific acceptance criteria derived from 40 CFR Part 53 Subpart D and 40 CFR Part 63 and guidance documents provided by the EPA. Each indicator's specifics are further detailed in the Quality Control and Quality Assurance sections of the individual Standard Operating Procedures (SOPs).

Data Accuracy, Precision, Bias and Measurement Range

Accuracy - Accuracy is a combination of random error (precision), and systematic error (bias).

Precision - "Precision is a measure of agreement between two replicate measurements of the same property, under prescribed similar conditions. This agreement is calculated as either the range or as the standard deviation." (US EPA QA/G-5)

Bias - "Bias is the systematic or persistent distortion of a measurement process that causes errors in one direction." (US EPA QA/G-5) Bias is determined by estimating the positive and negative deviation from the true value as a percentage of the true value.

Sensitivity/Measurement Range – "Sensitivity is the capability of a method or instrument to discriminate between measurement responses representing different levels of a variable of interest." (US EPA QA/G-5) Method, instrument, or quantitation limits of specific measurement procedures are known. The appropriate measurement range is determined by reviewing results and reconciling known ambient pollutant concentrations with reporting requirements. The specified/required measurement range will likely guide the selection for the monitor.

Data Representativeness

"Representativeness is a measure of the degree to which data accurately and precisely represent a characteristic of a population parameter at a sampling point or for a process condition or environmental condition. Representativeness is a qualitative term that is evaluated to determine whether in situ or other measurements are made and physical samples collected in such a manner that the resulting data appropriately reflect the media and phenomenon measured or studied." (US EPA QA/G-5)

Data Comparability

"Comparability is the qualitative term that expresses the confidence that two data sets can contribute to a common analysis and interpolation. Comparability must be carefully evaluated to establish whether two data sets can be considered equivalent in regard to the measurement of a specific variable or groups of variables." (US EPA QA/G-5)

Data Completeness

Completeness is a metric quantifying the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct, normal conditions. Completeness can be expressed as a ratio or a percentage. Data completeness requirements are included in the reference methods (40 CFR Part 50).

Measurement Quality Objectives

A procedure to ensure consistent validation of PM_{10} mass concentrations across the US was developed in 1998 through a collaborative effort between monitoring organizations, EPA Regional Offices, and Office of Air Quality Planning and Standards (OAQPS) and State and local agencies. The workgroup established three levels of criteria to assess data quality: Critical Criteria (must be met for data quality), Operational Evaluations (warrant further investigation), and Systematic Issues (potential systematic problems impacting decision-making).

These criteria, based on regulations such as 40 CFR Part 50 and 40 CFR Part 58, were compiled into a "validation template" and published in the 2008 QA Handbook for Air Pollution Measurement Systems Volume II. The templates were updated in 2017 and can be found on the EPA website (https://www3.epa.gov/ttn/amtic/files/ambient/pm25/qa/APP_D%20validation%20template%20version%2003_2017_for%20AMTIC%20Rev_1.pdf).

Each criterion includes the acceptable operational range, evaluation frequency, impacted sample size, applicable regulatory sections, and whether a criterion violation requires flagging before submitting data to the EPA's Air Quality System (AQS).

The Shoshone Bannock Tribal Ambient Air Quality Monitoring Program follows these established criteria to ensure data quality for pollutants, including PM_{10}. The following tables that summarize applicable quality assurance criteria and guidance on corrective actions and detailed descriptions of Measurement Quality Objectives (MQOs). These checks are documented in the QC Checklist (Appendix A) and the onsite logbook.

Requirement	Frequency	Acceptance Criteria	Corrective Action Triggered[1]	Data Invalidation Triggered
Flow Rate Verification	Monthly	<±4.1% of Transfer Standard Flow Rate	Between 3% - 4.1% of Transfer Standard	Exceed Acceptance Criteria
		<±5.1% of Design Flow Rate	Between 4% - 5.1% Design Flow Rate	
Design Flow Rate Adjustment	After multi-point calibration or verification	< ±2.1% of design flow	Exceed Acceptance Criteria	Data invalidation may be applicable – refer to BAM manual for troubleshooting.2
Leak Check	Monthly and before and after flow rate verification, $PM_{2.5}$ separator maintenance, or nozzle cleaning.	≤1.5 lpm Total flow	Exceed Acceptance Criteria[3]	Not Applicable[4]
Temperature Check	Monthly	< ± 2.1 °C	Exceed Acceptance Criteria	Not Applicable[4]
Pressure Check	Monthly	< ± 10.1 mmHg	Exceed Acceptance Criteria	Not Applicable[4]
Nozzle, Vane, Capstan Shaft, and Pinch Roller Tires cleaning	Monthly	Cleaned	Frequency not met	Not Applicable[4]
PM_{10} Inlet / $PM_{2.5}$ Cyclone Cleaning	Monthly	Cleaned	Frequency not met	Not Applicable[4]
Clock check	Monthly	Drift: ≤ 1 min drift / month (BAM to datalogger)	Exceed Acceptance Criteria	May or May Not Be Applicable – depends on severity of drift
		Accuracy ≤ 5 min BAM and datalogger to standard		
Shelter Temperature	Each Site Visit, and during daily data edits	Manufacturer Criteria 0 – 50 °C (refers to any single MIN or MAX average hourly temp)	Exceed Acceptance Criteria	Exceed Acceptance Criteria
Shelter Temperature	Each Site Visit, and during daily data edits	Hour to hour shelter temp variation < ±4 °C	Exceed Acceptance Criteria	May or May Not Be Applicable – depends on impact to concentrations [5]
Check Error/Alarm Log	Each Site Visit, and/or during daily data edits	Check Log	Errors/Alarms Present	Depends on Type – refer to BAM manual

Requirement	Frequency	Acceptance Criteria	Corrective Action Triggered[1]	Data Invalidation Triggered
Compare BAM to External Datalogger	Monthly	Digital Data = Agree Exactly Analog Data = ± 1 ug/m3	Does not agree exactly (digital) or > ± 1 ug/m3 (analog)	Not Applicable – data can be filled in from BAM data if discrepancy encountered with external datalogger
Inspect Tape Reel tension, Inspect integrity and crispness of particulate spots	Each site visit	Tasks performed	Frequency not met	Not applicable
Reference Membrane Span Foil Check	Performed daily, check alarm log during daily edits.	m < ±5.1% of ABS	Exceed Acceptance Criteria	Data invalidation not necessarily applicable – refer to BAM manual for troubleshooting steps and to determine severity of problem
Pump Check	Monthly	Able to achieve 18.4 LPM	< 18.4 LPM	Not Applicable[4]
HVAC filter screens	Monthly	Task performed	Frequency not met	Not applicable
Relative Humidity Check	Checked during daily data edits.	RH < 35%	Exceed Acceptance Criteria	Data invalidation not necessarily applicable – depends on RH %
Run SELF-TEST Function	2 months, or after the tape has been changed or a problem is suspected	Task performed	ERROR OCCURRED is displayed	Data invalidation not necessarily applicable -depends on items that failed the test.
Verify BAM Settings and Calibration Values	2 months	Task performed	Values not input as expected	Data invalidation may be necessary if PM10 specific, FEM-required values have been changed
Perform 72-hour BKGD (zero filter) Test[6]	Change of seasons, if RH and dew point levels are expected to significantly change (otherwise, annually)	Standard deviation < 2.4 $\mu g/m^3$	Exceed Acceptance Criteria	Data invalidation not necessarily applicable – refer to BAM manual for troubleshooting.

