San Diego County
Air Pollution
Control District

International Border Community Air Monitoring Plan – Supplemental Document

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Appendix A: Standard Operating Procedures, Instrument Manuals, and Analysis Methods

Table 1 lists and describes the documents that guide the Community Air Monitoring Plan. All documents are available to read and review upon request.

Table 1 Documents referenced by chemists, technicians, and third-party laboratories for conducting community air monitoring

Document	Project	Description
Organic and Elemental Carbon Program: Data Analysis & AQS Formatting (Python) Guide	EC	Guide for the automated analysis of elemental carbon data reports from third-party laboratory, Desert Research Institute
Desert Research Institute SOP – Model 2001 Thermal/Optical Carbon Analysis of Aerosol Filter Samples – Method IMPROVE_A	EC	Procedure followed by third-party laboratory, Desert Research Institute, to analyze elemental carbon filters sent by APCD
Field Operation Manual – Model SASS & SuperSASS $PM_{2.5}$ Ambient Chemical Speciation Samplers	EC	Manual for using the Met One Super Speciation Air Sampling System for elemental carbon sampling
SOP for the Met One SASS	EC	Guide for flow checks, calibrations, and audits of the Met One Super Speciation Air Sampling System
Operation Manual – BC 1060 Black Carbon Monitor	BC	Manual for using the Met One BC 1060 for black carbon monitoring
SOP – Calibration and Audit of the Met One BC 1060 Black Carbon Monitor	BC	Guide for flow checks, calibrations, and audits of the Met One BC 1060
SOP – Black Carbon Data Validation and Transmittal of AQS Data	BC	Guide for the preparation of continuous black carbon data into AQS format
Operation Manual – Met One E-SEQ-FRM Sequential Reference Method Particulate Sampler	Metals	Manual for using the Met One E-Sequential Federal Reference Method instrument for metals sampling
SOP – Calibration and Audit of the Met One E-Sequential FRM Instrument	Metals	Guide for flow checks, calibrations, and audits of the Met One E-Sequential Federal Reference Method instrument
Compendium Method IO-3.5 – Determination of Metals in Ambient Particulate Matter Using Inductively Coupled Plasma/Mass Spectrometry (ICP/MS)	Metals	Method prepared by the EPA for digesting and analyzing metals collected on filters using ICP/MS
SOP – Analysis of Volatile Organic Compounds for the Toxics VOC Program	VOCs	Historical procedures used by APCD in the internal Toxics – VOCs program for sampling, analyzing, and preparing data for AQS upload
SOPs – Collection of SGS Galson Standard Operating Procedures for VOC Analysis	VOCs	Collection of all SOPs used by third-party laboratory, SGS Galson, in the analysis of VOCs in canister samples
Method TO-15A – Determination of Volatile Organic Compounds (VOCs) in	VOCs	Method prepared by the EPA for collecting and analyzing VOC samples in canisters

Air Collected in Specially Prepared Canisters and Analyzed by Gas Chromatography–Mass Spectrometry (GC-MS)		
National Air Toxics Trends Stations Technical Assistance Document (NATTS TAD)	Metals & VOCs	Guidance document for air monitoring agencies performing air toxics sampling and analysis

Appendix B: Quality Assurance and Control Criteria

This section details the criteria that must be met to ensure high-quality data as well as the corrective action to be taken for specific failures.

Volatile Organic Compounds

Table 2 is from the NATTS TAD that summarizes sampling and laboratory QA/QC criteria for VOC monitoring. Table 3 summarizes the corrective action for specific failures related to VOC analysis.

Table 2 VOC QA/QC criteria from NATTS TAD

Parameter	**Description and Details**	**Required Frequency**	**Acceptance Criteria**
Instrument Blank (IB)	Analysis of swept carrier gas through the preconcentrator to demonstrate the instrument is sufficiently clean to begin analysis	Prior to ICAL and daily beginning CCV	Each target VOC's concentration < 3x MDL or 0.2 ppb, whichever is lower
BFB Tune Check	50 ng injection of BFB for tune verification of quadrupole MS detector	Prior to initial calibration and every 24 hours of analysis thereafter	Abundance criteria listed in Table 4.2-2 (from TAD)
Initial Calibration (ICAL)	Analysis of a minimum of five calibration levels covering approximately 0.1 to 5 ppb	Initially, following failed BFB tune check, failed CCV, or when changes/maintenance to the instrument affect calibration response	Average RRF ≤ 30% RSD and each calibration level must be within ± 30% of nominal For quadratic or linear curves, r ≥ 0.995, each calibration level must be within ± 30% of nominal
Secondary Source Calibration Verification (SSCV)	Analysis of a secondary source standard at the mid-range of the calibration curve to verify ICAL accuracy	Immediately after each ICAL	Recovery within ± 30% of nominal or RRF within ±30% of the mean ICAL RRF
Continuing Calibration Verification (CCV)	Analysis of a known standard at the mid-range of the calibration curve to verify ongoing instrument calibration	Following each daily BFB tune check and every 24 hours of analysis; recommended after each ten sample injections and to conclude each sequence	Recovery within ± 30% of nominal or RRF within ±30% of the mean ICAL RRF

Canister Cleaning Batch Blank	A canister selected for analysis from a given batch of clean canisters to ensure acceptable background levels in the batch of cleaned canisters	One canister from each batch of cleaned canisters – Canister chosen must represent no more than 10 total canisters.	Each target VOC's concentration < 3x MDL or 0.2 ppb, whichever is lower (All Tier I Core analytes must meet this criterion)
Internal Standards (IS)	Deuterated or not naturally occurring compounds co-analyzed with samples to monitor instrument response and assess matrix effects	Added to all calibration standards, QC samples, and field-collected samples	Area response for each IS compound within ± 40% of the average response of the ICAL
Preconcentrator Leak Check	Pressurizing or evacuating the canister connection to verify as leak-free	Each standard and sample canister connected to the instrument	< 0.2 psi change/minute or manufacturer recommendations
Method Blank (MB)	Canister filled with clean diluent gas	One with every analysis batch of 20 or fewer field-collected samples	Each target VOC's concentration < 3x MDL or 0.2 ppb, whichever is lower
Laboratory Control Sample (LCS)	Canister spiked with known amount of target analyte at approximately the lower third of the calibration curve	(Recommended) One with every analysis batch of 20 or fewer field-collected samples	Each target VOC's recovery must be 70 to 130% of its nominal spiked amount
Duplicate Sample	Field sample collected through the same inlet probe as the primary sample	10% of primary samples for sites performing duplicate sample collection (as prescribed in workplan)	Precision ≤ 25% RPD of primary sample for concentrations ≥ 5x MDL
Collocated Sample	Field sample collected through a separate inlet probe from the primary sample	10% of primary samples for sites performing collocated sample collection (as prescribed in workplan)	Precision ≤ 25% RPD of primary sample for concentrations ≥ 5x MDL

