



Performance Audit Procedures Using the Audit Information System

Volume V Audit Procedures Manual for Air Quality Monitoring

QMB SOP Appendix AK Revision 2

Quality Assurance Section Quality Management Branch Monitoring and Laboratory Division

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PERFORMANCE AUDIT PROCEDURES
USING THE AUDIT INFORMATION SYSTEM

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PERFORMANCE AUDIT PROCEDURES
USING THE AUDIT INFORMATION SYSTEM

ACRONYMS AND DEFINITIONS

Acronym	Definition
A/C	air conditioning
AIS	Audit Information System
AQMIS2	Air Quality and Meteorological Information System
AQS	Air Quality System (U.S. EPA database)
CARB	California Air Resources Board
CH ₄	methane
CO	carbon monoxide
°C	degrees Celsius
GPS	Global Positioning System
H ₂ S	hydrogen sulfide
ID	identification
m	meters
MET	meteorological
MySQL	Structured Query Language database
NAAQS	National Ambient Air Quality Standards
NIST	National Institute of Standards and Technology
NMHC	non-methane hydrocarbons
NO ₂	nitrogen dioxide
O ₃	ozone
PM	particulate matter
POC	Pollutant Occurrence Code
QA	Quality Assurance
QAS	Quality Assurance Section
QMB	Quality Management Branch
SOP	Standard Operating Procedure
SO ₂	sulfur dioxide
THC	total hydrocarbons
U.S. EPA	United States Environmental Protection Agency

AK.1.0 **INTRODUCTION**

The Audit Information System (AIS) is used by the Quality Assurance section (QAS) to manage data and site information collected during performance evaluations of air monitoring stations throughout the state.

To access AIS, users must have a username assigned by an administrator and a password. Users can log into AIS under “Auditor”, which contains a limited menu of functions, or “Full Status”, which permits a wider range of access.

Copies of the Audit Information System, including a MySQL database, are located on the California Air Resources Board (CARB) network as well as on laptops for use in the field. Laptop data is appended to the main network after audits are completed. Most functions are accessible without an internet connection, but a web browser is used as the user interface.

To log in on the CARB network, use the following address in a web browser:

- inside.arb.ca.gov/wg/mld/ais/login.php

To log in from a laptop that has AIS installed, use the following address in a web browser:

- localhost/qas/login.php

AK.2.0 **PERSONNEL QUALIFICATIONS**

All new CARB auditors undertake a one year training program that is documented and monitored by the manager. The training includes in-office reading and coursework, hands-on field experience conducting audits, and shadowing an experienced auditor for one year along with several in-field evaluations by the QAS manager.

The U.S. Environmental Protection Agency (U.S. EPA) reviews CARB’s training program regularly for approval as equivalent to their national certification and recertification courses. Auditors should be familiar with the regulations and guidance cited in the references section (AK.5.0) prior to conducting any audits without supervision. Each auditor is expected to have a minimum level of on the job training and familiarity with the audit equipment prior to conducting the audit(s).

The U.S. EPA’s Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II: Ambient Air Quality Monitoring Program (January 2017) should be considered as required reading prior to conducting audits.

NOTE: AIS has been set up with a “Test Site” (ARB # 33333) that is available to all users for testing and training purposes. Data for the Test Site is deleted regularly and is not displayed to the public.

AK.3.0 AUDITOR MAIN MENU

After logging into the program, users are directed to the Auditor Main Menu screen as shown in Figure AK.1. It is required that users log in as “Auditor” (rather than “Full Status”) until they are familiar with common menu options and links. The options are briefly described below.

The Auditor Main Menu currently consists of six boxes.

Quality Assurance
 Audit Information System

Username: eburton
 Login Status: Auditor
 Server: mysql@arb.ca.gov
 Last Login: 02-11-20, 07:49AM

Auditor Main Menu

- Select Site Data
- Edit Open Audits
- Change Login Status
- Change Password
- Report Generator
- View Standard Files
- Create Custom Sitelist
- Get Your Audit Statistics
- View Site Info by Agency
- CAN Main Menu
- AQDA Access
- Code Finder
- Log Out

Search for Air Monitoring Site Information

[Browse by Basin](#)
[Browse by County](#)
[Browse by District](#)

To get data for a specific site, enter the ARB or AQS site number, or approximate Site Name. Leave blank to get the entire sitelist.

Search by ARB#:
 Search by AQS#:
 Search by Site Name:

Recent Audits (up to 15) ALL OPEN AUDITS

Site Name	Issue Date	View	Edit
Mojave	15252 01-30-2020	VIEW	EDIT
Canebrake	15310 01-29-2020	VIEW	EDIT
Ridgecrest - Ward	15301 01-29-2020	VIEW	EDIT
Death Valley NP - Park Village	14151 01-28-2020	VIEW	EDIT

Links
(will open in a new tab)

- [Air Quality System \(AQS\)](#)
- [Title 40 - Protection of Environment \(e-CFR\)](#)
- [Ambient Monitoring Technology Information Center \(AMTIC/EPA\)](#)
- [Quality Assurance \(AMTIC/EPA\)](#)
- [Quality Assurance \(CARB\)](#)
- [Air Pollution Control Districts list](#)
- [IADAM Air Quality Data Statistics](#)
- [Air Quality and Meteorological Information System \(AQMIS2\)](#)
- [Pre-Generated Data Files \(AQS\)](#)