Requirement	Frequency	Acceptance Criteria	Corrective Action Triggered[1]	Data Invalidation Triggered
Test Filter RH and Filter Temperature Sensors	6 months	Filter RH = ± 4% of Transfer Standard Filter Temp = ± 1 °C of Transfer Standard7	Exceed Acceptance Criteria	Data invalidation not necessarily applicable – refer to BAM manual for troubleshooting steps and to determine severity of problem
Test Smart Heater	6 months	Smart Heater is working	Smart Heater not working	Data invalidation not necessarily applicable – depends on RH % at site
Test Shelter Temp Probe	6 months	<± 2.1°C	Exceed Acceptance Criteria	Data invalidation not applicable pending impact on 0°C to 50°C threshold.
Flow rate – Multipoint verification/Calibration	Following Electromechanical maintenance or transport or every 12 months.	<±2.1% of transfer standard	Exceed Acceptance Criteria	Data invalidation may be applicable – refer to BAM manual for troubleshooting.[2]
Beta Detector Count Rate and Dark Count Test	12 months, or sooner if other issues prompt conducting this test for verification	≥ 500,000 beta particles[8]	Exceed Acceptance Criteria	Data invalidation may or may not be applicable – depends on number of beta particles counted
Clean Downtube	12 months	Cleaned	Frequency not met	Not Applicable
Replace Lithium Battery	12 months, or sooner if battery reading low	Replaced	Frequency not met and battery reading low	Data invalidation may or may not be applicable – depends on how erratic BAM readings are due to low battery
Filter Tape Change	60 Days	QC Checks	Tape Out/Break	Data invalidation necessary if past tape roll.
Transfer Standard Cert.	Annually	Annually	Frequency not met	Not Applicable
Refer to BAM manual – Section 7, Maintenance, Diagnostics, and Troubleshooting for other recommended practices not included in this table.				

6. Special Training/Certifications

Adequate education and training are essential components of the Shoshone-Bannock Tribes' Ambient Air Quality Monitoring Program, ensuring that all data collected are reliable and accurate. Given that all tribal staff members involved in this project are already experienced in ambient air quality monitoring systems, the training program is tailored to build on this foundation and ensure all team members remain at the forefront of best practices and technology.

Training Program Overview

The Shoshone-Bannock Tribes' training program encompasses:

- Personnel Qualifications: All team members are qualified in ambient air quality monitoring, with ongoing verification of skills and knowledge by the Tribal Air Quality Manager.
- Training Requirements: Specifies detailed training for specific monitoring equipment and data management systems used in this program.
- Training Frequency: Outlines the schedule for regular training updates to ensure continuous proficiency.

Training Content and Methods

Given the team's high level of existing expertise, the training focuses on advanced topics and updates in the field:

- Required Reading: Advanced materials on the latest developments in air quality monitoring.
- Formal Training: Includes specialized workshops and seminars, often conducted through the Institute for Tribal Environmental Professionals (ITEP), which covers both monitoring techniques and data management practices.
- Self-Guided Study and Mentoring: Encourages ongoing independent study and peer mentoring to refine expertise, particularly in new technologies or methodologies.
- Customized Training: In specific cases, tribal staff receive one-on-one training directly from EPA staff, ensuring deep, personalized learning experiences.
- Performance Assessment: Evaluations are conducted periodically to assess the application of skills in practical settings and ensure all training objectives are met.
- Training Documentation: All training documents will be digitally stored in a Microsoft 365 database.

The training program is dynamic and is regularly updated to align with current environmental standards and technological advancements. This approach not only maintains the high standards of the Shoshone-Bannock Tribes in air quality monitoring but also ensures that the staff is well-prepared to effectively manage and interpret air quality data for the protection of public health and the environment on the Fort Hall Reservation.

7. Documentation and Records

Documentation and records produced by the Shoshone-Bannock Tribes' Ambient Air Quality Monitoring Program predominantly consist of data and supporting information crucial for understanding air quality trends and making informed environmental management decisions.

Monthly reporting shall provide information on the following:

- Data Quality Issues: Number of 1-hour data points missing, failed visual inspection, or outside plausible limits for PM_{10}.
- Site Visit Schedule: Details on the regular site visit schedule by the Shoshone-Bannock Tribes' Air Quality Department.
- Technician Notes: Notes on sensor issues and required replacements, highlighting any equipment failures and unsuccessful data collection efforts.

These data points are being documented by the field technician on the QC Checklist (Appendix A) and onsite logbook.

Data Management System`

All hardcopy records, digital data, and other documents will be managed through a program project database. This includes field documentation such as log sheets, instrument printouts, calibration results, quality control checks, and maintenance records.

Storage and Archival

- Annual Turnover: At the end of each monitoring year, all data and records are turned over to the Shoshone-Bannock Tribal Air Quality Department or its designee.
- Project Data: Resides in the project database throughout the project's life and is archived upon termination, then delivered to the Business Council of the Shoshone-Bannock Tribes.
- Controlled Documents: Project-related SOPs and technical instructions are controlled documents maintained on Tribal Air Quality Computers and their CD-ROM backup. The Quality Assurance Project Plan (QAPP) is also a controlled document, with the project manager responsible for maintaining its currency and managing the distribution list. Updated versions of the plan are distributed to parties on the distribution list as revisions are made.

Document Control and Retention

- Electronic Records: Digital records, including raw and validated project data, are stored on secure servers with backup and recovery procedures routinely managed by designated IT staff.
- Retention Policy: All documentation is stored in office according to the retention policies set by the Shoshone-Bannock Constitution, which outline the duration documents are to be kept based on their use, applicability, and regulatory requirements.
- Litigation and Claims: In the event of litigation or audits, affected records are retained beyond their scheduled period until all actions and issues are resolved.

Formal Document Control Procedure

The program employs a formal document control procedure for managing policy, procedure, and guidance documentation. Documents such as the QAPP, SOPs, and official policy interpretations are regularly updated, with each revision clearly dated and noted. Outdated documents are replaced in the database with clear indications that they are superseded by newer versions.

Access and Distribution

- Official Documentation: Current versions of essential program documents are available through the Tribal Air Quality Department. These documents include Quality Assurance Project Plans, Standard

Operating Procedures, and worksheets for field activities like siting, calibration, and maintenance.

- Internal Access: Staff can access these documents through an internal database, which includes links or document numbers for easy retrieval.

This structured approach ensures that all members of the Shoshone-Bannock Tribes Air Quality Monitoring Program have timely access to current and accurate documentation, essential for maintaining the integrity and effectiveness of the program.

8. Sampling Process Design

The Shoshone-Bannock Tribes' Ambient Air Quality Monitoring Program is primarily designed to determine compliance with the National Ambient Air Quality Standards (NAAQS) and to assess the air quality within the Fort Hall PM-10 Non-Attainment Area. Key objectives include monitoring trends over time, assessing emissions source impacts, and providing data to support public health studies and air quality forecasting.

