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| Station Operations and Logbook Entries Guide |
| *SOP Reference* |
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Table of Contents

[**Purpose** 3](#_Toc432496108)

[**Site Operations** 3](#_Toc432496109)

[**Log Entries** 3](#_Toc432496110)

[**Operator Log Entries** 4](#_Toc432496111)

[**Instrument Log Entries** 4](#_Toc432496112)

[**Appendix 1: Example Operator Log Entries** 6](#_Toc432496113)

[**Appendix 2: Example Instrument Log Entries** 8](#_Toc432496114)

[**Purpose**](#TableofContents)

This guide supplements SOP 100 Monitoring Station Site Operations to have frequently used information readily accessible to site technicians and to provide guidance to optimize log entries that will both document site work and provide material easy to search for events in the future. In keeping with uniform site configurations, schedules, calibrations and maintenance methods, uniform site operations will facilitate the operator and supervisor tasks in accomplishing and verifying proper performance of site operational tasks. The exact sequence to perform site operations can vary depending on equipment operating, tasks needed for a given visit, and time constraints.

**Site Operations**

1. Site operators will use the *Operational QC Checks Schedule* and *Maintenance Calibration Certification Operations and Firmware Schedule)* to accomplish these tasks.
	1. The *Operational QC Checks Schedule* contains station operation actions and corresponding frequency to perform the actions.
	2. The *Maintenance Calibration Certification Operations and Firmware Schedule*is the primary resource to plan scheduled station quality control (QC) and maintenance activities.
2. Operating as teams, technicians are expected to begin their normal workdays by utilizing the data acquisition system (DAS) to verify current operations and results from QC checks being performed under control of the DAS at the stations. Site operators should utilize station status information to plan and track site tasks. This information includes but is not limited to: routine checks, filter media changes, instrument and station maintenance and documentation, QC checks, and calibrations. Technicians are responsible for updating a station’s work list of tasks completed or in progress to include next due date. The list will be readily accessible to all site technicians and supervisors to facilitate shared operations of all monitoring stations.
3. Details on data logger operations, calibration limits, levels, and measurement quality objectives (MQO) are provided in separate Guides shown in the References.

**Log Entries**

1. Operator and Instrument Log entries will be made using standardized entries for most actions requiring an entry according to formats provided in this Guide. Specific instructions follow for the electronic Operator and Instrument logs. Always provide sufficient detail that your actions can be understood by trained technicians. The following “Do’s and Don’ts” are provided as general guidance.
	1. DO’s
		1. Be clear and to the point and use the standard entry formats where applicable.
		2. Include everyone’s name working on the issues.
		3. Regarding equipment entries, general issues belong in station Operator Logs and detailed information belongs in the Instrument Log.
	2. DON’T’s
		1. No weather reports in operator logs except for rare occurrences that affect station or equipment operations not included in measurements, such as significant rainfall.
		2. No personal comments or humor – the logs are official records.
		3. No skipping entries – documentation is essential to demonstrating operating conditions.
		4. No detailed information that belongs in an equipment log should be repeated in the operator log.
		5. No guessing - Many times a problem with an instrument requires a good examination of the instrument and many different types of troubleshooting to narrow down a problem. These types of entries are for equipment logs, not a station log. Be straight to the point of a problem, no long dissertations of what the process was and how it was corrected.

**Operator Log Entries**

1. Two types of station operation checks require documenting actions in the Operator Log:
	1. Routine daily checks made from the office that identify real or suspected problems should be documented promptly. Problems solved promptly and remotely do not require a separate entry for identifying and then resolving the problem.
	2. Onsite station visits. If limited checks were made then indicate that a full check was not made, such as “only changed FRM filters”.
2. Make separate Operator Log entries for non-routine tasks performed, typically by specific equipment type. Include standard terms such as: Conducted, Prepared, Completed, Repaired, Installed and Removed, followed by the instrument or other piece of equipment.
3. Appendix 1 of this Guide contains examples of Operator Log entries.