Open CANs for Eric Burton

CAN Number	Issue Date	Site(s)	Parameter
395	04-24-2019	Colusa-Sunrise Blvd	61104
429	01-31-2020	Ridgecrest - Ward	61103

Open AQDAs for Eric Burton

AQDA Number	Issue Date	Site(s)	Parameter
8423	06-03-2019	Healdsburg-Municipal Airport	O3
8425	08-20-2019	Los Angeles-North Main Street	PM10
8430	11-25-2019	Madera City	O3
8431	12-04-2019	Cloverdale	BAM

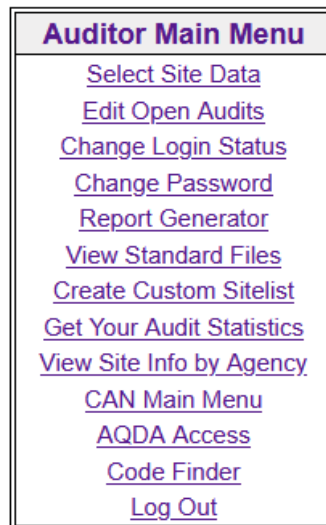
Figure AK.1
 Auditor Main Menu Screen

1. Auditor Main Menu: a list of selections available to all auditors. Clicking the words “Auditor Main Menu” will bring users back to the screen as shown in Figure AK.1.
2. Search for Air Monitoring Site Information: a condensed search box for finding site information.
3. Recent Audits: a list of recent audits conducted by the auditor.
4. Links: a list of important links to websites outside of CARB’s internal network.
5. Open CANs: a list of open Corrective Action Notifications (CANs) issued by the auditor.
6. Open AQDAs: a list of open Air Quality Data Actions (AQDAs) issued by the auditor.

More detailed descriptions of some of the options on the main menu can be found in the appropriate section.

AK.3.1 AUDITOR MAIN MENU SELECTIONS

Links available to users when logged in as “Auditor” are described below and shown in Figure AK.2. This box is always shown on the left side of the user’s screen.



*Figure AK.2
Auditor Main Menu Selections*

- **Select Site Data:** Takes users to a search tool to find information about any of the air monitoring sites audited by QAS. Refer to section AK.3.2.
- Edit Open Audits:** Displays a table of audits that are open for editing by the logged in user. Refer to section AK.3.3.
- **Change Login Status:** Allows users to switch between Auditor and Full Status, enabling access to other functions as applicable.
 - **Change Password:** Allows users to change their password.
 - **Report Generator:** Takes users to a query menu where various lists or reports can be generated based on selectable criteria. Refer to section AK.3.4.
 - **View Standards Files:** Allows users to view a report showing standards information for each audit vehicle, by quarter and year.
 - **Create Custom Sitelist:** Allows users to create a list of air monitoring stations from a variety of parameters.
 - **Get Your Audit Statistics:** Displays a table of information about all of the audits conducted by the logged-in user.
 - **View Site Info by Agency:** Provides access to a table of information about sites operated by a specific agency, including monitored parameters.
 - **CAN Main Menu:** Provides access to Corrective Action Notification related inquiries or the creation of a CAN. Refer to section AK.3.5.
 - **AQDA Access:** Provides access to Air Quality Data Action related inquiries or the creation of an AQDA. Refer to section AK.3.6.
 - **Code Finder:** Based on user input, displays information related to codes found in either AIS or the U.S. EPA's Air Quality System (AQS) database.
 - **Log Out:** Logs the user out of AIS.

AK.3.1.1 **FULL STATUS**

Switching to Full Status allows users and management to access functions based on privileges granted by the Administrator(s) of AIS. These “Specialized Task” and “Administrative Task” menus include tasks such as uploading AQS data into the database, editing or entering data in Standards Files, appending laptop data, editing site information, finalizing CANs, AQDAs, and audit reports, and other special functions. These tasks are assigned to specific individuals, and require specific training or knowledge to complete and are, therefore, not covered in this Standard Operating Procedure (SOP).

AK.3.2 **SEARCH FOR SITE INFORMATION**

Information about air monitoring sites audited by QAS can be found by using the “Select Site Data” link, or the simplified search box on the Auditor Main Menu screen as shown in Figure AK.3.

Sites can be searched by basin, county, district, Air Resources Board number (ARB #), Air Quality System number (AQS #), or portions of the site name.

