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**INDEPENDENT AUDIT PROTOCOL FOR FENCELINE AIR
MONITORING SYSTEMS
(DRAFT)**

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ABSTRACT

This protocol shall be used by owners and/or operators of facilities subject to South Coast AQMD Rule 1180 for conducting periodic independent audits, as required by the Rule.

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Approved on behalf of NPL by Rod Robinson,
Science Area Leader, Environmental Emissions Metrology Group

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Name _____ Title _____

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1 ACRONYMS AND ABBREVIATIONS

AQS	air quality system
CAMP	community air monitoring plan
CAPs	corrective action plans
DQOs	data quality objectives
FAMP	fenceline air monitoring plan
FAMS	fenceline air monitoring systems
MDL	minimum detection limit
PPE	personal protective equipment
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
QMP	quality management plan
SCA	specific cause analysis
South Coast AQMD	South Coast Air Quality Management District
SOP	standard operating procedure
TSA	technical systems audit

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2 DEFINITIONS

Audit: a systematic and independent review to assess whether activities and their results meet planned requirements and are effectively implemented.

Audited Facility: any petroleum refinery or related facility as defined in Rule 1180.

Auditee Representative: individual(s) representing the owner/operator of the audited facility who accompanies an auditor to provide explanations and/or clarifications about the system being audited.

Auditor: person(s) authorized and qualified to conduct quality audits with relevant technical expertise in Fenceline Air Monitoring Systems.

Audit Criteria: set of policies, procedures or requirements used as a reference against which audit evidence is compared.

Audit Discoveries: an assessment conclusion that identifies a condition having an effect on an activity which may be positive or negative.

Audit Discovery Categories: Findings (Major Non-Conformity as defined by ISO 17021-1:2015) – A serious concern for which adequate process controls are not in place, including documentation that is incomplete, absent, or not representative of what is being done.

Concerns (Minor Non-Conformity as defined by ISO 17021-1:2015) – An issue that does not constitute a Major Non-Conformity but could result in a non-conformity.

Observations (Opportunity for Improvement) – A recommendation for enhancement, not classified as a non-conformity.

Audit Plan: a detailed written document that outlines the specific tasks, timelines, operations, and resources required to execute a site audit.

Audit Program: set of one or more audits planned for a specific time frame and directed towards a specific purpose.

Audit Scope: extent and boundaries of an audit.

Conformity: fulfilment of specified requirements.

Corrective Action Plan: a compliance plan that details the actions a facility will execute to correct any findings, concerns and observations identified in an Independent Audit report.

Non-Conformity: nonfulfillment of a specified requirement.

Objective Evidence: data supporting the existence or verity of something.

Quality Assurance (QA): a system that includes planning, implementation, documentation, assessment, and reporting to ensure that a process meets defined quality standards.

Quality Control (QC): a system of activities that measures the attributes and performance of a process against defined standards to verify that they meet the established requirements.

Verification: the process of establishing that a condition or statement has been met or demonstrated, and that it may result in a positive or negative outcome (discovery).

3 OBJECTIVE

This protocol establishes a framework for auditors to implement an audit process which fulfils the requirements under Rule 1180 for petroleum facilities. The primary goal of the audit is to provide a systematic and independent review of the Fenceline Air Monitoring Systems (FAMS) at facilities subject to Rules 1180 and 1180.1, and to assess whether the system, activities, and results are compliant with the approved or partially approved Fenceline Air Monitoring Plan (FAMP) and Rules 1180 and 1180.1 and guidelines. This includes assessing the implementation of monitoring systems, data accuracy, reporting systems, and adherence to the FAMP, including the Quality Assurance Project Plan (QAPP) specifications. Auditing aims to identify non-conformities, identify areas for improvement, opportunities to strengthen the program and offer constructive feedback.

Rule 1180 states audits are expected to be conducted every three years to ensure that established procedures and practices are adequate and consistently followed. Audits are one component of a broader quality assurance system. Routine assessment of monitoring data by facilities plays a key role in ensuring data quality and alignment with the air monitoring objectives of Rules 1180 and 1180.1.

The audit will comprise both a desk-based audit, reviewing answers to a questionnaire, a document and data review, and a site-based audit, to observe the operation of the instruments and maintenance tasks, and interview staff involved in operation of the fenceline monitoring system.

4 REQUIRED RESOURCES

4.1 PERSONNEL

The audit provider ensures that the audit program is adequately resourced and establishes clear procedures for planning, scheduling, and conducting audits.

The organizational chart of the auditing team is presented in Figure 4-1.

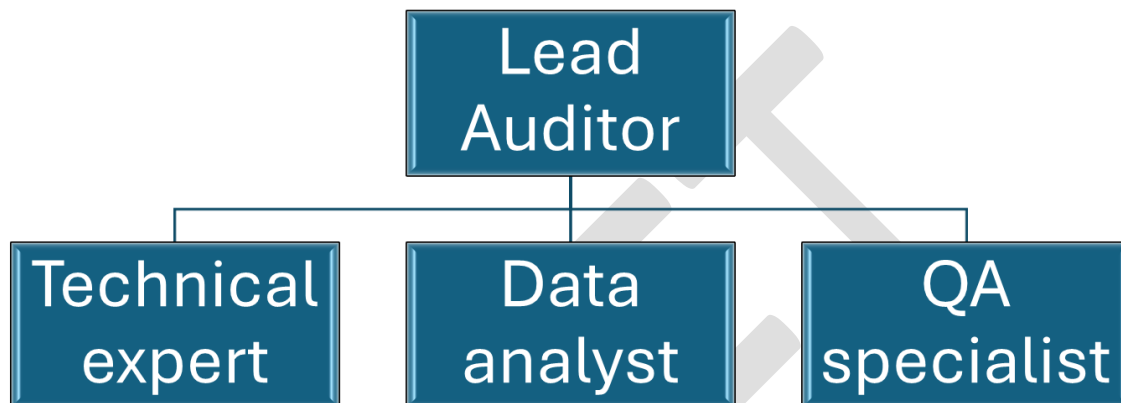


Figure 4-1. Audit team organization chart (Note: in some instances, one individual may perform several functions).