Replicate Analysis	Replicate analysis of a field-collected sample (chosen by analyst)	Once with every analysis sequence (as prescribed in workplan)	Precision ≤ 25% RPD for target VOCs with concentrations ≥ 5x MDL
Retention Time (RT)	RT of each target compound and internal standard	All qualitatively identified compounds and internal standards	Target VOCs within ± 0.06 RRT units of mean ICAL RRT IS compounds within ± 0.33 minutes of the mean ICAL RT
Canister Cleaning Batch Blank	Minimally one canister selected for analysis from a given batch of clean canisters to ensure acceptable background levels in the batch of cleaned canisters - must represent no more than 10 canisters	n/a	Each target VOC's concentration < 3x MDL or 0.2 ppb, whichever is lower
Canister Starting Pressure Determination	Each canister prior to collection of a field sample or preparation of a calibration standard or laboratory QC sample	n/a	Vacuum > 28" Hg as determined with calibrated pressure gauge or transducer
Compound Identification	Qualitative identification of each target VOC in each standard, blank, QC sample, and field- collected sample (including field QC samples)	n/a	Signal-to-noise ≥ 3:1 RT within prescribed window Ion abundances of at least one qualifier ion within 30% of ICAL mean Peak apexes co-maximized (within one scan for quadrupole MS) for quantitation and qualifier ions

Method Detection Limit	Determined initially and minimally annually thereafter and when method changes alter instrument sensitivity	n/a	MDL determined via 4.1 must be: Acrolein ≤ 0.09 µg/m3 Benzene ≤ 0.13 µg/m3 1,3- Butadiene ≤ 0.10 µg/m3 Carbon Tetrachloride ≤ 0.017 µg/m3 Chloroform ≤ 0.50 µg/m3 Tetrachloroethylene ≤ 0.17 µg/m3 Trichloroethylene ≤ 0.20 µg/m3 Vinyl Chloride ≤ 0.11 µg/m3 These MDL MQOs current as of October 2015. Refer to current workplan template for up to date MQOs.
Stock Standard Gases	Purchased stock standard gases for each target VOC All standards	n/a	Certified and accompanied by certificate of analysis Recertified or replaced annually unless a longer expiration is specified by the supplier
Proficiency Testing	Blind sample submitted to each laboratory to evaluate laboratory bias Two per calendar year	n/a	Each target compound within ± 25% of the assigned target value Failure of one PT must prompt corrective action. Failure of two consecutive PTs (for a specific core analyte) must prompt qualification of the analyte in field collected samples until return to conformance.
Canister Leak Test	Testing of the leak tightness of each canister in the agency fleet Annually, may be performed simultaneously with canister zero air	n/a	Leak rate must be ≤ 0.1 psi/day

	check		
Canister Zero Check	Verification that a canister does not contribute to positive bias over an approximate 30-day period Strongly Recommended: Each canister in the agency fleet once annually (or as defined by agency policy) or after major maintenance such as replacement of valve	n/a	All Tier I core target compounds must be < 0.2 ppb or < 3x MDL, whichever is lower
Canister Known Standard Gas Check	Verification that a canister does not contribute to bias over an approximate 30-day period Strongly Recommended: Each canister in the agency fleet once annually (or as defined by agency policy) or after major maintenance such as replacement of valve	n/a	All Tier I core target compounds must be within ± 30% of nominal

Table 3 Corrective action for specific QA/QC failures for VOC monitoring

QA/QC Measure	**Fail Action**
MS Tuning	Retune MS, recalibrate, and reanalyze samples.
System Monitoring Compound (SMC)	Retune MS, recalibrate, and reanalyze samples.
Non ISTD RT Difference	Flag samples, repair system, recalibrate.
ISTD RT Difference	Repair system, recalibrate, update RT.
Blank (system or canister)	System blank – repair system restart batch. Canister blank – flag canisters or clean canisters.

LCS	Flag samples, recalibrate
CCV	Batch is invalid, recalibrate, and reanalyze samples.
SSCV	Flag samples, repair system, or recertify standards.
Laboratory Replicate	Batch is invalid, repair system, recalibrate, and reanalyze samples.
ISTD Abundance	Batch is invalid, recalibrate, and reanalyze samples.
Collocated Sample	Calculate CV quarterly; if CV > 15%, flag samples.
Completeness	Collect makeups before next run or within the same month.
Leak Check	Check connections, repair system, inform lead chemist
Canister run	Inform lead chemist
Canister under/overfilled	Inform lead chemist

Metals

Table 4 is from Compendium Method IO-3.5 and summarizes the laboratory QC criteria for airborne metals analysis. Table 5 is from the EPA Quality Assurance Guidance Document and summarizes the field sampler QC criteria for airborne metals sampling. Table 6 dictates the corrective action that will be taken based on specific QC failures.

Table 4 QA/QC criteria for metals analysis from EPA Compendium Method IO-3.5

QC procedure	**Typical frequency**	**Criteria**
Initial calibration (IC)	At the beginning of the analysis	$R^2 \geq 0.995$
Initial calibration verification (ICV)	Immediately after initial calibration	90%-110% of the actual concentration
Initial calibration blank (ICB)	Immediately after initial calibration verification	May be less than project detection limits (MDLs)
High standard verification (HSV)	Following the initial calibration blank analysis	95%-105% of the actual concentration
Interference check standard (ICS)	Following the high standard verification, every 8 hours, and at the end of a run	80%-120% of the actual concentration

