Quality Assurance Project Plan for the Martinez Refining Company Fence-Line Monitoring Program

Revision 5.6
FLM-QLT-QAPP-001

Martinez Refining Company

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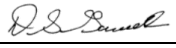
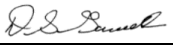
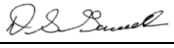
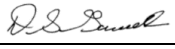
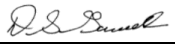
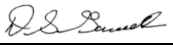
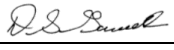
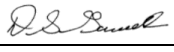
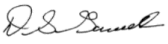
3	12/7/2018	Updated Draft	Don Gamiles	
4	08/16/2019	Updated Draft	Don Gamiles	
5	08/22/2019	Updated Draft	Don Gamiles	
5.1	03/06/2020	Updated Requirements	Don Gamiles	
5.2	03/11/2020	Change in Ownership	Don Gamiles	
5.3	05/09/2022	Incorporated TDL	Don Gamiles	
5.4	05/27/2022	Addressed Comments	Don Gamiles	
5.5	08/27/2022	Addressed BAAQMD Comments	Don Gamiles	
5.6	01/31/2023	Addressed BAAQMD change in TDL requirements	Don Gamiles	

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List of Acronyms

APCO – Air Pollution Control Officer for the BAAQMD.

BAAQMD – Bay Area Air Quality Management District

BTEX – Benzene, Toluene, Ethylbenzene, Xylenes

DQO – Data Quality Objectives

EPA – Environmental Protection Agency

FTIR – Fourier Transform Infrared Spectrometer

H_2S – Hydrogen Sulfide

LDL – Lower Detection Limit

MBC – Martinez Business Center

MET – Meteorological Station.

MRC – Martinez Refining Company

MQO – Measurement Quality Objectives

OEHHA – Office of Environmental Health Hazard Assessment

PPB – Parts Per Billion

QA/QC – Quality Assurance / Quality Control

QAPP – Quality Assurance Project Plan

SO_2 – Sulfur Dioxide

TDL – Tunable Diode Laser

TRI – Toxic Release Inventory

UV-DOAS – Ultraviolet Differential Optical Absorption Spectroscopy

UDL – Upper Detection Limit

Section 1 – Fence-Line Monitoring Overview

On April 20, 2016, the Bay Area Air Quality Management District (BAAQMD) adopted Regulation 12 Rule 15 which requires Bay Area refineries to develop and submit an Air Monitoring Plan for APCO approval to establish and operate a fence-line monitoring system. The BAAQMD also published guidelines for refineries to meet the fence-line monitoring requirements. Martinez Refining Company's policy is to comply with all local and federal environmental regulations including the fence-line monitoring provisions of BAAQMD Rule 12-15. This includes meeting all downwind fence-line siting requirements, uptime requirements, and reportable quantifiable detection levels. Siting included the evaluation of five years of meteorological data as well as seasonal and recurring short-term meteorological events (such as quarterly wind roses) in assessing siting positions per the BAAQMD guidance document. Site locations for the fence-line equipment were selected to strategically position the fence-line monitors using the predominant and variable meteorological conditions and topographical terrain features within the refinery.

Description of the Fence-Line Monitoring Program

A complete description of the Fence-Line Monitoring program is included in the MRC Air Monitoring Plan. The program is comprised of open-path air monitoring systems for the detection and quantification of benzene, ethylbenzene, sulfur dioxide, toluene, and xylene. Total Alkanes are measured using extractive FTIR air monitoring systems. Total Organics are measured with Organic Gas Detectors. Meteorological conditions are measured using EPA compliant MET equipment. Figure 1.1 presents a map of the refinery showing the locations of the air monitoring equipment. Table 1.1 presents the site location for each piece of equipment.