The program's emphasis is on monitoring particulate matter at the Ballard Site, where elevated pollutant concentrations are suspected due to its proximity to Pocatello, Idaho. The monitoring strategy aligns with areas of higher population and environmental sensitivity, with continuous operation of the Met-One BAM-1020 (PM-10) instrument to collect detailed particulate data.

Sampling Network Design and Monitoring Site Selection

The sampling network design and the selection of the Ballard Site comply with key regulatory guidelines to ensure the data's relevance and accuracy:

- 40 CFR Part 58, Quality Assurance Requirements for State and Local Air Monitoring Stations (SLAMS)
- 40 CFR Part 58, Network Design for State and Local Air Monitoring Stations (SLAMS) and Photochemical Assessment Monitoring Stations (PAMS)
- 40 CFR Part 58, Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring

Rationale for Selection of the Ballard Site

The site is strategically chosen with assistance from the EPA based on criteria outlined in 40 CFR Part 58, which takes into account several factors:

- Population Exposure: The site is near areas with significant population density, aiming to measure exposure levels representative of the community within the Non-Attainment area.
- Source Impact: Positioned to monitor the impacts of significant known sources or categories of sources of particulate pollution.
- Background Concentrations: While primarily focused on PM_{10}, the site helps in determining the

background levels of particulate matter to assess the general air quality and natural contributions to pollution.

- Maximum Concentration: The site is expected to record higher pollutant concentrations due to its proximity to urban activities and potential industrial sources in Pocatello.

Monitoring Objectives and Spatial Scales

Each monitoring objective at the Ballard Site is clearly defined to ensure that the data collected are appropriate for the spatial scales of interest. This careful matching of spatial scales with monitoring objectives helps in effectively assessing the air quality and in making informed decisions based on the monitoring data.

Site Selection Process

The selection of the Ballard Site involved:

- Developing a clear understanding of the monitoring objectives and the necessary data quality objectives.
- Identifying the spatial scale appropriate for these objectives.
- Reviewing potential locations based on the proximity to pollutant sources, population density, and meteorological conditions.

In summary, the design of the Shoshone-Bannock Tribes' sampling process for ambient air monitoring meticulously follows federal regulations and local needs to ensure the collection of valid, representative, and actionable air quality data.

Other Factors for Consideration

The site selection process for the Shoshone-Bannock Tribes' Ambient Air Quality Monitoring Program involves careful consideration of various critical factors:

- Economics: It is crucial to define the resources needed for all data collection activities comprehensively. This includes costs associated with instrumentation, installation, maintenance, data retrieval, data analysis, quality assurance, and data interpretation.
- Security: The preferred monitoring location must ensure the security of the monitoring equipment. Challenges such as theft or vandalism must be addressed with security measures like additional lighting or fencing. If these issues cannot be resolved, alternative locations close to the preferred site will be considered.
- Logistics: Effective logistics management is essential, encompassing procurement, maintenance, and transportation of materials and personnel. This process requires a thorough understanding of all aspects of the operation, including planning, reconnaissance, training, scheduling, safety, staffing,

procuring goods and services, communications, and inventory management.

- Atmospheric Considerations: The site selection must account for the spatial and temporal variability of pollutants and their transport. The impact of local structures, terrain, and heat sources on air trajectories, which can create localized anomalies in pollutant concentrations, must be considered. Meteorological factors are crucial for determining the geographic location of the site as well as the positioning of sampling probes. Utilizing local wind rose data is essential for optimal site positioning, whether to detect or to avoid emissions from specific sources.

- Topography: An assessment of local topography is necessary, using land use maps, U.S. Geological Survey topographic maps, and other resources. Both minor and major topographical features that affect pollutant transport and diffusion must be identified. For example, features like adjacent tree-lined streams or tall structures near point sources can influence pollutant dispersion, whereas major elements like mountain ranges or large lakes significantly affect wind patterns and local meteorology.

- Pollutant Considerations: The suitability of a monitoring site for one pollutant does not necessarily translate to its suitability for another. The temporal and spatial changes that pollutants undergo must be evaluated to confirm the appropriateness of each site for specific pollutants.

Given the interdependence of these factors, an iterative approach is necessary to ensure optimal site selection. In cases where potential sites do not meet the necessary criteria to achieve project objectives, a reevaluation of project priorities may be required before finalizing the monitoring site selection.

The Shoshone-Bannock Tribes conduct regular reviews of their air monitoring network to ensure that it continues to meet the defined monitoring objectives and priorities. These reviews help in adapting the network to changing environmental conditions and technological advancements, ensuring the continued relevance and effectiveness of the monitoring program.

If this site becomes inaccessible for any reason, the Air Quality team will perform a similar evaluation to select a new PM_{10} monitoring site.

9. Sampling Methods

The Shoshone-Bannock Tribes Air Quality Monitoring Program utilizes advanced methodologies for the continuous monitoring of particulate matter, ensuring accurate, reliable, and efficient quantification of airborne pollutants. The program adheres to evolving best practices in ambient air monitoring, with methodologies falling into two primary categories:

Continuous Real-Time Sample Analysis

Instrumentation: This category does not involve the physical collection of samples. Instead, real-time analysis of particulate matter mass and composition is conducted directly within the monitoring instruments. This method provides immediate data on air quality, allowing for rapid response and assessment.

Techniques Used

Beta-Attenuation: Utilizes a Carbon-14 element that emits beta rays. An external pump draws air through a filter tape, and the particulate matter causes attenuation of the beta rays. The degree of attenuation is directly proportional to the particulate concentration in the air.

Light Scatter: Air is drawn through a laser optical module where particles scatter a laser beam. The scattered light is detected, and the intensity is used to calculate the particulate concentration in real-time.

Filter-Based Time-Integrated Sample Collection

Description: Although the primary focus of the program is on real-time analysis, understanding the historical context of particulate levels is also vital. This method involves ambient air being passed through a filter, which is later analyzed in a laboratory to determine the mass and composition of particulate matter.

Implementation: This method is used selectively for detailed compositional analysis or when validating real-time monitoring techniques. It involves pre-weighed filters placed in a controlled air flow for a set period, after which the filters are weighed again to determine particulate accumulation.

Specific Standard Operating Procedures (SOPs)

An SOP for PM_{10} monitoring is in development to provide comprehensive guidance on the operation of monitoring equipment, data collection protocols, and the analytical methods used for both real-time and time-integrated sampling techniques. In the interim, the Tribes are utilizing IDEQ's SOP.

Analytical Methods

The particulate matter monitoring utilizes self-contained systems that are part of the continuous real-time analysis equipment. Additional laboratory analysis may be required for time-integrated samples to further assess particulate composition and validate continuous monitoring data.

Compliance and Monitoring Objectives

All monitoring methods and instruments used are in accordance with EPA-approved Federal Reference Method (FRM) or Federal Equivalent Method (FEM) standards, ensuring that data collected are suitable for NAAQS compliance assessments and real-time air quality index (AQI) reporting.

10. Sample Handling

The Shoshone-Bannock Tribes employ specific sample handling methods for collecting particulate data using the BAM 1020 air monitoring. These procedures ensure the integrity and reliability of the data collected for air quality assessment within the community.

