Martinez Refining Company
Regulation 12 Rule 15 Air Monitoring Plan

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4.3	8/27/2022	Updated to include BAAQMD Comments	Don Gamiles	
4.4	2/14/2023	Updated to include TDL information	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

DCU – Delayed Coker Unit

EPA- Environmental Protection Agency

FTIR – Fourier Transform Infrared Spectrometer

H_2S – Hydrogen Sulfide

LDL – Lower Detection Limit

LOP – Light Oil Processing

MBC – Martinez Refining Company Business Center

MET – Meteorological Station

MFO – Marine Fuel Oil

MRC – Martinez Refining Company

OEHHA – Office of Environmental Health Hazard Assessment

OPCEN – Operations Central

PPB - Parts Per Billion

QAPP – Quality Assurance Project Plan

QA/QC – Quality Assurance / Quality Control

SO_2 – Sulfur Dioxide

TDL – Tunable Diode Laser

TRI – Toxic Release Inventory

UV-DOAS – Ultraviolet Differential Optical Absorption Spectroscopy

UDL – Upper Detection Limit

WWTP – Wastewater Treatment Plant

Section 1 - 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. The Martinez Refining Company (MRC) has followed these guidelines to generate this Air Monitoring Plan for submission to BAAQMD. As presented in "Air Monitoring Guidelines for Petroleum Refineries, AIR DISTRICT REGULATION 12, RULE 15: PETROLEUM REFINING EMISSIONS TRACKING", the key elements of the BAAQMD rule and guidelines are as follows:

Requirement #1 – Gases Requiring Open-path Measurements

Refinery operators must measure benzene, toluene, ethyl benzene, and xylenes (BTEX) and hydrogen sulfide (H_2S) concentrations at refinery fence-lines with open path technology capable of measuring in the parts per billion (ppb) range regardless of path length.

Requirement #2 - Other Gases to be Considered for Measurements

Measurement of sulfur dioxide (SO_2), alkanes or other organic compound indicators, 1,3-butadiene, and ammonia concentrations are to be considered in the Air Monitoring Plan. Refinery operators must provide a rationale in the Air Monitoring Plan for not measuring all the above compounds. The rationale must address why these compounds are not contained in the compositional matrix of emissions; are not at expected concentrations measured by available equipment; and/or address the technical or other considerations that make specific measurements inappropriate or unavailable.

Requirement #3 – Fence-line Coverage

Measurements must cover populated areas within 1 mile of the refinery fence-line likely to be affected when the annual mean wind direction lies in an arc within 22.5 degrees of a direct line from source to receptors 10% of the time, or greater, based on the most representative meteorological measurements for sources likely to emit the compounds listed above at the refinery. In addition, the monitoring plan should take into consideration seasonal and short-term meteorological events.

Requirement #4 – Sample Time Resolution and Data Completeness/Retention

Fence-line measurements must be continuously measured with a time resolution of five minutes. If this is not the case, refinery operators must provide rationale in the Air Monitoring Plan for lesser time resolution based on equipment or other operational limitations. Instrumentation must 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 calculations. Owner must maintain records of all information required under this rule for a period of five years after the date of the records and records must be made available to the APCO upon request.

Requirement #5– Data Presentation to the Public

Measurements must be provided to the public on a real-time basis, with appropriate Quality Assurance/Quality Control (QA/QC) measures taken to provide assurance of data accuracy.

Requirement #6 - Develop a Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPP) that follows EPA guidelines must be developed that outlines the QA/QC parameters.

Requirement #7 – Schedule to Implement 12 months after plan Approval.

MRC’s intent is to meet the installation milestones associated with Rule 12-15. However, the actual time for installation and operation may be delayed for reasons outside MRC's control, including but not limited to:

- Incorporating revisions that result from the BAAQMD and Public Review process of the plan.
- Obtaining permitting for site development in locations with no current infrastructure.
- Creating permanent access routes to undeveloped locations during dry periods.
- Resolving security issues with any location outside the refinery security fence-line.
- Time to test and debug information flow from monitors to website to assure quality requirements of the data are achieved.

In the event the implementation schedule is delayed; MRC will notify the BAAQMD with an explanation of the delay as well as an updated schedule.

MRC’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. Finally, the specific chemicals that require monitoring were determined for each source area based on process knowledge.

The following sections provide a summary of MRC’s methodology for meeting the fence-line monitoring requirements of Rule 12-15.

Section 2 - Evaluation of Fence-line Requirements

Requirement #1 – Gases Requiring Open-path Measurements

As required by Rule 12-15, MRC will install open-path air monitoring systems for the detection and quantification of BTEX and H_2S. 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.

Requirement #2 - Other Gases to be Considered for Open-path Measurements

As required by Rule 12-15, MRC considered the measurement of sulfur dioxide (SO_2), alkanes or other organic compound indicators, 1,3-butadiene, and ammonia for inclusion in the Air Monitoring Plan. Alkanes and SO_2 will be included in the monitoring plan as they have the potential to be present in measurable quantities at SMR. 1,3-butadiene will not be included in the fence-line monitoring program because it is not produced as an intermediate or end-product at SMR and is only present in trace quantities at the refinery. Ammonia, where it is present in the form of anhydrous ammonia, is only in one location at the refinery and will already have local detection of release near the source prior to the fence-line plan implementation therefore no fence-line monitoring for ammonia is included in the plan.

Technology Descriptions

The MRC fence-line monitoring program uses two different types of technologies to measure gases in the air. The first type, open-path air monitoring systems, uses beams of light to detect and quantify gases. The systems work by sending a beam of light into the open air and receiving it at a detector. When gases are present in the beam, some the light is absorbed, and the detector can distinguish between a beam received in clean air, versus a beam when gases are present. Often gases have their own distinct way of absorbing light and may absorb light at several different wavelengths. This acts almost like a fingerprint for the gas, and by comparing known reference standards to the results from field measurements, the system can identify the gas based on which wavelength absorption patterns are present. Likewise, the quantity of light that was absorbed is a direct function of the concentration of the gas in the air. By analyzing the size of the absorption that took place, the system can estimate the average concentration of the gas along the beam path. A single open-path analyzer can send a beam of light out over half a mile. This makes these systems ideal for use as a fence-line monitoring system where a significant amount of linear distance needs to be covered. MRC is proposing BTEX and SO_2 will be detected and quantified using Open-path UV Differential Optical Absorption Spectroscopy (UV-DOAS) air monitoring systems. H_2S will be detected and quantified using open-path Tunable Diode Laser (TDL) air monitoring systems.