Continuing calibration verification (CCV)	Analyzed before the first sample, after every 10 samples, and at the end of the run	90%-110% of the actual concentration
Continuing clarification blanks (CCBs)	Analyzed following each continuing calibration verification	Must be less than project detection limits (MDLs)
Reagent blank (RB) or Method blank (MB)	1 per 40 samples, a minimum of 1 per batch	Must be less than project detection limits (MDLs)
Laboratory control spike (LCS) or Laboratory fortified blanks (LFB)	1 per 20 samples, a minimum of 1 per batch	80%-120% recovery
Duplicate and/or spike duplicate	1 per sample batch	RPD <20%
Matrix spike (MS)	1 per 20 samples per sample batch	Percent recovery of 75%-125%
Serial dilution	1 per sample batch	90%-110% of undiluted sample
Sample dilution	Dilute sample beneath the upper calibration limit but no lower than at least 5X the MDL	As needed

Table 5 QA/QC Criteria for metals field samplers from the EPA Quality Assurance Guidance Document

QA/QC Criteria	Frequency	Acceptance Criterion
Field Calibrations and Routine Checks		
One-point flow rate check at design flow rate	Monthly	±5% of transfer standard; and ±5% of design flow rate
External leak check(a)	Conducted with monthly flow check	≤ 0.1 L/min
Internal leak check	If external leak check fails, refer to manufacturer operating manual	≤ 0.1 L/min
One-point temperature check	Monthly	±2 °C of standard
Pressure verification	Monthly	±10 mmHg
Clock/timer verification	Monthly	1 min/month
Other calibrations as specified by manufacturer	Per manufacturer's SOP	per manufacturer's SOP
Quarterly Checks and Audits		
External leak check(a)	Semi-annual unless failed audit then at least quarterly until passes for 2	≤ 0.1 L/min

	quarters	
Internal leak check	If external leak check fails, refer to manufacturer operating manual	≤ 0.1 L/min
Temperature audit	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	±2 °C
Pressure audit	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	±10 mmHg
Flow rate audit	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	±5% of audit standard ±5% of design flow rate
Initial Installation Calibration and recalibrations thereafter		
Temperature calibration	On installation, annually, or if verification/audit indicates drift or failure	±2°C of standard
Pressure calibration	On installation, then annually, or if verification/audit indicates drift or failure	±10 mmHg
Flow rate calibration	On installation, annual, or if verification/audit indicates drift or failure	±2% of transfer standard at each flow rate
Design flow rate adjustment	As needed	±2% of design flow rate

Table 6 Corrective action for QA/QC failures in metals monitoring

QC procedure	**Failed Action**
Initial calibration (IC)	Batch is aborted, repair system, and recalibrate
Initial calibration verification (ICV)	Batch is aborted, repair system, and recalibrate
Initial calibration blank (ICB)	Samples < 5x Blank are flagged
High standard verification (HSV)	Batch is aborted, repair system, and recalibrate
Interference check standard (ICS)	Batch is invalid, repair system, recalibrate, and reanalyze samples
Continuing calibration verification (CCV)	Batch is invalid, repair system, recalibrate, and reanalyze samples
Continuing clarification blanks (CCBs)	Samples < 5x Blank are flagged
Reagent blank (RB) or Method blank (MB)	Batch is flagged
Laboratory control spike (LCS) or Laboratory fortified blanks (LFB)	Batch is qualified
Duplicate and/or spike duplicate	Batch is invalid, repair system, recalibrate, and reanalyze samples
Matrix spike (MS)	Batch is invalid, repair system, recalibrate, and reanalyze samples
Serial dilution	Batch is invalid, repair system, recalibrate, and reanalyze samples
Field Calibrations and Routine Checks	
One-point flow rate check at design flow rate	Correct problems. Recalibrate the sampler if needed. Applies to all flow channels

External leak check(a)	Determine cause of leak and correct. Validate and/or calibrate the sampler flow rate. Applies to all flow channels
Internal leak check	Determine cause of leak and correct. Validate and/or calibrate the sampler flow rate. Applies to all flow channels
One-point temperature check	Conduct a 3-point calibration to verify compliance. If failed 3-pt Cal, troubleshoot, and recalibrate
Pressure verification	Troubleshoot and recalibrate or replace sensor
Clock/timer verification	Adjust Clock/ timer
Other calibrations as specified by manufacturer	per manufacturer's SOP
Quarterly Checks and Audits	
External leak check(a)	Determine cause of leak and correct. Validate and/or calibrate the sampler flow rate. Applies to all flow channels
Internal leak check	Determine cause of leak and correct. Validate and/or calibrate the sampler flow rate. Applies to all flow channels
Temperature audit	Conduct a 3-point calibration to verify compliance. If failed 3-pt Cal, troubleshoot, and recalibrate
Pressure audit	Troubleshoot and recalibrate or replace sensor
Flow rate audit	Correct problems. Recalibrate the sampler, if needed. Applies to all flow channels
Initial Installation Calibration and recalibrations thereafter	
Temperature calibration	Conduct a 3-point calibration to verify compliance. If failed 3-pt Cal, troubleshoot, and recalibrate
Pressure calibration	Troubleshoot and recalibrate or replace sensor
Flow rate calibration	Correct problems. Recalibrate the sampler if needed. Applies to all flow channels
Design flow rate adjustment	Correct problems. Recalibrate the sampler if needed. Applies to all flow channels

Black Carbon and $PM_{2.5}$

Table 7 is from the EPA Quality Assurance Guidance Document and summarizes the QA/QC actions to be performed routinely on the Met One BC 1060 and Teledyne T640X samplers. Table 8 details the corrective action for BC 1060 and T640X QA/QC failures.

Table 7 QA/QC criteria for Met One BC 1060 black carbon and Teledyne T640X particulate matter samplers from the EPA Quality Assurance Guidance Document

QA/QC Criteria	**Frequency**	**Acceptance Criterion**
Field Calibrations and Routine Checks		
One-point flow rate check at design flow rate	Monthly	±5% of transfer standard; and ±5% of design flow rate
External leak check(a)	Conducted with monthly flow check	≤ 0.1 L/min