Routine Monitor Checks

- Weekly Inspections: Tribal operators are tasked with inspecting the monitors weekly. During these checks, they verify the functionality of the display screens for any alerts or flags and ensure the filter tape is advancing correctly. This is crucial to avoid any tape perforations that could compromise data accuracy. These checks are documented on the QC Checklist (Appendix A) and the onsite

logbook.

- Supply Checks: Operators also check to ensure there is a sufficient supply of filter tape available to continue uninterrupted monitoring.

Data Collection and Handling

- Monthly Data Download: Data from the particulate monitors are downloaded monthly onto laptops directly at the monitoring site. This approach allows for immediate assessment of the data integrity before further processing.

- Data Storage: Once downloaded, the data are initially stored in digital files on the onsite laptop. This data is categorized and stored in project-specific computer files to maintain organization and ease of access.

Data Preparation for Analysis

- Data Formatting: After collection, tribal staff reformat the raw data from its initial state into a structured format suitable for detailed analysis and reporting.

- Preliminary Review: Before finalizing the data for submission, a visual inspection of the data is conducted by a data technician to identify any obvious anomalies or errors that might have occurred during data collection. This preliminary check helps in ensuring the data's readiness for the next stages of validation and analysis.

These sample handling procedures are designed to uphold the high standards of data quality and reliability required for effective air quality management by the Shoshone-Bannock Tribes. By maintaining strict adherence to these protocols, the Tribal Air Quality Program ensures that the collected data are both accurate and reflective of the true air quality conditions on the reservation.

11. Analytical Methods

The Shoshone-Bannock Tribes Air Quality Monitoring Program employs advanced analytical methods to assess ambient air quality, focusing on particulate matter (PM) concentration measurements using the Beta Attenuation Monitor (BAM) method. This section outlines the operational principles and analytical procedures associated with the BAM 1020 Continuous PM Monitoring Systems.

BAM Operational Principles

Beta Ray Attenuation: The BAM systems utilize beta ray attenuation to measure the concentration of airborne particulate matter. Each unit consists of a beta source that emits a steady stream of electrons and a sensitive detector that counts the number of electrons passing through a filter tape where particulates are collected.

Air Sampling: A vacuum pump draws ambient air through a size-selective inlet and down an inlet tube, directing airborne particles onto the filter tape positioned between the beta source and the detector.

Mass Determination: As particulates accumulate on the filter tape, they increasingly attenuate the transmission of beta rays through the tape. This attenuation is continuously monitored and used to calculate the mass of particulate matter deposited on the filter.

Flow Control and Calculation: The flow rate during sampling is precisely controlled to ensure accurate volume measurement. Using the determined mass and the sampled air volume, the BAM calculates the ambient PM concentration, expressed in micrograms per cubic meter ($\mu g/m^3$) or milligrams per cubic meter (mg/m^3).

Installation and Operational Requirements

The BAM 1020 monitor is designed to operate in outdoor environments to accurately reflect ambient air conditions. Installation inside buildings, trailers, or other enclosures is not recommended as it may affect the accuracy of the measurements. Operating these monitors outdoors is essential for them to function.

12. Quality Control

To ensure the integrity and accuracy of data from our air monitoring measurements, the Shoshone-Bannock Tribes Air Quality Monitoring Program implements robust quality control and quality assurance functions. These functions are critical for controlling the measurement process and are delineated into two interrelated activities:

Quality Assurance (QA)

- Policy and Procedure Development: Establishing comprehensive policies and procedures that align with DQOs.
- Role Assignments: Clearly defining roles and responsibilities for staff involved in the monitoring process.

- Review and Oversight: Conducting regular oversight and reviews to ensure adherence to QA standards.

- Corrective Actions: Implementing corrective actions based on identified discrepancies during reviews.

Quality Control (QC)

- Calibration: Routine calibrations are performed to ensure that our instruments' measurements align with known standards. This involves comparing the measurements from our Met One Instruments Model BAM 1020 monitor against calibration standards and adjusting as needed to minimize deviation. Calibration details are provided in the specific instruments' operation manuals and SOPs.

- Precision Checks: We regularly assess the precision of our instruments by examining the agreement among repeated measurements under similar conditions. This includes periodic zero and span checks, as well as collocated monitoring, which helps identify any deviation from required precision standards.

- Accuracy and Bias Checks: Accuracy checks combine assessments of random errors (precision) and systematic errors (bias). By employing collocated monitors and daily zero and span checks, we track the percent differences over time to detect any biases in measurements.

- Performance Audits: These audits are essential for verifying that the operational measurements of our analyzers conform to certified standards. We utilize certified traceable transfer standards for these audits, which are distinct from those used for routine calibrations.

- Corrective Actions: Whenever deviations from standard operations are observed, corrective actions are promptly implemented to rectify any identified issues. This ensures continuous improvement in the monitoring process and adherence to the established data quality objectives.

Implementation of QC Procedures

The applicability and specific procedures for QC will be detailed within the "Quality Control and Quality Assurance" sections of relevant SOPs. Each procedure is designed to address the unique challenges posed by specific pollutants or measurement techniques, ensuring that all monitoring activities meet the stringent requirements set forth by regulatory standards.

Quality control procedures for particulate data are discussed below. Additional quality control information is presented in Sections B2, B3, and B4.

BAM 1020 data are collected monthly via a lap-top computer on-site or from the Air Quality Office. The BAM 1020 is calibrated yearly with monthly with flow-checks. Then audited by an independent third party bi-annually. Raw data includes PM_{10} (Micrograms/cubic meter) as well as pressure drop (volts), main flow, and auxiliary flow.

The goal of this Department is to verify the precision and bias for our PM_{10} instruments on a quarterly, annually and three-year basis.

Precision is determined using collocated PM_{10} samplers of the same type. The relative percent difference (d_i) is initially calculated using Equation 1 for each valid data pair within the given time frame or aggregate.

Equation 1
$$d_i = \frac{X_i - Y_i}{(X_i + Y_i)/2} \cdot 100$$

X_i is the concentration from the primary sampler and the Y_i is the concentration from the audit sampler.

The coefficient of variation (CV) upper bound is then determined using Equation 2. This value should not exceed 10%.

Equation 2
$$CV = \sqrt{\frac{n \cdot \sum_{i=1}^{n} d_i^2 - \left(\sum_{i=1}^{n} d_i\right)^2}{2n(n-1)}} \cdot \sqrt{\frac{n-1}{X^2_{0.1,n-1}}}$$

For this equation, n is the number of valid data pairs being aggregated and $X_{0.1,n-1}$ is the 10th percentile of a chi-squared distribution with $n-1$ degrees of freedom.

Bias Estimate for One-point Flow Rate Verifications

Use Equation 3 to determine the percent difference for each one-point flow rate verification for the given aggregate, where *meas* is the concentration value indicated by the instrument and audit is the concentration of the audit standard used by the Department or operator.

Equation 3
$$d_v = \frac{meas - audit}{audit} \cdot 100$$

The bias estimator is calculated using Equation 4. This is an upper bound of the mean value (absolute).

