

April 7, 2021

Mr. Jeff Beecher  
San Joaquin Refining Co.  
PO Box 5576  
Bakersfield, CA 93388

**Re: Final Approval of Petroleum Refinery Fence-Line Air Monitoring Plan  
Facility Number: S-36**

Dear Mr. Beecher:

The San Joaquin Valley Air Pollution Control District (District) has received and reviewed the submitted petroleum refinery fence-line air monitoring plan for San Joaquin Refining Co. dated November 5, 2020. Pursuant to Section 8.2 of Rule 4460 (Petroleum Refinery Fence-line Air Monitoring), the public was provided a thirty (30) day review and comment period from January 22, 2021 through February 23, 2021.

The purpose of this letter is to inform you that subsequent to this review period, the District has determined that the submitted air monitoring plan satisfies the requirements of Section 6.0 of District Rule 4460. Pursuant to Section 7.1 of Rule 4460, San Joaquin Refining Co. is now required to complete the installation and begin the operation of its planned real-time fence-line air monitoring system within 365 calendar days from the date of this approval letter.

If you have any questions, please contact Mr. Chay Thao, Program Manager, at [chay.thao@valleyair.org](mailto:chay.thao@valleyair.org) or (559) 230-5895.

Sincerely,



Jacob Whitson  
Director of Compliance

**Samir Sheikh**  
Executive Director/Air Pollution Control Officer

---

**Northern Region**  
4800 Enterprise Way  
Modesto, CA 95356-8718  
Tel: (209) 557-6400 FAX: (209) 557-6475

**Central Region (Main Office)**  
1990 E. Gettysburg Avenue  
Fresno, CA 93726-0244  
Tel: (559) 230-6000 FAX: (559) 230-6061

**Southern Region**  
34946 Flyover Court  
Bakersfield, CA 93308-9725  
Tel: (661) 392-5500 FAX: (661) 392-5585

**San Joaquin Refinery**  
**Rule 4460 Air Monitoring Plan**

**November 05, 2020**



## Table of Contents

List of Acronyms .....	3
Overview.....	4
Section 1 – Evaluation of Emission Sources and Community Impact.....	5
1.1 Facility Description .....	5
1.2 Sensitive Receptors.....	5
1.3 Emission Sources .....	8
1.4 Wind Rose Analysis.....	10
Section 2 – Proposed Fence-line Monitoring Systems and Site Locations .....	15
2.1 Monitoring Technology Descriptions .....	15
2.2 Proposed Locations for Monitoring Equipment .....	17
2.3 Generic Timeline for SJR System Implementation .....	19
Section 3 – Data Presentation to the Public.....	20
Section 4 – Data Management .....	25
4.1 Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOPs) .....	27
Appendix A – Emission Inventory .....	31

## List of Acronyms

APCO - Air Pollution Control Officer

BTEX – Benzene, Toluene, Ethylbenzene, Xylene

CAL/OSHA – California Division of Occupational Safety and Health

CARB – California Air Resources Board

EPA – Environmental Protection Agency

GC – Gas Chromatograph

H<sub>2</sub>S – Hydrogen Sulfide

HARP - Hotspots Analysis and Reporting Program

LDL – Lower Detection Limit

OEHHA – Office of Environmental Health Hazard Assessment

MET – Meteorological Station

NO<sub>x</sub> – Nitrous Oxide

PPB – Parts per Billion

QA/QC – Quality Assurance / Quality Control

QAPP – Quality Assurance Project Plan

REL – Recommended Exposure Limit

SJVAPCD – San Joaquin Valley Air Pollution Control District

SJR – San Joaquin Refinery

SO<sub>2</sub> – Sulfur Dioxide

SOP – Standard Operating Procedure

UDL – Upper Detection Limit

## Overview

On December 19, 2019, the San Joaquin Valley Air Pollution Control District (SJVAPCD) adopted a new rule: Rule 4460 concerning Petroleum Refinery Fence-line Air Monitoring.

Rule 4460 requires petroleum refineries operating under SJVAPCD's jurisdiction with refining capacity less than 40,000 barrels per day to submit to the District a written fence-line air monitoring plan for establishing and operating a real-time monitoring system. The plan is to consider the monitoring for benzene, toluene, ethylbenzene, and xylene (BTEX) gases, as well as hydrogen sulfide (H<sub>2</sub>S), and sulfur dioxide (SO<sub>2</sub>) gases. The purpose of the monitoring plan is to evaluate potential hazards to at-risk populations located near the refinery, present a list of air monitoring systems to be used to measure the emissions at the boundary of the refinery, and to present the information from the air monitoring systems to the public on a real-time basis. The critical tasks addressed in the development of the plan are included in the following sections:

- [Section 1](#) presents an evaluation of emission sources and community impact associated with emissions from the San Joaquin Refinery. This includes locating the individuals and organizations who might be considered sensitive receptors within a one-mile boundary of the refinery, along with the using of dispersion modeling and wind rose analysis to evaluate downwind impacts to communities.
- [Section 2](#) presents the proposed site locations for the fence-line air monitoring systems at the San Joaquin Refinery and an evaluation of specific fence-line air monitoring systems to be used to detect refinery emissions at the fence line.
- [Section 3](#) presents an overview of the presentation of the fence-line data to the public including a real-time public access website.
- [Section 4](#) presents the data management program including an outline of the Quality Assurance Project Plan.
- [Appendix A](#) presents the emission data used to model the downwind impact of the target pollutants.

## Section 1 – Evaluation of Emission Sources and Community Impact

### 1.1 Facility Description

The San Joaquin Refinery (SJR) is located in Bakersfield, California and specializes in supplying products for numerous applications including printing inks, lubricants, rubber and plastics, adhesives, paints and coatings, electrical insulating, fuels, road paving, asphalt recycling, and roofing. SJR feed stock includes refining San Joaquin Valley Heavy Naphthenic crude oil for developing its product. The facility produces less than 40,000 barrels per day of end goods.

### 1.2 Sensitive Receptors

SJR performed an extensive search of individuals and organizations who might be considered sensitive receptors within a one-mile boundary of the refinery. A real-time website will enable sensitive receptors as well as any individual in the community to evaluate when a detection of pollutants from the fence-line system is above normal background levels. This information can then be used by the interested parties to take appropriate action to minimize exposure from refinery emissions. Table 1.1 lists the potential sensitive receptors based on direction from the refinery. Table 1.2 shows a list of sensitive receptors located within a mile of the fence line boundary of the refinery.

**Table 1.1 – Potential Sensitive Receptors Based on Direction from Refinery**

Cardinal Direction from Fence Line	Sensitive Receptors within a One-mile Area of the Bakersfield Refinery Fence Line			Residential
	Schools/Daycare	Recreation Areas	Hospitals/Adult Health Facilities	
North				
Northwest	X			
Northeast	X			X
South		X		
Southwest		X		
Southeast		X	X	X
East			X	
West				