Figure 1.1 - Map of Fence-line Monitoring Program

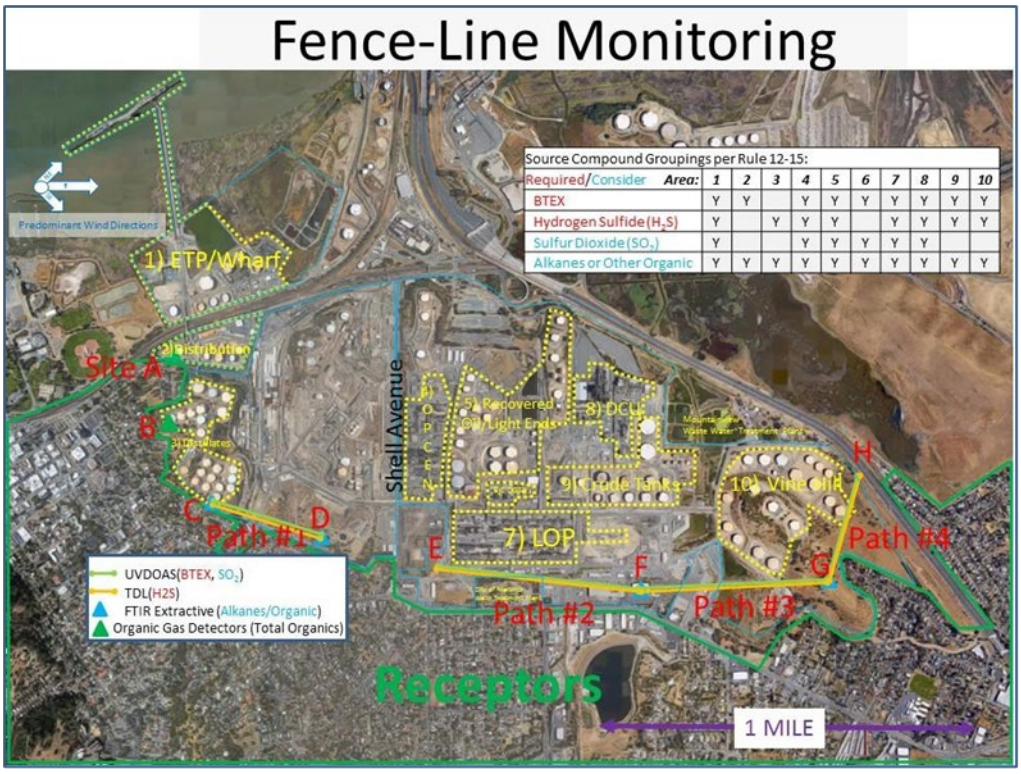


Table 1.1 - Monitoring Site Locations

Site # Name	GPS (North)	GPS (West)	Elevation (Feet)	Instrument
Site A	38°01'19.21"N	122°07'41.98"W	35	Organic Gas Detector
Site B	8°01'11.17"N	122°07'46.16"W	169	Organic Gas Detector
Site C S Distillates	38°00'59.26"N	122°07'35.22"W	164	TDL Source and UV DOAS Source FTIR Extractive
Site D Firewater Tanks	38°00'54.02"N	122°07'17.13"W	207	UV DOAS Receiver and TLD Reflector FTIR Extractive
Site E SW LOP	38°00'51.08"N	122°06'56.10"W	91	TDL and UV DOAS Source
Site F MBC	38°00'47.40"N	122°06'23.04"W	55	TDL and UV DOAS Source UV DOAS Receiver and TDL Reflector FTIR Extractive
Site G Vine Hill	38°00'48.69"N	122°05'49.60"W	211	2 UV DOAS Receiver and 2 TDL Reflector FTIR Extractive
Site H I-680	38°01'01.66"N	122°05'44.38"W	102	TDL and UV DOAS Source

All air monitoring equipment specified for the MRC refinery fence-line system are specified to collect data on five-minute averages. All air monitoring equipment specified for the MRC refinery will meet a minimum of 75% completeness on an hourly basis 90% of the time based on annual quarters. Atmospheric conditions beyond the control of the refinery that affect accurate measurements, such as dense fog, shall not be counted against data completeness requirements if appropriate meteorological measurements document time periods when these conditions exist (Refer to Operations Guidance Document "FLM-QLT-GUI-001 Operations Guidance Document" for how completeness is determined and how appropriate flags/documents are used to address valid/invalid/under review data). The specific criteria for validation of data that includes screening for weather-related events or other issues associated with data quality is included in Section 4 – Quality Management System. Data from the monitoring stations will be transmitted to an Internet website where the real-time results can be viewed by the public. The real-time website page will be incorporated into a larger website that will present additional resources to assist in the interpretation of the data. The addition of open-path H_2S systems will completed and operational prior to January 1, 2023. MRC will notify the Air District within seven days after the system is operational and data in compliance with the QAPP is available on the website.

Tables 1.2 and 1.3 summarize the gases included in the fence-line program and the technology used to detect them, along with the lower and upper detection limits (LDL and UDL). LDLs for the data generated by the equipment are normally set to be at least two times the manufacturer's claimed detection limit. This is done to minimize the occurrence of false detections being reported to the real-time public website, as these lower limits are often generated under ideal conditions. For the TDL air monitoring system, ideal conditions include clear air, non-condensing atmosphere, relative humidity less than 95%, and stable optical alignment.

Table 1.2 – Detection Limits for Gases Monitored by Open-Path Systems

	Path 1		Path 2		Path 3		Path 4	
Distance (m)	**445**		**810**		**825**		**435**	
Gas	**LDL** (ppb)	**UDL** (ppb)	**LDL** (ppb)	**UDL** (ppb)	**LDL** (ppb)	**UDL** (ppb)	**LDL** (ppb)	**UDL** (ppb)
Benzene	0.8	5,483	0.5	3,012	0.4	2,958	0.9	5,609
Ethyl Benzene	4.5	5,483	2.5	3,012	2.4	2,958	4.6	5,609
Hydrogen Sulfide	3.0	5,000	3.0	5,000	3.0	5,000	3.0	5,000
Sulfur Dioxide	4.0	2,202	2.2	1,210	2.2	1,188	4.1	2,253
Toluene	1.8	2,742	1.0	1,506	1.0	1,479	1.8	2,805
Xylene	1.0	2,742	0.5	1,506	0.5	1,479	1.0	2,805