The second type of air monitoring systems used in the monitoring program are point sampling devices. The point sample monitoring systems are suited for use in areas of the fence line that may not be suitable for open-path devices. These include areas with terrain limitations, or where sources release gases that do not absorb light well enough to be efficiently detected with an open-path system. At

MRC, two different types of point monitoring systems will be deployed to supplement the open-path air monitoring systems. One type is configured specifically to detect alkane gases, and the other type is configured to detect the total amount of organic gases present. Although this technology is a point sensor method rather than open path, it has the capability to detect gases on a real-time basis while meeting the operational efficiency requirements presented in the rule. In addition, the units have an operational advantage compared to open-path systems as they will continue to operate during conditions when the open-path technologies will be inoperable due to weather events (e.g., heavy fog or rain). This additional coverage will enhance the community benefit of the fence-line system. The systems will be deployed at strategic points along the fence-line to capture emissions from the refinery. MRC is proposing to use extractive Fourier Transform Infrared Spectrometers (FTIRs) for monitoring alkanes and where open path is not suitable, MRC is proposing the use of Organic Gas Detectors (OGD).

In either open path or point detection, using the data in combination with the metrological station data from the MET station located on site is helpful in determining where sources originate from and where the gases are moving towards. The basic difference is demonstrated in Figure 2.1. In this figure, a gas plume is generated from a source and released into the air. As the gases are released, they are carried by the wind and begin to disperse and move away from the source. As seen in the figure, the concentration of gases in the plume will be highest in the center of the plume (shown as the darker red) and closest to the source, while gas concentrations will be less at the edge of the plume (shown as the lighter color red) as the distance from the source increases. The shape of the plume can be affected by changing terrain and meteorological conditions, but in general, this dispersion pattern is an accurate depiction of what happens after a gas release.

Figure 2.1 Demonstration of Open-Path Average Concentration vs Point Sampler Detection

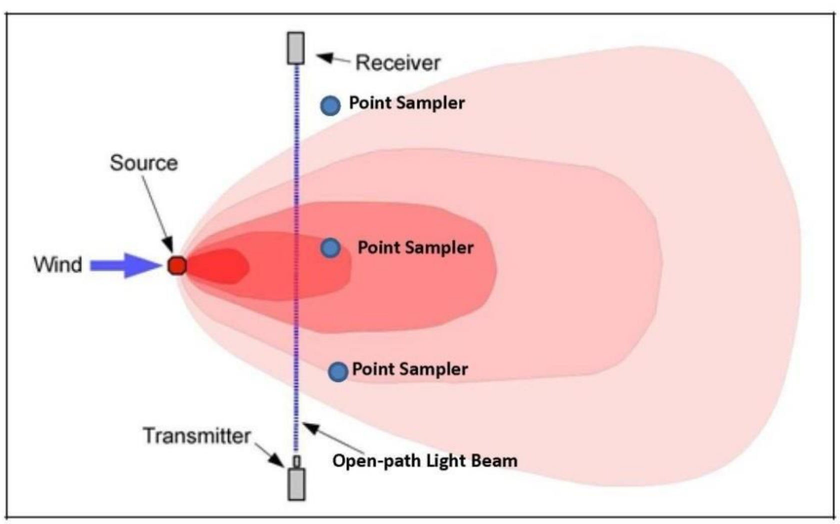


Table 2.1 presents the monitoring technologies proposed to comply with the Rule 12-15 monitoring requirements, along with the technology capabilities, common potential interferences for each

instrument type and restrictions. Additional information for the UV-DOAS, TDL, FTIR and OGDs air monitoring systems are included in the QAPP.

Table 2.1 –Monitoring Equipment Overview

Equipment	Capabilities	Interferences	Measurement Errors	Restrictions
Extractive FTIR	Detects alkanes. No loss of data quality due to rain or fog.	Water and CO_2 which can be compensated for with analytical software	Monitoring uses multiple regression to analyze data.	None
Open-path UV	Detects Benzene, Toluene, Xylene, Ethylbenzene, and Sulfur Dioxide at path lengths up to 1,000 meters	Ozone and Oxygen which can be compensated for with analytical software.	Monitor uses partial least squares regression to analyze data.	Heavy Fog and Rain
Open-path TDL	Detects Hydrogen Sulfide Gas	Water and CO_2	Monitor uses multiple regression to analyze data.	Heavy Fog and Rain
Organic Gas Detectors	Detects Total Hydrocarbons. No Loss of data quality due to rain or fog.	None	None	None
Meteorological Station (MET)	Wind direction and speed, temperature, dew point, rain gauge	None	None	None

Sample Analysis Method

Each analyzer has a vendor specific method for collecting and quantifying data. Each specific analytic method is described below:

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 either sealed or flow through gas cells.

Open-path Tunable Diode Laser

The TDLs detect Hydrogen Sulfide (H_2S) gas on a real-time basis using beams of infrared light. A beam of light is sent out in the open air to a reflector that sends the beam back along the same path. If H_2S gas is present in the air, it will absorb at certain known wavelengths of the light. The tunable diode laser analyzes the light beam for H_2S gas as well as water and carbon dioxide which also absorb light in the same region as the H_2S gas. The system uses a multivariate approach to analyze the data to separate the total amount of light absorbance by each of the three gases and outputs a result for each gas. The system has the ability of undergoing data and quality assurance checks using either sealed or flow through gas cells in the field.

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 can distinguish between 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 from the refinery depending on its spectral signature.

Organic Gas Detectors

The Organic Gas Detectors based on the principal of photoionization 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 the gas is ionized it can be measured with a gas detector. The major advantage of the PID air monitoring system is its sensitivity and ability to 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, the system cannot measure C2-C3 hydrocarbons but is capable of measure the majority of gases associated with refining.

Detection Limits

Tables 2.2 and 2.3 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). LDL for the data generated by the equipment are normally set to be at least 2 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 and if the system is operating in less than ideal conditions (such as when there's fog or rain) the system will generate false detections. As with any instrument, the possibility of measurement error exists. However, the Quality Assurance Project Plan (QAPP) specifically identifies QA/QC processes intended to minimize errors for the fence line program. While higher UDLs may be possible, these ranges were chosen to ensure that measurements at or near the LDLs are as low as possible to capture above ambient concentration releases. Both levels will be evaluated on at least an annual basis to ensure the best measurements at low concentrations while attempting to achieve higher UDLs. In addition, LDLs can be calculated near real-time and is described in FLM-QLT-SOP-007 MDL_Determination_031020 and will be updated when new LDLs are calculated on the community website and provided to BAAQMD upon request.

Table 2.2 – Detection Limits for Gasses 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)
H_2S	3	5,000	3	5,000	3	5,000	3	5,000
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
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 2.3 – Detection Limits for Gases Monitored by Point Source Samplers

Point Source Monitor	**Detection Limits**	
	LDL (ppb)	**UDL** (ppb)
Total Alkanes	75	4200
Total Organics	10	100,000

Requirement #3 – Fence-line Coverage

This section describes the process used to determine where along the SMR fence-line the air monitoring equipment will be installed. Emission sources within the physical bounds of the refinery were identified and marked based on physical location and type of emissions. These sources are shown on a map of the refinery in Figure 3.1. Each emission source location was evaluated for the types of potential emissions and summarized in Table 3.1. Note that 96+% of all equipment covered by the refinery's fugitive emissions inspection program are included in these 10 areas.