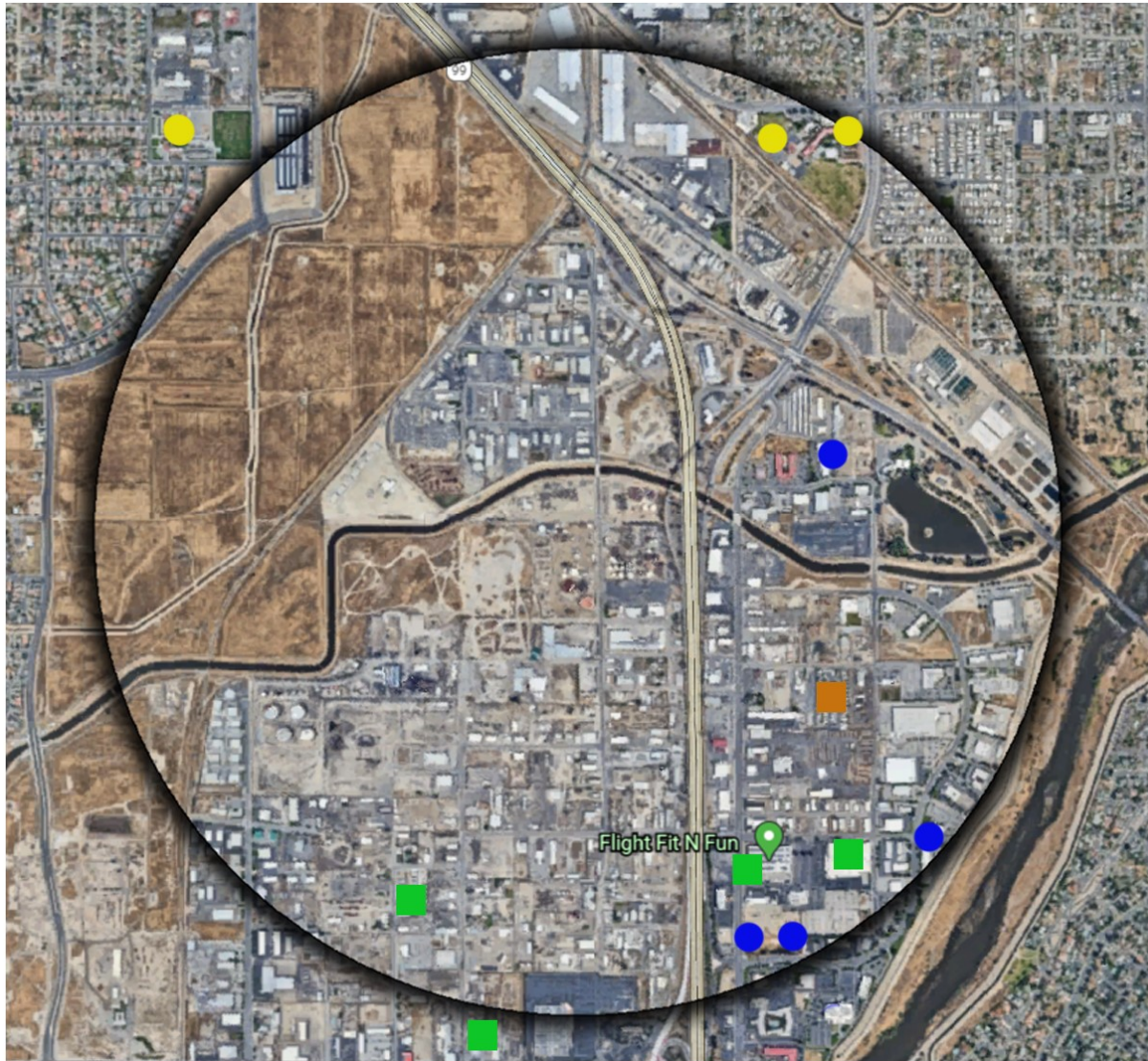
**Table 1.2 – SJR Sensitive Receptors with Addresses and GPS Coordinates**

Name and Type	Address	GPS Coordinates
Beardsley Junior High School-School	1001 Roberts Ln, Bakersfield, CA 93308	35.420160, -119.058740
Beardsley Elementary School-School	1001 Roberts Ln, Bakersfield, CA 93308	35.420160, -119.058740
San Lauren Elementary School-School	5210 Victor St, Bakersfield, CA 93308	35.407870, -119.060440
Flight Fit N Fun - Recreation Center	3200 Buck Owens Blvd Ste 100, Bakersfield, CA 93308	35.388760, -119.042220
Galaxy Gymnastics & Tumbling - Recreation Center	3101 Gilmore Ave #200, Bakersfield, CA 93308	35.388770, -119.040970
MCS CrossFit - Recreation Center	2620 Gibson St, Bakersfield, CA 93308	35.384720, -119.051700
Ferry Jiu Jitsu - Recreation Center	3104 Fairhaven Dr, Bakersfield, CA 93308	35.388450, -119.054310
Care Medical - Health Care	3232 Rio Mirada Dr # B3, Bakersfield, CA 93308	35.399310, -119.040470
Coram Healthcare - Health Care	3101 Sillect Ave # 109, Bakersfield, CA 93308	35.387780, -119.038210
Priority Care Clinic - Health Care	3012 Sillect Ave suite c, Bakersfield, CA 93308	35.386100, -119.040480
Kern Family Health Care - Health Care	2900 Buck Owens Blvd, Bakersfield, CA 93308	35.386100, -119.040480
Bakersfield Mobile Home Park - Residential	33219 Gulf St, Bakersfield, CA 93308	35.393030, -119.040200



Figure 1.1 shows the location of several types of sensitive receptors with respect to the refinery, including schools and childcare facilities, adult health facilities, recreation areas, and residential areas.

**Figure 1.1 – Sensitive Receptors within a Mile Radius of the SJR Refinery Fence Line**





### 1.3 Emission Sources

In order to determine the optimal location to site fence-line air monitoring equipment at the San Joaquin Refinery, annual emissions of applicable pollutants were used for input into a screening dispersion model, which was then used to determine conservative estimates of downwind impact on local communities. Total facility emissions used for the modeling, and the process of evaluating and determining their potential impact on downwind communities, followed guidelines outlined by the SJVAQMD. The emission source information was compiled from the Hotspots Analysis and Reporting Program (HARP) and used to determine source location. A map of the emission sources for the San Joaquin Refinery is shown in Figure 1.2.

**Figure 1.2 [Map of Emission Sources]**



It was decided to specifically focus on screening atmospheric dispersion models that could provide a conservative over-estimation of the impacts of the emissions at the refinery to see the worst-case impacts from the facility using the emission rates provided. The EPA SCREEN 3 model was selected, due to its international acceptance, either as an industry standard and/or regulatory use. It is designed to predict pollution concentrations from a continuous point, flare, area, line, and volume sources. In addition, the model was set up to give the worst-case scenario for emission releases based on the facility emission inventory. Downwind community impact was estimated by modeling release from the center of the refinery at low temperature and low release height to wind rose analysis gave an idea of the predominant wind directions for the dispersion of pollutants. This also provided an idea of which fence lines were going to receive the major impact.

**Evaluation of what pollutants to monitor:**

The result of this modeling for routine operations is shown in Table 1.3. The wind rose analysis is discussed below. Since all of these above-listed gases may be present during an unplanned release, the fence-line system will include technologies that have the capabilities to detect BTEX, H<sub>2</sub>S, and SO<sub>2</sub> as a method of determining potential impact to the community when an unplanned release occurs.

**Table 1.3 – Maximum Hourly Impact of Pollutants Modeled for Routing Operations**

	1 hr. Recommended Exposure Limit (REL)(ppb)	Source	Maximum Ground Level Concentration 0.3 miles (ppb)	Maximum Ground Level Concentration at Nearest Community (ppb)
Benzene	8.6	OEHHA	1.6	0.2
Toluene	9964	OEHHA	1.3	0.2
Ethylbenzene	TBD	-	0.7	0.1
Xylene	5142	OEHHA	1.1	0.2
Hydrogen Sulfide	30	OEHHA	0.1	0.0

## 1.4 Wind Rose Analysis

In addition to the modelling data, wind roses were generated using data obtained from the Figures 1.3 through 1.7. They show the wind roses from annual and seasonal data in 2018 and are superimposed on the SJR site location\*. The residential communities closest to the refinery are located to the northeast. Analysis of the wind data shows that on an annual basis the percentage of time winds are blowing toward the northeast is minimal. Data source - Bakersfield Municipal Airport