The team of auditors participating in the audits must have:

- Applicable technical knowledge of fence-line air monitoring programs including but not limited to siting requirements, instrument operation and maintenance, including open-path and point monitors, and meteorological sensors;
- An understanding of each instrument’s capabilities and limitations;
- An understanding of the data quality requirements.

Auditor training includes periodic refresher training, which is documented and regularly evaluated, and auditors are provided with appropriate training opportunities.

The lead auditor and the supporting members of the audit team are selected based on their experience, qualifications, and ability to remain independent and objective. The lead auditor coordinates and manages the audit, including pre-audit planning and post-audit close-out after completing all corrective activity. To ensure impartiality and fresh perspectives, where possible lead auditors may be rotated to avoid having the same lead auditor conduct consecutive audits for the same facility. This rotation may help to reduce bias and offer a new viewpoint on the organization’s quality system.

Each audit team includes at least two team members. Ideally, teams should have an even number of members to facilitate working in pairs. While it is acceptable for a two-person team to divide tasks to maximize efficiency, working in pairs is generally recommended. When scheduling audit activities, the lead auditor considers whether tasks are conducted jointly by the whole team or carried out concurrently by individual team members.

Personal attributes such as integrity, objectivity, confidentiality, and effective communication are essential for all audit team members. Depending on the scope of the audit, additional qualifications, such as safety or site-specific training, may also be required.

4.2 PHYSICAL RESOURCES

During the on-site portion of the audit, the audit team requires an on-site facility (e.g. room or office) with internet access and preferably AV system to facilitate discussions and document their discoveries.

Specialised equipment and/or PPE required for site access, such as personal gas monitors, hearing protection, two-way radios will be supplied by the facility. Other PPE, namely, steel toe boots, fire-retardant overalls, hard hats and protective eyewear and additional specialized equipment and supplies required for verification tests of the fence line air monitors, such as gas cylinders, certified dilution systems, and flow controllers, will be supplied by the auditing organisation (Note: for the first audit, gas cylinders, dilution equipment and flow controllers will be provided by South Coast AQMD).

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5 PLANNING

5.1 GENERAL

The audit planning and pre-audit activities will begin at least three months in advance of the site audit and outlined in Figure 5-1.

Action	Week																Audit 0	
	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1		
Agreement on audit date																		
Audit check list sent out																		
Document request																		
Data request																		
Receipt of completed checklist																		
Receipt of documents																		
Receipt of data																		
Initial planning meeting																		
Review of check list																		
Document review																		
Data review																		
Audit team selection																		
Audit plan draft sent out																		
Pre-audit meeting																		
Finalised audit plan sent out																		

Figure 5-1. Approximate timeline for pre-audit activities and milestones.

Other than for the first audit, the previous audit report is reviewed to understand the organization’s structure and help to assess whether the facility has adequately addressed any deviations from Rule 1180 and guidelines requirements identified in previous audits, and that corrective actions have been implemented effectively. Additionally, this may highlight areas not covered in the last audit; guiding aspects to focus on for the current audit.

The lead auditor will contact the South Coast AQMD and the facility representative to establish communication channels to discuss the scope of the audit and logistics.

The lead auditor will request information on any significant changes within the organization since the last audit and/or the latest approved versions of documents needed for audit preparation. These may include the QAPP, FAMP, a map or list of field monitor locations, the organizational chart, changes in key personnel, facilities, or the subcontractors of field or laboratory operations associated with maintenance and operation of the facility’s fenceline air monitoring system.

The Audit Checklist includes a comprehensive questionnaire on information required by the audit team in advance for the audit, to facilitate effective audit planning and execution. References to relevant sections of the Audit Checklist are noted in curly brackets ({}) within this document.

The audit team, at the minimum will request data and objective evidence from the previous 12 months of operation of the fenceline air monitoring system, and for the time periods since the last audit when any of the Rules 1180 and 1180.1 notification thresholds were exceeded, and may also request additional data (e.g. for other selected time periods) and supporting documentation dating back to the last audit, or, for the first audit, to the beginning of fenceline air monitoring. To the extent allowed by law, the confidentiality of business confidential information will be maintained by the audit team throughout the audit process. The following information will be requested from the facility:

- All available data levels, including:
 - Raw spectroscopic or equivalent data, as applicable.
 - Unprocessed lowest time-resolution data, prior to applying time-averaging.
 - 5-minute and 1-hour averaged data, prior to application of automated QA/QC flags.
 - 5-minute and 1-hour data resulted from automated QA/QC.

- Finalized 5-minute and 1-hour data after final/manual review (i.e., the data reported in the quarterly reports).
- Log of the manual quality checks, including any documented changes made to the automated data {5.1,5.3}.
- Records and results of blanks/zero checks, if applicable.
- Records and results of bump test or any other verification/audit tests for all the instruments {3.10, 3.11}.
- Certificates and traceability of gas standards used for bump tests and other verification tests {3.13}.
- Calibration data for the meteorological sensors, including calibration certificates {3.12}.
- MDL measurements and/or calculations.
- Digital copies of site notebooks and other logs, QC charts, QA/QC notes, and other logs {3.15}.