Table 3.1 – Potential Emission Types from Source Areas

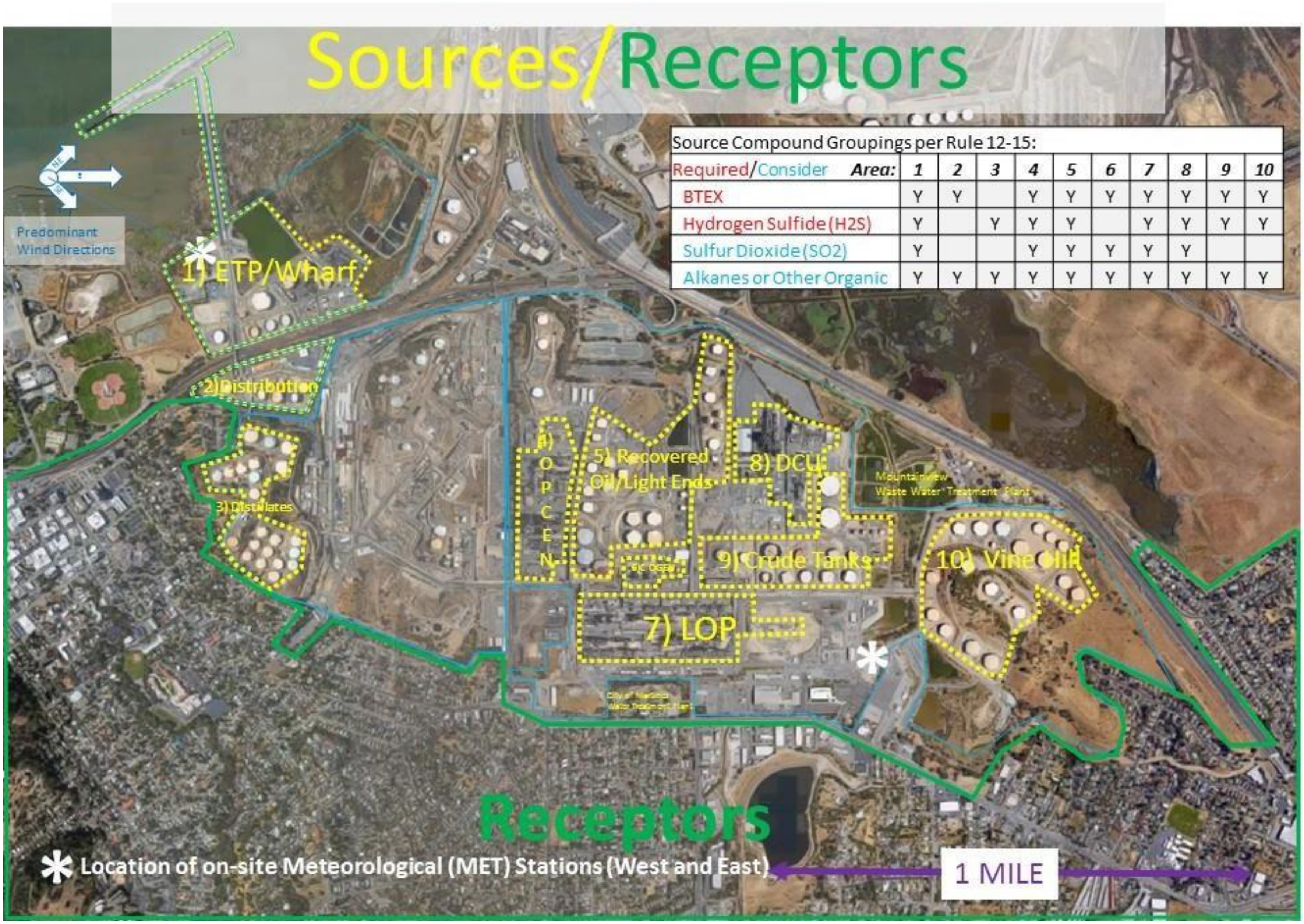
Area on Site Map	Source Type	Source Name	Emission Types
Area #1	Wastewater	Effluent Treatment Plant	BTEX[1], H_2S, SO_2, Alkanes
Area #1	Loading	Wharf	BTEX, H_2S, SO_2, Alkanes
Area #2	Storage	Distribution Tanks	BTEX, Alkanes
Area #3	Storage	Distillates Tanks	H_2S, Alkanes
Area #4	Process	Operations Central	BTEX, H_2S, SO_2, Alkanes
Area #5	Storage	Recovered Oil/Rerun Tanks	BTEX, H_2S, SO_2, Alkanes
Area #6	Process	COGEN, Gasoline Blending	BTEX, SO_2, Alkanes
Area #7	Process	Light Oil Processing	BTEX, H_2S, SO_2, Alkanes
Area #8	Process	Delayed Coking	BTEX, H_2S, SO_2, Alkanes
Area #9	Storage	Crude Tanks	BTEX, H_2S, Alkanes
Area #10	Storage	Vine Hill Storage Tanks	BTEX, H_2S, Alkanes

[1] BTEX includes one or more of Benzene, Toluene, Ethylbenzene, and Xylene

The fence-line monitors being installed as described in this Plan will complement and enhance air emission monitoring currently being done on the fence-line and on emission sources throughout the refinery for compliance with BAAQMD and EPA rules.

- Ground Level Monitors (GLMs) continuously sample the ambient air at four locations on the refinery fence-line and analyze for H_2S and SO_2 as required by BAAQMD regulations.
- Passive diffusion tubes are located around the refinery fence-line to be analyzed for benzene beginning in 2018 as required by EPA's Refinery Sector Rule.
- Continuous emission monitors measure NOx emissions from heater and boiler stacks, SO_2 emissions from sulfur plants, CO emissions from CO Boilers and sulfur in fuel gas as required by both BAAQMD and EPA rules.
- Hydrocarbon detection systems surround the propane and butane storage areas to provide early indication of any leak from these tanks.
- Several hundred thousand valves, pumps and connections are monitored throughout the refinery to detect any low-level hydrocarbon leaks by a team of trained inspectors as required by BAAQMD and EPA rules.

Figure 3.1 – Potential Emission Sources



Source Compound Groupings per Rule 12-15:

Required/Consider Area:	1	2	3	4	5	6	7	8	9	10
BTEX	Y	Y		Y	Y	Y	Y	Y	Y	Y
Hydrogen Sulfide (H2S)	Y		Y	Y	Y		Y	Y	Y	Y
Sulfur Dioxide (SO2)	Y			Y	Y	Y	Y	Y		
Alkanes or Other Organic	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Wind Data

Meteorological data from two MRC on-site Meteorological (MET) stations operated by Western Weather were used to generate wind roses based on 2015 annual averages showing which sectors had winds blowing in each quadrant of the wind rose at least 10% of the time. The location of these MET station can be seen on Figure 3.1. The wind roses showing these sectors are found in Figure 3.2.