**Figure 1.3 – Winter (December – February) Wind Rose at San Joaquin Refinery**

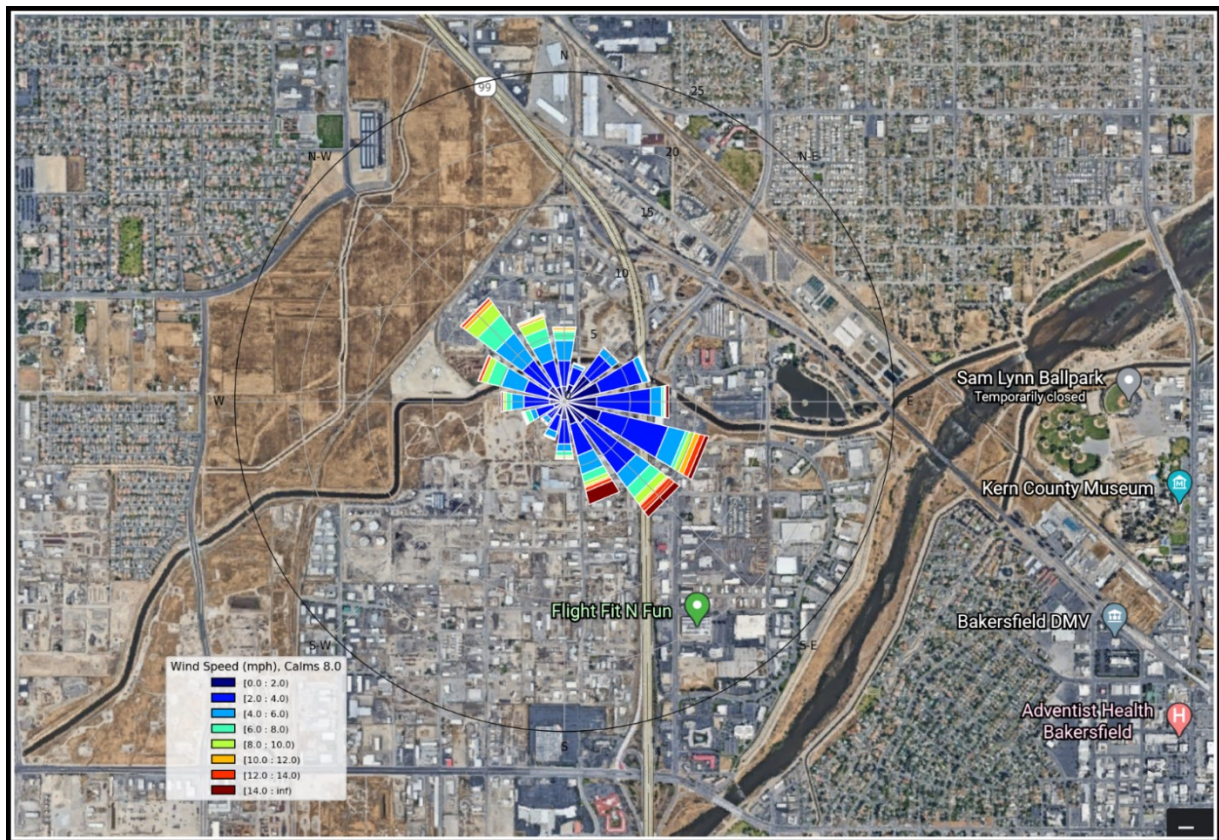




Figure 1.4 – Spring (March – May) Wind Rose at San Joaquin Refinery

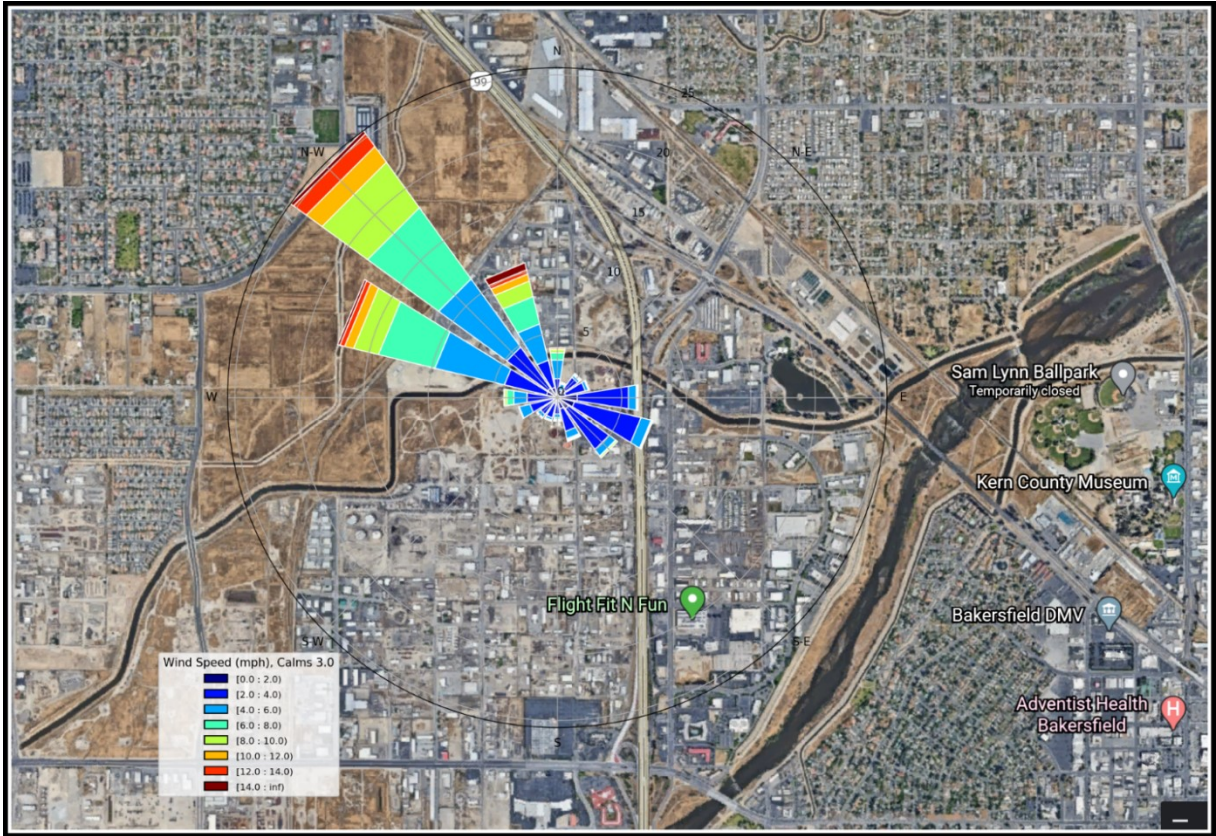


Figure 1.5 – Summer (June – August) Wind Rose at San Joaquin Refinery

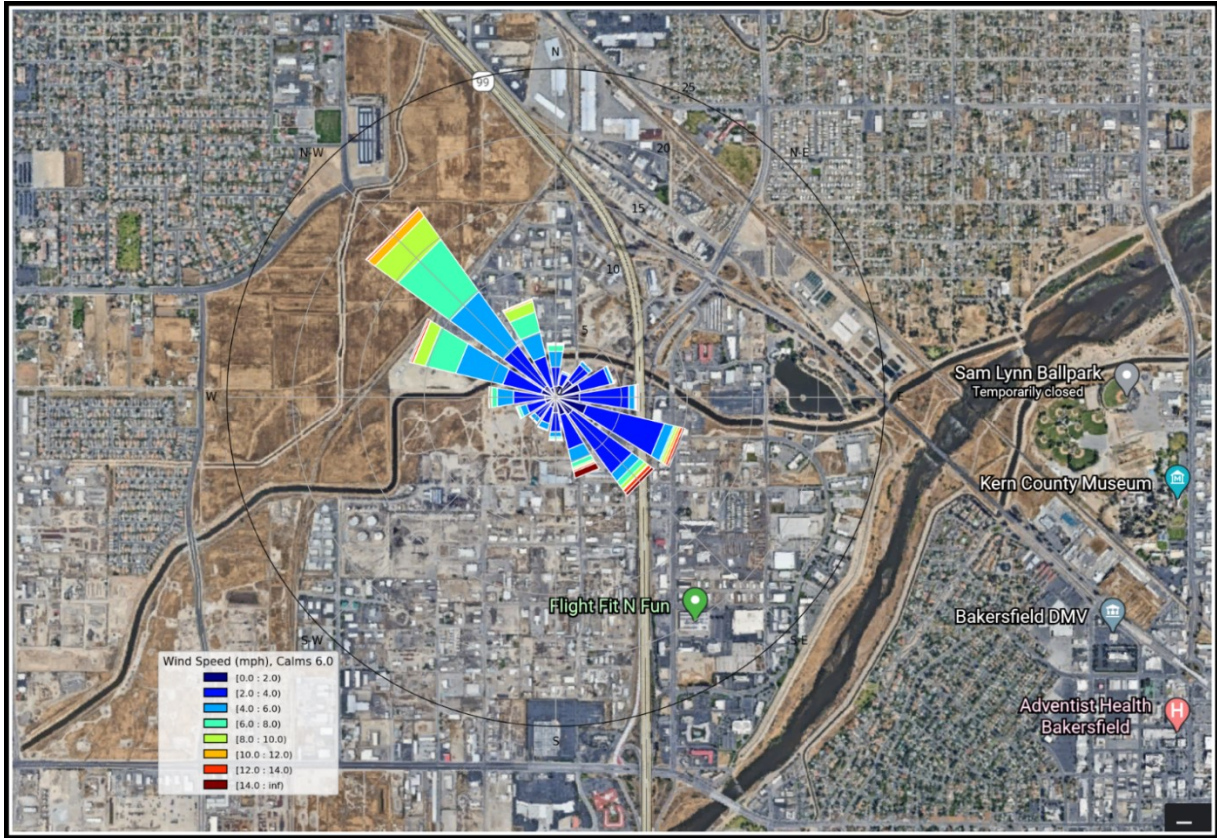




Figure 1.6 – Fall (September – November) Wind Rose at San Joaquin Refinery