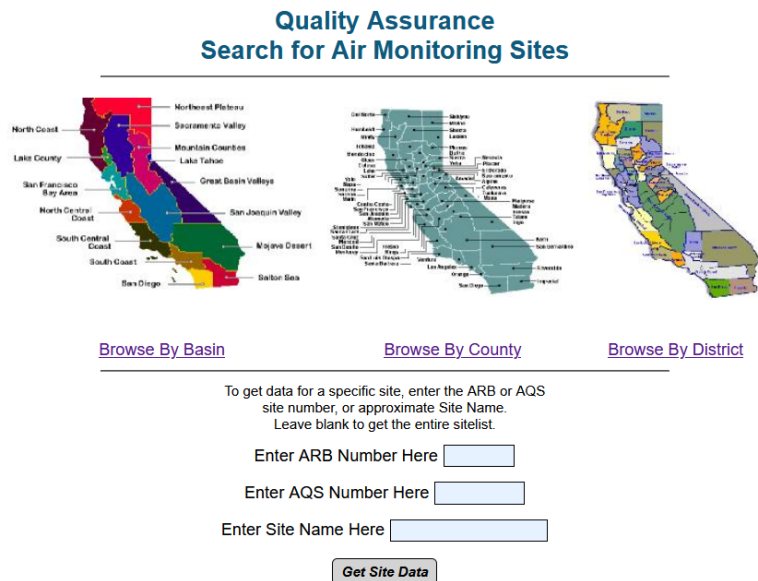
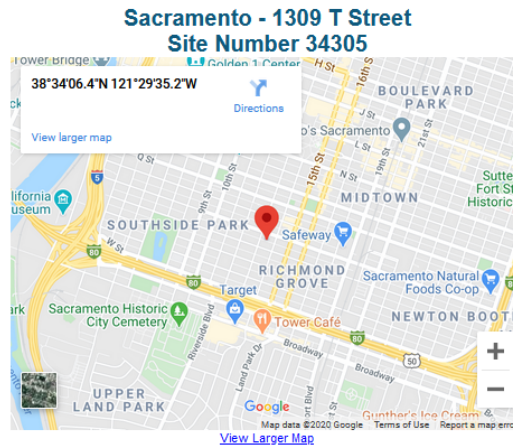


Figure AK.3
Search for Air Monitoring Sites

Once a site is chosen, auditors can find details about the site or perform other site-related tasks (see Figure AK.4 below):

- View, edit, or perform an audit for the site (the user must be in “Full Status” mode to edit an audit).
- Get the site dossier (refer to section AK.3.2.1 below), photos, or public web page for the site (the public web page requires an internet connection).
- View CANs related to the site. Editing or issuing CANs are possible with “Full Status” (refer to section AK.3.5).
- View AQDAs related to the site. Editing or issuing AQDAs are possible with “Full Status” (refer to section AK.3.6).
- Get the magnetic declination of the site (requires an internet connection).



From this page you can

<p>View past audit data. <input type="text" value="Choose an audit"/></p> <p>Edit past audit data. <input type="text" value="Edit audit information"/></p> <p>Do an audit at this site <input type="button" value="Perform an Audit"/></p>	<p>Get printable site dossier <input type="button" value="Get Dossier"/></p> <p>Get photos for this site <input type="button" value="Site Photos not available at this time"/></p> <p>View Public Web Page For This Site</p>
<p>Get CANs <input type="text" value="Select a CAN"/></p> <p>Edit CANs <input type="text" value="Select a CAN"/></p> <p>Issue a CAN <input type="button" value="Issue a CAN"/></p>	<p>Get AQDAs for this site <input type="text" value="Choose an AQDA"/></p> <p>Edit AQDAs for this site <input type="text" value="Choose an AQDA"/></p> <p>Issue an AQDA for this site <input type="button" value="Issue an AQDA"/></p>

[Get Magnetic Declination for this Site](#)

Figure AK.4
Site-related Tasks Page
 (shown in Full Status mode)

AK.3.2.1 SITE DOSSIERS

The site dossier (see Figures AK.5 and AK.6) is a critical tool for auditors, and contains the following information:

- Overhead view or map of the site from Google Maps
- Global Positioning System (GPS) coordinates
- AQS and CARB site numbers
- Site start date and/or termination date (if applicable)
- Operating or Reporting Agency information
- Site address, phone number, and location information
- Site contact information
- Comments, remarks, and directions related to the site
- Parameter information including audited and non-audited parameters
- Information from AQS

The second (and possibly additional) page(s) contain information from AQS that has been formatted for use by auditors. Data is downloaded from the U.S. EPA website every six months and is uploaded to the AIS database. Auditors are able to compare what's being reported to the U.S. EPA's database to information obtained during an audit. The following information is included:

- Parameter name and code
- Pollutant Occurrence Code (POC)
- Monitor Type
- Last Method description and code
- Monitoring Objective
- Measurement Scale
- Collecting and Reporting Agency
- First Year of Data
- Last Sample Date

Clicking the link at the bottom of the dossier page for "Complete AQS Information" provides data on all parameters associated with the site, whether open or closed (i.e. no longer reporting data to AQS).

Audit Information for Sacramento - 1309 T Street



AQS Number	ARB Number	Site Start Date	Reporting Agency and Agency Code	PQAO
060670010	34305	12-01-1988	California Air Resources Board (001)	CARB

Site Address	Site Phone	County	Air Basin
1309 T Street, Sacramento CA 95814		Sacramento	Sacramento Valley

Site Contact:	Name: Dustin Goto	Phone #:	E-mail:
Supervisor:	Name: Mac McDougall	Phone #:	E-mail:

Directions/Remarks/Comments

There is a 1/4 stainless steel T on the railing by the probe line, about waist high. Connect directly into the T, and use the probe inlet as your bypass.