The West MET station wind rose shows that the wind blows from the Southwest, West and Northwest more than 10% of the time and the East MET Station wind rose shows the wind blows from those same directions as well as from the South and Southeast. Although not shown, the 2011-2014 data were also evaluated and for all years the West MET station had the same 3 directions >10% and no other directions in any of the years. The East MET station had the same 5 directions >10% in all years except 2011 only had 4 of the directions >10% (not West) and no other directions were >10% in any of the years.

Seasonal weather patterns in the 5 years of wind data were also considered. February through October wind directions are like the annual wind roses. Calendar months November through January (labeled as Winter Conditions in Figure 3.3), show a wind direction from the East 16% and Northeast 13% of the time which accounts for most of the ~5% annual wind from either of these directions shown in Figure 3.2. Since the annual wind from these directions is much less than the 10% requirement for fence-line coverage and even during the winter period the frequency is only in the ~15% of the time range, additional fence-line coverage is not strictly required. However partial coverage for wind from these directions is included in the fence-line design as discussed below.

Figure 3.2 - Predominant Wind Direction

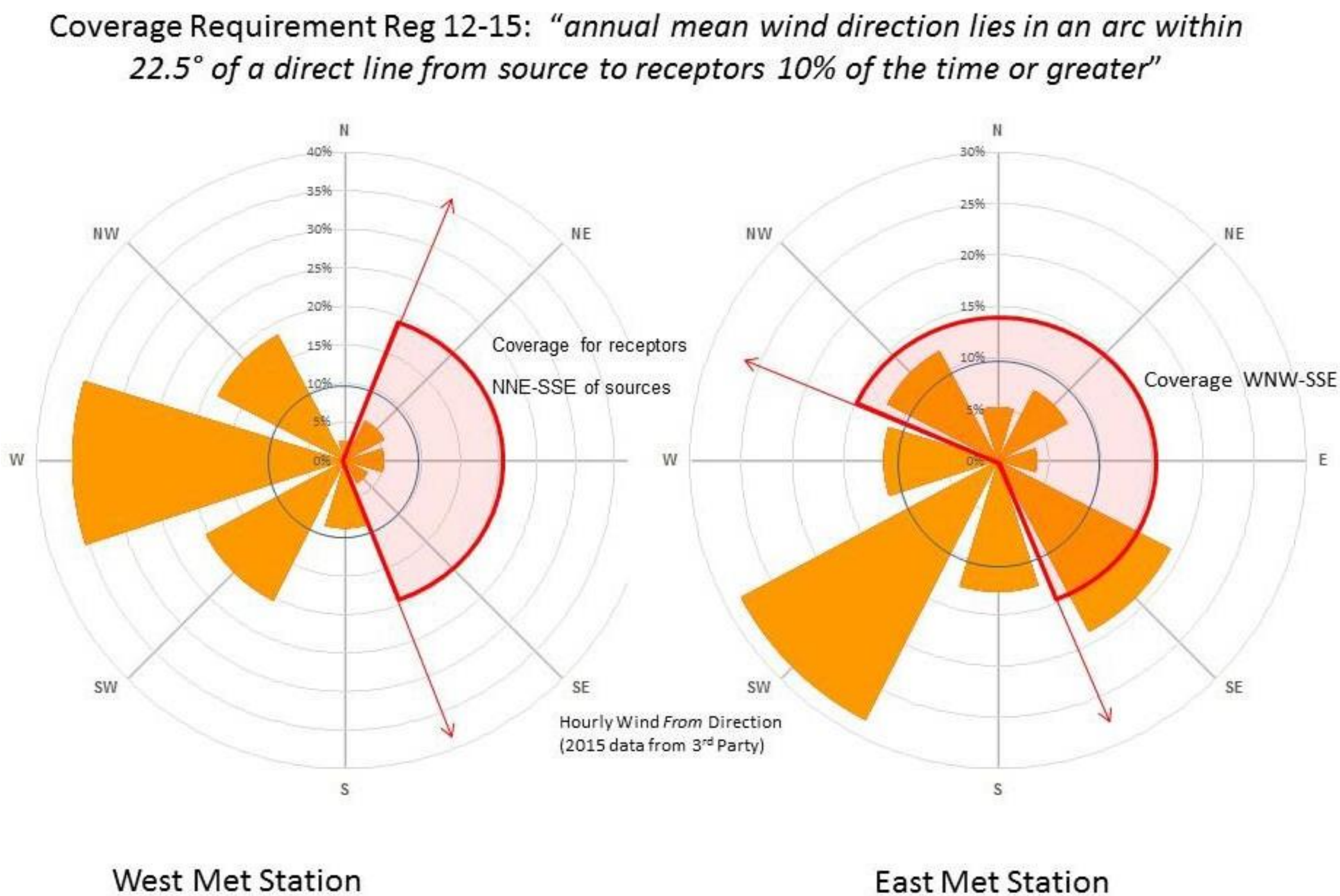
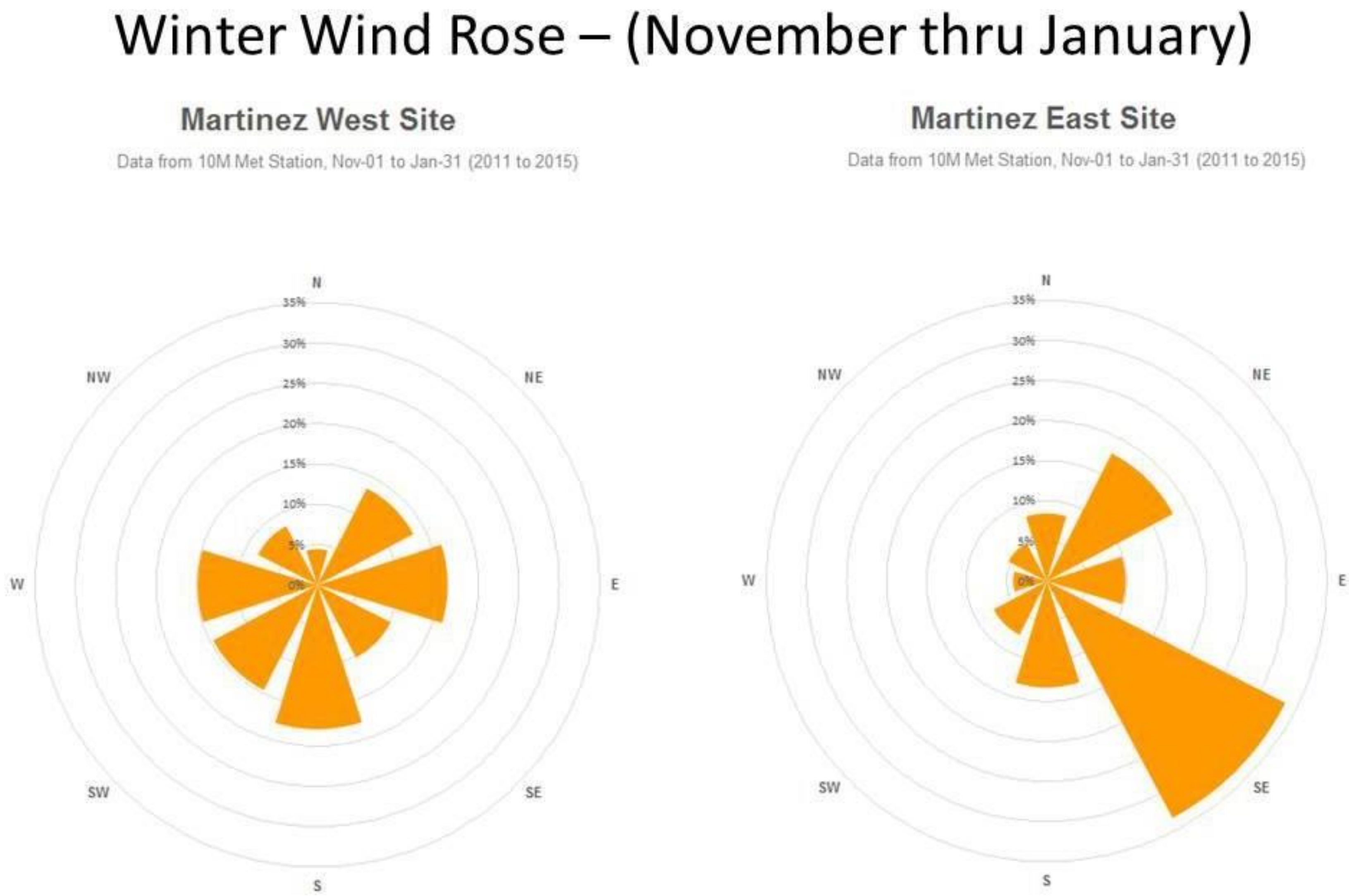