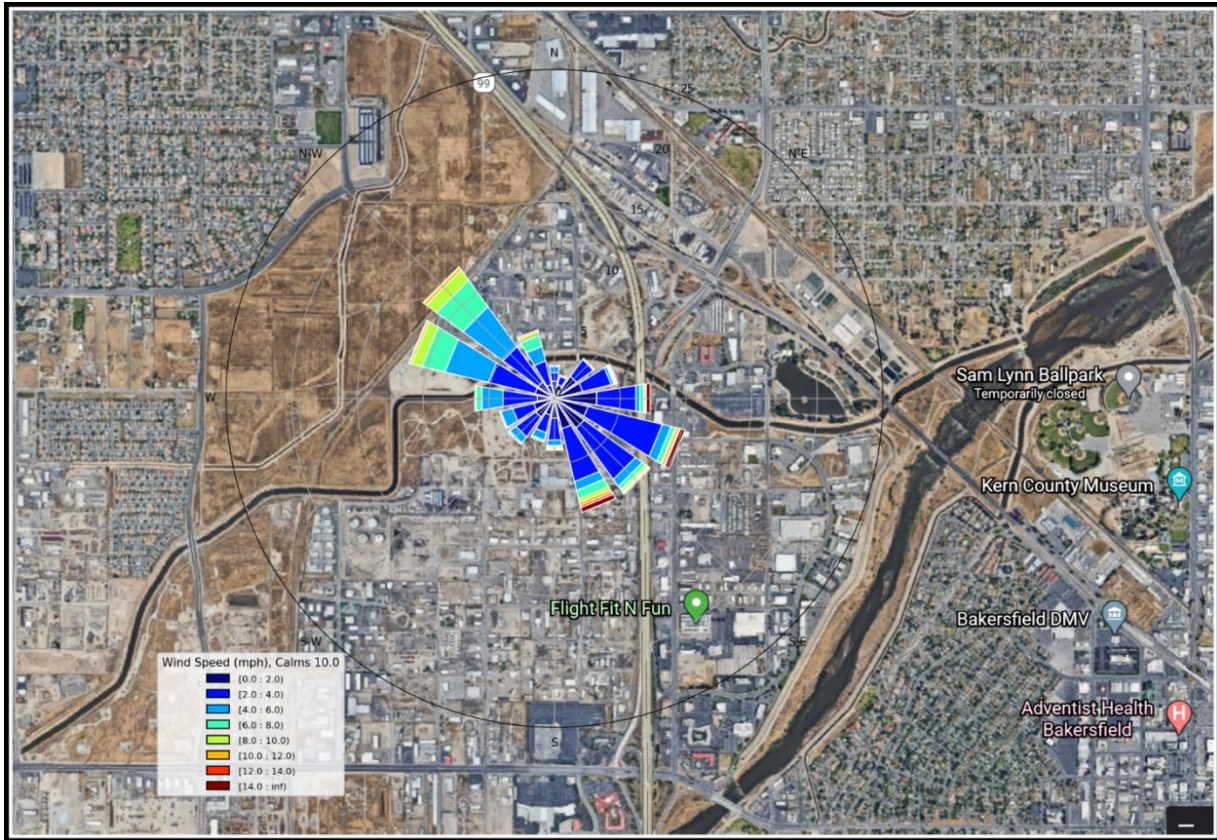
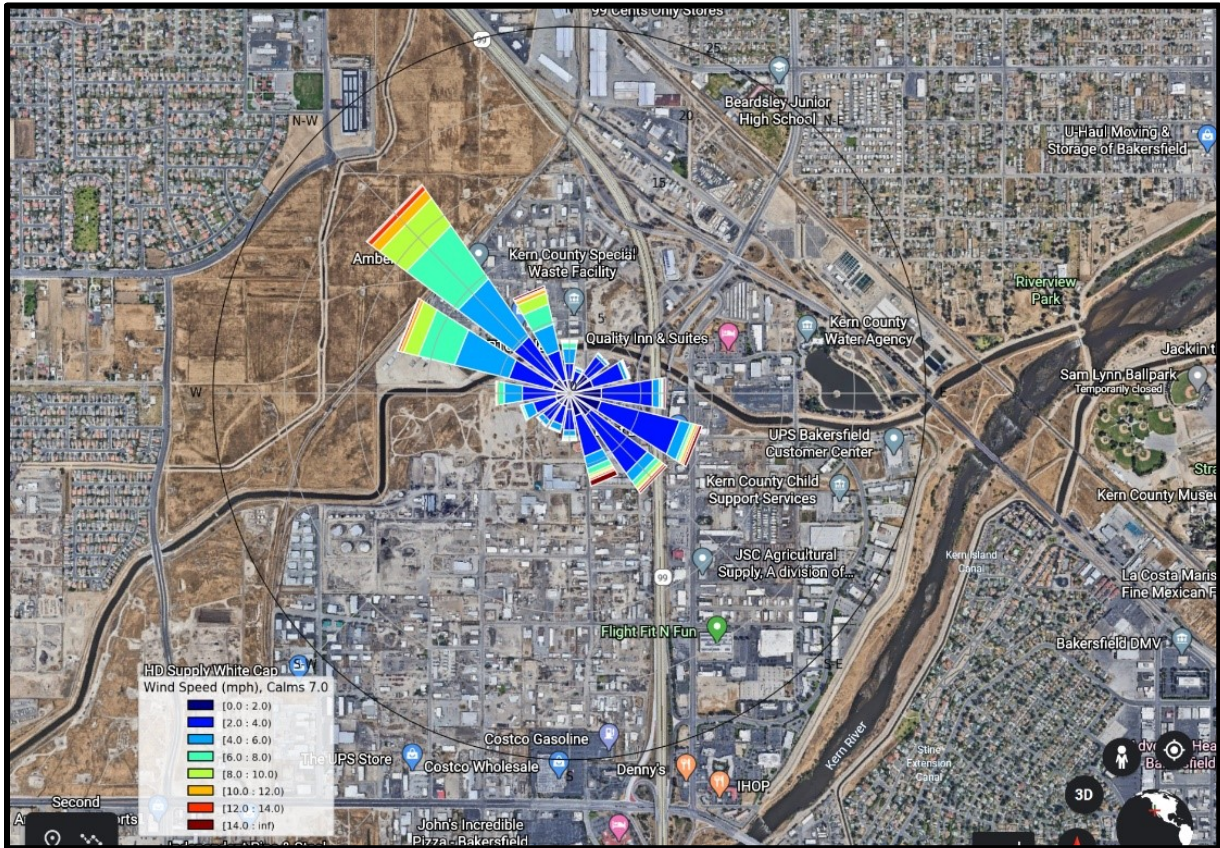




Figure 1.7 shows the wind rose generated from annual and seasonal data in 2018 superimposed on the SJR site location. The community closest to the refinery is located to the northeast. Analysis of the wind data shows that on an annual basis, the winds are blowing toward the northeast less than ten percent of the time.