Table 1.3 – Detection Limits for Gases Monitored by Point Source Samplers

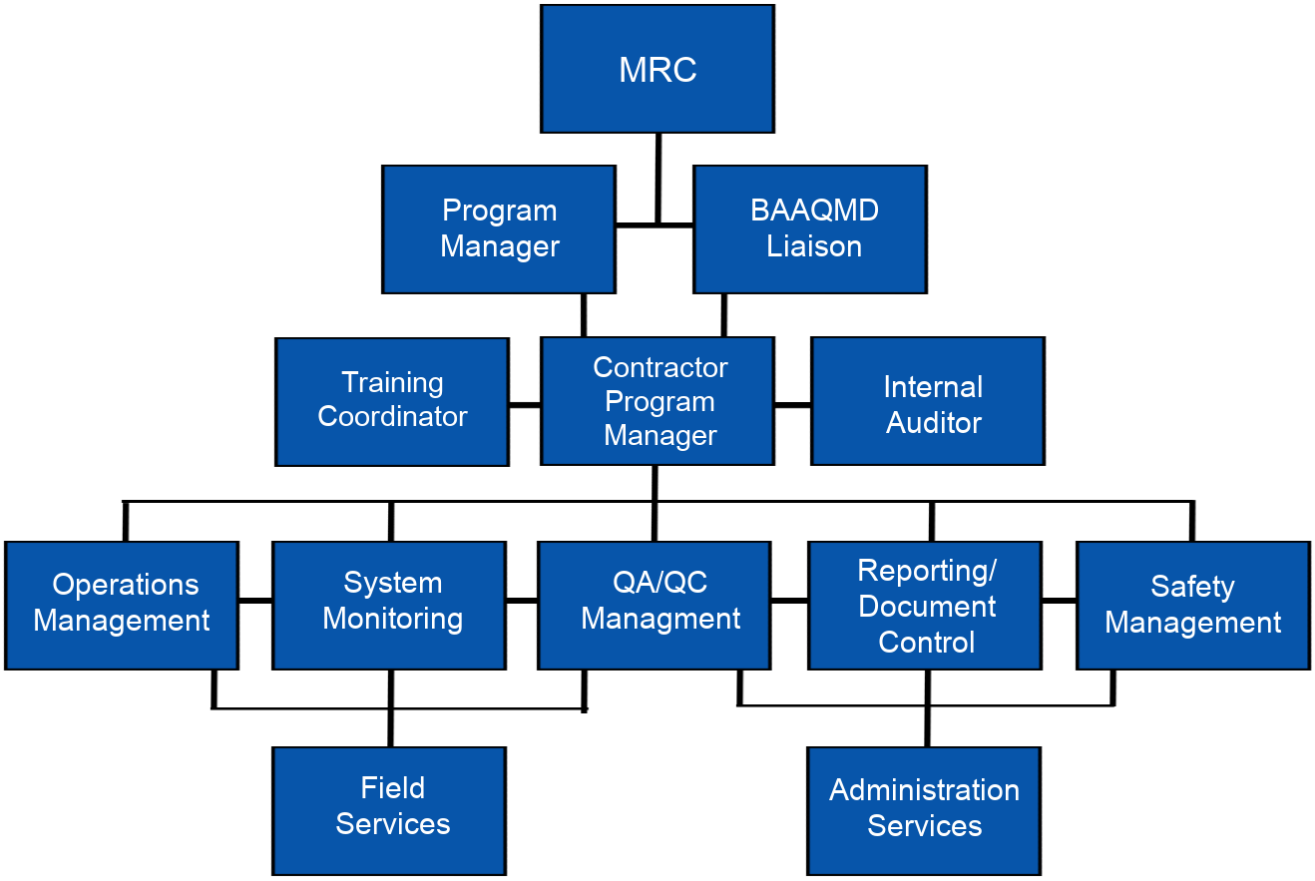
Point Source Monitor	Detection Limits	
	LDL (ppb)	**UDL** (ppb)
Total Alkanes	75	4,200
Total Organics	10	100,000

Section 2 – Project Management

Fence-Line Monitoring Task Organization

The program is organized between MRC and the contractor tasked with operating and maintaining the systems. Figure 2.1 shows the organizational structure for the MRC Monitoring Program. Table 2.1 lists the names, roles and responsibilities of the key refinery, air district, and contractor personnel involved with the MRC fence-line program.

Figure 2.1 – MRC Fence-line Air Monitoring Program Organization Chart



Organization	Roles	Responsibilities
Bay Area Air Quality Management District	BAAQMD Liaison, Rule 1215	Review the QAPP and make sure regulations are met for Rule 1215
Martinez Refining Company	Rule 1215 Liaison	Review/approve and submit reports to BAAQMD
Martinez Refining Company	Rule 1215 Program Manager	Overall system operation and maintenance. Contract management and procurement
Argos Scientific, Inc.	Contractor Program Manager	Primary interface between MRC and Argos / Overall Program Management
Argos Scientific, Inc.	Senior Manager Monitoring	Ensure data and notifications meet requirements of the QAPP
Argos Scientific, Inc.	Senior Operations Manager	Ensure system operations meet the requirements of the QAPP
Argos Scientific, Inc.	Senior Quality Assurance Manager/Data Processing Manager	Ensures QA/QC meets requirements of the QAPP
Argos Scientific, Inc.	Senior Manager Reporting/ Document Control	Ensure contractor reporting requirements of the QAPP are met. Ensure that documents associated with the QAPP are controlled.
Argos Scientific, Inc.	Lead Internal Auditor	Independently ensures monitoring program follows the QAPP
Argos Scientific, Inc.	Safety Officer	Ensure contractor safety per the contract with MRC
Argos Scientific, Inc.	FTIR/OGD Technical Expert	Ensures technology is operated in compliance with the QAPP

Organization	Roles	Responsibilities
Argos Scientific, Inc.	UV Technical Expert	Ensures technology is operated in compliance with the QAPP
Argos Scientific, Inc.	TDL Technical Expert	Ensures technology is operated in compliance with the QAPP
Argos Scientific, Inc.	Field Technician	Execute routine and non-routine site work according to the QAPP
Contractor	Field Technician	Execute routine and non-routine site work according to the QAPP
Argos Scientific, Inc.	Training Coordinator	Ensures all staff have appropriate training per the QAPP
Argos Scientific, Inc.	Senior Manager Administrative Support	Manages administration tasks, including assisting other departments

Contractor Personnel Qualification and Training

Management and the operators of the monitoring equipment shall be trained in their area of focus, including but not limited to data management, QA/QC, the operation, maintenance, and operation verification of the equipment, as well as have resources to troubleshoot any technical issues. As necessary, all personnel will undergo annual specific refresher training in their areas of focus. Training for equipment operators will be provided by the technical experts who have undergone vendor specific training for each analyzer. The Training Coordinator will document and verify staff have successfully completed the training. The following are the basic skills of each of the personnel:

Contractor Program Manager - Primary interface between MRC and Argos / Overall Program Management