What the QA website (AIS) shows the site has: * (C):collocated, (T):trace-level, (U):ultrasonic, (I):inaccessible/incompatible, (NFR):not for record

Audited Parameters:	O3, NO ₂ , BAM _{PM10} , PM _{2.5} , PM _{2.5} -SPEC, BAM _{PM2.5}
Parameters NOT Audited:	CO ₂ , HWS _(U) , WD _(U) , OT _(I) , RH
Previously Monitored Parameters:	VWS, BP

*Figure AK.5
 Site Dossier, Page 1*

AQS information last updated on November 13, 2019 (only current parameters shown)

Parameter	Parameter Code	POC	Monitor Type	Last Method (Code)	Monitoring Objective	Measurement Scale	Collecting Agency	Reporting Agency	First Year of Data	Last Sample Date
Nitrogen dioxide (NO2)	42602	3	SLAMS	Instrumental - Chemiluminescence Teledyne API 200 EU/501 (599)	POPULATION EXPOSURE	NEIGHBORHOOD	California Air Resources Board	California Air Resources Board	2013	5/31/2019
Ozone	44201	1	SLAMS	INSTRUMENTAL - ULTRA VIOLET ABSORPTION (87)	GENERAL/BACKGROUND	URBAN SCALE	California Air Resources Board	California Air Resources Board	1989	5/31/2019
Wind Speed - Scalar	61101	2	OTHER	Instrumental - RM Young Ultrasonic Anemometer Model 81000 (66)	OTHER	-	California Air Resources Board	California Air Resources Board	2018	5/31/2019
Wind Speed - Resultant	61103	1	OTHER	Instrumental - RM Young Ultrasonic Anemometer Model 81000 (66)	UNKNOWN	-	California Air Resources Board	California Air Resources Board	1995	5/31/2019
Wind Direction - Resultant	61104	1	OTHER	Instrumental - RM Young Ultrasonic Anemometer Model 81000 (66)	UNKNOWN	-	California Air Resources Board	California Air Resources Board	1995	5/31/2019
Outdoor Temperature	62101	2	OTHER	Instrumental - Vaisala HMP 155 (59)	OTHER	-	California Air Resources Board	California Air Resources Board	2015	5/31/2019
Relative Humidity	62201	2	OTHER	Instrumental - Vaisala HMP 155 (59)	OTHER	-	California Air Resources Board	California Air Resources Board	2015	5/31/2019
PM10 Total 0-10um STP	81102	4	SLAMS	INSTRUMENT MET ONE 4 MODELS - BETA ATTENUATION (122)	POPULATION EXPOSURE	NEIGHBORHOOD	California Air Resources Board	California Air Resources Board	2013	5/31/2019
PM10 - LC	85101	3	SLAMS	INSTRUMENT MET ONE 4 MODELS - BETA ATTENUATION (122)	POPULATION EXPOSURE	-	-	California Air Resources Board	2013	5/31/2019
PM2.5 - Local Conditions	88101	1	SLAMS	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC - Gravimetric (145)	POPULATION EXPOSURE	NEIGHBORHOOD	California Air Resources Board	California Air Resources Board	1998	8/31/2019
Acceptable PM2.5 AQI & Speciation Mass	88502	3	SLAMS	Met-One BAM-1020 W/PM2.5 SCC - Beta Attenuation (731)	POPULATION EXPOSURE	-	California Air Resources Board	California Air Resources Board	2004	5/31/2019
Acceptable PM2.5 AQI & Speciation Mass	88502	5	SLAMS	Met One SASS Teflon - Gravimetric (810)	OTHER	NEIGHBORHOOD	California Air Resources Board	California Air Resources Board	2002	8/25/2019

[Click for Complete AQS Information \(includes ALL parameters, open and closed.\)](#)

Figure AK.6
Site Dossier, Page 2

AK.3.3 VIEW, EDIT, OR OPEN AUDITS

There are a number of different ways to access audits, including the “Edit Open Audits” link, the “Recent Audits” box on the Auditor Main Menu, and the “Site-related Tasks Page” (refer to section AK.3.2).

When logged in as “Auditor”, users are only able to view audit data in report form. These audit reports are accessible to all users and can

include preliminary or final data. When logged in as “Full Status”, users can access audit data that is “open for editing”, or perform new audits at a site. Audits are only available to the auditors that performed the audit or AIS Administrators. If an audit that the user performed is not listed, it may need to be “opened for editing” by someone with a higher status. Once “closed for editing”, audit data is no longer changeable unless permissions are granted, and is only available for viewing in report form.

Performing (or opening) a new audit is typically done in the field on a laptop that is configured with AIS and a database. Section AK.4.0 outlines this process.

AK.3.4 **REPORT GENERATOR**

The Report Generator Main Menu provides the user with a number of options for querying the AIS database and generating tables of information, including preliminary and finalized audits. A brief description of each type of report is listed below:

- **List of Audits Performed by Date Range:** Provides a table listing audits conducted within a certain range of dates.
- **Agency Data by Pollutant:** Displays a list of audits conducted by parameter for a specified agency (or all agencies). Once a report has been generated, basic statistical information is available (by instrument identification (ID) for each audit.
- **Basin Data by Pollutant:** Displays a list of audits conducted by parameter within a specified air basin (or all basins). Once a report has been generated, basic statistical information is available (by ID) for each audit.
- **Audit Data (by Screening File or Reporting Agency):** Provides a table of audit data, including results, for upload to AQS. This report is, typically, only generated by the Auditor responsible for submitting audit data to the U.S. EPA’s AQS database.
- **AQDA List:** Provides a table of Air Quality Data Actions by the selected quarter and year.