Objective evidence will be gathered from sample data and selected instruments rather than a full review of all available information. The audit team will determine an appropriate sample size and locations and will communicate and discuss the findings during the audit.

During the pre-audit meetings, the lead auditor will review the audit questionnaire with the auditee, answer questions, and provide clarifications, as needed. The facility should complete the audit questionnaire at least two months prior to the start of the on-site audit.

5.2 PLANNING MEETINGS

Planning meetings will be held between the audit team and the audited facility consisting of:

- An initial planning meeting to discuss the audit scope, review previous audit results, assign team roles, conduct an initial review of received data and information - to determine if any data or information is missing, and coordinate logistics for the on-site portion of the audit. Any request for additional data or clarifications will be then sent out to the auditee.
- A pre-audit meeting, held shortly prior to the on-site audit, will aim to finalize logistical details for on-site activities, and communicate the audit team's preliminary feedback based on the analysis of data and audit questionnaire submitted by the facility.
- A final pre-audit meeting to confirm everything is in place for the audit.

The lead auditor will be responsible for coordinating and planning all meetings, which will be documented with written meeting summaries. The audit team will distribute the meeting summaries to all attendees for comments within a week, and finalize these summaries based on attendees' comments, if any.

The initial planning meeting will result in a draft audit plan. The plan will be sent to the facility for review and comments approximately five weeks before the start of the on-site portion of the audit. The facility must send any comments back to the auditors within two weeks. The final audit plan will be sent to all participants two weeks before the on-site portion of the audit.

This draft plan will be placed in the shared, password-protected audit folder. The audit folder will be accessible only to the audit team and other authorized personnel. This folder will include all working documents produced prior to, during, and after the audit, such as interview notes, questionnaires, meeting records, completed checklists, and reports. All audit-related documents will be securely stored, with access restricted to authorized personnel only. All documents and supporting information will be shared with South Coast AQMD.

Following the initial planning meeting, the lead auditor will inform the facility in writing of the following:

- Scope of the audit.
- The planned on-site audit date and the estimated completion time.
- The names and roles of the audit team.
- Any materials (e.g., audit gases) and equipment that will be brought on-site.
- Any special requirements for the audit.

The pre-audit meeting will finalise the audit plan and confirm that everything is in place for the audit to commence, including:

- Confirmation of the availability of all participants.
- Confirmation that the gases and equipment, and other required materials are ready.

The final pre-audit team meeting will be held to confirm and finalize the audit plan.

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6 PRE-AUDIT ACTIVITIES

6.1 AUDIT QUESTIONNAIRE AND CHECKLIST

Audit results will be based on objective evidence and observations related to the assessment requirements outlined in Section 9. The audit questionnaire and checklist provide a mechanism to systematically record objective evidence from information gathering and ensure that a systematic audit covering all relevant aspects of the quality system is performed across all the audited facilities.

The audit checklist and questionnaire template that accompanies this Procedure is designed to support audits and serves as a reference both for the audit team and the auditee. A comprehensive assessment of the monitoring program's quality system requires evaluating the organization against the specific policies and practices outlined in its quality documentation. To that end, the lead auditor may make modifications to an audit questionnaire and checklist based on the available FAMP, QAPPs, and all other relevant materials, with input from the audit team. This questionnaire and checklist also provide space for comments and essential details such as the auditee's name and location, the auditor's names, the audit date, and other relevant facility information.

The audited facility should complete the audit questionnaire and checklist for the audit team at least two months prior to the start of the on-site audit.

All audit team members review the auditee's responses and identify any concerns and topics requiring further discussion prior to the audit. These concerns are discussed and if possible, resolved during the second pre-audit meeting and prior to the start of the on-site audit. Issues that require additional investigation will be addressed during the audit or followed up afterwards, if necessary.

6.2 DOCUMENT REVIEW {1.1}

Facilities subject to Rule 1180 are required to develop and submit several key documents as part of their compliance with air monitoring requirements. These documents are essential to demonstrate that robust systems are in place to monitor air quality and provide quality information to the public. The primary documents required include:

- FAMP, including portions on data reporting and public communication.
- QAPP, if not included in FAMP.
- Standard Operation Procedures (SOPs).
- Quarterly Data Summary Reports.
- Specific Cause Analysis Reports.

Before the audit, the lead auditor will request the most up-to-date, approved versions of all required facility fence-line monitoring related documents from the South Coast AQMD and the audited facility. The audit team will then review these materials along with any published monitoring data, SOPs, prior audit reports, and corrective action plans (if applicable), key personnel roles, quality control charts, equipment lists, training records, and other relevant supporting documentation {1.2}.

This document review will enable the audit team to gain familiarity with facility's quality system, technical operations, performance criteria, and the goals of the fenceline monitoring program. Understanding these elements in advance minimizes disruptions during the audit and ensures a more efficient, thorough, and effective audit process.

Each facility is required to maintain a detailed quality system, documented in approved or partially approved FAMP and QAPP. These documents must clearly outline the structure and scope of the monitoring program and often include detailed policies and practices that support the objectives of the facility's quality system. Quality system requirements are described in detail in Section 9 of this document.

The lead auditor will be responsible for verifying the approval status of each quality assurance document. Best practice is for each document to be signed and dated by the author and/or approving personnel. The lead auditor will verify that all documents are both approved and implemented.

6.3 DATA REVIEW {5}

Before the audit, the audit team will review the facility's procedures for data validation and quality control and perform statistical analysis and spot-checks on a sample of the provided data, to ensure that the data reported on the public portal is accurate, complete, and consistent with Rule 1180 and Rule 1180 Guidelines.