Internal leak check	If external leak check fails, refer to manufacturer operating manual	≤ 0.1 L/min
One-point temperature check	Monthly	±2 °C of standard
Pressure verification	Monthly	±10 mmHg
Clock/timer verification	Monthly	1 min/month
Other calibrations as specified by manufacturer	Per manufacturer's SOP	per manufacturer's SOP
Quarterly Checks and Audits		
External leak check(a)	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	≤ 0.1 L/min
Internal leak check	If external leak check fails, refer to manufacturer operating manual	≤ 0.1 L/min
Temperature audit	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	±2 °C
Pressure audit	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	±10 mmHg
Flow rate audit	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	±5% of audit standard ±5% of design flow rate
Initial Installation Calibration and recalibrations thereafter		
Temperature calibration	On installation, annually, or if verification/audit indicates drift or failure	±2°C of standard
Pressure calibration	On installation, then annually, or if verification/audit indicates drift or failure	±10 mmHg
Flow rate calibration	On installation, annual, or if verification/audit indicates drift or failure	±2% of transfer standard at each flow rate
Design flow rate adjustment	As needed	±2% of design flow rate

Table 8 Corrective action for QA/QC failures during black carbon and particulate matter sampling

QA/QC Criteria	Failed Action
Field Calibrations and Routine Checks	
One-point flow rate check at design flow rate	Correct problems. Recalibrate the sampler if needed. Applies to all flow channels
External leak check(a)	Determine cause of leak and correct. Validate and/or calibrate the sampler flow rate. Applies to all flow channels
Internal leak check	Determine cause of leak and correct. Validate and/or calibrate the sampler flow rate. Applies to all flow channels
One-point temperature check	Conduct a 3-point calibration to verify compliance. If failed 3-pt Cal, troubleshoot, and recalibrate

Pressure verification	Troubleshoot and recalibrate or replace sensor
Clock/timer verification	Adjust Clock/ timer
Other calibrations as specified by manufacturer	per manufacturer's SOP
Quarterly Checks and Audits	
External leak check(a)	Determine cause of leak and correct. Validate and/or calibrate the sampler flow rate. Applies to all flow channels
Internal leak check	Determine cause of leak and correct. Validate and/or calibrate the sampler flow rate. Applies to all flow channels
Temperature audit	Conduct a 3-point calibration to verify compliance. If failed 3-pt Cal, troubleshoot, and recalibrate
Pressure audit	Troubleshoot and recalibrate or replace sensor
Flow rate audit	Correct problems. Recalibrate the sampler, if needed. Applies to all flow channels
Initial Installation Calibration and recalibrations thereafter	
Temperature calibration	Conduct a 3-point calibration to verify compliance. If failed 3-pt Cal, troubleshoot, and recalibrate
Pressure calibration	Troubleshoot and recalibrate or replace sensor
Flow rate calibration	Correct problems. Recalibrate the sampler if needed. Applies to all flow channels
Design flow rate adjustment	Correct problems. Recalibrate the sampler if needed. Applies to all flow channels

Elemental Carbon

Table 9 is from the method IMPROVE_A SOP from DRI and summarizes the QA/QC criteria for laboratory analysis of elemental carbon. Table 10 is from the EPA Quality Assurance Guidance Document and summarizes the QA/QC criteria for the Met One Super SASS field sampler used for elemental carbon sampling. Table 11 details the corrective action to be taken for QA/QC failures during elemental carbon monitoring.

Table 9 QA/QC criteria for elemental carbon analysis from the DRI IMPROVE_A method SOP

QA/QC Activity	Calibration Standard and Range	Frequency	Acceptance Criteria
Laboratory Blank Check	N/A	Beginning of analysis day	<0.2 µg C/cm^2
Calibration Peak Area Check	NIST 5% CH4/He gas standard; 20 µg C (6-port valve injection loop, 1000 µl)	Every analysis	Counts >17,000 and 95-105% of average calibration peak area of the days
Auto-Calibration Check	NIST 5% CH_4/He gas standard; 20 µg C (Carle valve injection loop, 1000 µl)	Alternating beginning or end of each analysis day	95-105% recovery and calibration peak area 90-110% of weekly average
Manual Injection Calibration	NIST 5% CH_4/He or NIST 5% CO_2/He gas standards; 20 µg C (Certified gas- tight syringe, 1000 µl)	Four times a week (Sun., Tue., Thu., and Sat.)	95-105% recovery and calibration peak area 90-110% of weekly average

Sucrose Calibration Check	10µL of 1800 ppm C sucrose standard; 18 µg C	Thrice per week	17.1-18.9 µg C/filter
Potassium Hydrogen Phthalate (KHP) Calibration Check	10µL of 1800 ppm C KHP standard; 18 µg C	Twice per week (Tue. And Thu.)	17.1-18.9 µg C/filter
System Blank Check	N/A	Once per week	<0.2 µg C/cm^2
Multiple Point Calibrations	1800 ppm C Potassium hydrogen phthalate (KHP) and sucrose; NIST 5% CH_4/He, and NIST 5% CO_2/He gas standards; 9-36 µg C for KHP and sucrose; 2-30 µg C for CH_4 and CO_2	Every six months or after major instrument repair	All slopes ±5% of average
Sample Replicates (on the same or a different analyzer)	N/A	Every 10 analyses	±10% when OC and TC >10 µg C/cm^2 ±20% when EC > 10µg C/cm^2 or <±1 µg/cm^2 when OC and TC <10 µg C/cm^2 <±2 µg/cm^2 when EC <10µg C/cm^2
Temperature Calibrations	NIST-certified thermocouple[c]	Every six months, or whenever the thermocouple is replaced	Linear relationship between analyzer and NIST thermocouple values with R^2>0.99
Oxygen Level in Helium Atmosphere (using GC/MS)	Certified gas-tight syringe; 0-100 ppmv	Every six months	Less than the certified amount of He cylinder

Table 10 QA/QC criteria for elemental carbon sampling using the Met One Super SASS from the EPA Quality Assurance Guidance Document

QA/QC Criteria	**Frequency**	**Acceptance Criterion**
Field Calibrations and Routine Checks		
One-point flow rate check at design flow rate	Monthly	±5% of transfer standard; and ±5% of design flow rate
External leak check(a)	Conducted with monthly flow check	≤ 0.1 L/min
Internal leak check	If external leak check fails, refer to manufacturer operating manual	≤ 0.1 L/min
One-point temperature check	Monthly	±2 °C of standard
Pressure verification	Monthly	±10 mmHg
Clock/timer verification	Monthly	1 min/month
Other calibrations as specified by	Per manufacturer's SOP	per manufacturer's SOP

manufacturer		
Quarterly Checks and Audits		
External leak check(a)	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	≤ 0.1 L/min
Internal leak check	If external leak check fails, refer to manufacturer operating manual	≤ 0.1 L/min
Temperature audit	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	±2 °C
Pressure audit	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	±10 mmHg
Flow rate audit	Semi-annual unless failed audit then at least quarterly until passes for 2 quarters	±5% of audit standard ±5% of design flow rate
Initial Installation Calibration and recalibrations thereafter		
Temperature calibration	On installation, annually, or if verification/audit indicates drift or failure	±2°C of standard
Pressure calibration	On installation, then annually, or if verification/audit indicates drift or failure	±10 mmHg
Flow rate calibration	On installation, annual, or if verification/audit indicates drift or failure	±2% of transfer standard at each flow rate
Design flow rate adjustment	As needed	±2% of design flow rate