- **Pass/Fail List:** Based on the selected quarter, year, van, and parameter, displays a table indicating audits that have passed or failed audit criteria.
- **Track Instrument By Serial Number:** Searches the database for audits conducted for a specific serial number or ID.
- **Get GPS Uploadable Waypoint List For Active Sites:** Provides a list of GPS coordinates, site names and waypoints, and site addresses. After formatting, the list can be uploaded to GPS units for navigation purposes.
- **Get a Sitelist File for use in Google Earth:** Allows users to save a file suitable for use in Google Earth. Once saved, rename the file as "sitelist.kml" (changing the extension) and open it with Google Earth. All active sites from AIS will be populated as markers, based on their GPS coordinates.

AK.3.5 **CAN MAIN MENU**

The main menu for Corrective Action Notifications can be accessed through the link provided on the left side of the screen on the Auditor Main Menu. This screen allows users to issue a new CAN or select existing CAN data for viewing or editing. Refer to the Air Monitoring Quality Assurance Manual, Volume V, Appendix AN, Corrective Action Notification (CAN) Standard Operating Procedure for more details.

AK.3.6 **AQDA ACCESS**

The main menu for Air Quality Data Actions can be accessed through the link provided on the left side of the screen on the Auditor Main Menu. This screen allows users to select existing AQDA data for viewing or editing. Issuing a new AQDA can be done from the page relating to the specific site that was audited (see Figure AK.4). Refer to the Air Monitoring Quality Assurance Manual, Volume V, Appendix AO, Air Quality Data Action Request (AQDA) Standard Operating Procedure for more details.

AK.4.0 OPENING A NEW AUDIT

After a site has been chosen, go to the “Site-related tasks page” and click the [Perform an Audit] button. Auditor #1 will be the logged in user. Choose Auditor #2 if appropriate, select the equipment set being used (Van), confirm the date, and click the [Go] button (see Figure AK.7).

Create an Audit for AIS Test Site, Site # 33333

Click "Go" to insert a record and perform an audit!

Auditor #1	Auditor #2	Van	Today's Date	Go!
Eric Burton	Honza Rejmanek ▾	C ▾	02 28 2020 Set Date	GO

*Figure AK.7
Opening a New Audit*

Confirm the creation of a new audit record on the next screen by clicking [Perform the Audit]. **Note:** Once created, audits opened by mistake may only be deleted by contacting an AIS Administrator.

AK.4.1 AUDIT DATA SELECTION SCREEN

The Audit Data Selection Screen allows users to add parameters to an audit, or perform miscellaneous functions. See Figure AK.8 below.

Currently, the following options are available on the Audit Data Selection Screen:

- Click [Add Primary Audit] to audit Gaseous, Meteorological, or Flow parameters, depending on the type of monitor being audited. More than one audit can be created for each monitor type, as needed. Refer to section AK.4.2 for more information.
- Click “Edit the General Site Survey” to enter general information about the site being audited (see section AK.4.1.1).
- Click “Upload Site Photos” to add photos to an audit (see section AK.4.1.2).
- Click “Printable Site Survey” to get a printable version of the monitor survey information (see section AK.4.2.7).

- Click “Get Full Report” to get a printable copy of the audit report.
- Click “Add a new met instrument” to add monitor data for a new type of meteorological instrument (rarely used) (see section AK.4.1.3).
- Click “Go to the Site Dossier” to see the site’s dossier information (see section AK.3.2.1).
- Click “Check for Inconsistencies” to check entered audit data for common errors or things to verify (see section AK.4.1.5).

Audit Data Selection Screen for Site #: 33333
AIS Test Site
On 2020-02-11

Gaseous Audits				
CO	NO2	SO2	H2S	Ozone
Perform A Primary Audit	Perform A Primary Audit	Perform A Primary Audit	Perform A Primary Audit	Perform A Primary Audit
Add Primary Audit	Add Primary Audit	Add Primary Audit	Add Primary Audit	Add Primary Audit

Meteorological Audits			
Outdoor Temperature	Barometric Pressure	Wind Direction	Horizontal Wind Speed
Perform A Primary Audit	Perform A Primary Audit	Perform A Primary Audit	Perform A Primary Audit
Add Primary Audit	Add Primary Audit	Add Primary Audit	Add Primary Audit

Flow Audits			
PM10 Hi-Vol	ARB PM10 Hi-Vol	PM2.5	Partisoli/PM10 Lo-Vol
Perform A Primary Audit	Perform A Primary Audit	Perform A Primary Audit	Perform A Primary Audit
Add Primary Audit	Add Primary Audit	Add Primary Audit	Add Primary Audit
BAM PM10	BAM PM2.5	TEOM	SASS
Perform A Primary Audit	Perform A Primary Audit	Perform A Primary Audit	Perform A Primary Audit
Add Primary Audit	Add Primary Audit	Add Primary Audit	Add Primary Audit
TSP	DICHOT	XONTECH 924	
Perform A Primary Audit	Perform A Primary Audit	Perform A Primary Audit	
Add Primary Audit	Add Primary Audit	Add Primary Audit	

Miscellaneous Functions	
Edit General Site Survey Upload Site Photos Printable Site Survey Get Full Report Back to Site Select Menu Add a new met instrument Go to Site Dossier Check for Inconsistencies (test)	Add a survey for a non-audited parameter Perform A Primary Audit Add Primary Audit
Delete This Audit	

Figure AK.8
Audit Data Selection Screen

AK.4.1.1 GENERAL SITE SURVEY

Clicking the “Edit the General Site Survey” link on the Audit Data Selection Screen allows users to enter information related to the site, rather than a specific monitor.