Figure 1.7 - Annual Wind Rose





## Section 2 – Proposed Fence-line Monitoring Systems and Site Locations

The most suitable technology to detect refinery emissions at the SJR during non-routine events are systems that can detect benzene, toluene, ethylbenzene, and xylene (BTEX) gases, as well as hydrogen sulfide (H<sub>2</sub>S), and sulfur dioxide (SO<sub>2</sub>) gases. A brief discussion of the system along with the technology used for meteorological measurements are given below.

### 2.1 Monitoring Technology Descriptions

#### Open-path UV Air Monitoring Systems

The measurements of BTEX gases and SO<sub>2</sub> can be achieved using a short path (less than 50 meters) open-path UV-DOAS air monitoring system. The light source for a short path system is a deuterium lamp which is different from a long-path system that uses a xenon lamp. The benefit of a deuterium lamp is it enables the UV-DOAS system to identify and quantify gases in the spectral region where gases such as H<sub>2</sub>S absorb light. These systems are comparable to point sampling stations used by regulatory agencies to measure gases in the ambient air.

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 reflector at the other end of the beam path. The light beam is then transmitted back to the base unit where the light spectra is analyzed. 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 that contains the target gases. It is anticipated the length of time needed for routine maintenance will be less than four hours per month.

#### Hydrogen Sulfide Point Monitoring System

Hydrogen sulfide (H<sub>2</sub>S) will be monitored using Teledyne/Advanced Pollution Instrumentation (Teledyne/API) T101 hydrogen sulfide analyzers. In the T101 analyzer, sulfur dioxide is removed from the sample gas in a scrubber. Hydrogen sulfide in the sample gas then is converted into sulfur dioxide in a molybdenum converter operating at 315 °C, designed to minimize conversion of reduced sulfur species other than hydrogen sulfide. Sulfur dioxide then is measured through excitation by ultraviolet (UV) light, where sulfur dioxide molecules absorb UV light and become excited at one wavelength, then decay to a

lower energy state emitting UV light at a different wavelength. The emitted light is captured on a photomultiplier tube through a bandpass filter tuned to wavelengths emitted by excited sulfur dioxide molecules and is translated into a reading of hydrogen sulfide concentration. The instruments will be configured to collect and record data in five-minute averages.

**Meteorological Station**

In addition to the air monitoring equipment, a meteorological station (MET) will be installed at the refinery. The station will provide wind speed, wind direction, temperature, and relative humidity measurements. With both open-path methods or point detection, using the data in combination with the metrological data from a MET station located on site is helpful in determining where sources of gases come from, and in which direction the gases are moving.

**Table 2.1 – Monitoring Technology Detection Limits\***

Distance (25 meters)	Path 1	
	LDL (ppb)	UDL (ppb)
Gas		
Benzene	0.9	5,483
Ethylbenzene	12	10,0000
Hydrogen Sulfide	2.0	500
Sulfur Dioxide	2.1	2,202
Toluene	2.8	2,742
Xylene	1.6	2,742

\* Detection limits were determined using EPA Method TO-16 and may vary due to field conditions

**Backup Monitoring Equipment**

In the event the UV-DOAS system is offline for extended periods of time, (> 96 hours), SJR will provide temporary monitoring using 24-hr volatile organic compound (VOC) canister sampling.

## 2.2 Proposed Locations for Monitoring Equipment

Based on the modeling analysis and wind rose analysis, most emissions are transported from the refinery a southeasterly direction. For this reason, the design of the location of the monitoring equipment for BTEX gases, H<sub>2</sub>S, and SO<sub>2</sub> is intended to capture pollutants transported in this direction where a community is within one mile of the refinery fence line. The following analysis presents the siting evaluation for each sector of the refinery:

**Northwest Side of Refinery** - Based on the wind rose analysis, there is minimal impact on the community located Northwest of the refinery.

**Southeast Side of Refinery** - Based on the air dispersion, modeling emissions from the refinery will impact the community southeast of the refinery a significant amount of the time. For this reason, a short-path UV monitor that detects benzene, toluene, ethylbenzene, xylene, hydrogen sulfide, and sulfur dioxide on a real-time basis will be placed to cover the southeast side of the refinery. The location of the analyzer and the Met Station are presented in Figure 2.1 as location number one.

**Southwest Side of the Refinery** - Based in the wind rose analysis, there is minimal impact on the community located Northeast of the refinery.

Figure 2.1 presents the proposed locations for the fence-line air monitoring systems at the San Joaquin Refinery. Table 2.1 presents the specific site information associated with the proposed monitoring equipment.

**Figure 2.1 - Map of Fence-Line Monitoring**

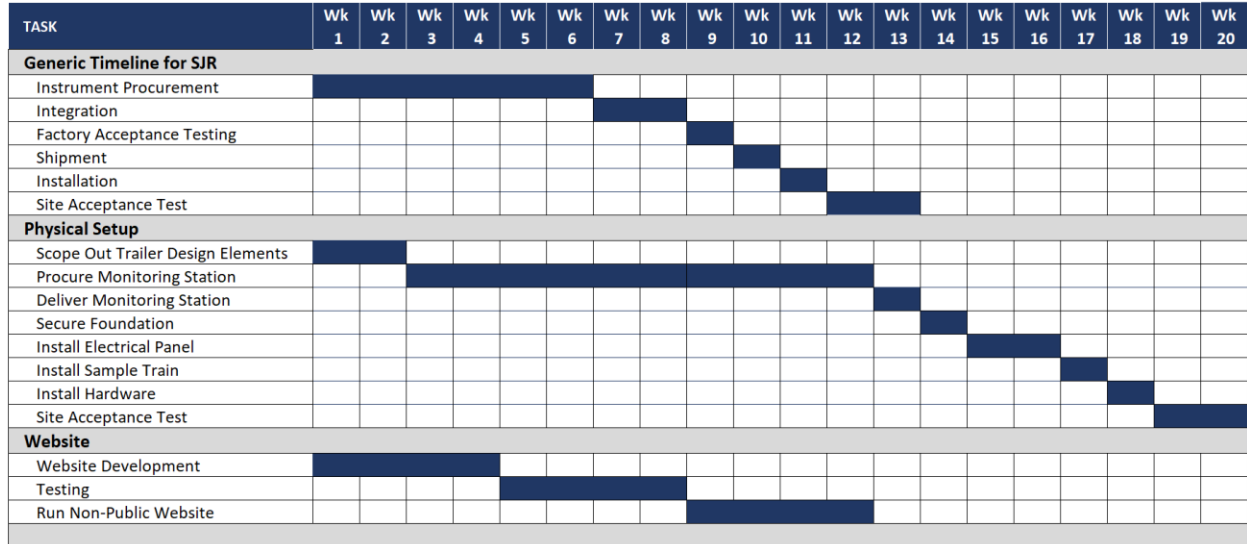


**Table 2.2 – Geographical Location of Equipment for Pollution Coverage**

Location Identifier	Equipment	Latitude	Longitude
1	Monitoring Station	35° 23' 45.15 N	119° 02' 43.66" W

## 2.3 Generic Timeline for SJR System Implementation

**Figure 2.2**



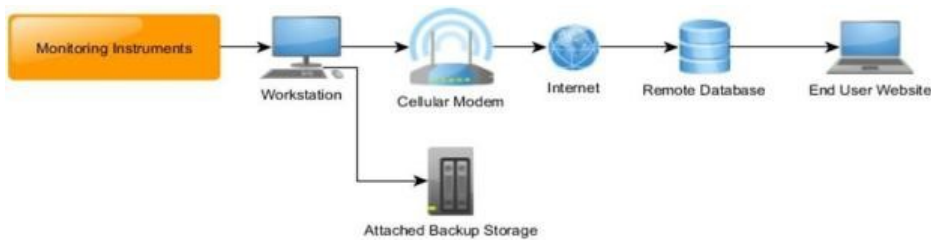
**Table 2.3**

Generic Timeline for SJR	Weeks
Instrument Procurement	6
Integration	2
Factory Acceptance Testing	1
Shipment	1
Installation	1
Site Acceptance Test	2
<b>Physical Setup</b>	
Scope Out Trailer Design Elements	2
Procure Monitoring Station	10
Deliver Monitoring Station	1
Secure Foundation	1
Install Electrical Panel	2
Install Sample Train	1
Install Hardware	1
Site Acceptance Test	2
<b>Website</b>	
Website Development	4
Testing	4
Run Non-Public Website	4

## Section 3 – Data Presentation to the Public

All air monitoring equipment specified for the SJR fence-line system will collect data from the analyzer every five minutes and be transmitted to an Internet website where the real-time results can be viewed by the public. Figure 3.1 provides an example of how the monitoring data will be communicated.