Equation 4
$$|AB| = AB + t_{0.95,n-1} \cdot \frac{AS}{\sqrt{n}}$$

Where, n is the number of verifications in the aggregate and $t_{0.95,n-1}$ is the 95th quantile of a t-distribution with $n-1$ degrees of freedom. AB, which is the mean of the absolute values of the d_v's, is calculated using Equation 5. AS, the standard deviation of the absolute values of the d_v's, is calculated using Equation 6.

Equation 5
$$AB = \frac{1}{n} \cdot \sum_{i=1}^{n} |d_v|$$

Equation 6
$$AS = \sqrt{\frac{n \cdot \sum_{i=1}^{n} |d_v|^2 - \left(\sum_{i=1}^{n} |d_v|\right)^2}{n(n-1)}}$$

Probability Determinations for Semi-Annual Flow rate audits

The percent difference (d_a) is calculated using Equation 7 for each semi-annual flow rate audit where *meas* is the concentration indicated by the monitoring organization's instrument and audit is the concentration of the audit standard.

Equation 7 $$d_a = \frac{meas - audit}{audit} \cdot 100$$

These semi-annual flow rate da values are then compared to upper probability limit (*UPL*) and lower probability limit (*LPL*) that we calculate using equations 8 and 9. As per Section 4.2 of 40 CFR 58 this Department will strive to ensure that ninety five percent (95%) of the d_a calculations will be between the *UPL* and *LPL*.

Equation 8 $$UPL_v = m_v + 1.96 \cdot S_v$$

Equation 9 $$LPL_v = m_v - 1.96 \cdot S_v$$

Equations 10 and 11 are used to determine the mean (m_v) and the standard deviation (S_v),

Equation 10 $$m_v = \frac{1}{k} \sum_{v=1}^{k} d_v$$

Equation 11 $$S_v = \sqrt{\frac{k \cdot \sum_{v=1}^{k} {d_v}^2 - \left(\sum_{v=1}^{k} d_v\right)^2}{k(k-1)}}$$

where m_v equals the mean of the k number of one-point verifications, and k equals the total number of one-point verifications for the given time period.

The percent difference for the one-point flow rate verifications (d_v) is calculated using Equation 3.

High Volume samplers will utilize collocated samplers, where the duplicate sampler and the primary sampler are used to assess measurement system precision. The concentrations from the site's primary sampler and from the collocated sampler are to be reported to the EPA. Note that

all collocated measurements must be reported, even those that might be considered invalid because of identified malfunctions or other problems during or following the sample collection period.

The Shoshone-Bannock Tribes are committed to maintaining a high-quality monitoring network by anticipating potential issues and preparing in advance with appropriate corrective measures. Our network is structured to robustly handle the diverse monitoring activities and complex instrumentation involved in accurately assessing ambient air quality.

Table 2. Typical Corrective Actions

Activity	Problem	Likely Actions
Performance Criteria Assessment	Out of specification check, sample handling or holding problem, or failed performance audit	1) Verify / reproduce performance check findings. If available, use an alternate transfer standard to confirm failures. 2) Perform alternate performance checks to determine cause (for example - leak tests to aid in flow rate issues). 3) Recalibrate monitor using standard operating procedures. 4) Identify any required procedural changes to prevent reoccurrence. 5) Document actions on audit worksheet, data sheet, or logbook as appropriate. 6) Notify air monitoring coordinator of performance audit failures as soon as practical.
Filter Inspection (Pre or Post sample)	Pinhole(s) or torn	1) Use of alternate filters 2) Void filter with pinhole or tear. 3) Obtain a new filter from lab. 4) Inspect sample stream and exchange mechanism to determine cause. 5) Document action taken on field chain of custody form, data sheets, or logbook as appropriate.
Run parameter check	Shortened sample run times	1) Verify proper monitor run-time programming. 2) Diagnose likely causes – low flow rates, low pressure, power disruption, others. 3) Document cause and any actions on field chain of custody form, data sheets, or logbook as appropriate.
Power	Power interruptions	1) Verify power supply integrity. 2) Verify circuit breaker and fuse integrity. 3) Document cause and actions taken on field chain of custody form, data sheets, or logbook as appropriate.
Data Review	Data missing from data acquisition system (DAS)	1) Verify DAS operation. 2) Ensure monitor polling is current. 3) Isolate telecommunications problem by connecting to the monitor using alternate processes. 4) Verify monitor operations remotely. 5) Notify DAS administrator or air quality manager as appropriate. 6) Perform site visit to resolve monitor or telecommunication issues.

13. Instrument/Equipment Testing, Inspection, and Maintenance

Preventative maintenance is crucial for ensuring the effectiveness of the Quality Assurance program for the Shoshone-Bannock Tribes Air Quality Monitoring Program. Established procedures are followed rigorously to ensure that all instruments and equipment remain in optimal condition and perform within acceptable standards. Detailed preventative maintenance activities are outlined in the Quality Control and Quality Assurance sections of the instrument-specific Standard Operating Procedures (SOPs).

Inspection and Acceptance Testing

New or serviced BAM 1020 particulate samplers undergo acceptance testing conducted by Tribal Air Quality Field Technicians. This process includes:

- Visual Inspection: Ensuring no physical damage and that components are intact and correctly assembled.
- Cleaning: Thorough cleaning of accessible parts to prevent any sample contamination.
- Operational Verification: Checking all functions and settings to verify correct operation as per manufacturer specifications.
- Calibration: Ensuring the equipment is calibrated and meets the required standards for accurate data collection.
- Field Installation Verification: Once installed at the site, the instrument is again operationally verified to ensure it is fully functional in its working environment.

Maintenance

Routine and Scheduled Maintenance: Maintenance of the BAM 1020 particulate sampler is a critical ongoing activity:

Site Visits: Regular maintenance checks are performed during every site visit to ensure ongoing reliability and performance of the monitoring equipment.

Long-Term Scheduled Maintenance: Comprehensive maintenance is scheduled according to a defined timeline to handle more extensive servicing needs.

Maintenance Procedures: Detailed procedures for both types of maintenance activities are documented in Table 8 of the monitoring program documentation. This table includes step-by-step instructions for servicing the BAM 1020 systems to ensure they continue to operate effectively and provide reliable data.

Certification and Traceability

Instruments and calibration standards are routinely verified to ensure their certification and traceability to the National Institute of Standards and Technology (NIST). This includes annual certifications of flow standards and other critical measurement devices used in the monitoring equipment.

Equipment Calibration and Verification

Compressed gas standards and other calibration materials are used within their certification dates, and their traceability to NIST standards is ensured to maintain the accuracy of pollutant measurements.

Monitoring Equipment Infrastructure

Monitoring shelters, sample inlets, and other infrastructure are regularly inspected to ensure environmental conditions do not adversely affect the equipment operation or data integrity.

Through these comprehensive testing, inspection, and maintenance activities, the Shoshone-Bannock Tribes ensure that their air quality monitoring program adheres to high standards of accuracy and reliability, safeguarding the health and environment of their community. This proactive approach to equipment management helps anticipate potential issues and facilitates immediate corrective actions to maintain the integrity and effectiveness of the air monitoring efforts.

14. Instrument/Equipment Calibration and Frequency

This section delineates the calibration protocols for the instruments and test equipment utilized in the Shoshone-Bannock Tribes Air Quality Monitoring Program. Calibration is essential to ensure that all data collection instruments perform within specified limits, maintaining the accuracy and reliability of air quality data.