Responsibilities

- Ensures compliance with contract and QAPP
- Contract review with client
- Ensures continuous improvement within quality system
- Advocates to client on any improvements that require additional budget
- Manages overall program

Senior Manager Monitoring - Ensure data and notifications meet requirements of the QAPP

Responsibilities

- Data processing and daily validation and compilation of resultant reports
- Daily, monthly and calibration data, including data preparation for reports
- Follow guidelines from the reporting department to ensure reports are completed in a prompt manner and within quality guidelines
- Verify gas detections for approval by the Program Manager
- Manages notification system for equipment operation

Operations Manager - Ensure system operations meet the requirements of the QAPP

Responsibilities

- Work with system manager and field services to maintain a schedule of site work for the technical teams
- Maintain a workflow system to manage the progress and completion of projects in a systematic and transparent manner
- Keep management team updated with any changes in schedules
- Ensure that sufficient stock of the consumables required for the work is available
- Ensure the quality of all reports
- Act as a Technical Signatory and sign reports

Senior Quality Assurance Manager/Data Processing Manager - Ensures QA/QC meets requirements of the QAPP

Responsibilities

- Oversee the quality process
- Update quality system documentation
- Manage the corrective action process
- Analyses data to facilitate continuous improvement

Senior Manager Reporting and Document Control – Ensure contractor reporting requirements of the QAPP are met. Ensure that documents associated with the QAPP are controlled.

Responsibilities

- Work with internal auditing to standardize the reporting process while working to improve it
- Manage and review routine reports and filings
- Review, store, distribute, and track company documents.
- Ensure coordination with change order originators and approvers
- Issue controlled document numbers
- Archive records
- Distribute controlled files to MRC as required in the QAPP
- Records management of paper files
- Ensure adherence to deadlines

Lead Internal Auditor – Independently ensures monitoring program complies with the QAPP

Responsibilities

- Coordinates and executes internal audits
- Ensures continuous improvement of the quality system
- If needed, arranges and coordinates for 3rd party audits
- Coordinates annual management review of QAPP

Safety Officer – Safety Officers are responsible for planning, implementing, and overseeing company's employee safety at work. Their main duty is to ensure that the company complies and adheres to client Health and Safety guidelines.

Responsibilities

- Plan and implement health and safety policies and programs
- Advise and lead employees on various safety-related topics
- Review existing policies and procedures and make changes as necessary
- Adhere to all the rules and regulations
- Conduct risk assessment
- Enforce preventative measures
- Check if all the employees are acting in adherence with rules and regulations
- Prepare reports on accidents and violations and determine causes

Field Technicians - Execute routine and non-routine site work according to the QAPP

Responsibilities

- Perform routine maintenance and quality checks as required, and record data and events in accordance with these tasks
- Perform routine site visits to perform QA/QC or maintenance
- Perform minor onsite repairs
- Inform superiors when consumable purchases and instrument maintenance are required
- Monitor alarms and work with the Operations Manager to troubleshoot and resolve them in a timely manner
- Align open path systems
- Assist the operations manager with instrument commissioning and any other duties that are required

Technical Expert – Evaluates methods, QA/QC, preventative maintenance and calibration of instruments and equipment at regular intervals and makes changes to the QAPP as necessary; coordinates proper installation and qualification of new instruments; engages in troubleshooting and repair of equipment including requalification.

Responsibilities

- Troubleshoots and repairs instruments, including coordination of vendor calls, with proper documentation and follow-through to return instrument to active service with proper re-qualification.
- Assists in writing and developing standard operating procedures (SOPs) associated with instrumentation and equipment. Revises SOPs as necessary and directed.
- Assist in training technical staff in instrument operations, SOPs, and proper documentation associated with instruments and equipment.
- Coordinates qualification of instrument operator personnel and supports individual training needs.
- Evaluates any instrument-specific method changes.

Training Coordinator – Ensures all staff have appropriate training per the QAPP

Responsibilities

- Identify training needs
- Based on research, plan and implement training programs that will prepare employees for the next step of their career paths
- Recruit trainers
- Make training schedules
- Build quarterly and annual training program
- Oversee employee attendance and performance
- Track employee success and progress
- Manage the production of program marketing material in collaboration with marketing team
- Communicate all the training programs on a timely basis

Senior Manager Administrative Support – Manages administration tasks, including assisting other departments

Responsibilities

- Responsible for inventory management
- Oversee logistics records
- Reporting assistance
- Refinery training coordination with Safety Officer

Section 3 – Description of Hardware and Technology

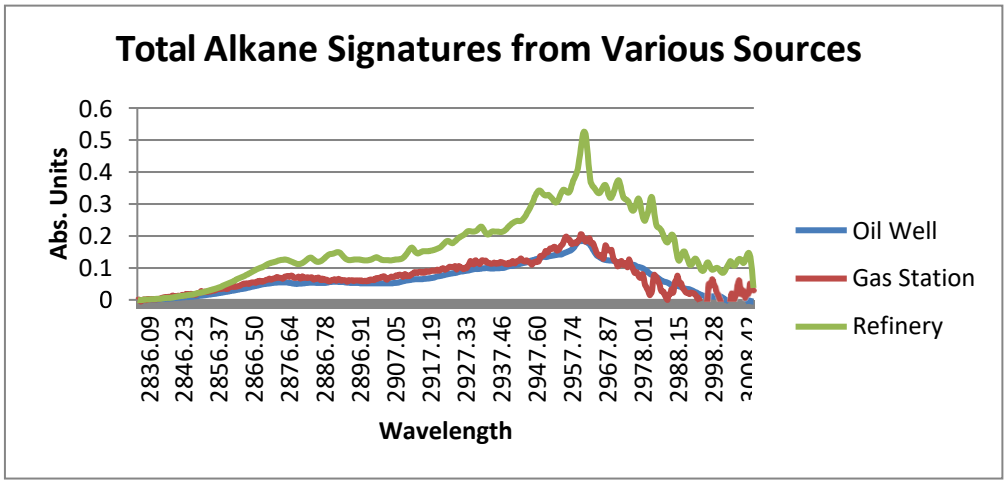
Sample Analysis

Samples will be collected using UV DOAS air monitors for the measurement of Benzene, Ethylbenzene, Sulfur Dioxide, Toluene, and Xylene. Extractive FTIRs will be used for the measurement of total alkanes. Organic Gas Detectors will be used for total organics. Each analyzer has a vendor specific method for collecting and quantifying data. A description of each specific analytic method is listed below:

Extractive FTIR

The FTIR air-monitoring system is a point sample air monitor that can be used for fence-line monitoring applications. The unit has the capability to detect total non-methane hydrocarbons on a real-time basis while minimizing the impact of gases that interfere with alkane measurement such as water vapor and methane gas. The analytical method employed by the FTIR is a multiple regression technique that separates the total amount of light absorbance by the various gases and outputs a result for each gas. In the case of alkanes, this includes the contribution of interfering gases such as water vapor and methane. The system also has the ability to distinguish between various sources of alkanes. Figure 3.1 shows the different types of spectral signatures for various sources of alkanes. The system has the ability of undergoing data and quality assurance checks in the field by monitoring known ambient gases or by using gas standards. Total Alkanes (regardless of source) will be displayed on the website, however, during the monthly QA process, the data may be identified as not originating from the refinery depending on its spectral signature. The methodology to identify sources involves collecting the spectral features for alkanes when the wind direction is from different sources i.e., various refinery process areas, local highways, and other industrial facilities. Once these data are collected, the resulting absorbance spectra can be converted in a qualitative library spectrum that can be inserted in the analytic software which then analyses the data. The results of the analysis will include residuals that can be used to identify specific sources.

Figure 3.1 - Spectral Signature of Alkanes from Various Sources



Open-path TDL

The AirOptic open-path H_2S tunable diode laser (TDL) monitoring system is a monostatic system that uses mid-infrared laser light to scan across a narrow band of the infrared spectrum where gases such as H_2S, water, and methane absorb light. The system utilizes wavelength modulation to enhance signal-to-noise characteristics to reach path-average minimum detection limits (MDLs) in a range of 3 to 25 ppb with an upper detection limit of 5,000 ppb. The system monitors and records in real-time the measurement and spectral fingerprint of H_2S, water, and methane present in the gas sample, and models their absorption of infrared light using a classical least squares analysis routine. To determine the concentration of H_2S in the gas sample, the software actively subtracts the interfering gases from the sample spectra and then performs an analysis of the H_2S absorbance spectra. The system uses a single corner cube retro reflector that allows the system to remain in optical alignment with no major adjustments.

The data output includes the quantified results of all gases in the light spectra, which can be used as real-time performance checks. For example, quantified results for methane should be above the natural ambient atmospheric background level of 1.72 ppm. Since the system quantifies methane in real time, along with moisture and other interferent gases, the verification of methane above natural ambient levels will be used as a real-time data quality check. Should methane concentrations drop below traditional ambient levels (currently 1.72 ppm), the data will be flagged for Level 1 review. During the first two months of operation, upper bound methane concentration variability will be determined and a three times standard deviation added as the upper bound for flagging for Level 1 review. Level 1 review will determine if historical trends indicate the data to be suspect. Reviewing staff will review other performance data along with historical trends to determine proper operation and will follow appropriate SOPs to either validate or invalidate suspect measurements. This would provide an excellent, near real-time check of proper system operation based on ambient methane concentration. Both upper and lower bound levels will be reviewed at least annually.

The system uses removable sealed H_2S calibration gas cells to perform “bump” and calibration checks. The sealed cells provide a safe, effective way to determine measurement quality parameters including system precision, accuracy, and linearity and can be inserted into the beam path remotely to provide near real-time performance verification. This method therefore includes the entire beam path in the “bump” or calibration measurements. “Bump” tests will be performed at least monthly with a 3-point calibration check performed at least quarterly with different concentrations than the “bump” test. The following are the key performance parameters of the instrument and will be verified at least

quarterly:

- Detection Limit Range: 3-25 ppb, depending on operational conditions with precision and accuracy no greater than 15%
- Average Path-Averaged Detection Limit 15 ppb
- Repeatable Detection Limit of 25 ppb with light transmission less than 1%
- Path-averaged Range of 3-5000 ppb (with the above caveats)
- Reports to BAAQMD will follow the prescribed format provided by BAAQMD

Open-path UV DOAS

The UV DOAS air monitoring system detects Benzene, Toluene, Ethylbenzene, Xylene, and Sulfur Dioxide on a real-time basis using beams of ultraviolet light. A beam of light is sent out in the open air to a light detector at the other end of the beam path. The system identifies gases by examining the wavelengths of UV light that have been absorbed by the gases present in the light beam. The amount of gas in the air is proportional to the amount of light absorbed at specific wavelengths.

The system uses a multivariate method to quantify data. This analytic approach is critical to ensure false detections of gas do not occur. Each target gas has a spectral library of gases covering the concentration range of the analyzer. It also includes libraries of potential interfering gases such as oxygen and ozone. In addition, the system has the ability of undergoing data and quality assurance checks in the field by using a sealed gas cell.