Figure 3.3 – Wind Rose During Winter Conditions



Location of Fence-line Systems

The following narrative presents the specific site location plan for the fence-line monitoring systems as shown in Figure 3.4. It is based on the source type, source location, predominant wind direction, and location of receptors. The West side includes the Wharf and Effluent Treatment Plant and stored products, and the East Side includes land east of MRC Avenue and most of the process units.

West Side of Refinery – Most of the time emissions from the west side of the refinery will move to a direction without receptors or toward the east side of the refinery (for winds from the West or Southwest). For a wind from the Northwest, emissions from the storage tanks located at Area 3 (Distillates Storage Tanks) would go to receptors to the Southeast. These tanks include heavier refined products (jet fuel, diesel, MFO) and will be monitored for alkanes and H_2S along Path 1. The end points C and D were selected to maximize the line of site distance for maximum fence-line coverage.

For the winter weather winds represented in Figure 3.3 when wind comes from the East or Northeast a higher percent of the time, Path 1 will also monitor for BTEX and SO_2 that could come from the process units east of Shell Avenue.

- Path #1 (see Figure 3.5 for the elevation profile) – From Site “C” at 164’ elevation, the farthest southerly location of Area #3 (Distillates Storage Tanks) to Site “D” at 210’ the farthest line of site location east of the source along the fence-line. Although the path is over 100’ off the ground at the lowest point the path elevation is well aligned with the potential emission sources as the typical upwind sources range from 120-215’ elevation.

Path #1 will include UVDOAS to measure BTEX and SO_2, and a TDL to measure H_2S. Additionally, two extractive FTIR point monitoring systems will be installed at Sites “C” and “D” to detect alkanes.

Sites “A” and “B” will have point detection for detecting any hydrocarbons from the Areas 1, 2, 3 or from East of Shell Avenue for wind directions from the East or Northeast. Site “A” was chosen to detect potential emissions from Area 1 (Effluent Treatment Plant and Wharf) or Area 2 (Distribution Tanks) that may go Southwest towards downtown Martinez and Site “B” was chosen as the farthest western location in the plant approximately halfway between Sites “A” and “C”. As shown in Figure 3.8 the terrain is not suitable for an open path solution, however the organic gas detectors used at Sites “A” and “B” are a good fit for detecting emissions from the potential sources in these adjacent areas.

East Side of Refinery - For the primary emission sources east of Shell Avenue, three open-path monitoring systems will be installed along the fence-line. See Figure 3.6 for the elevation profile. The specific location of the systems will be:

- Path #2 – Site “E”, the Southwest corner of Area 7, Light Oil Processing facility at an elevation of 81’ to Site “F”, the top of the two-story Martinez Business Center (MBC) at an elevation of 55’. The lowest point between the sites is 22’ with upwind sources ranging from 50-100’.

- Path #3 – Site “F”, the top of the MBC at an elevation of 55’ to Site “G” the top of a hill Southeast of Vine Hill (Area #10) at an elevation of 207’. The lowest point between the sites is 22’ with upwind sources ranging from 20-160’.
- Path #4 – Site “G”, the top of the hill Southeast of Vine hill at an elevation of 207’ to Site “H” on the ridgeline between Vine Hill and I-680 at an elevation of 102’. The lowest point between the sites is 52’ with upwind sources ranging from 20-160’.

Each of the three paths will have UVDOAS to measure BTEX and SO_2, and a TDL to measure H_2S. Additionally, two extractive FTIR point monitoring systems will be installed at Sites “F” and “G” (on the MBC and the top of the hill Southeast of Vine Hill) to detect alkanes.