Calibration Standards and Procedures

Traceability and Certification

All calibration activities employ standards that are traceable to the National Institute of Standards and Technology (NIST) to ensure that the monitoring equipment meets both EPA and tribal quality objectives. This traceability is maintained by:

- Using calibration standards that are purchased from and recertified annually by vendors recognized for their accredited NIST-traceable calibration processes.
- Retaining all calibration certificates, which are part of the quality control documentation, to confirm the traceability and validity of the standards used.

Calibration Activities for BAM 1020 System:

- Temperature Calibration: The ambient temperature sensors of the BAM 1020 system are calibrated using a handheld thermometer or thermistor that is certified annually. The certification demonstrates traceability to a NIST primary standard. The calibration involves comparing the temperature readings from the handheld device to those from the sampler to ensure accuracy.
- Pressure Calibration: The ambient pressure sensors are calibrated with a hand-held barometer, also certified annually for traceability to a NIST primary standard. Similar to temperature calibration, the

pressure readings from the sampler are compared to those from the certified barometer.

- Flow Calibration: The sampler's flow rate is calibrated using a flowmeter with an annual certification showing traceability to a NIST flow rate standard. The flow rate measured by the flowmeter is compared with the actual flow from the sampler to verify accuracy.

For more detailed information on specific calibration activities, refer to the operation and calibration sections of the individual SOPs associated with each piece of monitoring equipment. This approach ensures that all monitoring data collected by the Shoshone-Bannock Tribes Air Quality Monitoring Program are accurate, reliable, and compliant with established environmental standards.

15. Inspection/Acceptance of Supplies and Consumables

For the Shoshone-Bannock Tribes Air Quality Monitoring Program, the management of supplies and consumables is critical to ensuring the integrity and reliability of our environmental monitoring efforts. This section outlines the procedures for the procurement, inspection, and acceptance of these essential items.

Supply Procurement and Management

Vendor Relationships: Supplies and consumables, such as filter tape for the BAM 1020 systems, are typically procured directly from the original equipment manufacturer, in this case, Met One. This ensures compatibility and reliability of the supplies used.

Procurement Schedule: Based on the manufacturer's recommendations and the usage rate, the procurement schedule for each type of supply, especially consumables like filter tape, is carefully planned. The filter tape is changed out every two months as per operational requirements.

Inventory Management: Supplies are either stored at the tribal air monitoring facility or ordered as needed to maintain a continuous operation. A revolving inventory system is employed to ensure that older supplies are used first (first in, first out), preventing issues related to storage duration and material integrity.

Inspection and Acceptance Procedures

Initial Inspection: Upon receipt, supplies such as filter tapes are inspected to ensure they match the ordered specifications (e.g., part numbers) and are free from any shipping damage. This inspection is crucial to avoid operational disruptions.

Routine Maintenance Checks: Field Technicians follow detailed procedures outlined in the Met One manual to replace and test the filter tape. This includes checking for correct tension, ensuring smooth tape movement, and cleaning the nozzle to prevent tape perforation and debris build-up.

Nozzle Maintenance: Regular nozzle cleaning procedures are carried out as part of routine maintenance to ensure the longevity and proper functioning of the sampling equipment.

Quality Assurance in Consumable Use

- Consumable Inspection: Filters and other consumables are inspected at various stages:
  - Upon delivery to check for any damage incurred during shipping.
  - By the Field Techs when installing in the equipment to ensure there is no damage that could affect sample integrity.
  - After use to assess any potential damage from the equipment that might impact the results.

- Expiration Management: Any consumables that have expiration dates are carefully tracked to ensure they are used within their effective period. Supplies that exceed their expiration dates are discarded

according to established safety and environmental protocols.

16. Non-direct Measurements

This Program will not use any non-direct measurements.

17. Data Management

Formalized processes and procedures are rigorously upheld within the SBT AQ QAPP framework for the collection, recording, transformation, transmittal, reduction, storage, and retrieval of ambient air monitoring data.

Throughout the data management process, all collected data is periodically reviewed and flagged in accordance with established EPA guidelines within the Air Quality System (AQS). Once these flags are confirmed for accuracy, the data undergoes final formatting using XML Reporter, a specialized software tool. This formatted data is then submitted to AQS via. Quality Review and Exchange System for Tribes (QREST), ensuring that all information shared meets federal reporting requirements and retains its integrity throughout the process.

Data Recording

In the Shoshone-Bannock Tribes Air Quality Monitoring Program, all particulate monitoring data from BAM 1020 systems is captured electronically using advanced data loggers. These loggers record outputs continuously and are capable of initial data manipulations and formatting for seamless integration into the tribal central database. Data are downloaded regularly, verified for completeness and accuracy, and then reviewed bi-daily to quickly identify any discrepancies or operational issues. Comprehensive monthly validations ensure the data meet quality standards before being archived securely in digital and hard copy formats. This streamlined process ensures that data are reliable, secure, and readily accessible for air quality assessment and reporting.

Data Transmittal

Data transmittal from the PM_{10} continuous monitors to the central Data Acquisition System (DAS) at SBT is achieved through TCP/IP, telephone, or other remote communication methods to connect to the site's data logger. The downloading of collected data does not result in deletion from the data logger. Instead, data is continuously overwritten on a first-in, first-out basis. This setup necessitates regular extraction of data from the data logger to prevent any loss of data.

In cases where standard communication methods are disrupted, alternate data retrieval processes are employed. These include direct on-site access to the data logger or using alternative remote communication methods to ensure data continuity.

For data related to particulate loaded filters analyzed independently, the lab results are transmitted back to SBT through a secure FTP site once analyses are completed. This ensures that the data management team receives accurate and timely information for further processing.

All transmitted raw data sets are stored electronically in a secure, unalterable format until data reduction or

validation processes commence. To maintain the integrity of the original data sets, any data reduction and validation operations are conducted on replicate versions of the raw data. This procedure safeguards the originality and reliability of data, ensuring that all information used in analyses retains its factual accuracy and traceability.

Data Reduction

Data reduction activities within the SBT AQ QAPP involve processing raw data into aggregated averages essential for assessing compliance with the National Ambient Air Quality Standards (NAAQS) for particulate matter. These averaged data points are critical for determining whether NAAQS limits for PM_{10} have been exceeded in the monitored area.

Each data point undergoes rigorous standard validation procedures before being compiled into averages. Air quality monitoring analysts meticulously review each dataset, taking into account results from quality assurance checks, potential external influences, and other relevant characteristics to ascertain the validity of the data. Any data points identified as invalid are excluded from the dataset and are not included in the subsequent calculations.

To ensure the reliability of the data averages, a minimum of 75% data completeness is required for any collection interval. For instance, an hourly average concentration is deemed valid only if at least 45 minutes of valid data is available within that hour. Should the valid data fall below 75% for any given interval, it is marked as incomplete and is therefore disqualified from inclusion in the final dataset.

Data Storage and Retrieval

Data collected by SBT's monitoring network is stored across multiple platforms and formats to ensure integrity and accessibility. Initially, data is recorded in instrument-specific or station-specific data loggers, which maintain an unalterable record of measurements. Depending on the data logger's capacity and the complexity of the data, records are retained for a period ranging from 10 to 120 days.