Table 11 Corrective action for QA/QC failures during elemental carbon monitoring

QA/QC Activity	Corrective Action
Laboratory Blank Check	Check instrument and filter lots
Calibration Peak Area Check	Void analysis result; check flowrates, leak, and 6-port valve temperature; conduct an auto-calibration; and repeat analysis with second filter punch
Auto-Calibration Check	Troubleshoot and correct system before analyzing samples
Manual Injection Calibration	Troubleshoot and correct system before analyzing sample
Sucrose Calibration Check	Troubleshoot and correct system before analyzing samples
Potassium Hydrogen Phthalate (KHP) Calibration Check	Troubleshoot and correct system before analyzing samples
System Blank Check	Check instrument
Multiple Point Calibrations	Troubleshoot instrument and repeat calibration until results are within stated tolerances
Sample Replicates (on the same or a different analyzer)	Investigate instrument and sample anomalies and rerun replicate when difference is > ±10% (OC) or ±20% (EC)

Temperature Calibrations	Troubleshoot instrument and repeat calibration until results are within stated tolerances
Oxygen Level in Helium Atmosphere (using GC/MS)	Replace the He cylinder and/or O_2 scrubber

Appendix C: AQS Data Flags

Chemists review all monitoring data and organize it into AQS format, which includes applying certain codes to account for errors or qualifiers during sample collection and analysis. Table 2 and Table 3 list null and qualifier codes, respectively.

Table 12 Null codes for data uploaded to AQS.

AQS Formatting: Null Codes (only to be used for nullifying data – do not report values)		
Code	**Error**	**Description**
AA	Sample Pressure out of limits	The ambient pressure value reported by the sampler is known to be incorrect (sensor out of calibration) or outside the range of the sensor's detection capabilities.
AC	Construction/repairs in the area	The sample cannot be collected as a result of construction or repairs in the area
AF	Scheduled but not collected	Missed a sampling day – submit AF values for all parameters on missed day, and also submit any make-up values.
AG	Sample time out of limits	Sample took place over a time period other than 24 hours; e.g., due to incorrect event entries in the sampler or other causes.
AH	Sample flow Rate or CV out of limits	The CV is equal to or greater than 5% (CV ≥ 5% is out of limits) or the sample flow rate was insufficient to collect an appropriate sample.
AJ	Filter damage	The sample filter cannot be analyzed due to damage.
AK	Filter Leak	
AL	Voided by Operator	
AM	Miscellaneous Void	Do not use this code if there is a more specific code that applies. If you must use this code, thoroughly document your reasoning so that you can easily reference it during an Audit or in response to a public request for information.
AN	Machine Malfunction	
AQ	Collection Error	
AR	Lab Error	Catch-all code for errors during the sample analysis.
AV	Power Failure	
BE	Building/Site repair	If a sample cannot be collected due to site repair
BI	Lost or damaged in transit	
SC	Sampler contamination	
SV	Sample Volume out of limits.	The total sample volume reported by the sampler varies from the expected volume by more than 5% (based on the duration of sampling and an ideal flow rate of 6.7 LPM).

Table 13 Qualifier codes for data uploaded to AQS

AQS Formatting: QA, Inform, and ReqExc Qualifier Codes (not for nullifying data – report values)			
Qualifier Code	**Qualifier**	**Qualifier Type**	**Description**
3	Field Issue	QA	Catch-all code for errors in the field that do not necessarily require nullifying the data.

4	Lab Issue	QA	Catch-all code for errors during the analysis that do not necessarily require nullifying the data.
5	Outlier	QA	
9	Negative value detected – zero reported	QA	Blank correction can result in negative values in the adjusted data. This is not an error in the instrument, but a result of variation in field blank values. This does not affect unadjusted data because negative values only result from blank correction.
CB	Values have been Blank corrected ***Apply this code to all adjusted samples.***	QA	This qualifier should always be used for adjusted data. Note: it is acceptable to apply this qualifier to nulled adjusted data as well (if doing so makes preparing the AQS formatting easier).
FX	Filter integrity issues		There is a physical issue with the sample filter (e.g., a small hole, minor contamination, or uneven sample loading), but the analysis was performed.
HT	Sample pick-up hold time exceeded	QA	
MD	Value is less than MDL	QA	Values are reported as-is so that the statistics of the data set are not biased. Defer to the AB 617 Senior Chemist or MTS Chief's guidance and use MDL values at the time of analysis (these are subject to change).
MS	Value reported is ½ MDL substituted	QA	
NS	Nearby source	QA	Influenced by nearby source.
SS	Value submitted from secondary monitor	QA	For collocated monitoring. Applies to samples collected using the collocated/secondary monitor only (FT codes starting in C, such as CR, CB, and CD).
VB	Value below normal; no reason to invalidate	QA	Unusually low value but with no evidence of sampling or analysis error. (Likely more appropriate to use Code 5 – Outlier)
W	Flow rate average out of spec	QA	The sample flow rate was out of spec (high or low) but within 10% of the nominal (design) flow rate.
Y	Elapsed sample time out of spec	QA	The sample duration does not equal 24:00, but it is within the acceptable range of 24:00 ± 1:00 (23:00 to 25:00).
IA	African dust		
IB	Asian dust		
IC	Chemical spills and industrial accidents		
ID	Cleanup after a major disaster		
IE	Demolition		
IF	Fire - Canadian		
IG	Fire – Mexico/Central America		
IH	Fireworks	Inform	To signify that fireworks were set off during the sample (e.g., Fourth of July or New Years celebrations in the Portside region).
II	High pollen counts		
IJ	High winds		
IK	Infrequent large gatherings		
IM	Prescribed fire		
IN	Seismic activity		
IO	Stratospheric ozone intrusion		
IP	Structural fire	Inform	To signify that a structural fire may have influenced the sample (e.g., during the USS Bonhomme Richard fire).
IQ	Terrorist act		