Organic Gas Detector

The Organic Gas Detectors are based on the principal of photoionization and are referred to as Photoionization Detectors (PIDs). The systems work by inserting a sample of ambient air into a sample chamber where it is exposed to a small lamp that produces ultraviolet light. If an organic gas is present in the sample, it will interact with the UV light and become ionized. Once, ionized it can be measured with a gas detector. The major advantage of the PID air monitoring system is its sensitivity in that it can measure organic gases at very low concentrations in the air. The limitation to the system is it cannot discriminate between the different types of organic gases that are in the air. In addition, it cannot measure C2-C3 hydrocarbons but is capable of measuring the majority of gases associated with refining.

Meteorological Station

The East Side MET Station will provide real time wind direction to the website.

Meteorological instruments will be operated according to the EPA Quality Assurance Handbook for Air Pollution Measurement Systems Volume IV PSD Measurement Quality Objectives.

Data Collection

Workstations

The analyzers use Microsoft Windows based computer workstations to collect, analyze, and transmit data. The workstations will be industrial grade computer workstations.

Routers

Computer routers will be used to network the analyzers together so the information from each system can be transmitted to the Internet.

Remote Restart Equipment

Internet based remote restart equipment will be attached to critical parts of the monitoring system to ensure the equipment can be powered down and turned on remotely in the event a system requires a restart to clear an error status.

Cloud-based Data Storage

Data from the monitoring network will be stored on a cloud-based storage system with data backup capability. This data includes raw data, including raw spectral data, appropriate flagging and documentation of actions taken based on applicable SOPs and final data and will be made available to BAAQMD upon request.

Section 4 – Quality Management System

The overall goals of the fence-line monitoring program are referred to as "Data Quality Objectives" or "DQOs". The specific DQOs for the monitoring program at the MRC is ensuring all of the data, both real-time and QA/QC meets the quality standards for presentation to the public and the BAAQMD. This will include providing information on MDLs generated in near real-time as described in FLM-QLT-SOP-007 MDL_Determination_and will be updated on the community website and provided to BAAQMD.

Throughout the measurement process, focus is placed on three different specific elements of the monitoring program including the instruments themselves, the data collected, and the overall management of the program. MRC's Quality Assurance Project Plan (QAPP) uses a multi-level process to validate system performance. Four levels of review take place. Each level builds on the prior level, including the level of technical expertise possessed by the individuals reviewing the information.

Level 0 checks are based on historical real-world experience associated with operating and maintaining fence-line systems. Level 0 checks are automated real-time screening checks that are performed continuously. Levels 1, 2, and 3 checks are formulated around EPA Quality Assurance/Quality Control protocols published in documents such as:

Environmental Technology Verification (ETV) Protocol for Optical Remote Sensors
https://archive.epa.gov/nrmrl/archive-etv/web/pdf/01_vp_openpath.pdf

EPA – Compendium Method TO-16
https://www3.epa.gov/ttn/amtic/files/ambient/airtox/to-16r.pdf

EPA – FTIR Guidance Document
https://www3.epa.gov/ttn/amtic/files/ambient/longpath/r-96-040.pdf

Level 1 checks are performed on a daily or weekly basis depending on the application. Level 2 checks are performed monthly, and Level 3 checks are performed on a quarterly and/or annual basis, and this includes an annual audit.

For each level of review, specific "Measurement Quality Objectives" or "MQOs" have been developed. MQOs are defined as the specific performance criteria to evaluate whether the objective is met. When each of the MQOs are satisfied, this assures that the overall goals of the monitoring program (the DQOs) are being met. If any one of these MQOs are not met, corrective action will be initiated to address the issue. Each MQO will be evaluated and if necessary updated as part of the Internal System Audit Plan as well as during the Annual Management Review. A summary of the MQO's for each instrument, data quality parameter, and program management process is listed in Table 4.1 below. A detailed description of the operational parameters associated with the specific elements of the fence-line system are included in the Operations Guidance Document "FLM-QLT-GUI-001 Operations Guidance Document".

Table 4.1 – Summary of MQO's for Each Instrument

Check Type	Check	Frequency	Reference Document
Level 0			
Instrumentation	Light Signal from Optical Remote Sensors	Real-time	FLM-QLT-GUI-001, FLM-QLT-SOP-002
Instrumentation	Instrument Error Codes	Real-time	FLM-QLT-SOP-001
Instrumentation	Environmental Checks for UV	Real-time	FLM-QLT-SOP-001
Data	Quantitative/Qualitive Data Check	Real-time	FLM-QLT-SOP-001
Data	FTIR Methane	Real-time	FLM QLT SOP 001
Data	TDL – Methane and H_2O	Real-time	FLM-QLT-SOP-001
Data	UV - Oxygen and Ozone	Real-time	FLM-QLT-SOP-001
Program	Analyzer has low signal	Real-time	FLM-QLT-GUI-001, FLM-QLT-SOP-002
Program	Analyzer off-line	Real-time	FLM-QLT-SOP-001
Program	Workstation fails	Real-time	FLM-QLT-SOP-004
Program	Internet communication failure	Real-time	FLM-QLT-SOP-001
Program	Gas detected above alarm value	Real-time	FLM-QLT-SOP-001
Level 1			
Instrumentation	System noise – FTIR, TDL and UV - MDL	Monthly	FLM-QLT-SOP-007
Instrumentation	Single point check - FTIR, TDL and UV	Monthly	FLM-QLT-SOP-008
Instrumentation	Accuracy	Monthly	FLM-QLT-SOP-015
Instrumentation	Precision	Monthly	FLM-QLT-SOP-16
Instrumentation	Linearity	Monthly	FLM-QLT-SOP-17
Data	Validate detects - FTIR TDL and UV	Daily	FLM-QLT-SOP-006
Data	Negative detects - FTIR TDL and UV	Daily	FLM-QLT-SOP-006
Data	Verification of detects above threshold	Daily	FLM-QLT-SOP-006
Program	Equipment operation	3 x per day	FLM-QLT-SOP-001
Program	Website operation	3 x per day	FLM-QLT-SOP-001
Program	Data logging	3 x per day	FLM-QLT-SOP-001
Program	Message board update	3 x per day	FLM-QLT-SOP-001