The review of the documents, data, and completed questionnaire may result in preliminary findings that will be communicated to the facility. The lead auditor will generate a summary of preliminary findings for investigation during the on-site audit.

6.4 FINALIZING THE AUDIT PLAN

The audit plan outlines the scope, objectives, and key criteria for the audit. Once all relevant information has been gathered, the lead auditor will prepare the audit agenda detailing the planned activities and proposes a schedule (Note: the actual time required to complete the audit may vary). The agenda also identifies the locations to be audited (both physical and virtual), facility and subcontractor staff required to participate in the audit and a proposed meetings schedule. A minimum of three full business days will be allocated for on-site portion of the audit.

The lead auditor will identify the appropriate contact person(s) at the audit facility and will ensure the audit team understands and complies with facility entry procedures, including but not limited to site-specific safety requirements and required personal protective equipment (PPE). If possible, a pre-audit visit will also be scheduled, as is it usually helpful for effective planning.

The audit plan will be shared with the audited facility to ensure mutual understanding and agreement. The final draft of the audit plan will be provided 30 days before the on-site audit and will be discussed with the auditee during the pre-auditing meeting. Any agreed-upon changes during the meeting will be reflected in the final audit plan and shared 14 days prior to the start of the on-site audit.

A pre-auditing meeting with the audited facility will take place approximately three weeks before the scheduled start of the on-site audit to discuss audit plan and answer any questions, finalize the logistics of the audit, and clarify the PPE and other health and safety requirements for staff working on the facility, if necessary. This meeting can be in-person or virtual, depending on geographical location of the audit team.

7 ON-SITE AUDIT

7.1 GENERAL

The audit will adhere to the extent possible to the final audit plan to minimize disruption of facility activities and to ensure audit efficiency. During the audit, the audit team will verify whether equipment and procedures are implemented according to approved or partially approved FAMP and QAPP. Additionally, the audit team will assess whether QAPP requirements are being met, that all quality control procedures are properly documented and followed, and that data is reported in real-time. The audit team may also identify and document deficiencies in the operation and maintenance of the fenceline air monitoring system and quality assurance procedures and may discuss potential solutions.

The audit team will approach the audit as an objective evaluation. The audit team will follow this protocol and the audit plan, establish requirements, and communicate any immediate concerns or requests during the course of the audit, to avoid any unresolved issues remaining by the end of the audit.

Communication within the audit team members, and between the audit team and the audited facility are essential. During the on-site audit, the audit team will hold daily briefings to discuss daily activities and goals, and to maintain focus. Briefings will include a review of team member notes, address any emerging issues, and consider additional factors that may impact the audit.

During the performance of the audit, the audit team would ensure that sufficient information is gathered to evaluate whether objectives of the fenceline air monitoring are met. Therefore, the audit team may need to deviate from the audit plan to address non-conformances or other deficiencies that may be discovered during the audit. These deviations from the audit plan will be justified and communicated to the audited facility and South Coast AQMD.

The audit will begin with an opening meeting with key facility personnel and their contractors (if applicable), and end with a closing meeting, described in the subsequent sections 7.2 and 7.5.

7.2 OPENING MEETING

The opening meeting will be led by the lead auditor and will include the audit team, facility key personnel, other relevant facility representatives, and representatives from South Coast AQMD. The audited facility is expected to have facility staff, and/or their contractors, responsible for the implementation of the Rule 1180 fenceline air monitoring available for this opening meeting, in addition to relevant staff who are qualified to carry out validation tests and calibration of the fenceline monitoring instruments.

The opening meeting will outline the audit's scope, assessment criteria and focus on the overall objectives of the audit. The purpose of the opening meeting is to discuss the proposed audit plan, introduce the participants and outline their respective roles, and confirm that planned audit activities can be carried out as intended. Participants will have the opportunity to ask questions. Meeting notes and attendance records will be kept and submitted with the final audit report. Key logistical details, safety measures, and facility emergency and security procedures will also be addressed. At this time, conditions under which the audit may be terminated may also be discussed. The lead auditor will be responsible for explaining how audit discoveries are managed, clarifying what will and will not be done with those discoveries, and ensuring that all discoveries and resulting actions are properly documented.

7.3 ON-SITE AUDIT ACTIVITIES {3}

The onsite audit activities would include:

- Tour of the facility including monitoring equipment locations and surrounding areas ensuring they meet the siting requirements - This will be led by a designated facility representative. All

audit team members are required to use appropriate PPE, either provided by the host facility or brought by the audit team.

- Review of the questionnaire completed by the facility.
- Observe verification tests (see Section 7.4).
- Discussion and observation of concentration retrievals and MDL calculation for open-path multi-pollutant analysers of selected measurements for benzene, sulphur dioxide, total VOCs and ammonia, including, but not limited to data points:
 - below MDL;
 - at levels normally measured at facility fenceline;
 - at or above Rule 1180 notification thresholds.
- Observe routine work activities as an effective way to assess performance, for example retro-reflector alignment checks, calibration of the black carbon analyser.
- Conduct interviews with fenceline team personnel responsible for data management and verification, quality assurance, website data publication, review of data and issuing of quarterly report.
- Discussion of findings from the data spot-checks and statistical analysis.
- Hold daily wrap up meetings at the end of each day to communicate progress updates.