IR	Unique traffic disruption	Inform	To signify that a traffic disruption may have influenced the data during a particular sample. Describe the disruption in the FDS.
IT	Wildfire - U.S.	Inform	To signify that a wildfire may have influenced the data during a particular sample (e.g., during wildfires in California)
J	Construction	Inform	Construction activities were present during sampling, installing, or collection
Z	Other event	Inform	

Appendix C: Target Compounds

Table 14 List of target VOCs

1,1,1-trichloroethane	1,1,2,2-tetrachloroethane
1,1,2-trichloro-1,2,2-trifluoroethane	1,1,2-trichloroethane
1,1-dichloroethane	1,1-dichloroethene
1,2,4-trichlorobenzene	1,2,4-trimethylbenzene
1,2-dibromoethane	1,2-dichloroethane
1,2-dichloropropane	1,2-dichlorotetrafluoroethane
1,3,5-trimethylbenzene	2-butanone
4-ethyltoluene	4-methyl-2-pentanone
Acetone	Acetonitrile
Acrolein	Acrylonitrile
Benzene	Benzyl chloride
Bromoform	Bromomethane
Chlorobenzene	Chloroethane
Chloroform	Chloromethane
cis-1,2-dichloroethene	cis-1,3-dichloropropene
Dichlorodifluoromethane	Ethyl Acetate
Ethyl benzene	Ethylene oxide
Hexachloro-1,3-butadiene	Isoprene
m,p-xylene	m-dichlorobenzene
Methyl Methacrylate	Methyl tertiary butyl ether
Methylene chloride	Naphthalene
n-hexane	o-dichlorobenzene
o-xylene	p-dichlorobenzene
Styrene	Tetrachloroethylene
Tetrachloromethane	Toluene
trans-1,2-dichloroethene	trans-1,3-dichloropropene
Trichlorofluoromethane	Vinyl acetate
Vinyl chloride	

Table 15 List of target metals

Arsenic	Antimony	Strontium
Barium	Beryllium	Copper
Cadmium	Chromium	Titanium
Cobalt	Lead	Iron
Manganese	Molybdenum	Zinc
Nickel	Selenium	Aluminum
Tin	Vanadium	

Appendix D: EPA Sampling Schedule

APCD will follow the 6-day sampling schedule per the official EPA Sampling Schedule, which is shown on days highlighted in green and purple in Figure 1.

January

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

March

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

April

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

May

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

June

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

July

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

August

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

September

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

October

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

November

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

December

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Figure 1 2023 EPA Sampling Schedule. APCD will follow the 6-day sampling schedule, shown in green and purple

Appendix E: Websites

Data will be made publicly available through three websites:

San Diego County Air Pollution Control District <sdapcd.org>

California Air Resources Board - AQview <aqview.arb.ca.gov >

United States Environmental Protection Agency - Air Quality System <epa.gov/aqs>

San Diego County Air Pollution Control District

The San Diego County Air Pollution Control District (APCD) homepage is shown in Figure 2. Air Quality Index (AQI) can be searched by zip code. The Air Quality link across the top (marked with a red box) enables access to data, AQI forecasts, and more, and the page is shown in Figure 3. The AQI Forecast page is shown in Figure 4.

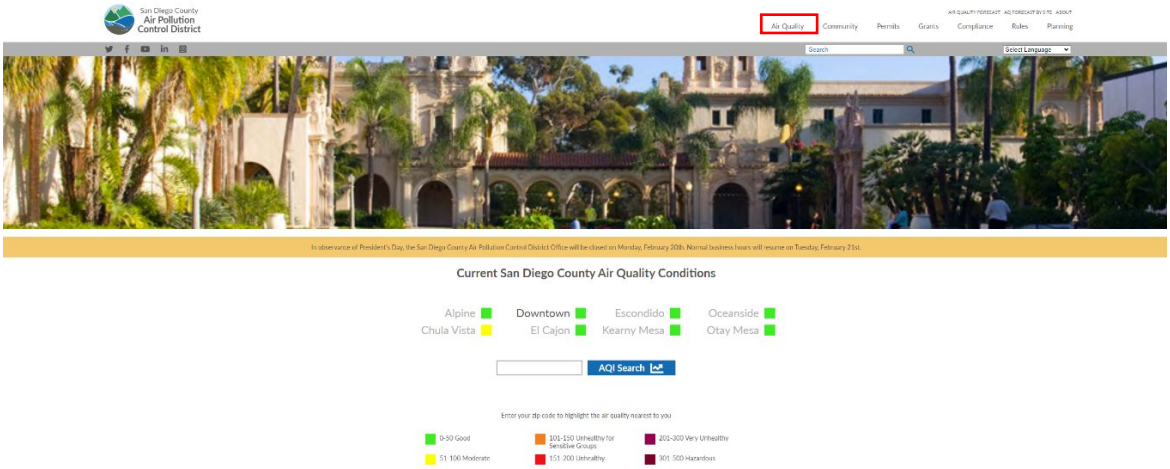

Figure 2 San Diego County Air Pollution Control District website homepage. The Air Quality link is marked with a red box.