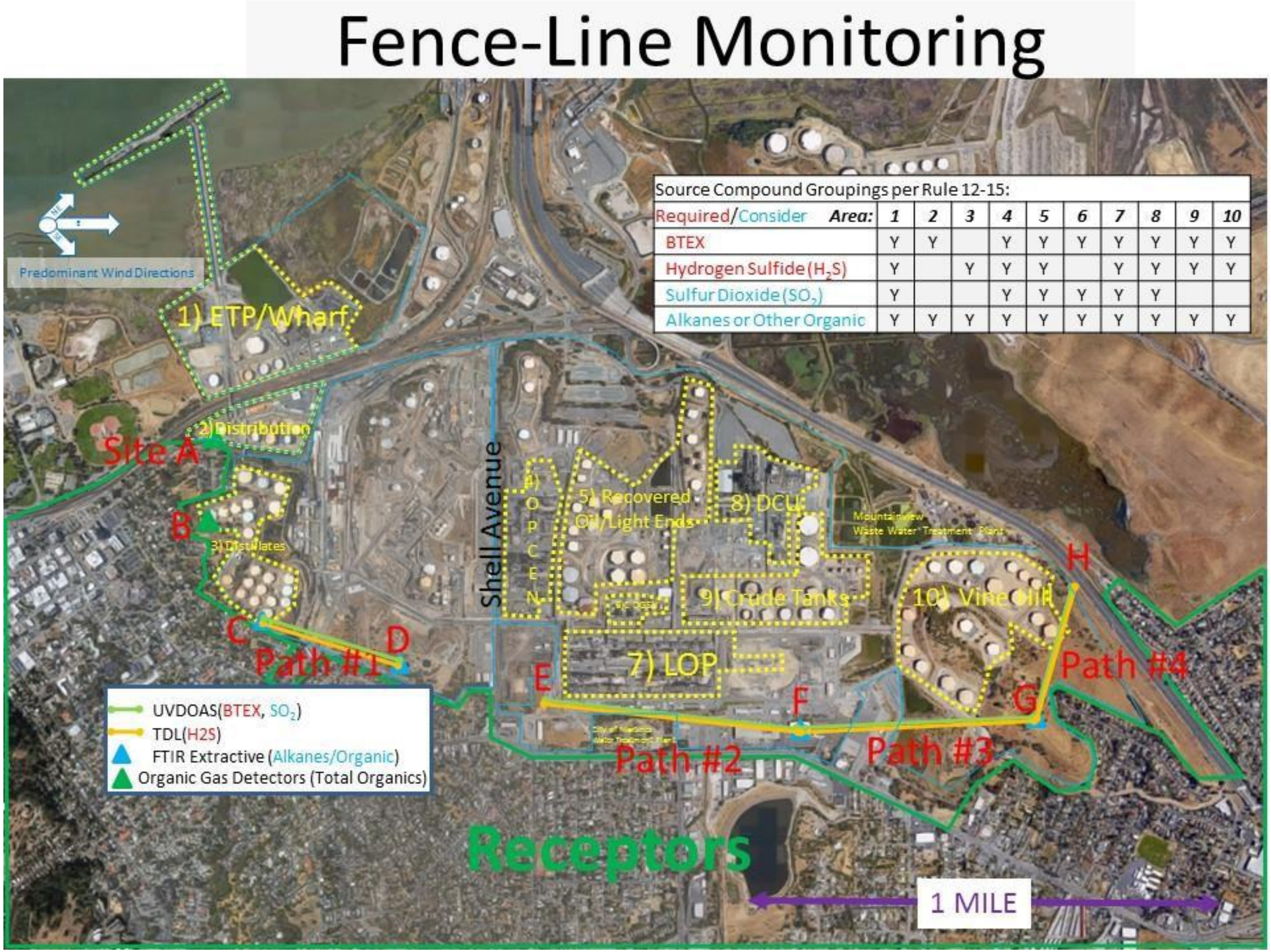
No open path is possible along the ~500m between Sites “D” and “E” due to lack of line of site from the terrain as well as half the segment is not on refinery property as shown in Figure 3.7. A point sensor to the East of Site D was considered but can only be placed about one third of the way between sites “D” and “E” to stay within the refinery security perimeter providing little difference in detection vs. the detection at site “D” only 100-150m away.

No Alkane Monitor is added at Site “E” as the emissions from predominate wind directions would be from Area 3 which is already covered for Alkanes at Site D or from area 2 where BTEX coverage in Path #2 provides a surrogate for emissions that could come from these tanks if they could travel that far (nearly a mile) and be detectable. Area 1 would be greater than a mile from receptors near Site “E”.

No Alkane Monitor is added at site “H” due to the likelihood of false readings from the freeway and from the Mountainview Wastewater Treatment Plant. Also, BTEX provides a surrogate for alkanes for most emission sources.

There are no receptors within one-mile north of Site “H” and across the North side of the refinery fence-line to the West of Area 2 Distribution, so no fence-line coverage is in the plan for this portion of the fence-line.

Figure 3.4 - Map of Fence-Line monitoring



Source Compound Groupings per Rule 12-15:

Required/Consider Area:	1	2	3	4	5	6	7	8	9	10
BTEX	Y	Y		Y	Y	Y	Y	Y	Y	Y
Hydrogen Sulfide (H_2S)	Y		Y	Y	Y		Y	Y	Y	Y
Sulfur Dioxide (SO_2)	Y			Y	Y	Y	Y	Y		
Alkanes or Other Organic	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Figure 3.5 – Elevation Profile