Effective interviews require preparation to ensure that appropriate and targeted questions are asked. Open-ended questions are encouraged, as they prompt more detailed responses. For example, questions such as “Describe how you....?”, “Why do you.....?”, “In what way could you improve the.....?”. Statements should be verified through supporting documentation. Interviews are an important tool for verifying and supplementing discoveries from document reviews and observational assessments. They allow personnel to clarify, elaborate on, or explain observed results and documented processes.

The audit team will take detailed notes, practice active listening and utilize the audit questionnaire and checklist to ensure all relevant questions are answered and fully understand responses, identify potential nonconformances, and gather objective information for the audit report. Observations will be evaluated against the procedures and processes outlined in the facility’s FAMP and QAPP, which served as the basis for the checklists.

The audit team may periodically step back from the auditees for internal discussions, to review collected materials and reach consensus on preliminary discoveries supported by the evidence. Preliminary findings will be discussed and verified with the auditee throughout the audit process. In the case where nonconformances or other data-impacting issues are observed, the audit team would evaluate their significance by asking clarifying questions and may request to review additional relevant records. However, during this process, the audit team will refrain from interfering with operations or suggesting corrective actions.

The audit team will also verify that the facility has an effective air quality notification system in place, as required when fenceline pollutant concentrations exceed thresholds specified in Rule 1180. Auditors will also verify that the facility provides quarterly reports summarizing measurements, data completeness, Specific Cause Analysis (SCA) reports, and adherence to quality assurance practices by reviewing the published reports prior to the site audit.

7.4 VERIFICATION TESTS {3.10, 3.11, 6}

Verification tests at selected fenceline monitoring locations will be carried out using reference gas concentrations, unknown to the auditee, of selected gasses for Open-path UV-DOAS and FTIR multi-pollutant analysers, and H₂S point monitors, using verification equipment normally employed by the facility. During these tests, the facility would process the data as “routine” ambient measurements (i.e. full process from taking a measurement through to the recording in the data management system, and not a ‘bump test mode’). The only deviation from standard procedure would be that the results would

not be reported on the real-time public website as ambient data. During the verification tests, a notice would be posted on the facility fence line data website indicating that an audit test is in progress.

Fence line monitoring locations for the verification tests will be selected by the audit team with input from the facility staff. The following factors will be taken into consideration:

- Site access.
- Manual handling limitations.
- Downwind of potential interfering emission sources from the facility.
- Downwind of potential interfering sources from neighbouring facilities.

In some cases, this may involve selecting locations that are upwind of the facility to capture background analyte levels not influenced by facility operations.

Verification tests will be performed by the facility staff under normal monitoring conditions for an analyser response check (also known as a “bump test”), following the approved facility SOP for each instrument. The main difference will be that the test gas would be supplied by the auditors. The test gas mixture for the open-path instruments will include at least two species required to be reported under Rule 1180. Gas concentrations will be varied to include levels that are:

- Close to the instrument’s most recently reported MDL.
- Close to typical levels measured in the Los Angeles Air Basin (e.g. MATES V).
- Near or below the notification threshold for given pollutants.
- Other concentration levels that audit team may find appropriate during the audit.

The method for introducing the test gas with each instrument will be agreed in advanced by both the audit team and facility staff. This will ensure compatibility of connectors, appropriate pressures and flow rates, and clarity on the number of tests to be conducted.

The facility is expected to inform the audit team if there are any specific health and safety requirements specific to these tests and if there needs to be any changes to the SOP required to accommodate the audit test. The required permissions for bringing equipment and gases on the facility premises will be obtained before the audit.

The audit team will also observe the data collection and method used to calculate the minimum detection limit (MDL) for each instrument used for the verification tests.

At least one of the verification tests concentration levels will be carried out for a minimum of 1 hour, in order to validate the 1 hour averaging calculations. The minimum data quality acceptance criteria for the verification test are shown in Table 7-1.

Table 7-1. Data quality acceptance criteria

Instrument	Acceptance Criteria		
	Accuracy	Precision	Zero
UV-DOAS	<25%	±25%	
FTIR	<25%	±25%	
H ₂ S point monitor	<15%	±15%	±1 ppb

The audit team will assess how the open-path FTIR and UV-DOAS spectral analysis is carried out and how the following aspects are addressed, see the audit checklist and questionnaire {6} for specific questions.

- Signal Strength (MDL adjustment?).
- Thermal background.
- Background (I₀).

- Wavenumber axis offset.
- Non-linearity.
- Spectra cross-interference.

If necessary, the audit team will also review spectral analysis results of other gasses included in spectral fitting, for example ozone for open-path UV-DOAS, and N₂O, H₂O for open-path FTIR.

The audit team will also observe the verification/calibration/testing procedures for the black carbon monitor, meteorological and visibility sensors performed by the qualified facility representative according to the established SOPs.

7.5 CLOSING MEETING

The closing meeting will be led by the lead auditor, and will include the entire audit team, facility management, key facility personnel, relevant facility representatives, and representatives of South Coast AQMD. Meeting notes and attendance logs will be recorded and submitted to South Coast AQMD and the facility with the final audit report.

The lead auditor will present the preliminary audit findings, concerns, and observations, and will discuss the objective evidence gathered during the audit. It is important that the audit team indicates that any findings, concerns, and observations are preliminary and that the final conclusions could be subject to change once all evidence is considered. The audit team will also use this meeting to request any additional information, corrections, or clarification needed to finalise audit discoveries:

- If there is relevant objective evidence that have not yet been reviewed but should be considered, this is the appropriate time for it to be presented.
- Similarly, if there are any misunderstandings or inaccuracies in the auditors' discoveries, this meeting provides an opportunity for the audited facility to offer corrections or clarifying information.