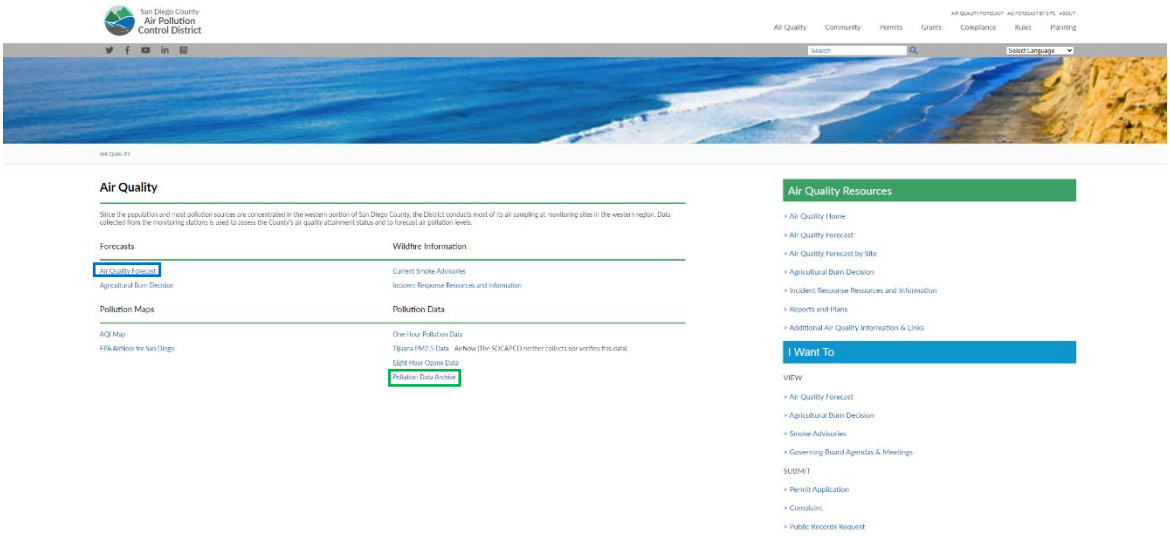

Figure 3 San Diego Air Pollution Control District Air Quality page. AQI Forecast is marked by a blue box, and historical data archive is marked by a green box.

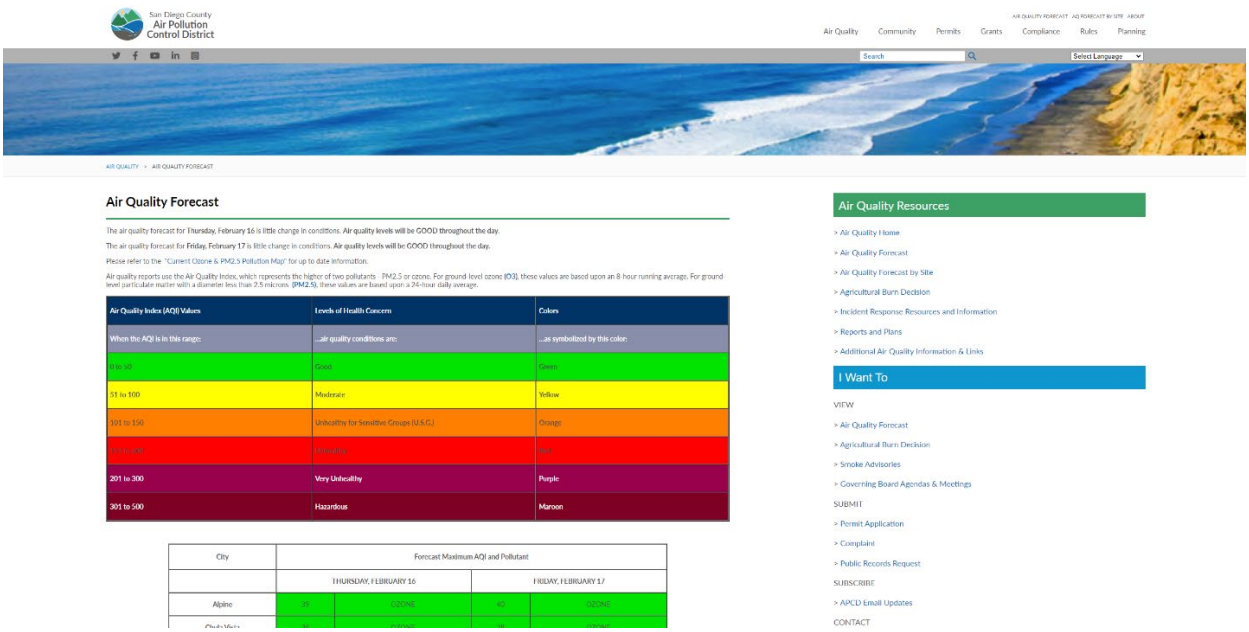

Figure 4 San Diego County Air Pollution Control District Air Quality Forecast page

California Air Resources Board – AQview

The California Air Resources Board maintains a database of air quality data across California called AQview, which is shown in Figure 5. Clicking on the Access Data dropdown menu, marked by a red box, brings up two options: Continuous Monitoring (Figure 6) and Additional Monitoring & Reports (Figure 7).