Table 4.1 (cont.) – Summary of MQO's for Each Instrument

Check Type	Check	Frequency	Reference Document
Level 2			
Instrumentation	Detection limit FTIR, TDL and UV	Quarterly	FLM-QLT-QAPP-001, FLM-QLT-SOP-007
Instrumentation	Precision FTIR, UV, TDL and OGD	Quarterly	FLM-QLT-QAPP-001, FLM-QLT-SOP-011
Instrumentation	Accuracy FTIR, TDL, UV, OGD	Quarterly	FLM-QLT-QAPP-001, FLM-QLT-SOP-009
Instrumentation	Linearity FTIR, TDL, UV, OGD	Quarterly	FLM-QLT-QAPP-001, FLM-QLT-SOP-010
Data	Data trends associated instrumentation performance	Weekly	FLM-QLT-SOP-006
Data	Differences between current data and historical data	Weekly	FLM-QLT-SOP-001
Data	Insert data in final QA/QC'd data base	Weekly	FLM-QLT-SOP-013
Program	Summary of calibration and maintenance activities	Monthly	FLM-QLT-SOP-008
Program	Summary of problems and corrective actions	Monthly	IMS-QLT-MAN-010, IMS-QLT-MAN-008
Program	Monthly summary report with OSE updated	Monthly	FLM-QLT-SOP-014
Level 3			
Instrumentation	Annual service FTIR, TDL, UV and OGD	Annual	FLM-QLT-SOP-005
Instrumentation	Certification system brought to factory spec	Annual	FLM-QLT-SOP-014
Data	Full reconciliation of data	Monthly	FLM-QLT-SOP-014
Data	Supervisor check for data trends	Monthly	FLM-QLT-SOP-014

Instrument Specific - Quality Assurance/Quality Control

The following checks are used to determine the hardware included in the fence-line air monitoring system are operating in a manner that meets all factory specifications. A complete listing of the specific parameters associated with vendor specific equipment is included in FLM-QLT-GUI-001 Operations Guidance Document. It should be noted that any data that is considered to be invalid can be reviewed using spectral analysis by a trained data analyst.

Level 0 – Continuous, Real-time Operational Checks

Monitor system output to include:

- Light signal from optical remote sensing analyzers
- Analyzer error codes
- Operational environment of UV analyzers

Level 1 – Monthly Operational Checks

- Evaluate system noise (FTIR , TDL and UV)
- Single point calibration checks (FTIR, TDL and UV)

Level 2 – Quarterly Operational Checks

- Detection limit checks (FTIR, TDL, and UV)
- Precision, linearity, accuracy checks (FTIR, TDL, UV, OGD)

Level 3 – Annual Operational Checks

- Annual servicing of instruments (FTIR, TDL, UV, OGD)
- Validate systems are meeting original factory acceptance specifications

Data Management / Validation

The following checks are used to determine the data included in the fence-line air monitoring system meets all data quality requirements. A complete listing of the specific parameters associated with vendor specific equipment is included in FLM-QLT-GUI-001 Operations Guidance Document. It should be noted that all data is collected and stored in its original format and data that fails to meet the data quality requirements is flagged with a code that lists the specific data check that failed.

Level 0 – Continuous, Real-time Operational Checks

Monitor Data Output:

- Utilize manufacture's analytic software for quantitative results and independent secondary analytic software for qualitative results.
- Check ambient gases such as ozone and oxygen (UV), and methane, N_2O for FTIR.

Level 1 – Daily Review

- Identification of detects where real-time MQOs indicate corrective action is needed, such as validating data when qualitative and quantitative detects do not reconcile (FTIR, UV, TDL)
- Flagging data as being invalid due to weather related conditions or operational events, such as QA/QC, maintenance activities etc. (FTIR, TDL, UV)
- Identification of gas detects above action levels

Level 2 – Weekly Checks

Validation Staff Review with consideration of historical data and similar measurements. Once data is reviewed and validated it will be inserted into the final database.

On a weekly basis, data will be summarized and reviewed to identify:

- Data trends associated instrumentation performance
- Differences between current data and historical data

Level 3 – Quarterly Checks

- Supervisor level review with consideration of interrelationships with other data
- A full reconciliation of data that had to be invalidated or corrected
- A summary of the monitoring data and performance of the fence-line monitoring system

Monitoring Program Response

The entire fence-line monitoring system is continually monitored for system performance. This includes the instruments, workstations, and Internet communication hardware. If at any time an element of the system fails to meet normal performance criteria, a message is generated immediately to key personnel at MRC and the Contractor who will begin activities to correct the problem. The following checks are used to determine the data included in the fence-line air monitoring system meets all data quality requirements. A complete listing of the parameters associated with vendor specific equipment as well as messages and times in the status of the equipment is updated is included in the FLM-QLT-GUI-001 Operations Guidance Document.

Program Management

Level 0 – Continuous, Real Time System Checks

Automated notifications generated when:

- Analyzer has low signal
- Analyzer off-line
- Workstation fails
- Internet communication failure
- Gas detected above alarm value

Level 1 – Daily System Checks

The contractor will monitor the fence-line system three times per day.

Systems will be checked for:

- Equipment operation
- Website operation
- Data Logging
- Message Board Update

Level 2 – Monthly Report and Review of Operational Performance

- Monthly summaries of calibrations and maintenance activities completed during the month, and a summary of audit results completed during the month, if applicable
- A description of problems that occurred during the month, including such things as power failures or system component problems and their resolution, or proposed corrective actions
- Monthly reports summarizing gas detections, operational performance statistics (on-stream efficiency) and significant events associated with the fence-line monitoring system will be generated.