Clear communication at this stage is crucial to ensure the audit report accurately reflects the conditions at the facility during the time of the audit. If auditors requested information during the audit that was not immediately available, the facility personnel will also be reminded of any outstanding data/information requests, if applicable, and will be given a final opportunity to present this information. If additional time is needed, a realistic timetable for providing the requested information will also be discussed and agreed upon at this time.

8 POST AUDIT ACTIVITIES

8.1 DRAFT DISCOVERIES REPORT REVIEW

The initial draft discoveries report will be submitted to the auditee for fact discovery review six weeks after the completion of on-site audit. This submission will provide the auditee with a final opportunity to identify and correct any erroneous information or omissions that may be present in the draft report.

A thorough and timely review of the draft report is essential to assist the auditors in finalizing the report. The auditee will be required to provide a written response to the draft report, confirming discoveries and addressing any inaccuracies or issues identified within 30 days of receipt of the draft report.

8.2 FINAL REPORT

The final audit report will be sent to the auditee and South Coast AQMD and it will comprehensively document all discoveries from the audit, including findings, concerns, observations, audit conclusions and suggested areas of improvement.

The final audit report integrates feedback received during the draft report review, and provides clear recommendations based on the objective evidence gathered. The final audit report, at a minimum, will include:

- A list of auditors, their title/function, and their affiliation.
- A list of key facility staff participating in the audit, their title, and their responsibilities.
- The date(s) over which the facility audit occurred.
- A brief discussion on the facility audited, including air monitoring, additional instrumentation, and other components of the fence line monitoring system established to meet Rule 1180 requirements.
- A detailed assessment of how well the fence line monitoring systems meet the real-time monitoring and data interpretation requirements of Rule 1180 and associated guidelines.
- A summary of how the QAPP, FAMP and SOPs procedures and processes were assessed and any discrepancies found.
- A detailed description and recommendations of the corrective actions agreed upon during the closing meeting, along with the timeline for their implementation.
- Inclusion of supporting documents including meeting checklists, questionnaires, and other documents.
- Audit team may also suggest possible improvements in operation of air monitoring equipment or data processing, if applicable.

8.3 CORRECTIVE ACTION PLAN {2.4}

If applicable, the facility will prepare a corrective action plan (CAP) within 30 days of receipt of the final Audit Report and submit CAPs to audit team and South Coast AQMD. See also Section 9.10. This CAP will describe how the findings, concerns and observations were or will be addressed, including a completion timeline. Included in the CAP must be a plan to minimize reoccurrence of any of the findings, concerns and observations and, if required, details of any changes to be implemented in the QAPP or SOPs. A suggested template for the CAP is provided in Attachment 1.

8.4 CONCLUSION

The audit process concludes with the conclusion phase, where the auditee must have addressed all findings, concerns and observations reported in the final report or given reasons why any outstanding actions have not been completed or have been delayed. This phase involves:

Verification: The audit team confirms that all corrective action and reoccurrence minimization processes were implemented according to the CAP and that any previously identified finding or concern were resolved satisfactorily. If any actions are unable to be completed before the audit closure an extension may be given with the approval of South Coast AQMD.

Documentation: All corrective actions, along with evidence of their completion and reoccurrence minimization, are documented and submitted to the audit team for review.

Final Review: A final review meeting is held to discuss the implementation of corrective actions and reoccurrence minimization activities to ensure that all issues have been addressed or are on their way to final resolution.

The audit team issues a closure report once all actions are verified, or the facility has formally committed to completing the actions within a stipulated time frame.

DRAFT

9 QUALITY SYSTEM REQUIREMENTS {2.1}

This section provides a summary of the Quality System requirements to be reviewed during facility audits. Specifically, the audit assesses compliance with requirements of South Coast AQMD Fenceline Air Monitoring Program (Rule 1180).

9.1 FENCELINE AIR MONITORING PLAN (FAMP)

The FAMP outlines the procedures and requirements for monitoring air quality along the facility fenceline. It is designed to assess emissions and air quality impacts at the facility boundary and to provide data that reflects facility's impact on surrounding communities.

Auditors verify that the FAMP clearly defines the purpose of fenceline monitoring, specifies the pollutants to be measured, the geographic area to be monitored, the objectives of the monitoring (e.g., regulatory compliance, public health assessment), and the data quality objectives.

The implementation of the FAMP is assessed to ensure all specified equipment is correctly installed, operational, and capable of accurate data collection meeting the data quality criteria stated in the plan.

9.2 QUALITY ASSURANCE PROJECT PLAN (QAPP) {2.3}

A quality system serves as a framework by which an organization implements effective quality control (QC) and quality assurance (QA) practices to ensure that the outcomes of its environmental programs meet expectations.

The QAPP is a detailed document that outlines the specific QA/QC and technical activities necessary to ensure that a particular monitoring project meets its performance criteria (DQOs).

Under Rule 1180, a facility QAPP must be South Coast AQMD approved, with any changes made to it also approved by South Coast AQMD. This document should be reviewed at least annually by the facility. The QAPP must include the following details: date of original approval, date of last revision, revision number, date of latest approval, and a list of approvals/signatories to the document.

The facility must explain how the QAPP updates are distributed and specify which personnel receive these updates.

After the QAPP is written and approved, it must be implemented. This is a key activity within the quality system and serves as a reference during audits. Auditors must confirm that the data management procedures specified in the QAPP are consistently followed and ensure data integrity and consistency meet South Coast AQMD Rule 1180 requirements.

9.3 DATA REPORTING {4.5}

Auditors verify that the data reporting and public communication plan, described in the FAMP or QAPP, includes provisions for real-time availability of monitoring data online and that the data is accessible and comprehensible to the public. The plan must detail the use of interactive tools such as dynamic graphs and maps to facilitate easy public access to real-time data.