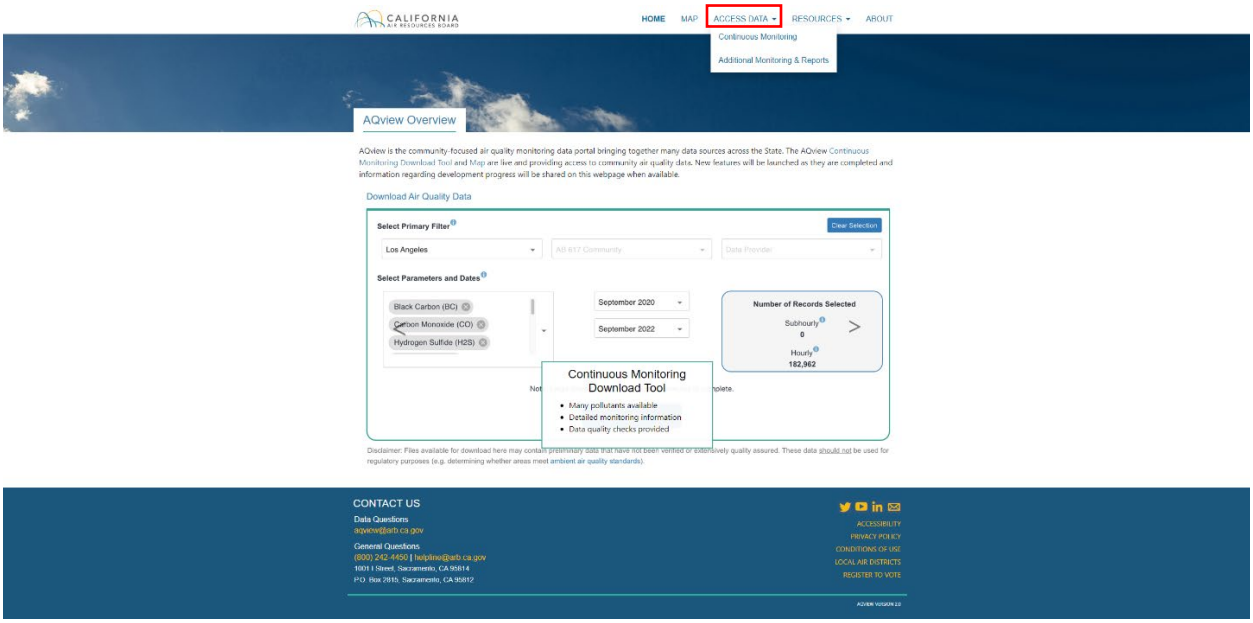

Figure 5 California Air Resources Board AQview homepage

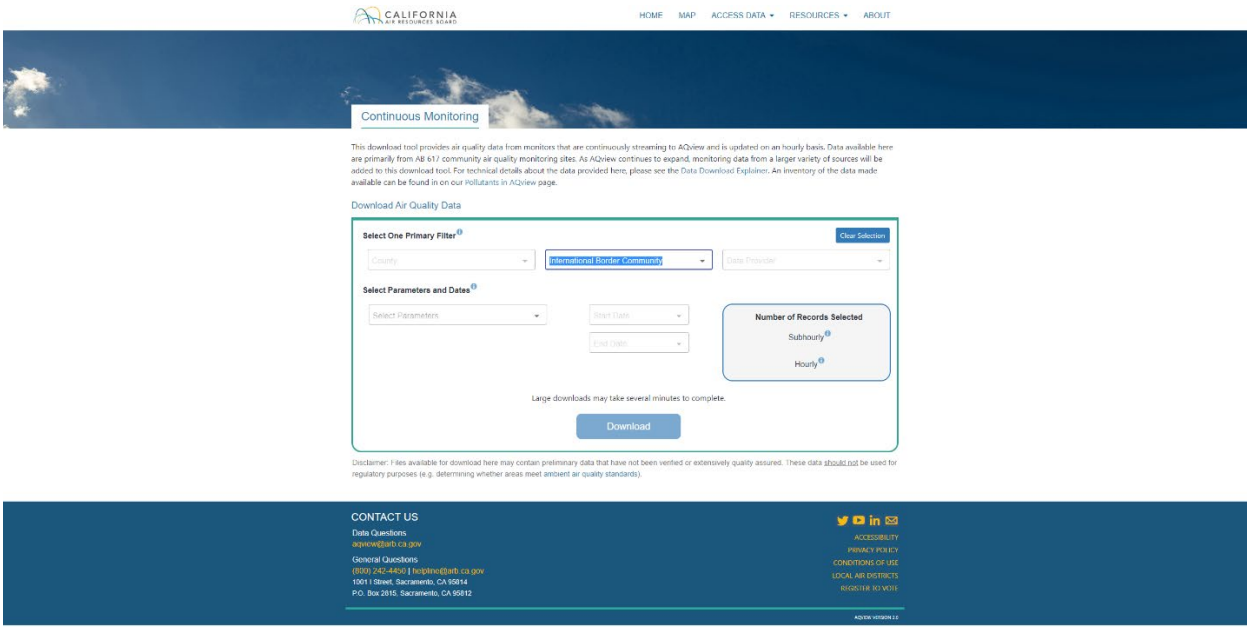

Figure 6 California Air Resources Board AQview Continuous Monitoring data page

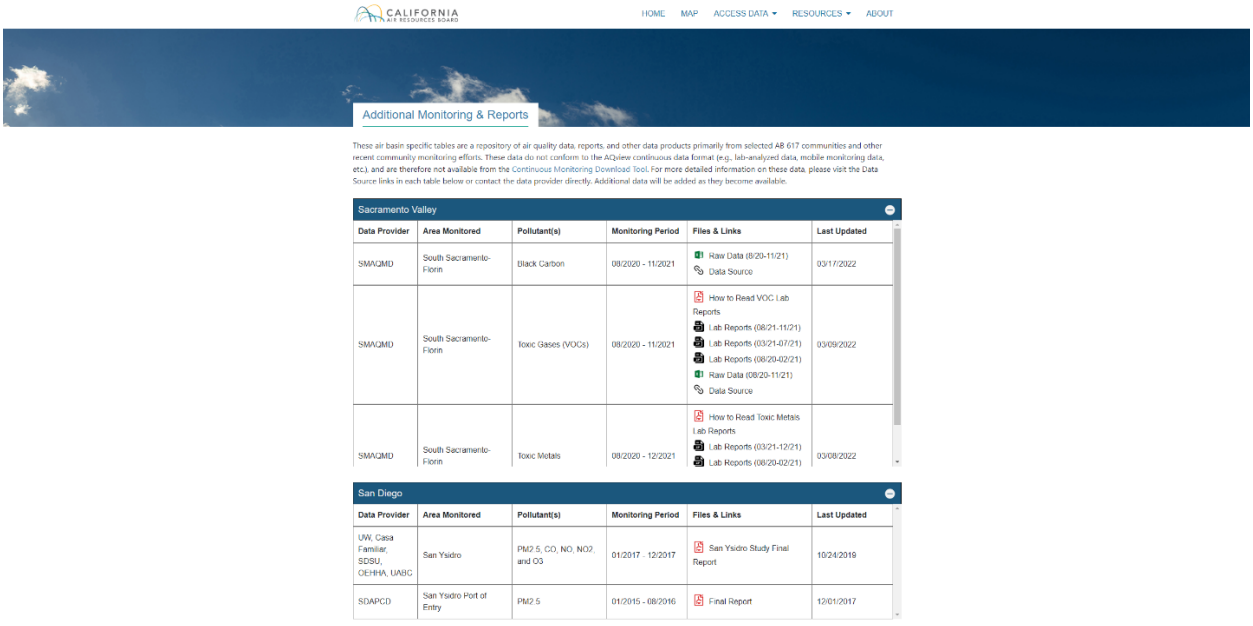

Figure 7 California Air Resources Board AQview Additional Monitoring & Reports

United States Environmental Protection Agency Air Quality System

Per the United States Environmental Protection Agency Air Quality System website: "The Air Quality System (AQS) contains ambient air pollution data collected by EPA, state, local, and tribal air pollution control agencies from over thousands of monitors. AQS also contains meteorological data, descriptive information about each monitoring station (including its geographic location and its operator), and data

quality assurance/quality control information." The homepage is shown in Figure 8 and includes support, documentation, and other helpful links.

Figure 8 United States Environmental Protection Agency Air Quality System homepage