Auditors should verify or enter data in fields relating to:

- Site information
- Station temperature
- Meteorology (at the site, if applicable)
- Traffic information
- Topography
- Other miscellaneous information

In addition, “Action Items” and “Comments” can be entered and will be printed on the Audit Report. “Action Items” should describe things identified during the audit as requiring urgent attention by the responsible agency, and may require issuance of a CAN or AQDA. Audit failures or criteria exceedances are usually highlighted as an “Action Item”. “Comments” should document anything of importance to the audit, including (but not limited to) deviations from normal procedures, site or monitor related notes, flags or warnings noted in the audit, and noteworthy changes from previous audits.

IMPORTANT: Documentation is of critical importance for audit reports. Audit forms and worksheets can provide written evidence of data obtained during an audit, but only information entered into AIS is available in the printable Audit Report. All pertinent information must be added to the report, and should be able to withstand scrutiny as well as be able to hold up to legally defensible standards.

AK.4.1.2 UPLOAD SITE PHOTOS

Clicking the “Upload Site Photos” link on the Audit Data Selection Screen allows users to transfer photos from a digital camera into AIS.

Auditors should take eight photos of the area surrounding the station (from a point on the roof, near the inlet/probe) towards the cardinal and inter-cardinal directions (north, northeast, east, southeast, south, southwest, west, and northwest), and four photos of the station from the cardinal points (north, east, south, and west) facing the station. Photos are primarily used for siting purposes, and should capture obstructions, trees, buildings, equipment, and other objects that are on and around the site. In other words, an effort should be made to capture the view of the entire station as seen from all four cardinal directions. If a direction is inaccessible, make a note in the Comments section of the audit report.

AK.4.1.3 ADD A NEW MET INSTRUMENT

This function is used when a site has a new meteorological instrument model that is not listed in the drop-down menu during model selection. Before entering a new instrument, users should ensure that their model is not already listed. Users will need to know the specifications of the model they are entering, including parameters like range of operation, slope, intercept, and/or k-factor (provided by the manufacturer). Once entered, the new instrument will be added to the database, and will be available for future selection.

AK.4.1.4 GO TO SITE DOSSIER

Clicking this link will take users to the site dossier (refer to AK.3.2.1).

AK.4.1.5 CHECK FOR INCONSISTENCIES

This tool allows users to check for missing information or common data entry errors. It is intended for use as a reminder, and not a substitute for thoroughness. Deficiencies are noted in red.

AK.4.2 CONDUCTING AUDITS

All audits should be conducted in conjunction with the appropriate SOP, which can be found in the CARB Quality Assurance Manual, Volume V (see Section AK.5.0 for the reference). Data is gathered in the field using the appropriate forms or worksheets and then entered into AIS. Current versions of audit forms and worksheets are available on the CARB internal network at: (S:)Cabinet\FORMS and WORKSHEETS – QA.

Clicking the [Calculate Values] or [Enter Data] buttons in an audit module will perform calculations and enter data into the database. Upon completion and after returning from the field, the data will be appended into the main database and preliminary reports can be generated. This append process can only be performed by a user with appropriate privileges.

After adding at least one audit, click the [Do Selected Audit] button to proceed to the audit module.

AK.4.2.1 AUDIT STANDARDS INFORMATION

Double check that the standards listed at the top of the screen match the equipment being used, and show the current quarter, year, and instruments or cylinders. If not, click on the [Change] button and choose the correct cylinders or equipment from the drop down menu. Then click on “Select Standard” button to return to the data input screen.

IMPORTANT: If the equipment being used in the audit is not listed, a user with appropriate privileges must edit the Standards File and values must be re-calculated. Audit Standards may have a slope and intercept associated with them, and should have valid certification dates, all of which are tracked using the Standards File.

AK.4.2.2 STATION INSTRUMENT INFORMATION

Enter data related to the equipment being audited in this section. Commonly, this will include serial numbers, manufacturer and model, calibration information, maintenance information, method descriptions, etcetera.

NOTE: If a method description and/or code is entered, it should match the dossier’s AQS information for “Last Method”. If the instrument being audited doesn’t match the method being reported to AQS, further investigation must be done to determine if there is a discrepancy warranting issuance of a Corrective Action Notification. If the audited instrument’s data is not being reported to AQS, choose the appropriate method description that matches.

AK.4.2.3 AUDIT INFORMATION

Enter data for the audit equipment and station equipment. This information should match the written data from the appropriate Audit Worksheet (form). The second auditor should verify and review that the data have been entered correctly. Click the [Enter Data] or [Calculate Values] button to record values into the database.