Auditors also verify this plan includes a comprehensive strategy for both routine and emergency communications, using multiple platforms. These must include timely updates via official websites, SMS, emails, and, possibly, mobile app notifications, to ensure broad public awareness of air quality conditions.

Auditors assess whether this plan clearly defines methods for notifying the public about air quality concerns or incidents. This includes specifying the communication channels used (e.g., website, press

releases, and email or text messages) as well as mechanisms for ongoing community engagement and addressing public concerns.

Auditors also access the facility's web portal to confirm that air monitoring data is displayed in accordance with approved procedures outlined in the FAMP and the QAPP. Auditors will register for web portal notifications to verify that exceedance alerts are issued correctly and reflected in the historical data displays. Auditors will check that the required information is given in the exceedance notifications, that they are sent out within 15 minutes of the exceedance and that follow-up notifications are also sent out within 15 minutes of the concentration falling below the threshold. Auditors will check that an SCA is carried out and published when an exceedance occurs.

Auditors will request unprocessed pre-averaging, 5 minute and 1 hour averaged data without automated QA/QC flags from periods prior to the audit to compare with data published on the web portal and verify that QA/QC flags have been assigned according to the rules in the QAPP. This data must be requested in time to allow the facility to provide it at least two months in advance of the audit.

A statistical analysis is carried out on selected data to determine the percentages of valid data, valid data above the MDL, valid data above REL and data flagged as a poor spectral match. Spot checks will be performed on the historical data to confirm the correct assignment of QA flags and that any manual data changes are properly logged.

9.4 SOP {2.3, 3}

Auditors must confirm that the facility's SOPs are up-to-date, accessible to all relevant personnel, and accurately reflect the procedures outlined in the QAPP. SOPs must include version control and a revision history to ensure that any changes are clearly documented and traceable and a list of approvals and signatories.

The audit includes verification that SOPs are consistently followed in day-to-day operations and that any deviations are properly documented and addressed. Auditors will also verify that all relevant personnel are adequately trained on applicable SOPs and that a system is in place to track and verify training records {1.2}.

There are some important points that need to be checked during the review of the documents. At a minimum, SOPs must be reviewed annually. Auditors will ensure that this review process is documented, and any updates to the SOPs are communicated to all relevant personnel in a timely manner. Additionally, auditors will check that the SOPs include clear procedures for emergency situations, equipment maintenance, and quality control, which are critical for maintaining operational standards.

9.5 QUARTERLY REPORTS, PERIODIC REVIEW AND UPDATES

Auditors will verify that quarterly reports comprehensively summarize air monitoring results, including any exceedances of either or both air quality and Rule 1180 thresholds.

It is important to ensure that the reports document all equipment maintenance activities and address any issues encountered during the reporting period. The reports must also detail any improvements made to the monitoring system, along with explanations for these changes.

Specific Cause Analysis reports published since the last audit will be reviewed and verify that required remedial action has been carried out as stated.

Auditors will verify that the facility has established procedures for the periodic review and update of the QAPP and SOPs, ensuring they remain current with operational changes, technology advancements, or regulatory updates.

Auditors will verify that revisions of these documents are submitted to South Coast AQMD for approval in a timely manner.

Additionally, auditors will verify that the most current versions of QAPP and SOPs are maintained, and that outdated versions are promptly removed from circulation and archived.

9.6 DATA MANAGEMENT AND REPORTING {5}

Auditors will verify that the facility has an effective data management system that adheres to the data transfer, storage, backup processes and reporting protocols outlined in the QAPP.

Auditors will assess whether data anomalies, such as exceedances of reference exposure limits, are properly flagged and investigated according to the criteria set forth in the FAMP and QAPP. This includes a review of the methods used for flagging these anomalies and the procedures for communicating them to relevant stakeholders.

9.7 ROLES AND RESPONSIBILITIES

A facility must allocate sufficient personnel and funding to effectively plan, implement, assess, and report on the requirements set forth in Rule 1180, its associated guidelines, and the approved implementation plan outlined in the QAPP. This includes ensuring that qualified technical staff, designated quality assurance staff, and adequate resources are in place to maintain a robust fence line air monitoring system.

During the audit, the audit team will verify that the facility has clearly defined key roles and designated backups for critical functions such as network design, QA/QC activities, data management, equipment repair and maintenance, QAPP implementation, and oversight. Auditors will review supporting documentation to confirm that an adequate number of qualified personnel are assigned to these essential roles.

To ensure objectivity and avoid conflict of interest, the QA group must operate independently from routine operations, including QC functions. This independence must be explicitly defined in the QAPP. This structural requirement reinforces the importance of maintaining clear organizational boundaries between the QA and QC responsibilities. The facility will be expected to provide a detailed description of how this independence is implemented. This typically includes organizational charts, reporting structures, and descriptions of roles and responsibilities that demonstrate compliance with the required independence of the QA function.

Responsibilities of facility personnel in the monitoring program are summarized below:

- Develop and implement the QAPP ensuring it meets the requirements and data quality objectives of Rule 1180 and its Guidelines, and consistent with accepted practices used by other U.S. EPA, State, South Coast AQMD air monitoring programs.
- Ensure quality assurance in all phases of the data collection process, including planning, implementation, and reporting, with adherence to both the QAPP and SOPs.
- Conduct regular internal audits to verify compliance with QA/QC standards and take corrective actions and recurrence minimization activities as necessary, including audits of QAPP related activities.
- Provide ongoing training for all relevant personnel on regulatory requirements, QA/QC procedures and specific QAPP and SOPs protocols.
- Regularly review and update, QAPPs, and SOPs to reflect changes in regulatory requirements or operational practices.