Level 3 – Annual Program Audit

System will undergo an annual independent audit of the entire monitoring program. Findings and observations will be addressed with corrective action plans.

Statue report of annual service by equipment vendor will be reviewed and maintenance program updated if necessary.

Section 5 – Instrument Maintenance

Instrument service and repair calls are conducted as needed, based on continuous evaluation of instrument error codes. In addition to service and repair calls conducted on an as needed basis, preventive maintenance is conducted based on the schedules provided below. Instrument specific parameters are included in the FLM-QLT-GUI-001 Operations Guidance Document.

Table 5.1 - Open-path UV Instrument Maintenance Schedule

Activity	Monthly	Quarterly	Annually
Visually inspect the system.	✓		
Confirm the alignment to verify there has not been significant physical movement. Note: this is automatically monitored as well.	✓		
Download data from detector hard drive and delete old files to free space, if needed.	✓		
Ensure there are no obstructions between the detector and the light source.	✓		
Verify system settings.	✓		
Clean optics on detector and retro reflector.	✓		
Realign system after service.	✓		
Check system performance indicators.	✓		
Check UV light source.			✓
Annual Service Check			✓

Table 5.2 - Open-path TDL Instrument Maintenance Schedule

Activity	Monthly	Quarterly	Annually
Visually inspect the system.	✓		
Confirm the alignment to verify there has not been significant physical movement. Note: this is automatically monitored as well.	✓		
Download data from detector hard drive and delete old files to free space, if needed.	✓		
Ensure there are no obstructions between the detector and the light source.	✓		
Verify system settings.	✓		
Clean optics on detector and retro reflector.	✓		
Realign system after service.	✓		
Check system performance indicators.	✓		
Annual Service Check			✓

Table 5.3 - Schedule of Maintenance Activities for the FTIR

Activity	Monthly	Annually
Visually inspect the system.	✓	
Download data from detector hard drive and if needed delete old files to free space.	✓	
Check system performance indicators.	✓	
Annual Service Check		✓

Table 5.4 - Schedule of Maintenance Activities for the Organic Gas Detector

Activity	Monthly	Annually
Visually inspect the system.	✓	
Download data from detector hard drive and if needed delete old files to free space.	✓	
Check system performance indicators.	✓	
Annual Service Check		✓

Section 6 – Document Control

Document Control will include the following elements

- Management and Organization
  - Quality Assurance Project Plan for Fence-Line Monitoring Program
  - Organizational chart
  - Personnel qualifications and training
  - Support contract

- Site Information
  - Site maps
  - Equipment registers

- Field work
  - SOPs
  - Field notebooks
  - Sample handling check sheets
  - Maintenance check sheets
  - QA check sheets

- Raw data
  - Description of raw data files generated by instruments

- Data Reporting
  - Realtime website
  - Monthly reports

- Data Management
  - Database structure
  - Data management flowchart
  - Database backup plan

- Quality Assurance
  - Site audits
  - Corrective action reports
  - System audits
  - Data quality assessments

Section 7 – Website Management

The real-time Website is operated and maintained by the contractor who will be solely responsible for its content. This section addresses the methods used to provide information to the public including message board updates, notification of significant events, data reporting, learning center section, and a contact page.

Message Board Updates

A message board on the real-time website is used to inform the public whenever an event such as gas detections above a preset level occurs, the Internet connection is lost, or an instrument fails to operate within normal parameters. When data is not updated on the website due to conditions described in FLM-QLT--001 Operations Guidance Document (e.g. environmental conditions, system maintenance, system failure), the website message board will be updated as soon as practical to reflect the issue. A listing of the standardized messages and the timeframe in which they will be posted to the website are listed in FLM-QLT-GUI-001 Operations Guidance Document.

Data Reporting

Data from the fence-line monitors will be transmitted to an internet website where the near-real- time results can be viewed by the public. Data generated by the fence-line monitoring equipment undergoes review throughout the measurement and reporting process. Included in this process is automated QA/QC checks that occur before data is reported on the real-time website. Under normal circumstances a 5-minute average measurement will appear on the website within 10 minutes of the end of the measurement period. However, the data uploaded may be impacted by internet traffic. An automated system conducts the Quality Assurance checks before the data is reported to the website. The website will also make available a rolling 24-hour trend of the 5-minute data for each gas reported.

The website will report the MDL for H_2S at all times, as described in FLM-QLT-SOP-007 MDL Determination. Instances where data is below the MDL, the website will report the actual MDL as calculated according to the appropriate SOP and state "<MDL of [MDL as calculated]". In instances where the TDL light signal is below those described in FLM-QLT-SOP-002 Low_Signal_Alarm_Response, the website will report the MDL and also state that light level is too low to accurately measure H_2S concentrations.

Once QA/QC of the final data is completed within 60 days after the end of each calendar quarter, the refinery will provide one-hour average concentration data in tabular format through a comma separated value data file to the BAAQMD in a format provided by BAAQMD. This will include the signal intensity, MDL calculations and the data and supporting documentation for invalidated or otherwise flagged or qualified data. The BAAQMD may make the one-hour average data available to the public through a BAAQMD website or through public records request. The refinery will make data available to BAAQMD upon request prior to the report submittal. Any data invalidation or exclusion will be reported to BAAQMD and will be verifiable as required by the appropriate SOP and made available to BAAQMD upon request.

Learning Center

Individuals will be able to access additional information pertaining to the fence-line program. This will include information about each target gas, a site map showing locations of fence-line equipment, Office of Environmental Health Hazard Assessment (OEHHA) health standards for target gases (if applicable), and links to the BAAQMD and CARB.

Contact Section

Individuals will be able to send feedback to operators of the fence-line system.