NOTE: If an “Audit Type” is available, it should be entered early in the data-entry process. This selects the parameters and criteria specific to the audit being conducted, and will affect things like flags, warnings, and control limits (see section AK.4.2.5 below).

AK.4.2.4 STATISTICAL INFORMATION

This section of the data input screen automatically calculates values such as Average Percent Difference, Slope, Intercept, Zero Average, Standard Deviation, Correlation coefficient, and the Upper and Lower 95 Confidence Limits when the [Calculate Values] button is clicked. No user input is required for this data, but values should be checked for anomalies.

Gaseous audit modules also display an Audit Data Comparison graph or table that displays the current results as well as previous years' results.

AK.4.2.5 FAILURES AND WARNINGS

If enough data is available, AIS will populate the "Failures and Warnings" section of the screen. Users should review this section every time data is entered to highlight any potential issues.

Yellow, orange, or red values are flags or warnings, and should be investigated as possible data entry or audit problems. If all parameters are within specifications, a green message will appear.

AK.4.2.6 RESIDENCE TIME

Gaseous audit modules require the entry of residence time calculations. Clicking the [Res Time] button will open a separate window where residence time measurements and values can be entered. Values for the probe, manifold, and manifold-to-instrument should be entered onto the Residence Time Worksheet and transcribed into AIS. It is important to differentiate between millimeters, centimeters, and meters for measurement values, and enter the currently displayed flow rates. If the Total Residence Time is more than 20 seconds, double-check data entry. Exceedances will require a CAN to be issued.

NOTE: If multiple tubing diameters or large open-space filter holders are used, use the "Multiple Diameters" Worksheet to combine values for entry into AIS. AIS can not account for all variations in tubing configurations, but combining values on the Worksheet provides numbers that can be entered into the database, providing a Total Residence Time.

Looking at values entered during the audit of this parameter on this date
Carbon Monoxide Specific Residence Time Information

	Probe	Manifold	Manifold to Instrument
Material	-- Material --	-- Material --	Teflon
ID (mm)	0.00	0.00	4.80
Length (m)	0.000	0.000	8.000
Flow (L/min)	0.000	0.000	0.730
Time	0.0	0.0	11.9
	Total Residence Time (seconds)		11.9

Enter Values

Use Probe and Manifold Values From Other Gaseous Audits Performed Today.
 Remember to Press "Enter Values" after you "Get" them!

Get Other Values

[Close Window](#)

*Figure AK.9
 Residence Time Entry*

AK.4.2.7 MONITOR SURVEYS

Every audited parameter should have a Monitor Survey completed. This data is used to record information about siting and the area surrounding the audited equipment and inlets. Additionally, the type of audit is recorded, along with information about data reporting and AQS (if applicable). Clicking the [Survey] button will open a separate window as shown in Figure AK.10.

The Audit Data Selection Screen also allows users to add a monitor survey for non-audited parameters, but this function is rarely used.

Carbon Monoxide Monitor Survey Information
 for Serial Number: co test

(values updated!!)

Current Monitor Information for							
Parameter (Code)	POC	Method	Monitor Type	Objective	Scale	Collecting Agency	Reporting Agency
Carbon Monoxide (42101)	1	INSTRUMENTAL - NONDISPERSIVE INFRARED (11)	SLAMS	BACKGROUND CONCENTRATION	REGIONAL SCALE	California Air Resources Board	California Air Resources Board

Data For Record?	Evaluation Type	Sampling Frequency	AQS Primary?	Collocated Sampler?	Sampler Spacing	Inlet Height Above Ground (m)	Inlet Height Above Platform (m)
Yes <input type="checkbox"/>	Annual P.E. <input type="text"/>	CONTINUOUS	-	N/A	N/A	5 <input type="text"/>	1.5 <input type="text"/>

Obstructions ON ROOF			Obstructions NOT ON ROOF			Other Distances			
Description (leave blank if none)	Distance to Inlet (m)	Height above Inlet (m)	Description (leave blank if none)	Distance to Inlet (m)	Height above Inlet (m)	Dripline (m)	Furnace, Flue, or A/C (m)	Nearest Roadway (m)	Unrestricted Airflow (degrees)
wall <input type="text"/>	9 <input type="text"/>	2 <input type="text"/>	tree <input type="text"/>	9.5 <input type="text"/>	8.4 <input type="text"/>	9 <input type="text"/>	<input type="text"/>	25 <input type="text"/>	360 <input type="text"/>

Comments	
Comments are entered here	

Edit ALL Monitor Info	<input type="radio"/>
Change AQS Info	No AQS info found
Revert Back To Past Audit Info	No Past Audits Available

[Close Window](#)

*Figure AK.10
 Monitor Survey Data Entry*

AQS Information: Current monitor information, including Parameter (and Code), Method, Monitor Type, Objective, Scale, Collecting Agency, and Reporting Agency, comes from the latest download of AQS monitor information into AIS. This should match information found on the back of a recent site dossier. If the information doesn't match, or is incorrect, select the "Edit ALL Monitor Info" or "Change AQS Info" radio buttons and provide the correct information. Further investigation will need to be done to provide an explanation for the discrepancy, which could lead to the issuance of a Corrective Action Notification.