**Figure 3.1 - Data Communication System**



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, QA/QC checks are being conducted, or in other conditions where an analyzer is not in an operational state for an extended period. In addition, the public will be able to send E-mails 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.

### General Description of the Community Website

As part of the fence-line monitoring program, a public website will be created to educate the public on the information provided by the fence-line monitoring system. The site will present air monitor readings and is designed as an educational tool to inform the community, as well as answer questions about the air monitoring system used to capture these readings. The website will include four major sections:

- Learning Center
- Resources and Contacts
- Real-time Data
- Reports and Archives

#### Learning Center

The website will include a learning center to educate the public on the information provided on the site,

which will include the following elements:

- Where the fence-line monitors are located
- Why these locations were selected
- What chemicals are being monitored
- What equipment is being used
- Terms and definitions

### **Resources and Contacts**

Resources and contact information will be provided for the general public to inquire about this website, the monitoring program, and resources associated with the possible health effects of the toxics being monitored. Resource links will include:

- The 24-hour phone number provided by SJR
- The contractor operating and maintaining the fence-line system
- The San Joaquin Valley Air Pollution Control District (SJVAPCD)
- The California EPA Air Resources Board (CARB)
- The California Division of Occupational Safety and Health (Cal/OSHA)
- The California Office of Environmental Health Hazard Assessment
- The U.S. Environmental Protection Agency
- The World Health Organization

### **Real-time Data Display**

Data will be updated from the analyzer every five minutes and displayed as one-hour and eight-hour averages. In addition, the website will include a method for the general public to sign up for notifications that will give them status updates associated with the community website. These updates will include notifications when instrument readings are above preset levels, an instrument is offline or inoperable, when maintenance is being performed on the instruments, and when any other significant event associated with the fence-line monitoring programs occurs. The website will include the following:

- Information regarding the analyte measured and the measurement techniques
- Discussion of levels of concern for each measured analyte
- Definition of data QC flags
- When monitor or system is offline, flag/notification identified  
online explaining the loss of data
- Links to additional sources of information, as necessary
- Details of how the public can report experiences and provide comments and feedback for improvement of the website and other data dissemination tools and the monitoring activities in general



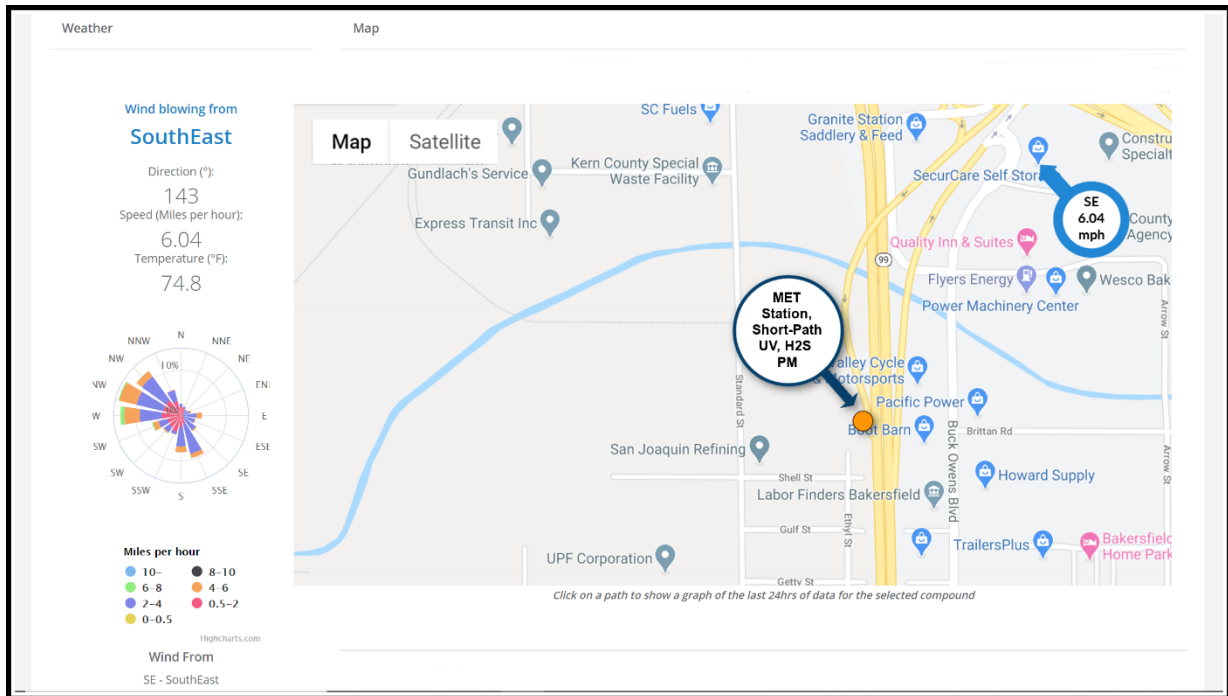
## Reports and Archives

The public will be provided access to an archive of air quality monitoring reports gathered by the air quality monitoring system. Figures 3.2 through 3.4 present the website concept for the fence-line monitoring system.

Figure 3.2 – San Joaquin Refinery Community Website Home Screen



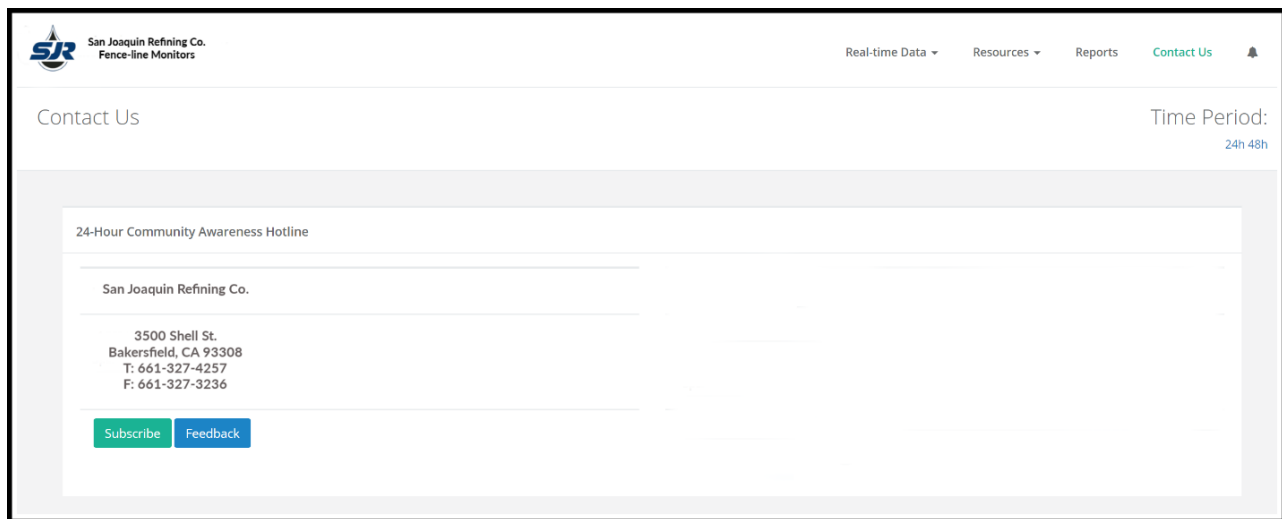
Figure 3.3 – San Joaquin Refinery Community Website Interactive Map Concept Page