The central Data Acquisition System (DAS) actively retrieves data from these loggers by "polling" or remotely accessing each monitor and station to collect raw data. The DAS gathers interval data averages, which can range from 1-minute to hourly averages, and stores them in a primary archive database. Additionally, a duplicate of this data is stored in an "edit" database, where staff can perform necessary data edits and validations without altering the original raw data file, adhering to SBT's strict data integrity policies.

An edit history is maintained within the DAS to record and track all modifications made to data in the edit database, ensuring transparency and traceability of data changes.

Physical records such as logbooks, sample tracking chain of custody forms, and diagnostic information worksheets are maintained in the regional office for a minimum of one year. These documents are archived following SBT's document retention policy.

Electronic data is retained in the DAS for at least three years to facilitate trend analysis and leverage system reporting capabilities. Comprehensive backup and recovery procedures are in place to safeguard data against potential loss due to disasters. When database capacity is reached, data migration protocols are

enacted to transfer older datasets to an archival database. Furthermore, electronic logbooks and other critical data are regularly backed up in accordance with our data management standards.

All data storage practices adhere to the specified archive policies of SBT, as outlined in Section 9. Following the prescribed storage period, storage media are either securely disposed of or recycled, ensuring compliance with environmental and data protection regulations.

18. Assessment and Response Actions

Overview of Assessment Activities

Assessment activities are crucial for maintaining the integrity and accuracy of the air quality monitoring project. These activities include systematic reviews of system operations, data quality, and data completeness to ensure compliance with established standards and effectiveness in capturing accurate air quality data.

Frequency and Types of Assessments

Bi-daily Reviews: Every two business days, system operation, data quality, and data completeness will be assessed by reviewing the data downloaded via telephone from the data-logger.

Calibrations

BAM 1020 Samplers: Bi-monthly and during specific events (post-installation, post-maintenance, and project takedown).

Independent Audits: Semi-annual audits for all particulate samplers (BAM 1020 and 1022) by a contracted auditor.

Participation in EPA Programs: Involvement in the PM10 TSA administered by EPA Region 10 to assess measurement system uncertainty and bias.

Dates of Assessments

The specific dates for these assessments will be scheduled annually and included in the project calendar. Calibration and audit schedules will be aligned with the requirements outlined in the QAPP and regulatory standards.

Responsibilities and Authority

Individuals Responsible for Conducting Assessments

Data Reviews: Conducted by the Project Manager or designated data quality officers.

Calibrations: Performed by Tribal field technicians or trained site operators.

Audits: Conducted by external, contracted auditors with expertise in particulate monitoring systems.

Authority

The Project Manager and Tribal Air Quality Director have the authority to issue stop work orders if significant issues are identified during assessments. They are also responsible for initiating and verifying the implementation of corrective actions.

Reporting of Assessment Information

Internal Reporting: All findings from bi-daily reviews, calibrations, and audits will be reported directly to the Project Manager.

External Reporting: Audit reports and calibration results will be documented in quarterly data reports delivered to the Shoshone-Bannock Tribes, which include timelines, operational status of each instrument, and any anomalies or issues noted.

Corrective Actions

Initial Action: Upon identification of any inconsistency or problem, the Project Manager will initiate immediate corrective action.

Documentation and Verification: All corrective actions will be documented in the project log, detailing the nature of the problem, the corrective action taken, and the results of the corrective action. The Tribal Air Quality Director will review and verify the effectiveness of all corrective actions.

Follow-Up: If corrective actions involve recalibration or re-auditing of equipment, these activities will be scheduled and conducted as per the stipulated guidelines, and results will be documented in the subsequent quarterly report.

19. Reports to Management

This section outlines the protocols for reporting the project's quality assurance (QA) status to management, fulfilling the requirements outlined in the Quality Assurance Project Plan (QAPP). The following reporting mechanisms are in place to ensure that management is regularly informed of project progress, challenges, and outcomes.

Quarterly Data Reports

Data reports are an essential component of our quality assurance framework and are required on a quarterly basis. These reports will be prepared and delivered by the Tribal Air Quality staff to the Shoshone-Bannock Tribes Business Council. The content of these reports will include:

- Operational Summaries: Overview of project operations within the reporting period, highlighting any significant changes or developments in monitoring activities.
- Data Listings: Comprehensive listings of collected data, organized in a manner that supports review and detailed analysis.
- Data Collection Statistics: Statistical analysis of the data collection efforts, providing insights into the volume and quality of data gathered.
- Precision Statistics: Analysis of the precision of data collected, aiming to identify trends and potential areas for improvement in data accuracy.
- Calibration/Audit Results: Details of any calibration or audit activities undertaken during the period and the outcomes of these actions.

Annual Summary Reports

In accordance with 40 CFR Section 58, the Tribal Air Quality Director is responsible for compiling an annual summary report of all ambient air quality monitoring data from stations designated as State and Local Air Monitoring Stations (SLAMS). This report, which covers the period from January 1 through December 31 of the previous year, must be submitted to the EPA by July 1 annually. The annual summary report will include:

- Comprehensive Data Overview: A complete summary of the year's data, providing insights into air quality trends and potential environmental impacts.
- Certification of Accuracy: The report must be certified by the Tribal Air Quality Director or a designated proxy to ensure that all information is accurate to the best of the director's knowledge.

Responsibilities and Distribution

- Report Preparation: The Tribal Air Quality staff, under the direction of the Tribal Air Quality Director, are responsible for the preparation of both quarterly data reports and the annual summary report.

- Report Review and Submission: The Tribal Air Quality Director reviews all reports for accuracy and completeness before they are submitted to the appropriate parties.
- Report Recipients: Quarterly reports are delivered to Shoshone-Bannock Tribal personnel involved in the project and relevant tribal departments. The annual summary report is submitted directly to the EPA.

These reporting protocols are designed to maintain a high level of transparency and accountability throughout the duration of the air quality monitoring project, ensuring that all stakeholders are well-informed and that the data collected is utilized effectively to support tribal environmental health initiatives.

20. Data Review, Verification, and Validation

Each of the network's analytical instruments is employed to measure meteorological conditions or the ambient concentrations of specific pollutants. However, in order to be useful the data must undergo evaluation to determine the degree to which each datum has met its quality objectives and specifications. Evaluators estimate the potential effect that each deviation from the QAPP or SOP may have on the usability of the associated datum, its contribution to the quality of the reduced and analyzed data, and its effect on decisions.

Data review is the in-house examination to ensure that the data have been recorded, transmitted, and processed correctly. It includes completeness checks to determine if there are any deficiencies such as missing data or lost integrity.

Data verification is the process for evaluating the completeness, correctness, and conformance / compliance of the data set against method, procedural and contractual specifications.

Data validation is a pollutant-specific process to determine the quality of a specific data set relative to the end use. Data are examined routinely and in a timely manner to ensure data are within a specified range. Corrective action is taken if errors or anomalies are found.