9.8 PERSONNEL TRAINING AND QUALIFICATIONS {1.2}

Training is an essential component of any air monitoring program. Both facility staff and contractors are expected to meet personnel qualifications requirements, defined as a combination of relevant education and experience.

Auditors will verify that all personnel involved in the air monitoring program, including contracted staff, have received appropriate training and possess the qualifications to fulfil their responsibilities as outlined in the SOPs and QAPP. This includes training in the operation, maintenance, and troubleshooting of fence-line monitoring equipment, as well as data analysis and interpretation in the context of Rule 1180 data quality requirements.

The facility must develop a documented procedure for staff training, supported by a comprehensive written training plan. The plan should clearly define training requirements across several categories: general, core, role-specific, cross-training, and refresher-training. During the audit, facility's training program is reviewed to ensure it adequately covers all necessary topics, including regulatory requirements, QA/QC procedures, equipment operation, and protocols specific to the QAPP and SOPs.

Training frequency should be appropriate to the roles and responsibilities of each staff member. These intervals must be documented within the training plan or procedures. In addition, the facilities and its contractors must also ensure that updates to Rule 1180 or guidelines are promptly integrated into the QAPP/SOPs and reflected in the training content.

Training methods may include classroom instruction, workshops, online courses, and hands-on practice. Personnel should also be familiar with key reference materials, including the QAPPs, SOPs and related procedural documents.

9.9 RECORDS

The following checks are designed to ensure that recordkeeping is aligned with the requirements of Rule 1180 and its associated guidelines:

- The facility must maintain a list of official records, specify their media type and must have a formal records management plan, including a schedule for the retention and disposition of records, and backup of electronic files. Records must be retained for a minimum of five years.
- Field and laboratory data (if applicable) must be recorded in a standardized format that clearly identifies parameters, date, time, location, personnel involved, and QC flags. Thorough documentation from data collection to data reporting and use; including conversations with QA/QC personnel and South Coast AQMD staff (if applicable) is crucial for ensuring data credibility.
- When using handwritten records, errors should be corrected by crossing them out with a single line, writing the correct value above, and initialling and dating the correction. Indelible black or blue ink must be used, and all forms must be signed and dated legibly. Auditors verify that any handwritten records are maintained with proper corrections and documentation practices.
- The designated data storage and records retrieval staff must be identified and the security measures implemented to protect data integrity and records.

9.10 CORRECTIVE ACTIONS

During the audit, auditors will verify that the facility has implemented a comprehensive corrective action program. This includes documented procedures that address any issues or discrepancies identified during monitoring or data review. Auditors will verify that the program includes detailed corrective action plans and defined steps to prevent recurrence. The program must demonstrate alignment with the requirements of Rule 1180, relevant guidelines and procedures documented in the QAPP and SOPs.

Auditors will also confirm that the facility has clearly established and documented acceptance criteria for all QA and QC activities. These criteria must be consistent with Rule 1180, its associated guidelines, and the approved implementation plan described in the QAPP and SOPs.

Where results fall outside established acceptance criteria, whether related to performance evaluations, audits, precision and bias goals, or system checks; auditors will confirm that procedures are in place for initiating corrective actions and minimizing reoccurrence. This includes a documented process for evaluating the effectiveness of corrective actions, along with a timeline for implementation and verification, in line with regulatory expectations.

Finally, auditors will ensure that responsibilities for implementing corrective actions are clearly defined and documented within the CAP. This ensures accountability and supports the timely and effective resolution of identified issues.

9.11 CONTRACTORS AND SUPPLIERS {1.3}

The audit will confirm that oversight responsibilities for contract personnel are clearly assigned and that measures are in place to ensure all contract personnel meet the required training and experience criteria. Auditors will assess the frequency of contract reviews and/or renewals to verify ongoing compliance. It is essential that contract personnel receive training specific to the QAPP and SOPs, and that their performance is regularly evaluated for alignment with Rule 1180 requirements.

The audit will also verify that criteria and specifications for consumable supplies and equipment have been clearly defined, documented, and consistently applied. This includes quality control measures and acceptance criteria for all equipment and supplies critical to the fence line monitoring system. These controls ensure that equipment and supplies meet or exceed the standards required under Rule 1180 and its associated guidelines.

Finally, audit team will verify that subcontractors have delivered the specified equipment, and that all required systems are installed, operational and implemented in accordance with the approved or partially approved CAMP and QAPP.

ATTACHMENT 1: CAP TEMPLATE

Section 1. *To be completed by the facility audited.*

This plan should be sent to the Approving Party for approval after completion of Section 1.

Name of Facility:

Location:

Audit Date:

Finding number:

Instrument and serial number (if relevant):

Summary of Finding: *Summary of finding from audit report.*

Recommendations by auditors: *Any recommendations from the audit report.*

Corrective action plan to address finding: *This should include actions to address and correct the findings including timescales, and measures to prevent reoccurrence and minimize of any impact. A date for the completion of this plan should be stipulated.*

Plan submitted by: *Facility representative.* Position:

Date:

Date:

Section 2. *To be completed by the Approving Party*

Reviewer Comments: *Any comments, additional information required or recommended changes to plan that should be made before approval.*

Reviewer:

Position:

Date:

Approver Comments: *Any comments or recommendations.*

Approver:

Position:

Date:

After plan has been reviewed and approved the completed form should be signed and returned to the facility or returned for further amendments.