**Instrument Log Entries**

1. Electronic instrument logs are identified by instrument type, model and serial number. Following initial acquisition information, entries are made in chronological order.
2. Initial acceptance test documentation includes a detailed list of instrument configuration settings and operating settings, particularly to show configuration specific to DAQ applications (such as measurement and output voltage ranges).
3. Subsequent entries for calibrations and maintenance actions include a statement that primary operating parameters have been verified.
4. Make entries for inventory, location moves, calibrations, and maintenance other than routine adjustments or sample line filter changes. Maintenance entries involving a change include before and after values of relevant parameters.
5. Minimum calibration entries are: Date, station, before and after instrument slope and offset values, a statement that the significant operating parameters have been verified (e.g., flow rate, output voltage) and technician(s) performing work.
6. Appendix 2 of this Guide contains examples of Instrument Log entries.

**Appendix 1: Example Operator Log Entries**

*Remote check documentation:*

Remote check showed [identify problem seen, and any immediate action taken]. First and last name.

*Onsite station visit documentation:*

Conducted [type of check or preventive maintenance action] on [identify type and serial number] with results [satisfactory or other]. First and last name.

Prepared instrument [identify type, model and serial number] for calibration. First and last name.

Repaired [identify instrument type and serial number] with results [satisfactory or other]. [Include a statement on extent of data impacted, if known]. First and last name.

Installed [identify instrument type, model and serial number]. First and last name.

Removed [identify instrument type, model and serial number]. First and last name.

Cyl #LL [number] certification expires [MM/DD/YY], concentration(s) [enter certified values and type of gas, ppm], pressure [enter value] psig. First and last name.

Local condition [identify] may have impacted [station or specific measurement] with comments. First and last name.

QA Conducted [identify type as annual, quarterly, exceedance] Audit on [identify instrument type and serial number]. Identify audit outcome, if known. First and last name.

Use these abbreviations for references

* O3 for ozone analyzers
* CO for carbon monoxide analyzers
* NOx for NO/NO2/NOx analyzers
* NO2 for CAP analyzers (NO2 only)
* NOy for NO/NOy analyzers at JM
* SO2 for sulfur dioxide analyzers at JM
* PM2.5 for particulate matter at 2.5 microns or lower
* PM10 for particulate matter at 10 microns or lower
* PMC for coarse particulate matter between 10 and 2.5 microns
* FRM for the filter-based PM2.5 manual samplers (other than trace chemical)
* SASS
* URG
* Pb for TSP lead sampler
* Cyl for Cylinder
* MET for general reference to wind, outside temperature (T), relative humidity (RH), barometric pressure (BP), and precipitation (PRECIP).
* Stn Temp Cal for Station Temperature Calibration

**Appendix 2: Example Instrument Log Entries**

*Acceptance tests*

* State that the tests were performed with satisfactory results and any changes to the configuration, such as, Voltage output, Range, PM2.5 or PM10, NCore, etc.
* Include a list or table showing configuration settings other than default values. Refer to the instrument manual version used for the test.

*Move*

* Simple statement noting move locations information is adequate.

*Gas Analyzer Calibrations at instrument level*

* Before and after instrument slope and intercept values.
* Statement that the primary parameters were verified and within acceptable range.

*PM Sampler Calibrations (depends on sampler)*

* Before and after values for results that were out of tolerance range.
* Statement that leak check was performed and the results as Passed or Failed. If it failed and adjustments or repairs made to bring it into compliance then include before and after values.
* Statement that the primary parameters and settings were verified. For continuous samplers note whether the sampler operation is for PM2.5 or PM10.

*Gas analyzer calibrators (photometers with or without mass flow controllers)*

* Configuration of levels and sequences
* Bench calibration and verification tests with result summary (such as slope, intercept, photometer offset, dark calibration voltage).

*Zero Air Modules*

* Note when scrubber materials were replaced.
* Note when repairs or replacements (such as for the pump) were made.