Path #1

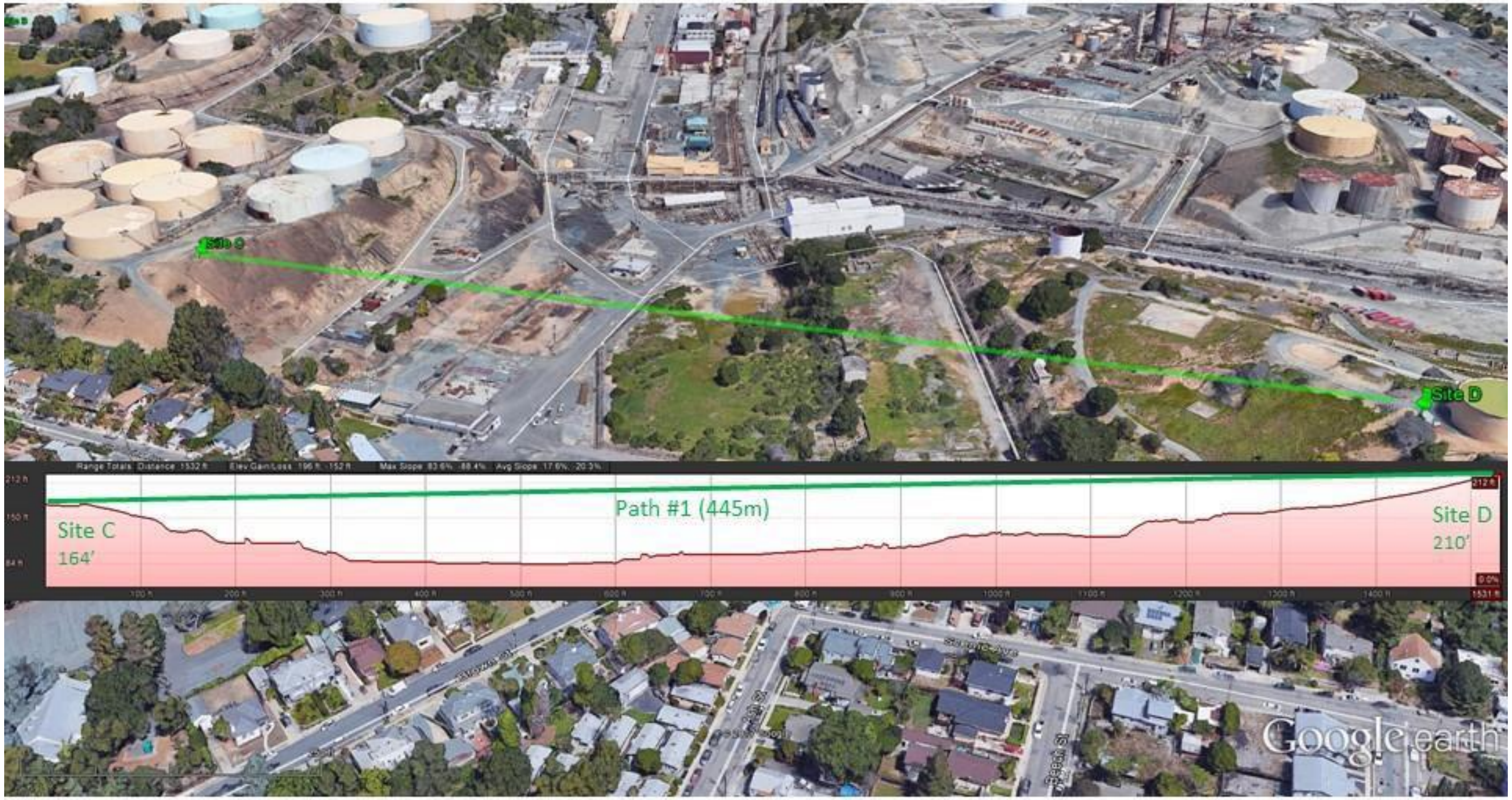


Figure 3.6 – Elevation Profile

Paths #2, 3 & 4

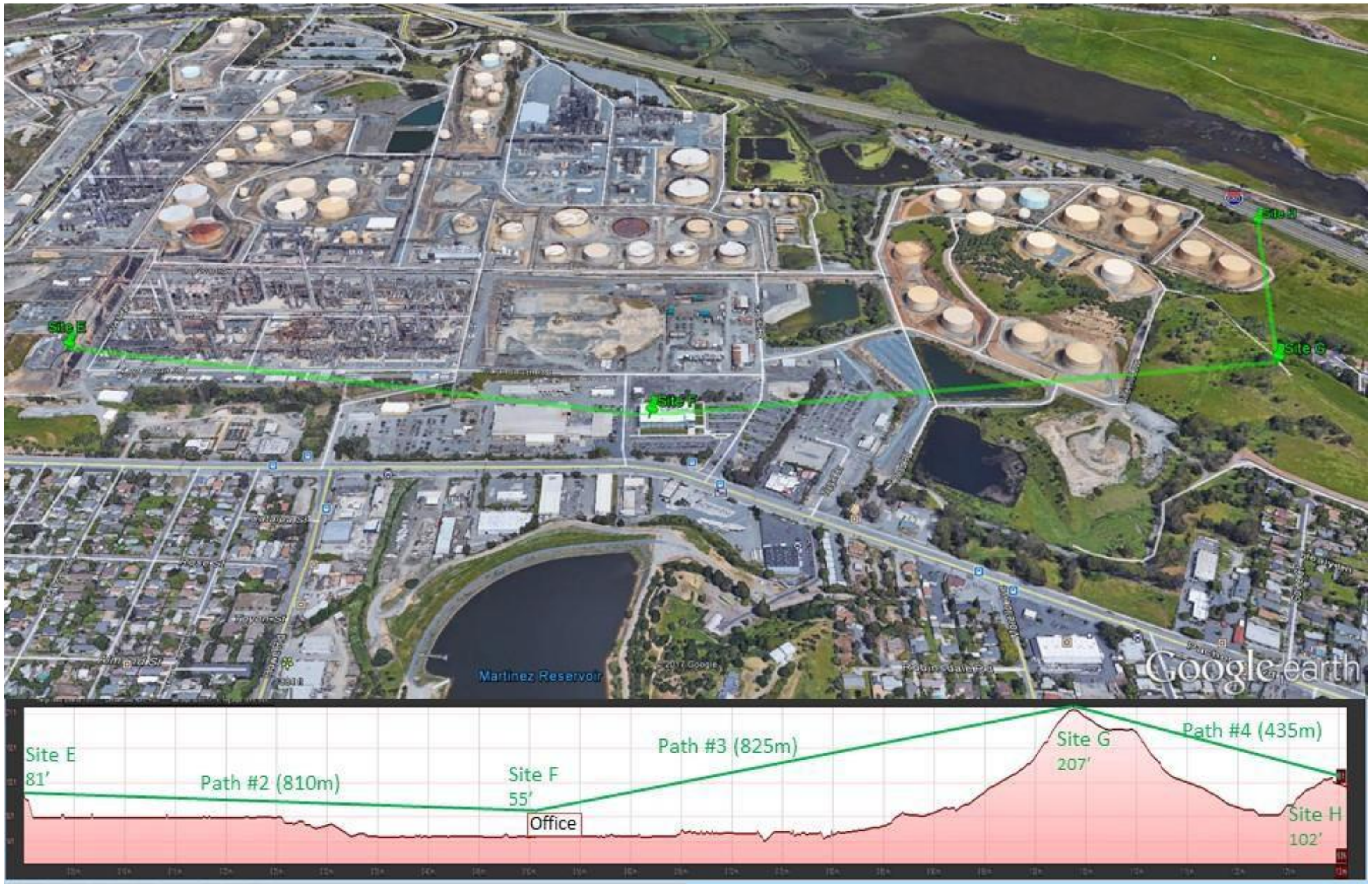
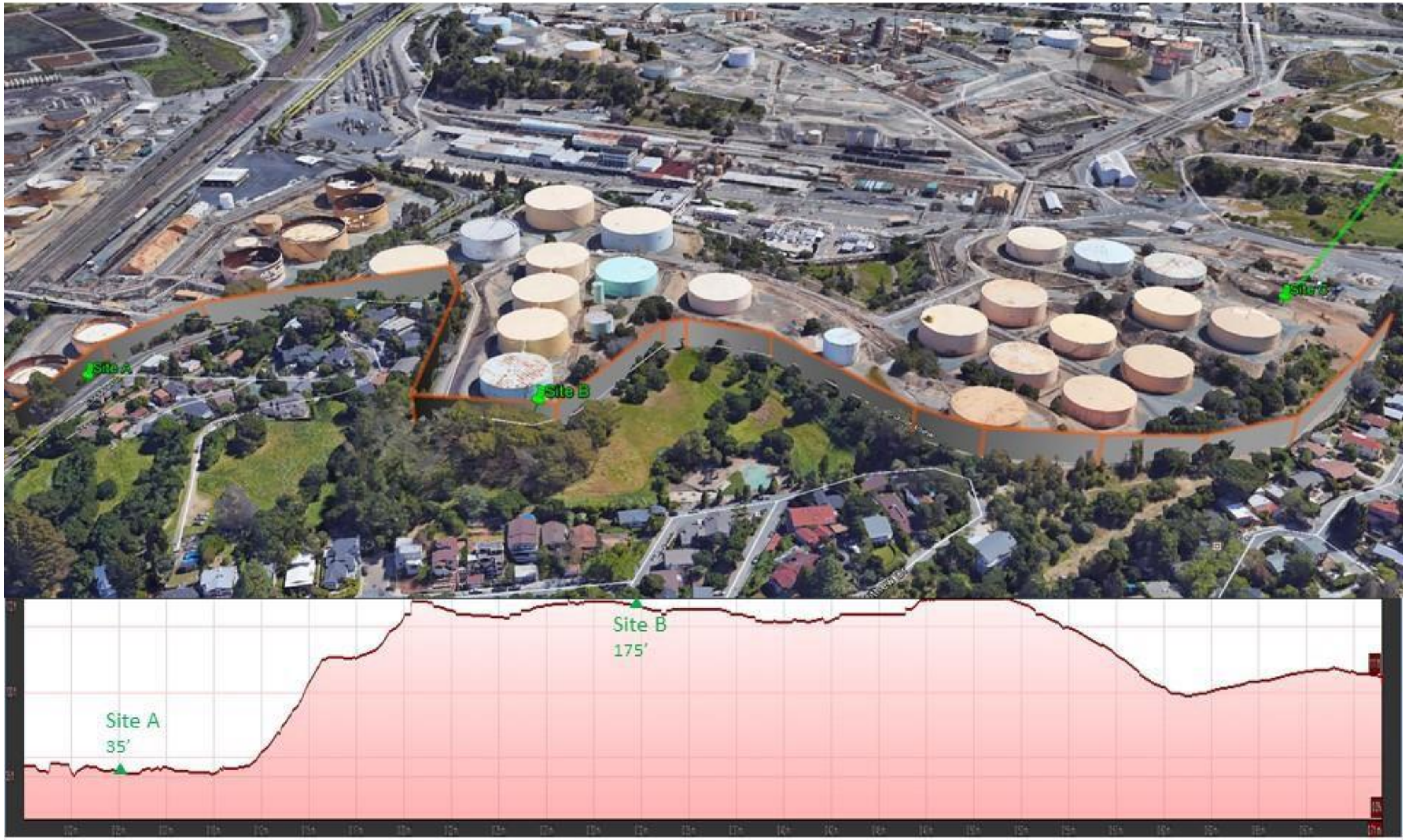


Figure 3.7 – Elevation Profile between Site D and E

Terrain from Sites D to E

Figure 3.8 – Elevation Profile between Site A and C

Terrain from Sites A to C



Requirement #4 – Sample Time Resolution and Data Completeness

All air monitoring equipment specified for the SMR fence-line system will collect data on five-minute averages. All air monitoring equipment 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)

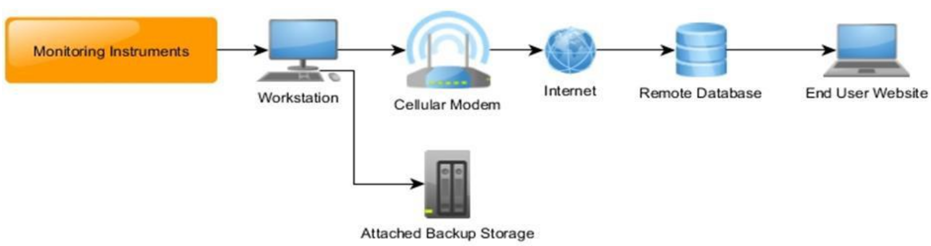
If an instrument's light signal drops below a predetermined signal strength the contractor will assess coincident signal drops on other instruments as well as the local meteorological conditions to determine the presence of rain or fog by examining current temperature, relative humidity, wind speed, dew point and local rain gauge readings. If the local meteorological conditions are indicative of heavy rain or fog, the data will be identified and flagged as a weather-related event.

In addition to rain and fog, other types of environmental conditions beyond the control of the refinery can occur. These environmental factors include but are not limited to; strong winds, dust, and earthquakes all of which can impact the ability of open-path instruments to provide accurate measurements. In the event an instrument indicates a low signal; the data may be flagged as being caused by other environmental factors and will not be counted as instrument down time.

Requirement #5– Data Presentation to the Public

Data from the monitoring stations will be transmitted to an Internet website where the real-time results can be viewed by the public. Figure 5.1 provides an example of how the monitoring data will be communicated to the public.

Figure 5.1 - Data Communication System



The website will be developed with input from the various stakeholders within the community and may evolve in the future as stakeholder needs change. The community website will include a message board to inform the public of relevant information as needed. For example, the message board may be updated when an analyzer is undergoing maintenance or QA/QC checks, or other conditions where an analyzer is not in an operational state for an extended period. In addition, the public will be able to send emails suggesting enhancements to the public access website or any other issue of interest to the community.

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.

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. 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. Both real-time and QA/QC'd data will be retained for five years.

As mentioned, the data collected and reported on the public website are based on five-minute averages. This allows the system to generate data at very low detection levels (which take more to time average) while presenting updates to the community as quickly as possible. It is important to understand that health limits for gases are based on people being exposed to average concentrations that are much longer than 5-minute averages produced by the fence-line monitoring program. In fact, most health limits are based on exposures of 1 hour, 8 hours, or 24-hour averages, so it is important to keep the measurements from the fence-line systems in perspective. The State of California has generated guidance for acceptable exposure levels for many compounds. This guidance is published by California's Office of Environmental Health Hazard Assessment (OEHHA). For further information regarding the potential health impacts of gases that will be monitored at the Refinery fence line, please refer to the OEHHA guidelines on the topic (https://oehha.ca.gov/chemicals).

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. Information will be provided on the website to help the public understand the monitoring being done and data being presented. This will include providing information on MDLs generated in near real-time as described in FLM-QLT-SOP-007 MDL_Determination_031020 and will be updated on the community website and provided to BAAQMD. Links to various public websites including the BAAQMD and OEHHA along with information about detection levels and typical background concentrations will help provide context for the data.

MRC's overall public communication process for refinery information includes use of social media (e.g., Facebook and Twitter), media statements and the Contra Costa County Community Warning System as appropriate. The fence-line monitoring website will be incorporated into these existing community relations programs. At the end of one year, MRC will evaluate the fence-line monitoring program by evaluating the data collected by the fence line equipment using the Measurement Quality Objectives (MQOs) specified by the QAPP as well as the on- stream efficiency (OSE) for each analyzer. If a deficiency is found at the time of the evaluation, or at any other time, corrective actions will be initiated to address the issue and improve the system performance. MRC will engage the community through its public communication process to ensure stakeholders are informed of any changes. MRC will perform an evaluation of the fence-line systems whenever an analyzer fails to meet MQO or OSE thresholds.

Requirement #6 - Quality Assurance Project Plan

A preliminary QAPP is included as a separate attachment to be updated with the approved Air Monitoring Plan, finalization of equipment and contractor support for operating the monitoring equipment and website.