When the San Joaquin button is clicked, an interactive map will be seen that consists of:

- Short-path UV monitor, H<sub>2</sub>S Point Monitor, and MET, with labels (SJR boundary lines added, if needed)
- An information box with an accompanying arrow to indicate wind direction and speed
- A consistently updating table below the map (not shown in this concept) that lists all the detectable gases, and their current detected concentrations

**Figure 3.4 – Email Notifications**



### **Alternative Communications Methods**

Other methods of communicating the data to the public include the following:

- Automated email notification system
  - Click on the “subscribe” button on the [Contact Us](#) page.
  - Enter email for notifications.
- Published quarterly data summary reports

## Section 4 – Data Management

Data generated by the fence-line monitoring equipment will undergo review throughout the measurement and reporting process. Included in this process are automated QA/QC checks that occur before data is reported on the real-time website. A complete description of the quality assurance project plan (QAPP) is included in the Quality Assurance Project Plan for the San Joaquin Fence-Line Monitoring Program. Under normal circumstances, a measurement will appear on the website within 10 minutes of the end of the measurement period. All data generated by the monitoring equipment will be retained for a period of five years after collection.

However, the data uploaded may be impacted by Internet traffic. An automated system conducts the Q/A checks before the data is reported to the website. The site will also make available a rolling 24-hour trend of the five-minute data for each gas reported. Table 4.1 lists the real-time automated data quality checks.

**Table 4.1 – Real-time Data Quality Checks**

Real-Time Check	Check	Action
<b>Instrument Error Code</b>	Instrument Error Code	Real-time website reports "offline" message. E-mail sent to SJR and fence-line contractor. Website message board updated to inform community that analyzer troubleshooting underway. Website updated when system is back online.
<b>Instrument Workstation Offline</b>	Instrument Communication Check	Real-time website reports "offline" message. E-mail sent to SJR and fence-line contractor. Website message board updated to inform community that computer workstation troubleshooting underway. Website updated when system is back online.
<b>Internet Connection Lost</b>	Backup Connection Enabled	E-mail sent to SJR and fence-line contractor. Community is not notified because backup connection will be enabled.
<b>High Detection</b>	Valid Data Detection Above Threshold	Real-time website indicates detection above alarm threshold by color change for gas. Notification sent to SJR and fence-line contractor. Contractor will examine raw data to validate detection. SJR will initiate investigation into source. Message board on website will be updated with information as available.

The entire fence-line 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 performance criteria, a message is generated and sent to key personnel at SJR and the contractor who will begin activities to correct the problem. If an issue cannot be immediately corrected, the real-time website will be updated with a notification explaining the problem and the corrective action activities. Table 4.2 lists elements and the performance thresholds.

**Table 4.2 - Real-time Instrument Performance Checks**

Problem	Notification	Action
Analyzer offline	Notification sent to contractor and SJR	Website updated with analyzer offline message. Technician dispatched to correct issue.
Workstation fails	Notification sent to contractor and SJR	Website updated with analyzer offline message. Technician dispatched to correct issue.
Internet communication failure	Notification sent to contractor and SJR	Backup Internet connection activated

In addition to the real-time data checks, data from the fence-line system will be reviewed and validated monthly with the results stored in a separate portion of the monitoring database from the raw data. Data review and validation include but are not limited to the following:

- Non-field data such as calibration data
- Spurious data associated with power or mechanical issues

Data that has been flagged as non-valid will be retained along with a notation for the reason it was flagged. Table 4.3 summarizes the process by which monitoring data is reviewed and post processed.

**Table 4.3 – Monthly Data Validation Checks**

Post Process Data Check	Check	Action
<b>Non-field Data Check</b>	Maintenance logs and QA/QC logs will be checked to see when systems were not in normal operating mode.	Quality Assurance Manager will flag any data that meets these criteria. Data will be excluded from QA/QC report.
<b>Spurious Data</b>	Instrument error codes will be checked and flagged if instrument error codes are recorded.	Quality Assurance Manager will flag any data that meets these criteria. Data will be excluded from QA/QC report.

#### 4.1 Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOPs)

The QAPP and SOPs will be living documents that will be updated and revised as SJR and its contractors gain experience operating, maintain and managing their fence-line monitoring system. These documents will be reviewed periodically and revised and reapproved as needed. This will include an annual review and five-year updates or more frequently if significant changes are made. The QAPP and SOPs will be submitted for review and approval by SJV when the final equipment is selected for the fence-line program. The plan will be reviewed by a third-party auditing process that will be reviewed by SJVAPCD. Finally, it is understood that SJVAPCD may periodically audit the QAPP and SOPs. The following items will be included in the QAPP:

#### **Outline - Quality Assurance Project Plan for Fence-Line Monitoring Program**

- Document Control Page
- Signatory Page
- Table of Contents
- Distribution List

#### **Section #1 - Project Management**

- Fence-line Monitoring Task Organization
- Key Refinery Personnel
- Key Contractor Personnel
- Contractor Program Manager
- Contractor Quality Assurance Manager
- Contractor Data Processing Manager
- Contractor Field Technician

## **Section #2 - Description of the Fence-Line Program**

- Objective of the monitoring program
- Site map
- Physical description of equipment location including GPS coordinates, elevations, and monitoring equipment
- Upper and lower detection limits for each pollutant

## **Section #3 – Description of Hardware**

- Analyzer description
- Meteorological station
- Data collection equipment
- Workstations
- Routers
- Remote restart equipment
- Cloud-based data storage

## **Section #4 - Quality Management System**

### **Instrument Quality Assurance Quality Control**

#### Level 0 Continuous Real-time Operational Checks

- Monitor instrument error codes

#### Level 1 Monthly Checks

- Evaluate system noise
- Calibration checks

#### Level 2 Quarterly Checks

- Detection limit checks
- Precision, linearity, accuracy checks

#### Level 3 Annual Checks

- Annual servicing of instruments
- Preventive maintenance
- Validate systems are meeting original factory acceptance specifications

### **Data Management Quality Assurance Quality Control**

#### Level 0 – Continuous Real-time Checks

- Real-time validation of the data using two methods for quantification

#### Level 1 – Daily Review of Data

- Operational staff daily review



#### Level 2 – Weekly Review Data

- Validation staff review considering historical and similar measurements

#### Level 3 – Monthly Review of Data

- Supervisor level review with consideration of interrelationships with other data

### **Monitoring Program Response**

#### Level 0 – Real Time System Checks

- Real-time notification of instrument error code
- Real-time notification light signal from open-path monitoring

#### Level 1 – Daily System Checks

- Check community website three times per day

#### Level 2 – Monthly Report and Review of Operational Performance

- Review on-stream efficiency

#### Level 3 – Annual Audit

- Annual independent audit of fence-line monitoring program

### **Section #5 - System Maintenance**

- Maintenance and service based on real-time error code
- Monthly maintenance check of instruments
- Quarterly preventive maintenance
- Annual service from certified manufacture representative

### **Section #6 – Training**

- Field work training
  - System alignment
  - Routine analyzer maintenance
  - QA checks on site
- Data analysis
  - Verification of detections
  - Data validation

### **Section #7 – Document Control**

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

## Appendix A – Emission Inventory

Gas	Emission Rates (lbs./year)
Benzene	1650
Toluene	1670
Ethylbenzene	957
Xylene	1610
Hydrogen Sulfide	43.6

## **ATTACHMENT**

### **Summary of Public Comments and District Responses for Proposed Fenceline Air Monitoring Plan**

## SUMMARY OF COMMENTS

April 7, 2021

The District published and noticed the proposed fence-line air monitoring plan for San Joaquin Refining on January 22, 2021. The following summary of written comments were received during the public comment period from the following: Comité Progreso De Lamont; Committee for a Better Arvin; Committee for a Better Shafter; Association of Irrigated Residents; Center on Race, Poverty & the Environment; Central California Environmental Justice Network; Lost Hills in Action; Clean Water Action; and Earthjustice.

1. **Comment:** The coverage gap on the northwest side of the petroleum refinery fenceline ignores residences, wind direction modeling, and emission sources.

**Response:** The predominant wind direction blows from northwest to southeast. The proposed plan provides monitoring on the southeast boundary. This provides sufficient coverage for the residences located predominantly downwind from the refinery and satisfies the requirements of District Rule 4460.

2. **Comment:** The Plan fails to explain the coverage gaps around the northwest perimeter of the petroleum refinery containing an emission source.

**Response:** See Response to Comment 1

3. **Comment:** The Plan fails to adequately explain the gap in fenceline coverage on the northeast perimeter, despite the closest residential areas being to the northeast.

**Response:** See Response to Comment 1

4. **Comment:** The Plan fails to adequately describe how the monitoring system will cover the identified impacted communities.

**Response:** See Response to Comment 1

5. **Comment:** The monitoring path distance requires detailed information regarding its potential impacts on instrument measurements. The Plan proposes the use of Ultra Violet-Differential Optical Absorption Spectroscopy (“UV-DOAS”) monitoring equipment. The southeast monitoring system would use a short path open-path UV-DOAS monitoring system to detect benzene, toluene, ethylbenzene, and xylene (or “BTEX” gases). The typical path length for UV-DOAS systems is 500 meters. The Plan proposes to use a short path system of “less than 50 meters” with a deuterium lamp, but fails to describe whether and how the proposed path length and lamp choice would affect pollutant measurements. Moreover, the Plan marks the location of the monitoring system but does not provide information regarding the reflector or the precise path of the UV-DOAS equipment.

**Response:** According to a contractor implementing these devices, UV-DOAS successfully measures chemical species up to about 600 meter (one-way path length), and shorter monitoring lengths should not cause any issues. The air monitoring equipment also meets the lower monitoring detection requirements. Continuous, monthly, quarterly, and annual checks will ensure that this equipment is operating in a manner that meets specification requirements. Therefore, the proposed plan satisfies the requirements of District Rule 4460.

6. **Comment:** The Plan should include details regarding the height of the monitoring station and obstructions that could cause interferences. The Plan does not include a proposed height for the air monitoring system, nor does it address whether and how the height of the monitoring station could impact signal interference or whether pollutants could escape detection. In addition, the Plan fails to address any potential obstructions at the monitoring site that could also cause interferences with pollutant measurements.

**Response:** As shown by the map on page 18 of the Plan, the proposed air monitor is located in an open lot without any obstructions. The precise heights will be determined after the plan is approved, and the engineering phase of the project has begun.

7. **Comment:** The Plan omits the specific distances of sensitive receptors from the petroleum refinery and fails to include all the sensitive receptors in the area.

**Response:** On page 7 of the Plan, locations of sensitive receptors are identified on a map within a one mile radius circle. This allows the reader to determine the approximate distance of all receptors relative to the refinery. The predominant wind direction blows from northwest to southeast. The Plan provides monitoring on the southeast fence line. This provides sufficient coverage for the residences located predominantly downwind from the refinery and therefore satisfies the requirements of District Rule 4460.

8. **Comment:** The Plan fails to provide detailed information about how pollutants from the petroleum refinery are distributed in the impacted community.

**Response:** See Response to Comment 1

9. **Comment:** The Plan fails to address the impacts of calm winds, non-prevailing wind direction, and other meteorological conditions such as inversions.

**Response:** See Response to Comment 1

10. **Comment:** The Plan fails to explain why it used wind data from only one year that might not be representative of typical wind conditions.

**Response:** The windrose is intended to provide the frequency of the wind direction and wind intensity over a given time period. The predominant wind direction in the Valley may vary between seasons of the year but does not vary significantly on a year to year basis. Therefore, the 1-year average data is sufficient to capture the general wind patterns and determine the predominant wind direction.

11. **Comment:** The Plan does not specify how community members without internet access or limited English language proficiency will access data. The Guidance states that air monitoring plans should identify alternative methods of accessing reports for community members without internet access, including via mobile application and/or automated text notification. The Plan notes that its alternative communications methods will consist of automated email notifications and published quarterly reports. But, community members would still need internet access to sign up for and to receive the automated email notifications. The Plan also fails to describe whether it will make reports available in hard copy or if they will only be available online. Moreover, the Plan does not specify whether it will provide reports or information in a language other than English, which the Guidance recommends doing based on community needs.

**Response:** The District's *Petroleum Refinery Fence-line Air Monitoring Plan Assistance Documentation* is intended to provide assistance to refineries developing fenceline air monitoring plans. District Rule 4460 specifically only requires that quarterly reports be submitted to the District, which can be made available in hard copy to the public upon request.

12. **Comment:** The Plan is vague about the types of data it will make available to the public, local response agencies, and Valley Air. The Guidance requires that air monitoring plans include "real-time current and historical air pollutant and meteorological data," as well as quarterly data summary reports that describe the pollutants' "relationship to health thresholds." The Plan, however, includes no mention of historical air pollutant data or historical meteorological data. In addition, although the Plan discusses making monitoring data publicly available, it does not provide details on the extent of pollutant data it will agree to publish and whether it will include the relationship of the measured pollutants to health thresholds.

**Response:** The District's *Petroleum Refinery Fence-line Air Monitoring Plan Assistance Documentation* is intended to provide assistance to refineries developing fenceline air monitoring plans. District Rule 4460 requires maintenance of onsite records of all information required under the rule for at least five years, which must be made readily available to the District upon request. The Plan states on page 25 that all data generated by the monitoring equipment will be retained for a period of five years after collection. As identified on page 16 of the Plan, the monitoring equipment measures meteorological conditions and concentrations levels of various pollutants. This includes wind speed, wind direction, temperature, relative humidity, benzene, toluene, ethylbenzene, xylene, sulfur dioxide, and hydrogen sulfide. As such, the record retention proposed in the Plan satisfies this requirement.



13. **Comment:** The Plan lacks detailed information regarding its quality assurance and quality control procedures. The Guidance requires fenceline air monitoring plans to include “detailed information” on procedures for implementing quality assurance and quality control measures. The Plan omits detailed information on its quality assurance procedures, quality control measures, and standard operating procedures—instead, the Plan includes only a basic outline.

**Response:** The District’s *Petroleum Refinery Fence-line Air Monitoring Plan Assistance Documentation* is intended to provide assistance to refineries developing fenceline air monitoring plans. The development and implementation of a fenceline air monitoring system is complex and resource intensive. Therefore, the Plan must be approved prior to implementation. The fenceline air monitoring plan provides a detailed outline of what will be included in the Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOPs), which will provide the facility with the processes that will be followed to ensure the collection of quality data. During the implementation phase, and as the equipment is installed and established, further details of the QAPP and SOPs can be developed.

14. **Comment:** The Plan lacks details on its procedures for maintaining air monitoring equipment to secure reliable emissions data. The Guidance requires plans to include details on maintenance procedures, including what temporary air monitoring measures will be implemented during routine maintenance activities and when systems need repair. The Plan, however, states only that it anticipates routine maintenance will be required less than four hours per month, and includes no details on the maintenance procedure.

The Plan lacks details on its backup monitoring system during system downtimes for maintenance or repairs. As previously noted, the Plan states that it will deploy its backup monitoring system when the main system is offline for more than 96 hours. This downtime is excessive; the petroleum refinery should deploy the backup system after 24 hours or explain why doing so would be infeasible. In addition, the Plan lacks details about the backup monitoring system, stating only that it will use 24-hour volatile organic compound canister sampling. Without details on the number of VOC canisters it will deploy and the measures it will use to monitor other pollutants, it is impossible to assess the adequacy of the backup system.

**Response:** Downtime for routine maintenance are expected to be less than 4 hours per month. Longer downtime would be due to breakdowns, which are subject to strict District Rule 1100 requirements. This includes notification to the District no later than one hour after detection and taking immediate appropriate corrective measures. The 96 hours will provide the necessary time for the facility to diagnose, address the breakdown, and bring the monitor back online or implement the backup monitoring if necessary. Furthermore, the temporary 24-hour volatile organic compound canister sampling would be performed until the primary air monitoring system is operational.