Data For Record?: If the instrument's data is being reported to AQS, select "Yes", otherwise select "No".

Evaluation Type: Select the appropriate type of performance evaluation (P.E.) being conducted. Choices vary depending on the Primary Quality Assurance Organization (PQAO), gaseous audits including ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), or hydrogen sulfide (H2S), particulate matter (PM) monitors, meteorological (MET) monitors, or re-audits. A table of suggested choices can be found below.

Audit (Year: 2020)	CARB PQAQO	Non-CARB PQAQO
O₃, CO, NO₂, SO₂	NPAP and Annual P.E.	NPAP
H₂S	Annual P.E.	Annual P.E.
PM samplers (annual)	Annual P.E.	Annual P.E.
PM samplers (semi-annual)	Semi-annual P.E.	Semi-annual P.E.
MET	Annual P.E.	Annual P.E.
Re-audits	Re-audit	Re-audit

*Table AK.1
Suggested Evaluation Types*

Sampling Frequency: Select the sampling frequency of the monitor. Common choices include “Continuous”, “Every 1 Day”, “Every 3 Days”, “Every 6 Days”, and “Every 12 Days”.

AQS Primary?: If the monitor data is being reported to AQS and is designated as a primary monitor for comparison to the National Ambient Air Quality Standards (NAAQS), it will be shown here as “NAAQS”. If the monitor data is being reported to AQS and is designated as a primary monitor for Quality Assurance (QA) purposes, it will be shown here as “QA”. A monitor can also be designated as both a NAAQS and QA primary monitor. Will this selection ever be blank?

Collocated Sampler?: If the monitor is collocated for comparison to another monitor, and both are reporting data to AQS, one should be designated here as the “Primary” monitor and the other as “Secondary”. Additionally, the distance between the two inlets should be indicated in the area for “Sampler Spacing”.

Inlet Heights: Enter the distance between the monitor’s inlet (in meters) and the ground level, and the distance between the inlet and its platform (or roof).

Obstructions: Obstructions are differentiated here by “on the roof” (things like walls or parapets) and “not on the roof” (such as trees). Refer

to the CARB Quality Assurance Manual, Volume V, Appendix AE for more information about what defines an object as an obstruction, and siting criteria. If an object is deemed an obstruction, enter the vertical distances and horizontal heights accordingly, otherwise leave the fields blank.

Dripline: The distance to the nearest tree's dripline should be entered here if less than ten meters, otherwise leave it blank.

Furnace, Flue, or A/C: The distance to the nearest furnace, chimney flue, or air conditioning unit (A/C) should be indicated here.

Nearest Roadway: Measure the distance to the nearest roadway where traffic may affect monitor data.

Unrestricted Airflow: There must also be unrestricted airflow in an arc of at least 270° around the sampler, and the predominant wind direction for the season of greatest pollutant concentration potential must be included in the 270° arc. Enter the approximate value of unrestricted airflow here (in degrees).

Comments: Any comments pertaining to the monitor should be entered here. Comments will be printed in the Audit Report and can help document circumstances, provide explanations, or describe conditions specific to the audit for future reference.

Edit ALL Monitor Info: Allows most fields to be changed after initial data entry.

Change AQS Info: If AQS information entered initially doesn't match the monitor as listed on the back of the site dossier, selecting this option allows users to choose different AQS information (if applicable).

Revert Back to Past Audit Info: Selecting this option allows users to revert entered values back to the most recently entered audit (prior to this one).

AK.4.2.8 APPENDING AUDIT DATA

After all audit data has been entered into AIS, any data on the laptops needs to be appended to the main database. Auditors with appropriate permissions and training will connect the laptop to the CARB network and transfer any new data (since the previous append) into the main database.

At the same time, specific data is written back onto the laptop, creating a duplicate of the main database complete with all of the updated or changed data. In addition, site photos are transferred to a location available for public access. Appending ensures that all database tables and files are up to date and consistent for users, no matter where they access AIS from.

AK.5.0 **REFERENCES**

California Air Resources Board. (Various dates). [Quality Assurance Manual, Volume V, Audit Procedures for Air Quality Monitoring.](https://ww2.arb.ca.gov/audit-procedures-air-quality-monitoring)
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United States Environmental Protection Agency. (January 2017). [QA Handbook for Air Pollution Measurement Systems: "Volume II: Ambient Air Quality Monitoring Program".](https://www3.epa.gov/ttn/amtic/files/ambient/pm25/qa/Final%20Handbook%20Document%201_17.pdf)
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AK.6.0 **REVISION HISTORY**

Subject	Revision 2 (2020)
New or Revised Sections	<ul style="list-style-type: none">• Added 'Acronyms and Definitions' section• Added information relating to the new Auditor Main Menu• Revised individual audit modules to consolidate audit data entry procedures based on gaseous, meteorological, and particulate matter parameters• Updated all figures based on new AIS formatting• Added 'References' section
Sections Removed (obsolete information)	<ul style="list-style-type: none">• Removed "Browse Database"• Removed information pertaining to audit modules for total hydrocarbons (THC), non-methane hydrocarbons (NMHC), methane (CH₄), relative humidity, solar radiation, and vertical wind speed