Details on the data acceptance criteria for quality control procedures specific to each pollutant or measurement technique can be found in the SOP's Section ***Quality Control and Quality Assurance.***

21. Review, Verification and Validation Methods

Data Review

Data review involves the initial in-house examination to verify the integrity and correctness of data collected by the SBT AQ project. This process ensures that all data are accurately recorded, transmitted, and processed according to the established Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOPs). The review process includes:

- Completeness Checks: To ensure all data sets are complete, with no gaps or missing data entries. This involves cross-verifying logbooks, data logger outputs, and transmission records to identify

any potential data loss.

- Integrity Checks: Ensuring that data have not been altered or corrupted during collection, storage, or transmission. This includes reviewing checksums and validation codes generated during data recording and transfer.
- Correctness Checks: Confirming that the data are recorded in the correct units, and timestamps are accurate and consistent across all monitoring stations and sensors.

Data Verification

Data verification assesses the completeness, correctness, and compliance of the dataset against the project's methodological, procedural, and contractual specifications. It involves:

- Conformance Review: Comparing data against methodological specifications outlined in the QAPP and specific SOPs for each type of measurement and instrument.
- Procedure Compliance: Verifying that data collection and processing have adhered to the procedural steps defined in the SOPs.
- Contractual Compliance: Ensuring that data meet any additional specifications or requirements as defined by project contracts or agreements.

Data Validation

Data validation is the process of confirming the reliability and accuracy of specific data sets for their intended use. This pollutant-specific validation ensures that:

- Data Quality Indicators (DQIs) such as precision, bias, representativeness, comparability, completeness, and accuracy are within acceptable limits.
- Threshold Value Checks: Data points are routinely examined to ensure they fall within predefined acceptable ranges or thresholds. Any data points outside these ranges are flagged for further investigation.
- Anomaly Detection: Automated and manual checks are used to identify outliers or abnormal data points that could indicate instrumental errors, environmental anomalies, or data processing mistakes.

Criteria for Data Acceptance, Rejection, or Qualification

- Acceptance Criteria: Data that meet all predefined DQIs and fall within the specified thresholds for accuracy, precision, and completeness are accepted for analysis and reporting.
- Rejection Criteria: Data points that fail to meet critical quality criteria, show evidence of tampering, or fall outside the defined acceptable ranges without a plausible environmental or operational explanation are rejected.
- Qualification Criteria: Data that deviate from quality expectations but are still within a tolerable error margin may be qualified with annotations explaining the potential impacts on data usability for decision-making.

Implementation and Documentation

- Routine Reviews: Data are reviewed, verified, and validated on a schedule that aligns with the data collection frequency and the reporting needs of the project.
- Documentation: All findings from the review, verification, and validation processes are documented in detailed reports, specifying the data reviewed, processes followed, results obtained, and any actions taken in response to the findings.
- Corrective Actions: If errors or anomalies are found during any stage of data handling, immediate corrective actions are initiated, documented, and followed up to ensure they address the root cause effectively.

This comprehensive approach ensures that data generated by the SBT AQ project are reliable, accurate, and suitable for informing air quality management decisions.

22. Reconciliation with User Requirements

Evaluating Uncertainty of Validated Data

The process of evaluating the uncertainty of validated PM10 data is critical to ensuring that data users receive accurate and reliable information about air quality near the monitoring site. This section outlines the procedures used to assess data validity and estimate uncertainty.

Procedures for Evaluating Uncertainty

- Operational Checks: During each field visit, field technicians confirm the proper operation of samplers. They ensure that the sample run was complete and that the data parameters collected appear valid based on standard operating procedures.

- Visual Verification: Staff perform a visual verification of the data entered into the Tribal Air Quality Database (TAQD). This includes cross-checking data entries made from field notes to ensure accuracy before forwarding the data for further review.

- Review and Final Flagging: The Program Director reviews the verified data. Final flagging decisions, including identification of any questionable or invalid data points, are made at this stage based on established criteria.

- Precision and Accuracy Data: Field technicians are responsible for uploading not only the PM10 data but also associated precision and accuracy data into the EPA's Air Quality System (AQS) database. This ensures that all data users have access to information regarding the reliability and uncertainty of the data.

- Timeliness of Data Upload: Data, including assessments of precision and accuracy, are uploaded to AQS within 90 days following the end of each quarter. This timeframe allows for thorough

review and validation processes while maintaining data relevance.

Reporting Limitations on Data Use

Understanding and communicating the limitations of PM10 data is essential for its proper use in environmental assessments and policy-making. The following describes how limitations on data use are communicated to data users.

Procedures for Reporting Limitations

- Documentation in Field Logbook: If any data point is determined to be questionable or invalid, detailed notes are made in the field logbook. These notes include the nature of the problem and the circumstances under which it was identified.

- Reporting in Quarterly Reports: All identified issues with data validity are reported in the quarterly data reports. These reports provide a comprehensive review of data quality and include discussions on any data points that were flagged during the period.

- Flagging in AQS Database: Following EPA protocols, any data determined to be questionable or invalid is flagged in the AQS database. This flagging alerts data users to potential issues with specific data points and provides guidance on their use.

- Data Use Advisory: When significant limitations are identified, a data use advisory may be issued. This advisory provides specific guidance on how the affected data should be interpreted and used, ensuring that data users are aware of any factors that may impact the reliability of the data.

By following these procedures, the program ensures that all data users are well-informed of the validity, precision, accuracy, and potential limitations of the PM10 data provided. This transparency is crucial for the effective use of the data in environmental monitoring and decision-making processes.

23. References

40 CFR 58, Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD).

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Appendix A – SBT Air Quality QC Checklist

Visit Details

Date & Time: _____

Site: | Inventory: | Technician:

Reference Standard Device & S/N:

As Found

Last Conc.:	Flow:	Amb. BP:	Filter Temp:	Filter Description:
Status:	Last Span(M):	Tape BP:	Heater:	Alarms Since Last Visit:
Alarm:	Amb. Temp:	Filter RH:	Tape %:	Data Stop Time:

Comments:

Calibrations and Maintenance

Monitor Time		Leak Checks		Shelter Temp	Smart Heater	Membrane/Span(<5%)	
Sampler:		Pre Maint:				Target:	
Reference:		Post Maint:		Pump Vac Check		Actual:	
Adjusted:						Cleaned:	

Clean Nozzle & Vane		Clean PM2.5 Cyclone		Replace Filter Tape	
Clean Capstan Shaft		Clean Bug Screen		Inspect particle spots	
Clean Pinch Rollers		Clean Drip Jar		Run Self Test	
Clean PM10 Inlet		Inspect Reel Tension			

Temp Sensor	
Sampler:	
Reference:	
Adjusted:	

Pressure Sensor	
Sampler:	
Reference:	
Adjusted:	

Initial Flow (16.7LPM)	
Sampler:	
Reference:	
Calib Needed?*	

**Calibration is required if actual flow is greater than 4% +/- of target flow (16.0-17.4)*

Flow Calibration (LPM)

Sampler	Reference	Adjusted?	Calibrated Value
15.0			
18.4			
16.7			

As Left

Last Conc.:	Flow:	Amb. BP:	Filter Temp:	
Status:	Last Span(M):	Tape BP:	Heater:	
Alarm:	Amb. Temp:	Filter RH:	Tape %:	Data Start Time:

Comments: