



Refinery Emergency Air Monitoring Assessment Report

Objective 1: Delineation of Existing Capabilities

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California Environmental Protection Agency
 **Air Resources Board**



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REFINERY EMERGENCY AIR MONITORING ASSESSMENT REPORT

Objective 1: Delineation of Existing Assets and Resources

I. EXECUTIVE SUMMARY

This report provides comprehensive information on existing assets and resources for emergency air monitoring around California's major oil refineries. Air Resources Board (ARB) staff from the Monitoring and Laboratory Division's Office of Emergency Response (OER) compiled this information with the cooperation of the California Air Pollution Control Officers Association's (CAPCOA) participating air districts, the refineries, and local, State, and federal emergency response authorities. The report fulfills Objective 1 of the ARB-CAPCOA Project Plan, *Air Monitoring for Accidental Refinery Releases: Assessment of Existing Capabilities and Potential Improvements* that was issued in July, 2013. It is an integral component of the Governor's Interagency Refinery Task Force (IRTF) work on refinery safety.

ARB has inventoried current monitoring protocols, methods, and capabilities of the major refineries, the respective local air districts, and other oversight/response agencies in the State. The inventory includes information on physical monitoring systems, methods for equipment deployment/use for local emergency air monitoring, data gathering, and procedures for informing emergency management officials and the public. It focuses only on monitoring for off-site impacts of unplanned emergency releases. Other types of ambient air or process emissions monitoring are considered only to the extent that they could provide actionable measurements during an emergency at one of California's designated major refineries. Table ES-1 lists the major refineries by air district and Figure ES-1 diagrams their general locations.

The inventory identifies a number of notable air release emergency preparedness and response practices that were found to be common among refineries, air districts, and local response agencies statewide. For example, all refineries conduct periodic emergency drills and exercises with local fire and hazmat authorities. All refineries

Table ES-1 California Refineries

Bay Area Air Quality Management District	Chevron Richmond Tesoro Martinez Shell Martinez	Valero Benicia Phillips 66 Rodeo
South Coast Air Quality Management District ¹	Chevron El Segundo ExxonMobil Torrance Phillips 66 Wilmington	Tesoro Wilmington/Carson Valero Wilmington Paramount Petroleum Paramount
San Joaquin Valley Air Pollution Control District	Alon USA Kern Oil Bakersfield	San Joaquin Refining Co.
San Luis Obispo Air Pollution Control District	Phillips 66 Santa Maria	

are required to perform risk assessments and develop risk management plans (RMP) that meet minimum State and federal requirements for chemical hazards. All refineries employ both proactive and responsive community patrols to investigate odor complaints, check for environmental hazards at the facility’s fence line, and conduct basic monitoring during emergencies using various types of handheld monitors. All of the local air districts respond to and investigate odor and other types of complaints, breakdowns, and other reported incidents related to refineries. The local air districts have some combination of fixed ambient air monitoring stations and portable air monitoring equipment that can provide certain types of air quality data for a particular release incident. All of the local response agencies utilize a telephonic community notification system to notify surrounding residents of refinery emergencies and have portable air monitoring devices of some kind.

The inventory also identifies emergency air monitoring assets, capabilities and practices that in many cases are not ubiquitous statewide, and in some instances they are quite unique. For example, some refineries perform voluntary fence line and/or off-site community monitoring. Several refineries utilize modeling software that can quickly analyze on-site emission levels to predict offsite consequences, expediting effective public protection advisories. In general, local districts do not require fence line or off-site monitoring of likely air contaminant releases. Regarding local response agencies, only a few have formal incident command agreements with refineries. There is one noteworthy case wherein an individual fire department has very specific authority to require a refinery within its jurisdiction to provide notification of internal events and unrestricted access to incident command operations.

Lastly, the inventory sought to identify “needs” - areas where potentially valuable emergency air monitoring and hazard assessment tools or procedures are not currently in use. It is noted, for example, that neither the federal RMP program or analogous State regulations provide an advisory, planning, or oversight role for local or State air quality agencies, even though those programs are rooted in the federal

¹ The ARB-CAPCOA Project Plan “Air Monitoring for Accidental Refinery Releases: Assessment of Existing Capabilities and Potential Improvements” issued in July, 2013 listed seventeen major California refineries as identified by the California Energy Commission. This report addresses operations of fifteen major refineries in operation. The BP Carson Refinery was acquired by Tesoro in 2013 and is now under unified management with the adjoining Tesoro Wilmington Refinery. The Edgington Oil Refinery owned by Paramount Petroleum in Long Beach has been shut down.

Clean Air Act. Routine involvement of air quality agencies in refinery emergency exercises is limited. The report also identifies emerging air monitoring technologies and methodologies for more robust real-time monitoring and modeling of air contaminant releases. Table ES-2 provides a more comprehensive tabular summary of the basic emergency air monitoring capabilities and program components that ARB staff identified in the inventory process.

This report provides the foundation of information to enable ARB and the CAPCOA Air Monitoring Committee to proceed with Objective 2, the technical evaluation of current refinery air monitoring capabilities, practices, and procedures. This evaluation will produce a comparative statewide assessment of emergency air monitoring practices and will include emerging technologies and methodologies. It will provide findings and recommendations for program enhancements and development of best practices that can be employed statewide to improve preparedness for future refinery air release events.

Figure ES-1 Map of California Refineries

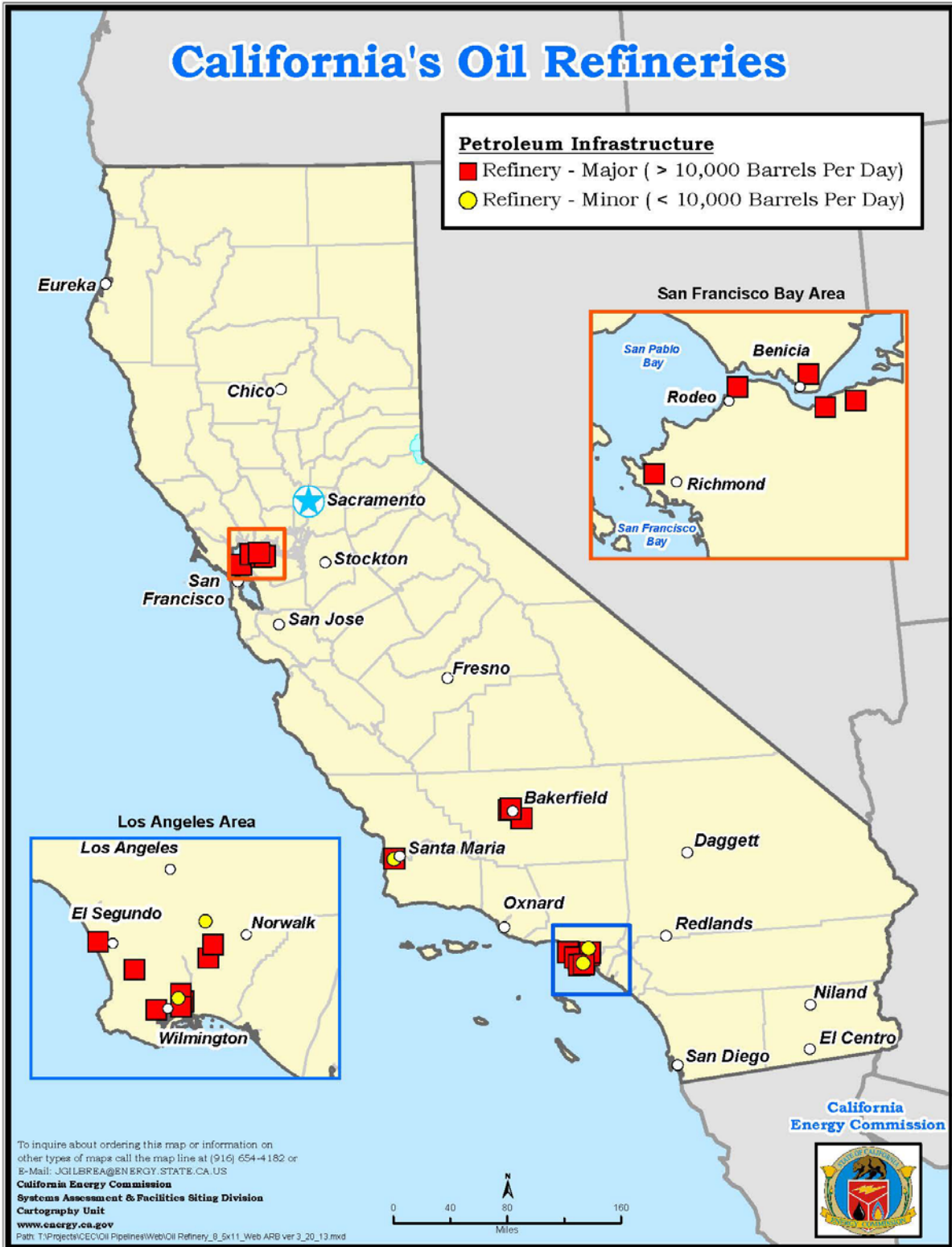


Table ES-2 Inventory Overview

Refineries	Chevron	Phillips 66	Shell	Tesoro	Valero	Chevron	ExxonMobil ²	Phillips 66	Tesoro	Valero	Paramount	Alon	San Joaquin	Kern Oil	Phillips 66
Regular drills/exercises with local fire/hazmat	•	•	•	•	•	•		•	•	•	•	•	•	•	•
CAA/CalARP Risk Management Plan (RMP)	•	•	•	•	•	•		•	•	•	•	•	•	•	
Mutual aid organization	•	•	•	•	•	•		•	•	•	•				
Community hazard patrol - responsive	•	•	•	•	•	•		•	•	•	•	•	•	•	•
Community hazard patrol - proactive	•	•	•	•	•	•		•	•	•	•	•	•	•	•
Continuous process unit air monitoring (OSHA)	•	•	•	•	•	•		•	•	•	•	•	•	•	•
Hand held air monitors for off-site use	•	•	•	•		•		•	•	•	•	•		•	•
Supports Local CAER or similar community organization	•	•	•	•	•										
Real-time onsite modeling capability		•							•						•
Voluntary fence line monitor(s)	•	•													
Voluntary community monitor(s)	•				Inactive										
Social media notifications								•							
Air District	BAAQMD					SCAQMD						SJVAPCD		SLOAPCD	
Mobile incident monitoring equipment (trailers, portable E-BAMs)						•	•	•	•	•	•	•	•	•	
Fixed real time PM monitors		•			•		•	•	•	•	•	•	•	•	•
Fixed real time toxics monitors (SO2, H2S, NH3, VOC)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Portable and hand held incident air monitors	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Required refinery specific ground level monitors	•	•	•	•	•							•			
Regular drills/exercises with refinery															•
Area plan/RMP oversight															
Lead CUPA/Local Responder	Contra Costa				Solano	LA County, LA City and/or Local Fire/Hazmat						Kern		SLO	
Community siren alert system	•	•	•	•	•	•	•	•	•	•	•				•
Hand held air monitors	•	•	•	•		•	•	•	•	•	•	•	•	•	•
Reverse 9-1-1 community notification	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Local industrial safety order	•	•	•	•	•		•								
Formal unified command agreement	•						•								
Internal refinery event notification							•								

² ExxonMobil has requested proprietary treatment of all submitted information pertaining to the Company's Torrance Refinery.

II. BACKGROUND

On August 6, 2012, a major fire occurred at the Chevron Richmond Refinery. The refinery fire raised serious concerns about safety practices, public health, and emergency preparedness in the vicinity of California's major oil refineries and other large petrochemical facilities. As a result, the Governor's Office created the Interagency Working Group on Refinery Safety to work with local authorities to coordinate refinery compliance and enforcement activities and improve emergency preparedness in the event of future refinery incidents.

ARB actively participated in the Interagency Working Group on Refinery Safety. As a key element of the Working Group's deliverables, ARB and the California Air Pollution Control Officers Association (CAPCOA) jointly developed a Project Plan (released in July, 2013) for assessing existing emergency air monitoring capabilities and potential improvements to California's current refinery monitoring system. The Plan builds upon the existing emergency management infrastructure established by the State Emergency Plan and the California Environmental Protection Agency's Unified Program.

The ARB-CAPCOA Project Plan identified four key objectives:

1. Delineate existing air monitoring assets and resources (including modeling and forecasting) and make information available through an online publicly accessible clearinghouse.
2. Evaluate air monitoring capabilities, assess gaps and potential enhancements, and make recommendations as needed.
3. Develop statewide guidance to enhance refinery air monitoring and encourage best practices.
4. Improve interagency coordination, preparedness, and training for air emergencies.

The Project Plan placed a strong emphasis on multi-agency cooperation. ARB and CAPCOA agreed to evaluate and make recommendations on optimizing the use of existing resources, as well as on the potential need for additional resources including equipment, services (e.g., analytical, instrument support, maintenance, modeling, and forecasting), staffing, and training, in order to support local air emergency response programs.

ARB and CAPCOA members continue to participate in the California Environmental Protection Agency's (CalEPA) Interagency Refinery Task Force (IRTF), a permanent group established under CalEPA to advise on State oversight of refinery safety issues, including coordination and best practices for community air monitoring

adjacent to California's refineries³. This Refinery Emergency Air Monitoring Assessment Report presents the initial inventory, findings, recommendations, and proposed guidelines pursuant to the Project Plan.

III. SCOPE OF THE REPORT: OBJECTIVE 1

To develop local and statewide guidance on potential modifications and improvements to emergency air monitoring plans, ARB and each local air district must first clearly identify current monitoring protocols, methods, and capabilities. Objective 1 is focused on an inventory of the physical monitoring systems, trained staff, methods for equipment deployment and use for local emergency air monitoring, and making information easily accessible to emergency management officials and the public. The objective includes information from air districts and refineries⁴, as well as local (i.e., fire and hazmat departments, public health officers, and environmental health departments), State, and federal agencies.

The tasks identified to complete Objective 1 are as follows:

- A. Summarize State and local ambient air quality monitoring network information.
 - 1. Identify refineries and adjacent ambient air quality monitoring network operations.
 - 2. Identify local air district points of contact for emergency monitoring.
- B. Identify other key points of contact with capabilities and assets for emergency response.
 - 1. Secure local air district support for proposed project plan.
 - 2. Identify and contact local air district emergency response team.
 - 3. Identify any contractors used for air monitoring.
 - 4. Identify any institutional air monitoring resources.
 - 5. Identify local emergency responders and air monitoring capabilities.
- C. Develop mechanisms to provide emergency management officials and the public with timely information on refinery-related air monitoring issues.
 - 1. Create an online publicly accessible clearinghouse to disseminate information.
 - 2. Investigate the feasibility of deploying emerging monitoring technologies near refineries.
 - 3. Provide links to important resources and documents, including web-based technologies for interoperable emergency data communication.
 - 4. Provide tools for communicating training, best practices, and guidance.

³ The CalEPA IRTF was formed in September 2013 as the ongoing entity established to execute the recommendations of the Governor's Interagency Working Group on Refinery Safety. See Appendix G for further information.

⁴ For purposes of this report, a refinery is defined as a facility with a crude oil throughput capacity of 10,000 barrels per day or more, as identified by the California Energy Commission. Several smaller facilities operate within the air quality jurisdictions participating in this project, and so will be subject to resulting emergency planning improvements.

- D. Conduct a collaborative inventory of existing air monitoring capabilities of local emergency authorities.
1. Review air monitoring capabilities, assets, and resources (including modeling and forecasting) of local air districts, local agencies, private industry, and institutions.
 2. Issue a report on the identification of local monitoring capabilities and develop a mechanism for ongoing tracking of progress toward completion of project plan objectives and tasks.

A listing and maps of California oil refineries to be included in this assessment were provided in the July 2013 Project Plan. Those documents are attached to this report as Appendix A. Seventeen refineries were identified as having a throughput capacity of 10,000 barrels/day or more in California. More recent investigation has determined that the Edgington Oil Refinery in Long Beach, owned by Paramount Petroleum Corp., ceased refining operations in 2011. That facility is no longer part of the assessment, although the facility retains its use permits and could re-open in the future.

ARB has worked with local districts, emergency response agencies, refineries, the IRTF, and other contributing agencies to compile and present the statewide baseline information presented in this report.

Note on Reference Materials

An important aspect of the Objective 1 inventory is the collection of reference materials on air monitoring technology and the practices and procedures currently employed in and around California refineries. Also important to this assessment is the documentation of emerging technologies. Appendix B provides a detailed list of monitoring equipment used throughout the State. Many documents from numerous sources have been compiled to inform the assessment process. These documents are included as Appendices C through H. Contacts made throughout the assessment process are included in Appendix I. Websites have also provided and will continue to provide background information for the assessment. A list of website sources and references is attached as Appendix J. A list of acronyms is attached as Appendix K.

IV. EXISTING EMERGENCY AIR MONITORING CAPABILITIES

A. Bay Area

There are five major refineries located in the San Francisco Bay Area. Four refineries, Chevron (Richmond), Shell (Martinez), Tesoro (Martinez), and Phillips 66 (Rodeo), are located in Contra Costa County while one, Valero (Benicia), is located in Solano County.

1. Air District Assets and Resources

Following the Chevron Richmond fire, the Bay Area Air Quality Management District (BAAQMD or District) governing board adopted a refinery-focused work plan to evaluate the District's emergency capabilities, practices, and needs. As part of that work plan, the District retained Desert Research Institute (DRI), a private contractor, to evaluate the data generated, its usefulness, and what could be done to improve air monitoring for future accidental industrial releases. The initial findings of the evaluation were released in July 2013 and were reviewed by an expert panel convened by the District. A final report incorporating the expert panel's findings and recommendations was issued in June 2014 and will be reviewed as part of Objective 2 of this statewide assessment.

a. Monitoring Network

BAAQMD's permanent core monitoring network was designed to ascertain and monitor the region's air quality attainment status for the criteria pollutants under the federal Clean Air Act (CAA). Over the years, additional monitoring sites have been added by the District and ARB to monitor for additional pollutants as required by various programs under CAA amendments and State law.⁵ The District network presently consists of twenty-seven permanent air pollution monitoring stations. The network also gathers meteorological data that enables the District and other agencies to conduct assessments and studies of pollution dispersion trends.

b. Stationary Equipment

Stationary monitoring equipment supports a variety of federal, State, and local monitoring programs within the BAAQMD's jurisdiction. In addition to the State and Local Air Monitoring Station (SLAMS) instruments sited for CAA criteria pollutants⁶, instrumentation is in place for Photochemical Assessment Monitoring Stations (PAMS), a Chemical Speciation Network (CSN), National Air Toxics Trends Stations (NATTS), the Urban Air Toxic Monitoring Program (UATMP), and the BAAQMD's Ground Level Monitoring (GLM) Program. Appendix A provides a complete listing of all network and special purpose air monitoring stations that surround the five refineries operating in the District and are deemed to be within the air shed that could be affected by a refinery release. The lists include four categories of stations: BAAQMD and ARB air monitoring stations, BAAQMD meteorological stations, and GLM monitoring stations.

⁵ A detailed summary of statutory air monitoring programs is provided in: [Review of Current Air Monitoring Capabilities near Refineries in the San Francisco Bay Area: Final Report](#) by Desert Research Institute, July 3, 2013

⁶ Stations mandated under CAA regulations that conform to U.S. EPA federal reference methods (FRM) or federal equivalent methods (FEM) for measurement of gaseous and particulate criteria pollutants.

c. Deployable Equipment

In addition to the fixed air monitoring network, BAAQMD currently utilizes a set of mobile monitors and test equipment capable of measuring gaseous and particle air pollutants. This equipment is available to supplement the fixed network data during an emergency incident. In addition, the District is evaluating additional mobile air monitoring assets that will better define community exposures near refineries and provide further information during incidents. Current deployable monitoring capabilities include:

- i. Infrared cameras to identify volatile organic compounds (VOCs).
- ii. Summa[®] canister⁷ samplers to collect instantaneous air samples (“grab” samples). Canisters are brought to the District laboratory for VOC analysis.
- iii. High volume filter samples that can be collected and analyzed by the District laboratory for asbestos, trace metals, and other specific particulate matter components.
- iv. Various real-time or near real-time instruments for the measurement of ultrafine, fine, and coarse particulate matter, hydrogen sulfide (H₂S), and hydrocarbons.
- v. A mobile measurement van located in the vicinity of the refineries and available for rapid deployment. The van provides canister sampling capability and real-time H₂S and sulfur dioxide (SO₂) measurement instrumentation.

Appendix B provides a comprehensive list of BAAQMD’s deployable instruments and equipment available for emergency air monitoring.

d. Staffing

BAAQMD has not historically functioned as an emergency response agency, but contributes in a technical advisory capacity to regional emergency air release responses. The District provides specialized technical assistance in support of the emergency incident command system (ICS)⁸ and can assess the atmospheric concentration of specific air pollutants through: 1) the District’s air monitoring network, 2) use of mobile instrumentation, or 3) collection of additional air samples for

⁷ The term “Summa[®] canister” is a generic trademark that refers to electro-polished, passivated stainless steel vacuum sampling devices that are cleaned, evacuated, and used to collect whole-air samples for laboratory analysis. The samples can be analyzed using methods such as U.S. EPA Method TO-15 for VOCs, American Society for Testing and Materials (ASTM) Method D-1946 for methane and other hydrocarbons, and a host of other methods for other parameters. Because these canisters are so versatile, they are widely used to sample for indoor air quality, odor identification, environmental compliance, worker exposure, and process effluent measurement, among others. For sample collection, the Summa[®] canister valve is opened and the canister is left in a designated area for a period of time to allow the surrounding air to fill the canister and achieve a representative sample. After sample collection, the canister is sent to the laboratory for content analysis.

⁸ Incident Command (IC) or Incidental Command System (ICS) refer to a standardized organizational reporting and accountability structure established as the California Standardized Emergency Management System, for any emergency incident regardless of size. Under this system, an environmental agency such as an air district initially reports to the incident liaison officer and is subsequently assigned to support a technical planning team.

subsequent laboratory analysis, if requested. Specific monitoring and sampling needs (e.g., sampling protocol and frequency, sampling media and/or instrumentation type) are evaluated on a case-by-case basis depending upon the requirements of the incident command (IC) or on-scene compliance and enforcement staff.

The District's Compliance and Enforcement Division (CED) maintains an on-duty standby schedule, making staff available to respond to an incident upon request. CED staff makes every effort to be at the incident command center to provide assistance during an air release event.

In case of a significant air release incident, the District is alerted by the Contra Costa County's Community Warning System (CWS), described in detail below. When notified of an incident, the CED Director, Inspection Manager, or a designee designates staff to respond, if necessary.

If an incident occurs after business hours, the supervising CED inspector on duty initiates an investigation through the CED chain of command. The staff member(s) responding to the incident assess the situation and contact the supervisor with a recommendation for an incident response. If a response is necessary, the supervisor designates an on-scene coordinator and notifies District management.

When an incident occurs that necessitates an expanded air monitoring response, the BAAQMD Technical Services Division (TSD) Director or his designee is notified by IC and assesses/communicates needs from the IC to divisional section managers (Air Monitoring, Source Test, and Laboratory Services). Under the lead of the TSD Director, the Air Monitoring Section Manager makes recommendations regarding sampling intervals and locations, and deployment of portable instrumentation and resources. The Source Test Section Manager arranges logistics for the incident response van to be activated and mobilized. The Laboratory Services Section Manager assists the response by expediting the laboratory analysis from collected samples.

The TSD Director continually assesses relevant air monitoring data and updates IC on current measurements. By updating the IC, air quality information is also being provided to local health officials for assessing potential health and safety impacts to the surrounding communities.

Procedures specify that appropriate staff, such as public information officers or monitoring and laboratory staff, also be alerted in the event that additional resources are needed. The safety and well-being of District staff members take precedence at all times. Table A-1 lists the BAAQMD emergency response staff.

Table A-1 BAAQMD Emergency Response Staffing

Position Title	Section	Contact
Compliance and Enforcement Division (CED)		
Supervising Specialist/ Inspector	CED	1-800-334-6367
On Scene Coordinator (OSC) Area Inspector	CED	1-800-334-6367
Director	CED	(415) 749-4789
Technical Services Division (TSD)		
Director	TSD	(415) 749-4695
Laboratory Services Manager	Laboratory Services	(415) 749-4625
Air Quality Engineering Manager	Source Test	(415) 749-4601
Air Quality Monitoring Manager	Air Monitoring	(415) 749-4672
Incident Responders		
Supervising Air Quality (AQ) Instrument Specialist	Source Test	(415) 749-4985
Senior AQ Instrument Specialist	Source Test	(415) 749-4985
Air Quality Instrument Specialist I	Source Test	(415) 749-4985

e. Analytical Services

BAAQMD's TSD operates an atmospheric chemistry laboratory within its headquarters in San Francisco that analyzes a full range of criteria pollutant and toxic air contaminants (TAC). The BAAQMD laboratory utilizes the following capabilities and methods:

- i. Gas Chromatography.
- ii. Ion electrode.
- iii. Atomic absorption spectrophotometry.
- iv. X-ray fluorescence spectroscopy.
- v. Reid vapor pressure bomb.
- vi. Polyester resins.
- vii. Fluoride specific ion meter.
- viii. VOC by pour pan method.

The laboratory typically operates during normal business hours and is not staffed for multiple shifts or extended hours. Under very limited circumstances, testing can be conducted before or after normal business hours. BAAQMD is presently evaluating the possibility of using third party analytical services to support emergency response air sample analysis, as needed.

2. Local Agency Emergency Response Assets and Resources

There are seven primary local emergency response agencies that participate in the Bay Area's emergency response program for refineries: Contra Costa County Hazardous Materials Program (CCCHMP), San Ramon Valley Fire-Hazmat, Richmond Fire-Hazmat, Alameda County Fire-Hazmat, Solano County Interagency Hazmat Team (SCIHMT), Solano County Environmental Health Division (EHD), and City of Benicia Fire-Hazmat. The principal local government response entity for Bay Area refinery emergencies is Contra Costa County. The County is the CUPA with emergency planning jurisdiction over four refineries: Chevron Richmond, Phillips 66 Rodeo, Shell Martinez, and Tesoro Martinez. The Solano County Department of Resource Management, Environmental Health Services Division is the CUPA for all cities and unincorporated areas within Solano County, including all hazardous material safety regulations and emergency response for the Valero Benicia Refinery.

a. Preparedness and Response Programs

The Contra Costa County's emergency response functions are shared by: 1) the Sheriff's Department – operating the Office of Emergency Services (CCCOES) and 2) the Health Services Department (CCCHSD) – managing the CCCHMP. CCCHSD oversees a broad spectrum of public health programs, including emergency preparedness and education for chemical release emergencies. A dedicated full-time CCCHMP staff is responsible for hazardous material inspections and an Incident Response Team that deploys to chemical release emergencies. CCCOES functions as the County's IC in the event of a major refinery accident or other serious emergency. In combination, these agencies serve County residents by providing coordinated monitoring of and response to hazardous releases.

Industrial Safety Ordinances

In 1998, Contra Costa County enacted a landmark Industrial Safety Ordinance (ISO) that expanded existing State and federal accidental release prevention programs in order to minimize the risks of chemical accidents to local communities from facilities processing hazardous materials. The City of Richmond adopted a similar ISO shortly thereafter. Facilities subject to the ISOs are in the unincorporated areas of the county or in the City of Richmond, must be a chemical facility or a petroleum refinery, and a Program Level 3 facility under the California Accidental Release Prevention (CalARP) program. The Phillips 66, Shell, and Tesoro refineries are covered by Contra Costa County's ISO, while the Chevron refinery is covered by the City of Richmond's ISO.

The addition of the ISOs to State and federal risk reduction regulatory efforts culminated in the most stringent accidental release prevention programs in the United States, if not the world. The original program dates back to 1986 when the California legislature passed Assembly Bill 3777 - establishing the Risk Management and Prevention Program. This program was similar to programs established in Delaware and New Jersey at the time and subsequently replaced by the State and federal accidental release prevention programs.

After California's Risk Management and Prevention Program was enacted, Congress established the Federal Accidental Release Prevention Program as part of the Clean Air Act Amendments in 1990. This created Occupational Safety and Health Administration's (OSHA) Process Safety Management Program as well as the U.S. EPA's Accidental Release Prevention Program. OSHA established regulations for Process Safety Management in 1992 and the U.S. EPA established regulations in 1996 for the Risk Management Program.

The U.S. EPA's Risk Management Program applies to facilities that have greater than a threshold quantity of 77 toxic chemicals and 63 flammable substances. The program requires a facility to develop a hazard assessment, prevention elements, a management system, and an emergency response program. The hazard assessment includes "worst case scenarios", "alternate release scenarios", and an accident history. The prevention elements consist of operating procedures, mechanical integrity programs, training, incident investigation, and process management of change procedures. The management system requires facilities to ensure that all of the prevention elements are being implemented with a feedback process for continuous improvement. The facilities are required to have an emergency response program documented with a written plan. Facilities document the overall program with a risk management plan that is a public document and submitted to the U.S. EPA.

After passage of the federal Accidental Release Prevention Program, California replaced its Risk Management and Prevention Program with the CalARP program on January 1, 1997. The CalARP program is very similar to the U.S. EPA's Risk Management Program except: California lists 276 toxic chemicals instead of the U.S. EPA's 77, the threshold quantities of the chemicals are smaller (e.g., chlorine federal threshold quantity is 2500 pounds vs. California's threshold quantity is 100 pounds), it requires external events and seismic analysis, and the CalARP program requires more interaction with the public and agencies. The Contra Costa County and City of Richmond ISOs expanded the CalARP program by requiring the following:

- i. The whole facility to be covered, not just processes having a regulated substance over a threshold quantity.
- ii. Covered facilities to submit a safety plan accessible to the public.
- iii. A human factors program for process hazard analysis, operating procedures, incident investigation, and management of change procedures for the emergency response / operations organizations.
- iv. Facilities to conduct a root cause analysis as part of major chemical incident investigations.
- v. Independent incident investigations by the county or city, including a root cause analysis.
- vi. Consideration of inherently safer technologies and systems.
- vii. Public meetings.

ISO implementation has generally improved safety programs and operations at the facilities that are regulated. CCHMP continually seeks assistance from stakeholders including the regulated facilities, workers, and community members to explore additional measures that can be taken to further reduce the likelihood of chemical accidents at the covered industrial facilities. Since the 2012 Richmond fire, CCCHMP and the City of Richmond are also working closely with the U.S. Chemical Safety Board (CSB) on recommendations that they may identify to strengthen the County and City ISOs.

Additional local response agencies also have assets and capabilities to support a regional response to an emergency refinery air release. These agencies include: San Ramon Valley Fire-Hazmat, City of Richmond Fire-Hazmat, Alameda County Fire-Hazmat, Solano County Environmental Health Division, and City of Benicia Fire-Hazmat. In Solano County, emergency response functions are also performed by a collaboration of authorities similar to Contra Costa's organized as the Solano County Interagency HazMat Team (SCIHMT).

b. Stationary and Deployable Equipment

Local emergency response agencies in the Bay Area do not maintain fixed air monitoring sites or other stationary equipment useful during an airborne release of hazardous chemicals.

The CCCHMP Incident Response Team and SCIHMT respond to chemical spills and toxic releases. The response teams provide 24 hours a day technical assistance with identification of unknown substances and health hazard assessment information. Appendix B lists the instrumentation the Incident Response Team and SCIHMT use to detect chemicals, evaluate samples, and make recommendations related to community health protection during a response. Current monitoring and sampling capabilities include:

- i. A variety of portable and handheld gas monitors and detectors capable of measuring the most common gases that are considered dangerous with twenty five interchangeable/field replaceable sensors including photoionization detector (PID), infrared (IR), catalytic bead, and electrochemical sensor options.
- ii. Stainless steel Summa[®] canisters used to collect whole air samples.

Each of the other six Bay Area emergency response and hazmat teams maintains and deploys a similar array of air monitoring equipment for use in and near the immediately impacted area of a fire or chemical release. This equipment is also detailed, agency-by-agency, in Appendix B.

c. Staffing

The seven response agencies in the Bay Area that either provide direct support or assist as needed on industrial facility emergency air releases at industrial facilities each have hazmat response personnel with specific training for refinery and other industrial emergencies.

CCCHMP Incident Response Team

The CCCHMP Incident Response Team has technicians trained for accidental releases and emergency response. The team is based in the community of Pacheco, and is staffed by responders and technicians 24 hours a day.

<http://cchealth.org/hazmat/about-us.php>

San Ramon Valley Fire-Hazmat

The San Ramon Valley Fire-Hazmat Response Team is located in the southern area of Contra Costa County and has technicians trained for unanticipated releases. A hazmat response station in the Blackhawk community of San Ramon is staffed by six technicians 24 hours a day, with capabilities to respond to incidents having air quality consequences if requested.

Richmond Fire-Hazmat

The City of Richmond Fire-Hazmat Response Team is based in Richmond and has technicians trained in emergency response. A hazmat response station near the Chevron refinery supports the facilities' accidental release monitoring and containment efforts.

Alameda County Fire-Hazmat

The Alameda Fire-Hazmat Response Team provides protection for Alameda County and has air response technicians trained to detect and mitigate hazardous airborne materials, primarily for operations in the Port of Oakland. A hazmat response station near the Port also has technicians on duty 24 hours a day, with the ability to respond to refinery related air

quality impacts if requested. Alameda County personnel regularly participate in training and exercises with their Contra Costa and Solano County counterparts.

SCIHMT

SCIHMT is a collaboration of trained technicians and emergency managers specializing in hazmat response. The hazmat response team is based in Fairfield and deploys technicians from Solano County, the City of Fairfield, and Travis Air Force Base, 24hours a day with basic air monitoring support, if requested.

Solano County EHD

Solano County is the CUPA with emergency planning jurisdiction over the Valero Benicia Refinery. As such, it has an important planning and prevention role as well as inspection compliance and enforcement authority. Solano County EHD has staff on call 24-hours a day to respond to hazardous incidents at the request of first responders and SCHIMT. Solano County EHD acts as the health officer's representative to provide technical information on public health/environmental issues to the incident command and to SCHIMT. Additionally, Solano County EHD provides regulatory oversight for cleanup and remediation activities after the incident is stabilized. Solano County EHD has basic air monitoring equipment that can be used if requested. Solano County EHD maintains community notification and public health assessment resources for emergency response.

City of Benicia Fire-Hazmat

The City of Benicia also deploys personnel trained for emergency hazmat response, primarily for the Valero Refinery. A hazmat response station near the refinery has responders available on a 24 hour basis and can provide basic hazmat air monitoring support if requested.

d. Analytical Services

The response units noted above utilize fairly standardized hazardous material identification instruments and monitors for first response, and typically do not collect samples for post-response laboratory analysis after an incident. An exception is the CCCHMP Incident Response Team that is equipped with Summa[®] canisters by agreement with BAAQMD. During a significant air release response, CCCHMP collects ambient air grab samples from specified locations within the affected community as directed by the BAAQMD. CCCHMP delivers the sample containers to the District's laboratory for chemical analysis.

In addition to its in-house monitoring and analysis capabilities, Solano County Environmental Health Department (EHD) and SCHIMT maintain a group of contract analytical laboratories (Table A-2) that provide analyses for a variety of laboratory needs including emergency response.

Table A-2 Solano County Contract Analytical Laboratories

Laboratory Name	Location	Contact Information
California Laboratory Services	Rancho Cordova	(916) 638-7301
Sequoia Analytical	Sacramento	(916) 921-9600
Acculabs	Davis	(530) 757-0920
Alpha Analytical	Sacramento	(916) 366-9089
Kiff Analytical	Davis	(530) 297-4800
McCambell Analytical	Pittsburg	(925) 252-9262
Sparger	Sacramento	(916) 369-7688
Napa/Solano Public Health Laboratory	Fairfield	(707) 784-4410

3. Refinery Emergency Response Assets and Resources

a. Preparedness and Response Programs

The Bay Area refineries individually and collectively have established extensive programs for monitoring air contaminant releases both internally and in neighboring communities. These programs are generally responsive to regulations for industrial and public safety, air quality, and risk management. Emergency protocols and procedures are maintained in the refineries' internal standard operating procedures and are summarized in their RMPs, discussed in a later section.

b. Stationary and Deployable Equipment

In addition to their internal safety monitoring for leaks in process, piping, and storage systems (not the subject of this assessment), Bay Area refineries employ three types of monitoring for possible offsite atmospheric releases to meet specific regulatory requirements and localized needs:

- i. Each refinery maintains a small network of fixed, GLMs as required by BAAQMD Regulation 9, Rules 1 and 2. The refineries operate the GLMs; BAAQMD audits and validates the data. Siting and specification of GLMs are designed to provide useful data for protection of public health during a large, unplanned release of H₂S or SO₂. Bay Area GLMs are sited on or near refinery fence lines or at surrounding locations. Specific sites are shown in Appendix A.
- ii. Two refineries operate fence line monitoring systems along portions of their operational boundaries and voluntarily make air quality data available to the public in real time.
- iii. One refinery has recently established mobile community monitoring sites in neighborhoods adjoining the refinery. These monitors are maintained voluntarily by agreement with the City. Another refinery

voluntarily purchased and maintained a mobile monitoring station for the local community several years ago, eventually turning it over to the City to maintain.

Chevron Richmond

The Chevron Richmond Refinery operates all three types of monitoring systems to identify and quantify unplanned chemical releases into the neighboring community. These systems provide notification of possible release incidents, and include data access for the community on a real time basis. The systems consist of GLMs, an open path fence line monitoring system, and three semi-permanent mobile monitoring stations located in the nearby community. In addition, the community monitoring stations can collect 24-hour composite samples for further off-site laboratory analysis, when activated remotely for a verified incident.

Chevron's GLM system was the first system installed in the Bay Area and was required by the BAAQMD GLM rule. The system is located inside Chevron's fence line. The GLM data are not available for public review; however, the data are used to alert refinery operators of potential emergencies and initiate safety notifications for the community, if necessary. Chevron provides GLM data reports to BAAQMD and other public health and safety authorities as requested.

In August 2012, Chevron initiated a two year contract with a monitoring sciences company, Argos Scientific, to operate the fence line and community monitoring systems. The Argos Scientific systems include three fence line open path arrays located within the refinery borders and three air monitoring stations located in the nearby community.

The Argos Scientific fence line system paths were chosen based on prevailing winds, location of communities, and the location of potential process unit hazards in relation to the nearest communities. The system utilizes a series of open path ultraviolet (UV)/Laser line-of-site instruments operated in conjunction with meteorological instruments. The system provides data in five-minute averages on a 24-hour rolling basis that is publically available on a City of Richmond webpage. The system helps to detect unplanned releases and provide decision makers with the necessary information to initiate an emergency response and community warning, if needed.

The three community monitoring stations sample for a set of analytes requested by the City of Richmond. To site the stations, Chevron consulted with community groups and also considered security, proximity to other emission sources, and availability of electric power. The community monitoring system posts real-time preliminary data and event

notifications to a public website hosted by the City. Indications of elevated emissions are analyzed by Chevron staff to make decisions regarding emergency alerts and if further investigation of the contaminant source is warranted.

In addition to real-time monitoring, three event-based sampling systems at each community monitoring location can be triggered remotely when an emergency alert and response is initiated. One system is a Tisch polyurethane foam (PUF) sampler for polycyclic aromatic hydrocarbons (PAH) compounds. The second is a Tedlar[®] bag for collecting and analyzing VOC compounds. The third is a cartridge sampler used for toxic metals analysis. When the collection systems are remotely triggered, they collect an aggregate sample over a 24-hour period, and the contents of the cylinder, bag, and cartridges are analyzed by a third party laboratory.

The Chevron Fire Department (CFD) has mobile response capabilities when it receives an off-site release alarm from any ground level monitor, a public odor complaint, or fence line monitoring threshold notification. CFD responds to the location to assess the area for odors or detectable readings using an Industrial Scientific iTX H₂S, lower explosive limit (LEL), carbon monoxide (CO), or SO₂ multi-gas detector. If readings are verified, CFD personnel attempt to identify the source by checking upwind. CFD may also dispatch an Industrial Scientific MX6 multi-gas PID monitor for detection of VOCs in the ppm range. All investigations and findings are documented in the CFD turnover reports.

Phillips 66 Rodeo

The Phillips 66 Refinery in Rodeo employs GLM and fence line monitoring systems similar to those of the Chevron Richmond Refinery. Phillips 66 also utilizes Argos Scientific to operate and maintain its fence line monitoring system, and makes the 24-hour averaged data available to the public via a website.

The refinery's GLM network has four H₂S and five SO₂ analyzers as well as three met stations monitoring wind direction, speed, and ambient temperature. Refinery staff can use portable monitors to measure H₂S, LEL, CO, oxygen (O₂), and particulates. Additionally, staff can collect samples with Summa[®] canisters or Tedlar[®] bags for later analysis for toxic organics or sulfur compounds.

The Phillips 66 fence line monitoring system consists of:

- i. Two Open path Fourier Transform Infrared (FTIR) spectrometers measuring ammonia (NH₃), butadiene, CO, carbonyl sulfide (COS), ethylene, total hydrocarbons, methane, methyl mercaptan, and MTBE.
- ii. Two open path UV monitors measuring benzene, carbon disulfide, xylene, toluene, and SO₂.

- iii. Two open path tunable diode lasers (TLD) measuring H₂S.
- iv. Six organic gas detectors (OGD) measuring organic gas in percent LEL.

Shell Martinez

The Shell Martinez Refinery maintains a GLM system consisting of stationary SO₂ and H₂S monitors with continuous data collection. The SO₂ monitors are located on the refinery's fence line and the H₂S sensors are stationed at four locations along the facility fence line.

Shell has established a community sampling team consisting of volunteers from its Quality Assurance Department that can sample air in the community using colorimetric detector tubes. This voluntary team is dispatched during an incident by Shell's emergency operations center for incidents where there is concern about potential impact to the neighboring communities. If potentially hazardous conditions exist, (e.g., a shelter-in-place order has already been issued), this team would not be deployed in order to avoid unnecessary exposure. The voluntary team members may also not be working at the time of the incident, so response time will be delayed while team members report for duty, collect their instruments, and then deploy to the identified sampling locations in the community. The community sampling team conducts quarterly off-site air monitoring sampling and testing exercises at several off-site areas during the year. The Shell Martinez Refinery also uses the Contra Costa County CWS for incident notification.

Tesoro Martinez

Tesoro Martinez Refinery has GLMs installed at four locations near the refinery property boundaries, which measure H₂S and SO₂. They also operate a meteorological station onsite. Additionally, the refinery has various portable air monitoring and sample collection equipment that can be used for emergency air response. Tesoro has also established contracts with several analytical laboratories that can be activated to analyze collected samples.

Tesoro has a contract with Odor Science and Engineering, Inc. to conduct routine odor patrols. This service can also be dispatched to patrol locations that may be assumed to be potentially impacted from unanticipated releases.

Valero Benicia

The Valero Benicia Refinery operates GLMs installed at locations near the refinery property boundaries that measure H₂S and SO₂. No other air monitoring for potential off-site impacts was reported.

Additional GLM monitoring instrument details and specifications for each listed refinery are summarized in Appendix B.

c. Staffing

Each Bay Area refinery has a full-time, in-house fire-hazmat department on duty 24 hours a day. These teams are capable of responding with air monitoring support both onsite and in the neighboring community, as requested. Each refinery has an industrial hygienist that can be contacted by phone to coordinate responses to off-site odor complaints and shift safety inspectors that can be contacted by plant radio. Each refinery's RMP contains detailed procedures and contact information for initiating emergency notifications, investigations, and responses. Refinery personnel conduct periodic exercises, some of which include local agency responders and emergency management officials.

d. Analytical Services

Chevron Richmond

Chevron Richmond contracts with Argos Scientific to perform analytical support services, in addition to maintaining their fence line and community monitoring stations. Under the contract, Argos Scientific serves as a third-party technical liaison between the refinery and the public.

Phillips 66 Rodeo

Phillips 66 contracts with Argos Scientific to perform analytical support services similar to those provided to Chevron Richmond. Additionally, Phillips 66 contracts with Air Toxics Ltd. in Folsom, CA for analyzing air grab sample for toxic organics or sulfur compounds, Micro Analytical Laboratory in Emeryville, CA for asbestos or lead air samples, and Bureau Veritas in Novi, MI for air samples of any other analyte.

Shell Martinez

Shell Martinez contracts for air sample analysis from Bureau Veritas North America, Inc. and Eurofins Air Toxics, Inc. These companies may be requested to provide U.S. EPA, National Institute for Occupational Safety and Health (NIOSH), or OSHA air sample analysis.

Tesoro Martinez

Tesoro Martinez contracts with Los Angeles (LA) Testing in Garden Grove, California for industrial hygiene chemical analyses (other than asbestos and lead) and with Forensic Analytical Laboratories in Hayward, California for asbestos and lead testing.

Valero Benicia

Valero Benicia did not report the use of contract analytical services. Valero has reportedly also used Argos Scientific as a technical consultant for the Benicia Community Air Monitoring Project (BCAMP.)⁹

4. Release Modeling and Forecasting

a. Air District Incident Modeling

BAAQMD does not routinely conduct or provide air dispersion modeling or forecasting of emissions from complex industrial sources. When a specific study or project requires air emissions modeling and forecasting, the District typically contracts for these services or assigns responsibility to the study or project sponsors.

b. Incident Modeling by Refineries

The RMP rule implements Section 112(r) of the 1990 Clean Air Act amendments. A facility is subject to the rule if there is more than a threshold quantity of a regulated substance in any process at the facility. Regulated substances include toxic substances, flammable gases, volatile liquids, and high explosives.

Facilities subject to the rule must perform at least one hazard analysis to determine whether chemical transfer, processing, or storage puts nearby populations at risk. The RMP guidance developed by U.S. EPA describes procedures for modeling the release distance to a specified geographic endpoint of risk, required in the hazard analysis. To estimate the hazard endpoint, facilities can either use provided equations or a model that meets specified requirements. The RMP guidance also requires and enables a demographic calculation of the population affected by each modeled release.¹⁰

Three modeling tools recognized by U.S. EPA are used by the Bay Area refineries for RMP hazard analyses:

- i. RMP*Comp is the most common and widely used estimate-calculating tool that enables facilities to answer a short list of questions about the regulated substance - such as the amount released - and models the potential release exactly as specified in the RMP guidance.
- ii. Areal Locations of Hazardous Atmospheres (ALOHA) is a more complex emergency response and planning tool that requires more source and scenario information than the RMP guidance does. ALOHA can calculate how quickly chemicals are escaping from tanks,

⁹ Article published 5/20/2012 in the Sonoma-Napa Times Herald online edition.

http://www.timesheraldonline.com/ci_20666938/benicia-air-monitoring-project-limbo-valero-and-community

¹⁰ ARB and CAPCOA have gathered details of the off-site consequences that are not presented in this report for proprietary and security reasons. The details will be considered in assessing the adequacy of local air monitoring for public safety.

pools, and pipelines, and predict how a release rate changes over time. Responders can use ALOHA to help quantify what chemical dangers are present and the distance a chemical plume could travel. ALOHA can also provide information about the levels of spilled chemicals that are likely to seep into buildings near the source of the chemical spill. The program has variables that allow first responders to select the type of structures near the spill and the rate of air exchanges inside the buildings. ALOHA does not factor in the effects of particulates, fires, chemical reactions, or chemical solutions or mixtures. ALOHA is not appropriate for some large releases. U.S. EPA's RMP guidance information provides the step-by-step process for using ALOHA to generate the required output for the worst-case and alternative analyses.

- iii. CANARY is a privately developed software that allows the user to model the potential impacts following a hazardous release. CANARY developers claim it is unique in that it provides thermodynamic calculations for mixtures of up to 10 components from a list of more than 250 common industrial compounds.

Using the multicomponent thermodynamics information, CANARY calculates time-varying release rates from a user-described vessel/piping system. These calculations account for two phase flow, flash vaporization, and aerosol formation, as well as liquid rainout. Vaporization from liquid pools takes into account pool spreading, heat transfer effects, and impoundment. The information generated by these models forms the source term(s) for the hazard models.

CANARY includes application-specific hazard models for vapor dispersion, fire radiation, and vapor cloud explosions. CANARY allows the user to define the hazard endpoints (e.g., gas concentration, radiant flux, overpressure) that determine the extent of toxic or flammable gas clouds, radiation from several types of fires, or overpressure resulting from an explosion.

Refinery RMPs contain standardized information on refining processes, chemical hazards, risk analysis, and emergency planning, as prescribed by U.S. EPA regulations and the CalARP regulations. RMPs must be updated every three years at a minimum, with addenda submitted whenever there is a significant change that affects the potential on-site and/or off-site emergency preparedness or response procedures in the refinery's emergency plan. The Local CUPA inspects refineries for emergency plans and RMP adherence at least once every five years.

Refinery RMPs contain common elements of interest to emergency response unit air monitoring personnel. These common elements include:

- i. Effective date of the RMP.
- ii. A summary of plant processes and operations.
- iii. A worst-case-scenario (WCS) release for a toxic chemical or compound.
- iv. A WCS release for a flammable compound.
- v. WCS modeling may include passive mitigation measures.
- vi. One or more alternative release scenarios (ARS) for toxic and/or flammable compounds that the refineries consider to be more likely than the WCS.
- vii. ARS modeling may include both passive and active mitigation measures.
- viii. Modeled estimates of the potential exposure area and affected population of each scenario.
- ix. A list of sensitive receptors, when located within the modeled release radius.
- x. A summary of the facility emergency plan, protocols, and chain of command.
- xi. A summary of the emergency notification contact plan and protocols.
- xii. 5-year history of incidents.

Table A-3 provides a summary of some general information from the Bay Area refineries' RMPs.

Table A-3 Bay Area Refinery RMPs - General Overview

Refinery	Tesoro Martinez	Phillips 66 Rodeo	Shell Martinez	Chevron Richmond	Valero Benicia
RMP Date	06/01/2012	09/19/2011	08/23/2010	02/26/2013	10/14/2011
Worst case-toxic	NH ₃	H ₂ S	H ₂ S	NH ₃	NH ₃
Worst case - flammable	Butane	Butane	Pentane	Pentane	Flammable mixture
Alternate scenarios	Butane, H ₂ S, NH ₃ , SO ₂ , SO ₃	Butane, H ₂ S, NH ₃ (aqua), flammable mixtures	NH ₃ , NH ₃ (aqua), H ₂ S, isopentane	NH ₃ , pentane, H ₂ S, propane	H ₂ S, NH ₃ (aqua), flammable mixtures
Release model(s)	RMP*COMP urban	RMP*COMP urban	RMP*COMP urban, ALOHA 5.2.3	RMP*COMP urban, CANARY 3.1, CANARY 4.4	RMP*COMP urban

The modeled RMP public health risk assessments are intended to be a planning tool for local monitoring decisions and emergency responders only. Because the risk assessment model is based on a prescribed

release scenario with no real-time inputs, it has limited suitability for making immediate public health and safety decisions during an actual event if real-time source and atmospheric data are available.

c. Incident Modeling by Local Response Agencies

CCCHMP utilizes a field modeling system that incorporates portable rapid deployment weather stations. These units compute five-minute running averages and wind stability. This information is sent wirelessly to a host controller capable of automatically updating chemical plume modeling every thirty seconds using software such as CAMEO[®]/ALOHA[®], ADASHI[®], and CoBRA[®].

Solano County EHD hazmat staff uses Wireless Information System for Emergency Responders (WISER) modeling software on office desktops and as a mobile application. WISER enables users to perform plume modeling for hazardous materials. Additionally, the director and several staff have installed the ALOHA and CAMEO software. SCIHMT also uses CAMEO and ALOHA.

d. Incident Modeling by State and Federal Agencies

In the recent past, ARB, U.S. EPA, and several California air districts had direct access to the nation's preeminent suite of hazardous air contaminant flow and dispersion models through the National Atmospheric Release Advisory Center (NARAC) at Lawrence Livermore National Laboratory. A reorganization of the federal Department of Homeland Security in 2012 limited that access for security reasons. Access to this modeling tool suite may now only be established through the California National Guard Civil Support Teams (CST) on a case-by-case basis. A detailed discussion of these modeling tools is provided in Section E.

5. Partnerships and Mutual Aid

a. Coastal Region Hazardous Materials Response Organization

All local agency emergency response units in Contra Costa and Solano Counties cooperate among themselves and with State, federal, and industry representatives through the Coastal Region Hazardous Materials Response Organization (CRHMRO). This organization is comprised of ten cooperating counties from Contra Costa to the Oregon border. Its mission is to assure that response resources and training are provided regionally, to minimize the risk and impact of hazardous material emergencies. CRHMRO conducts regular meetings, workshops, and training to improve collaborative response capabilities.

b. Petro-chemical Mutual Aid Organization

The Bay Area refineries joined Dow Chemical Company (Dow) and several other chemical manufacturing partners to form the Bay Area

Petro-chemical Mutual Aid Organization (PMAO), originally established in 1980. The PMAO is an emergency response cooperative operating under a formal membership agreement. The primary purpose of the organization is to provide limited assistance to any member requiring aid during an emergency situation. Each member must meet its own response requirements before it can assist other members. The organization maintains a mutual aid plan and discusses fire experiences, fire protection, and fire prevention at monthly meetings.

The PMAO consists of six responding companies: five refineries and Dow. Additionally, the organization has two non-responding members: NuStar LP Terminals (petroleum transport and storage) and Solvay Chemical Group. Non-responding members rely on their local fire protection districts in an incident, and the responding PMAO members assist at these facilities if requested by that member's fire district.

The PMAO responding members provide current, detailed lists of equipment, materials, and personnel that, under most circumstances, could be furnished to another member in an emergency. These lists are limited to fire suppression equipment; Chevron is the exception with its hazmat unit listed as an available asset. Normally, personnel are dispatched from one PMAO member to another only to deliver and operate the equipment requested, but they may be assigned other roles as directed by the IC. The member entity requesting assistance through PMAO manages and directs the on-site emergency response.

c. SCIHMT

SCIHMT is the formal Solano County partnership of trained responders that specializes in hazmat materials handling and accidental chemical releases. This collaboration of local hazmat response teams is based in Fairfield and has technicians staffed and ready to respond 24 hours a day with hazmat and local air monitoring support, if requested.

d. Other Partnerships

BAAQMD and U.S. EPA Region IX are presently in discussion and negotiation for an agreement whereby U.S. EPA will provide emergency air monitoring response services within the District's boundaries, from its hazmat response station in downtown San Francisco. The scope and duration of this agreement is undetermined at this time, as BAAQMD is also evaluating the option of establishing an internal emergency response and special studies monitoring team.

6. Advisory and Stakeholder Groups

The Bay Area region has numerous groups organized to enhance employee, public, and community safety in the vicinity of refineries and related industrial facilities.

a. Global Community Monitoring (GCM)

GCM is a nonprofit organization that promotes broad distribution of relatively inexpensive community air monitoring systems. Following the Chevron Richmond fire, GCM advocated for real-time air monitors on the fenceline of Chevron's property. GCM served as a consultant to the City of Richmond in recommending the appropriate fenceline monitoring strategy that was ultimately adopted by Chevron. GCM continues to work actively with the City of Richmond, BAAQMD, and other community interests on the siting of community air monitors and the collection of potential exposure data.

b. Valero Benicia Community Advisory Panel

The Valero Refinery sponsors a Community Advisory Group (VCAP) that provides an ongoing means of communication between the community and Valero. VCAP is currently comprised of an executive and Public Affairs Manager from Valero, two community-at-large members, and representatives of the Good Neighbor Steering Committee, Benicia City Council, Benicia Unified School District, and Benicia Industrial Park Association. VCAP meets quarterly at the refinery. Minutes of CAP meetings are available at the Benicia Public Library.

A related project, the Benicia Community Air Monitoring Program (BCAMP), was an independent, community-based, and primarily educational venture created to gather scientific evidence to help address two basic questions: 1) what's in the local ambient air, and 2) what are the public health risks associated with the air pollutants that may be detected in local air samples?

BCAMP consisted of an array of real-time air monitoring instruments, a meteorological station, and a public access website that served as a data reporting and chemical information center. The BCAMP monitoring station was housed in a trailer located east of the Southampton residential development in Benicia. It was sited to capture several different potential emissions sources including major roads, the Valero Refinery, residential neighborhoods, a gas station and a city corporation yard. Valero donated the station and supporting components to the City and community of Benicia. Ongoing maintenance and calibration of the system was the City's responsibility. The program is currently inactive.

- c. Phillips 66 Rodeo Community Advisory Panel
Phillips 66 sponsors the Rodeo Community Advisory Panel (RCAP) to establish open communications and partnership with neighboring communities. RCAP's objective is to discuss issues of community concern. RCAP suggests ways that Phillips 66 can strengthen its relationship with its neighbors, review and monitor projects and incidents at the refinery, and share expertise regarding company actions, projects and activities. Phillips 66 provides a facilitator for RCAP meetings and is represented by the refinery manager and managers from Operations, Health and Safety, Public Relations, and Community Affairs. The CAP meets monthly.
- d. Shell Martinez Community Advisory Panel
Shell sponsors a Community Advisory Panel that meets each month with the refinery's senior management. They also have a 24-hour hotline, and do a series of community socials each year to educate neighbors on their operations and field questions about the refinery. In addition to the 24-hour hotline, during an incident, they take calls and provide information to the community regarding the emergency and recommended actions to take.
- e. Tesoro Community Advisory Panel
Tesoro sponsors a Community Advisory Panel that meets monthly from January through October to communicate issues, concerns, and key activities of the Tesoro Refinery with the local community. The fifteen-member panel represents nearby communities, businesses, emergency responders, and local education and covers health/safety, environmental issues, and community/government affairs. Panel members participate in and observe events outside of their meetings relevant to the refinery and report back to the panel, as needed. The refinery may reach out to the Community Advisory Panel during an incident.
- f. Refinery Action Collaborative
The Refinery Action Collaborative (RAC) was formed after the 2012 Chevron Richmond fire to engage industry directly in order to improve safety and reduce health and environmental damage. The coalition formed under the aegis of the Labor Occupational Health Program at UC Berkeley and consists of the United Steel Workers, Communities for a Better Environment, the Asian Pacific Environmental Network, the Natural Resources Defense Council, and the BlueGreen Alliance.

The coalition seeks to transfer the burden of ensuring safety from government to refinery management based on the European model known as the "safety case" approach. In the safety case model, management must demonstrate adherence to rigorous health, safety, and environmental standards as a condition of operating their plants. The

process is overseen by safety experts who serve as government auditors. This safety case approach has reportedly produced a marked decline in industrial accidents in countries where it has been adopted. RAC is calling for a similar approach in California, with public access to the information provided by the companies and the actions taken by government auditors. RAC is also calling for a host of immediate changes, such as a thorough assessment of corrosion damage, better emissions reporting by the industry, and a reduction in the use of “flaring” and other processes that release air contaminants into the community.

- g. Contra Costa County Community Awareness and Emergency Response
The Contra Costa County Community Awareness and Emergency Response Group, Inc. (CoCoCAER) is a nonprofit public benefit corporation of public emergency response agencies, local government officials and facilities, and businesses that use, store, handle, produce, or transport hazardous materials. The nationwide mission of CAER groups is to actively enhance public health and safety. CAER's core objectives are: 1) safe industrial facility operations, 2) coordinated emergency response, 3) an effective safety sharing forum, and 4) a trust-based relationship with the community. All Bay Area refineries participate in one or more action teams of CoCoCAER.

CoCoCAER is one of the oldest and most formal CAER groups in the U.S., with a paid staff funded by industry members. Other member organizations include cities, local response agencies, and active community members organized into eight action teams. Participation on a CAER action teams does not require paid membership in the organization.

- i. Community Outreach Team: promotes shelter-in-place education in the community and publicizes the many resources provided by CAER. The team organizes an annual countywide shelter-in-place drill.
- ii. Emergency Notification Team: improve emergency notification, including the Community Warning System and other mechanisms used to make timely and consistent notifications to agencies and the community during an industrial incident.
- iii. Emergency Preparedness Team: promotes planning for all types of emergencies by providing community and education grants, mentoring, assisting with the annual shelter-in-place drill, and providing training workshops.
- iv. Process Safety Management Team: reviews incidents, shares lessons learned, discusses new process safety regulations and standards, shares best practice approaches to managing process safety, interfaces with local Certified Unified Program Agencies, and provides a risk management forum.

- v. Industrial Hygiene (IH) Team: discusses new regulations and standards related to Industrial Hygiene to promote effective implementation and standardization as appropriate.
- vi. PMAO Team: (essentially the same as described under Partnerships above) reviews and discusses incidents, studies and implements fire protection and prevention best practices, evaluates emergency response equipment and supplies, sponsors and conducts emergency response, self-audits PMAO functions and monthly emergency response equipment drills, develops standard implementation practices for new regulations as they relate to emergency response, and provides emergency response mutual aid to non-PMAO Action Teams.
- vii. HazMat Team: (essentially the same as CRHMRO described under Partnerships above) minimizes the risk and impact of hazardous materials emergencies by integrating regional response training within the sixteen counties of the California Office of Emergency Services Region II.
- viii. Security Team: identifies and disseminates information regarding facility security vulnerability issues and activities. The team works with Law Enforcement, Regulatory Agencies, and Industry to share security related information/alerts/occurrences.

Another CoCoCAER sponsored activity is the Safety Summit program. For over twelve years, refinery managers, supervisors, operators, contractors, and union representatives have met quarterly for safety presentations, incident debriefings, and candid discussions of worker and public safety. These meetings offer an open public forum for any and all concerned about technical and operational aspects of refinery safety in the Bay Area,

7. Public Alert and Communication Systems

a. Contra Costa and Solano Counties

Because of the longstanding, industrialized nature of development along the region's marine coastline, Contra Costa and Solano Counties maintain a multifaceted community warning, notification, and education system for industrial emergencies. The Community Warning System (CWS) is overseen by CCCHSD, with education and outreach support coordinated by CoCoCAER to notify affected communities in the County of chemical emergencies.

A principal feature of CWS is a network of audible safety warning sirens located strategically around each refinery. The sirens are tested monthly throughout Contra Costa County and western Solano County. In the event of an actual emergency, safety sirens in the affected areas are sounded to alert the community to shelter-in-place and turn on a radio, television, or internet news source for further information.

In the event of a verified incident with evidence of a release that may produce community health impacts, the responsible refinery or CCCHSD initiates an emergency alert and shelter-in-place order, if appropriate, that is disseminated to the public via Contra Costa County CWS.

In addition to audible sirens, CWS provides a telephone emergency notification system (TENS) used for automated call-outs. A computerized system makes telephone calls to the known telephone numbers in the vicinity of the hazard based on incident specific issues. CCCHSD also has a subscription alert service that enables residents and businesses to sign up for emergency notifications directly to smartphones via email or text messages.

CCCOES coordinates CWS alert procedures with local radio, television, Caltrans, and California Highway Patrol (CHP) to provide timely broadcasting of emergency situations through available media. Several participating refineries also use social media within the CWS framework to provide information on refinery conditions and situations that could affect community health.

All messaging and data transfer under Contra Costa County's community warning system complies with the Federal Emergency Management Agency's (FEMA) Common Alerting Protocol (CAP) message format.

Additional information:

CWS: <http://www.cococws.us/getCurrentAlerts.action>

Community Alert Network: <http://www.cococws.us/loadlogin.action>

b. Phillips 66 Rodeo

In addition to the CCC CWS, the refinery has the Automatic Community Information System (ACIS) telephone system and a community information line to keep community members and nearby residents informed about current conditions at the facility. ACIS is used to send messages to Community Advisory Panel members, key contacts, and community members that signed up for the ACIS notifications. The community information line is a recorded message that community members can call to receive up-to-date information about the current status of the refinery. In the event of an emergency, information is updated to provide a summary of the current event.

c. Valero Benicia

The Valero Refinery in Solano County utilizes a notification and alert system integrated to the Contra Costa County model. Both notification

systems use a rating procedure based on the potential impacts that allow SCIHMT, BAAQMD CED staff, and other responders to determine if further investigation and/or actions are required.

d. City of Benicia

In the event of a refinery disaster or emergency, the City of Benicia may activate its Community Alert and Notification (CAN) System that includes a series of sirens placed throughout the city. Local access Benicia TV (BTV) on Comcast Channel 27, AT&T U-Verse Channel 99, AM 1610, and the City's emergency webpage provide real-time information and instructions to residents.

8. Preparedness and Response Training

a. Chevron Richmond

Chevron maintains regular contact with State and local employee and public safety officials to conduct large-scale emergency drills. Chevron holds frequent drills with local fire-hazmat departments. The refinery fire department provides training to local fire departments and is a mutual aid participant for the city and county.

All Richmond Refinery workers receive extensive safety training in their specific duties before they begin their jobs, and they continue with refresher training at regular intervals.

b. Tesoro Martinez

Tesoro employees receive training in: general safe working practices, safe handling and use of refinery chemicals, hazardous wastes and other hazardous materials, emergency response tactics, care and use of emergency response and personal protective equipment, firefighting procedures, release containment and cleanup procedures, evacuation, and alert procedures. Tesoro's training does not have a specific emphasis on offsite air releases; however, air monitoring implications are considered as part of various table-top exercises that are conducted to simulate potential release scenarios. Additional information is available at:

<http://tsocorp.com/social-responsibility/health-safety/>

c. Phillips 66 Rodeo

The Phillips 66 Emergency Response Team (ERT) conducts quarterly drills that often include offsite consequences. Also, the ERT leadership team completes monthly training on CWS notifications and other external notifications.

The refinery sponsors the Rodeo-Hercules and Crockett fire fighters in its petroleum fire schools on a yearly basis to familiarize them with its response and firefighting strategies and tactics.

The Phillips 66 Rodeo Refinery Incident Management Team holds an annual table top-drill with Cal Office of Spill Prevention and Response (OSPR), United States Coast Guard (USCG), and local response representatives which include notifications and monitoring. These scenarios always include offsite consequences to be exercised by the participants.

d. CoCoCAER

CoCoCAER provides a variety of County-wide public safety outreach, training, and education programs. These subjects are outlined in Table A-4 below. CoCoCAER has a webpage designed for individuals to refer to at home during an emergency incident. The page depicts real-time threat levels as dictated by the federal Homeland Security Advisory System, as well as appropriate precautions. In addition, CAER provides a detailed list of preparations that residents can make to maximize their safety and comfort during an air contamination emergency.

e. Community Emergency Response Teams

Bay Area residents are also served by a number of volunteer Community Emergency Response Teams (CERT). The CERT concept was developed in 1987 by the Los Angeles City Fire Department after the Whittier Narrows earthquake. This emergency confirmed the value of training citizen volunteers to prepare for emergency situations. As a result, the City created the first CERT program. Recognizing the importance of preparing citizens for emergency events, the Federal Emergency Management Agency adopted and expanded upon the CERT materials and made them applicable for all hazards.

FEMA now supports CERT by offering and sponsoring train-the-trainer and program manager courses for members of the fire, medical, and emergency management community. The courses provide the knowledge to conduct training sessions for neighborhoods, businesses, industry, and government groups and organize teams with which first responders can interface following a major disaster. Table A-4 provides a listing of some of the active CERTs in the Bay Area, and the education and training they offer.

f. CRHMRO

CRHMRO offers a multi-day, highly technical, hands-on hazardous materials transportation workshop for public and private emergency response personnel and interested members of the public each spring.

The training workshop curriculum can be found online at the CRHMRO website which includes courses such as:

- i. Incident Command during a HazMat Emergency.
- ii. Ethanol / Crude Oil Emergency Response.
- iii. Initial Response to a HazMat Emergency.
- iv. Oil-by-rail Emergencies.

The full list of annual courses can be viewed on the CRHMRO webpage.

- g. CCCHSD and City of Richmond
CCCHSD and the City of Richmond each sponsor an annual emergency preparedness exposition to provide public education on:
 - i. Understanding and preparing for shelter-in-place directives.
 - ii. Understanding the Community Warning System.
 - iii. General preparation for emergencies.
 - iv. Emergencies when using public transportation.
 - v. Preparedness for special needs (medical and disabilities).

Table A-4 Training, Drills, and Exercise Resources

Organization	Description	Web Link
CRHMRO	CRHMRO meets monthly to debrief on recent emergency events, and discuss recent and upcoming training, drills, and exercises. CRHMRO sponsors an annual workshop that provides hands-on training for transportation-related hazardous materials incidents (e.g., oil-by-rail, tankers, and pipeline.)	http://www.crhmro.org/
CoCoCAER	Outreach Team organizes an annual county-wide shelter-in-place drill to ensure that schools and neighborhoods know about CWS and how to shelter-in-place in the event of a chemical related emergency.	http://www.cococaer.org/schooldrill.html
CoCoCAER	A video provides training for school staff and business owners to provide shelter-in-place instructions and inspect buildings for shelter adequacy.	http://www.cococaer.org/video.html
CoCoCAER	Shelter-in-place Drill Planning Checklist.	http://www.cococaer.org/PDF/2013/SIP_Drill_Planning_Checklist.pdf
REACT/ Richmond CERT	Richmond Emergency Action Community Teams (REACT)/CERT students are trained by the Richmond Fire Department and certified volunteer community trainers. REACT/CERT students receive 20 hours of free life saving training, plus attend disaster drills yearly.	http://www.ci.richmond.ca.us/index.aspx?NID=339
REACT/ Richmond CERT	The CERT offers on-going, quarterly refresher training opportunities for CERT graduates. The topics include shelter operations, communications, and animal response teams, among other courses.	http://www.ci.richmond.ca.us/index.aspx?NID=2345
San Pablo CERT	CERT offers a twenty-hour training program that gives individuals the basic disaster response skills to offer vital support to their family, associates and neighborhood.	http://sanpabloca.gov/index.aspx?NID=1074
Martinez Area CERT	CERT Basic Training involves a FREE instructor-led course consisting of 20 hours of instruction. CERT members are trained to provide immediate assistance to victims in their area, organize spontaneous volunteers who have not had the training, and collect disaster intelligence that will assist professional responders with prioritization and allocation of resources following a disaster.	http://martinezcert.org/Basic.htm

9. Innovative Approaches

This section discusses research or demonstrations of emerging technologies or systems for monitoring, modeling or responding to fugitive or unplanned upset emission releases. Participating refineries and agencies have been polled to voluntarily provide this content.

BAAQMD is currently evaluating new refinery air quality monitoring technologies for different applications, including regulatory compliance and unplanned release monitoring. BAAQMD and South Coast AQMD are

collaborating on the evaluation of several technologies for estimating industrial fugitive emissions and pinpointing fugitive emission sources. BAAQMD conducted a demonstration of solar occultation flux (SOF) for fugitive emissions profiling at the Shell Martinez and two nearby refineries in late 2013. Results showed that measured VOC emission rates were significantly greater than reported rates derived from emission factors. Although the study compared a short time period with annualized emissions, the results were in common with the vast majority of fugitive emissions measurement studies conducted to date. The District has made the results available to the refineries and other stakeholders for peer review. The report is provided in Appendix C-1.

The District is investigating additional capabilities and enhancements for its mobile monitoring van and further utilization of other mobile platforms currently in use for other testing purposes. In July 2013, BAAQMD convened a panel of air monitoring experts, including ARB representatives to recommend further action on capability enhancements identified in DRI's report. Final comments and recommendations of the expert panel were released in June 2014 and are also provided in Appendix C-1.

BAAQMD and individual refineries are evaluating the voluntary fence line monitoring programs at the Chevron and Phillips 66 refineries for expansion, possibly to include a community-based odor monitoring project near one refinery. The latter project will evaluate state-of-the-art analytical methods to identify odorous gases and trace them back to their source. In addition, at the request of local community leaders, Phillips 66 has commissioned Argos Scientific to develop a curriculum that will be used to train students at the local high school in environmental sampling methods. Additional information is available at:

<http://www.argos-sci.com/about.htm>

10. Identified Needs

This section discusses programmatic and resource needs that ARB and/or CAPCOA have identified through interview, stakeholder meetings and public documents. It includes technical improvement efforts that are still in planning or development stages. These needs will be addressed in detail in the Objectives 2 and 3 reports.

- a. The BAAQMD action plan issued in late 2012 included a number of identified needs related to the industrial emergency air monitoring program:
 - i. Evaluating enhancements to current air monitoring capabilities, including collaboration with outside monitoring experts. (Completed - DRI study.)

- ii. Expediting development of a rule to track total refinery emissions and require mitigation of significant increases, along with inclusion of additional air monitoring. (In process.)
 - iii. Evaluating incident response resources and recovery of associated costs.
 - iv. Evaluating enhancements to communication strategies.
 - v. Sponsoring legislation to collect higher penalties.
- b. The final report of Governor's Interagency Working Group on Refinery Safety (February 2014) identified a number of air monitoring needs:
- i. Identify additional information needed from refineries to enable regulatory agencies to provide more effective oversight.
 - ii. Keep the CalEPA Refinery Information Officer (RIO) informed on emergency air monitoring activities related to refineries. The RIO will be a catalyst for improved public participation, education and outreach about refinery emissions and releases, safety metrics, regulatory compliance status, emergency planning and response, and the roles of various agencies.
 - iii. In conducting this assessment and developing recommendations to improve toxic air contaminant monitoring, ARB and CAPCOA should provide input for, and incorporate improved area plans into OER operations to enable it to meet its specific requirements in the improved plans.
 - iv. Involve the ARB and affected air districts in the technical review of Area Plans and in ongoing partnerships with CUPA programs, especially in areas where there are refineries or other potential major sources of toxic air releases. The partnership should also include Area Plan design, cross-training, preparedness exercises, coordination, and communication.
 - v. California Governor's Office of Emergency Services (CalOES) should consider regulations to clarify key terminology in the Health and Safety Code Section 25504, subdivision (a), specifying criteria for reporting thresholds and a clearer definition of the terms "immediate" and "threatened release."
 - vi. ARB and CAPCOA should consider the following elements in their project plan to improve state and local air monitoring practices as possible program improvements: increase the availability and quality of air monitoring data on local and state websites during both routine refinery operations and upset events; develop user applications and other electronic tools to make data more accessible; and convene local town hall meetings for community input and outreach.

11. Documentation

Documentation includes practices, procedures, and guidance prepared and maintained for emergency response actions to address a non routine, unplanned air contaminant release.

BAAQMD has incident response policies and procedures designed to provide information and support to first responders and other incident response agencies. The District works with these agencies to develop methodologies to foster efficient and effective interaction and communication when the District participates in incident response activities. The District is updating its incident response policy and procedures as part of its action plan, in response to the fire at the Chevron Refinery.

BAAQMD publishes an Annual Air Monitoring Network Report describing its air monitoring system. The 2013 report (published July, 2014) is available at: http://www.baaqmd.gov/~media/Files/Technical%20Services/2013_Network_Plan.ashx?la=en).

Appendix C-1 lists additional BAAQMD program reference documents reviewed as part of the inventory process.

The inventory process included review of the refineries' emergency response procedures in their RMPs. The RMPs are not widely disseminated to the public and are not provided in Appendix C-1. They can be reviewed at the CUPA with jurisdiction over each refinery.

B. South Coast

The South Coast Air Basin is a heavily industrialized, densely populated urban area consisting of multiple cities bordering each other. The South Coast Air Quality Management District (SCAQMD) covers all of Orange County and the non-desert regions of Los Angeles County, Riverside County, and San Bernardino County. Six refineries; Chevron – El Segundo, Valero – Wilmington, Tesoro – Wilmington/Carson, ExxonMobil – Torrance, Phillips 66 – Wilmington, and Paramount Petroleum – Paramount; are generally located to the south and southwest of the City of Los Angeles in a patchwork of overlapping emergency response/oversight jurisdictions.

1. Air District Assets and Resources

SCAQMD offers a broad range of programs for businesses, the community, and local government that help to achieve cleaner air quality for all. SCAQMD works with local/State/federal agencies, industry groups, businesses, and local responders to achieve its mission. Along with these partners, SCAQMD has pre-planning, modeling, monitoring, sampling, and analytical resources to aid in refinery incident response.

The Ports of Long Beach and Los Angeles have jointly developed the San Pedro Bay Ports Clean Air Action Plan (CAAP) designed at significantly reducing the health risks posed by air pollution from port-related ships, trains, trucks, terminal equipment, and harbor craft. The CAAP was developed with the cooperation and participation of the SCAQMD, ARB, and U.S. Environmental Protection Agency.

a. Monitoring Network

SCAQMD operates 38 permanent monitoring stations and 4 single pollutant source impact Lead air monitoring sites in the South Coast Air Basin and a portion of the Salton Sea Air Basin in Coachella Valley. The network measures ozone (O₃), PM₁₀¹¹, PM_{2.5}, nitrogen dioxide (NO₂), carbon monoxide (CO), SO₂, particulate Lead, VOCs, and air toxics under various programs. Additionally, the network gathers meteorological data that enables SCAQMD and other agencies to conduct assessments and studies of pollution dispersion trends.

HF Alkylation Process Reporting System

ExxonMobil and Valero use a mixture of modified hydrogen fluoride (HF) in their alkylation process units that require monitoring with SCAQMD oversight. The alkylation process produces a premium blending component used in the manufacturing of gasoline. Modified HF is a proprietary diluted version of HF that has much lower diffusion properties and poses less risk than pure HF. Because even modified HF is

¹¹ PM₁₀ refers to particles with an aerodynamic diameter of 10 microns or smaller. PM₁₀ includes PM_{2.5} - the subgroup of finer particles with aerodynamic diameter of 2.5 microns and smaller.

extremely hazardous, these two refineries monitor their alkylation equipment using a network of HF sensors located around the perimeter of the process unit and in close proximity to the modified HF storage vessels. The network sends alarm signals to SCAQMD so that inspectors can perform a follow up investigation. To date, there has never been an HF incident.

HF sensor alarms are set to trigger at a specific concentration. If an alarm is triggered, a Remote Terminal Unit (RTU) sends a signal to the SCAQMD's Central Station via modem which in turn dials a telephone number to notify the appropriate staff. The RTU provides information regarding the time the sensor alarmed, the location of the sensor within the facility, and information pertaining to the minimum concentration detected. The Central Station computer also activates an audible alarm to alert SCAQMD's Communications Center staff during normal business hours. The HF sensors are tested on a monthly basis for proper operation and readiness.

When a HF notification is received through the Central Station, the designated SCAQMD Compliance Program Supervisor:

- i. Is automatically paged and alerted that an alarm has been activated.
- ii. Immediately phones the SCAQMD inspector assigned to the facility, advises them of the alarm, and dispatches the inspector to the facility to initiate an investigation into the notification.
- iii. Immediately contacts the Standby Supervisor and advises of the notification and that an inspector has been dispatched to the facility.
- iv. If no phone notification is received from the reporting facility within ten minutes of receipt of the page, SCAQMD's Program Supervisor phones the facility's contact directly to gather additional information relating to the notification.
- v. Depending on the details provided from the facility; false alarm, cause, extent, severity of the release that triggered the alarm, and the steps implemented to minimize/control the release, Executive Management is contacted for further direction should deployment of the Emergency Response Team (ERT) be necessary.

San Pedro Ports Air Monitoring Network

As part of CAAP, the San Pedro Ports maintain an air monitoring network capable of providing potentially valuable criteria pollutant measurements during an incident at any of several refineries located in the vicinity. The maps in Appendix A show the positions of the refineries in relation to the San Pedro Bay Ports monitoring network, and the tables list the equipment at each monitoring station.

b. Stationary Equipment

Although there are localized measurements that are conducted in emergency response situations, the data from the SCAQMD air monitoring network can be used in larger scale emergencies that may have regional scale impact or transport. Since the type of data needed varies with the type of incident, SCAQMD provides for reference its Final SCAQMD Annual Network Plan which describes the current air monitoring network configuration and special monitoring projects that can be used during an emergency response. The most recent version of the Annual Network Plan is available online at:

<http://www.aqmd.gov/home/library/clean-air-plans/monitoring-network-plan>

Appendix A provides a complete listing of all network and special purpose air monitoring stations that surround the refineries operating in the SCAQMD jurisdiction and are deemed to be within the air shed that could be affected by a refinery release.

c. Deployable Equipment

In addition to the fixed air monitoring network, SCAQMD has an extensive inventory of deployable equipment that can be used to measure VOCs, particles, and sulfur compounds that supplements the air monitoring network during an incident. Some of the instruments provide on-site analysis, while others require samples to be collected and later analyzed. The SCAQMD is evaluating other deployable technologies for providing more information during incidents if applicable. Current deployable monitoring capabilities include:

- i. Field Deployable On-Site Near Real Time Measurements
- ii. Volatile Organic Carbon
- iii. Hydrogen Sulfide
- iv. Particulate Matter – Mass

On-Site Collection for Laboratory Analysis

- i. Volatile Organic Carbon
- ii. Sulfur Containing Compounds
- iii. Particulate Matter – Mass, metals, ions

Additional Trailer Deployable Near Real Time Measurements for Longer Term Incidents

- i. Hydrocarbons
- ii. Black Carbon
- iii. Ultra-Fine Particles
- iv. Ozone, NO₂, NO, SO₂, PM_{2.5}, PM₁₀

Appendix B provides a comprehensive list of SCAQMD's deployable instruments and equipment available for emergency air monitoring.

d. Staffing

SCAQMD supports public safety agencies that are responsible for primary incident command during events with unplanned air releases. SCAQMD does not assume primary incident command during emergencies, but will dispatch its ERT at the request of local police, fire, California Highway Patrol (CHP), and health departments. SCAQMD responds to emergencies such as fires, explosions, toxic spills, and toxic gas releases at industrial/commercial facilities and other sources. SCAQMD also dispatches its ERT to events which may result in significant public air quality impacts. Table B-1 lists the ERT programmatic leads.

Table B-1 SCAQMD Emergency Response Staffing

Position Title	Section	Contact ¹²
Deputy Executive Officer	Engineering and Compliance	(909) 396-2662
Deputy Executive Officer	Science and Technology Advancement	(909) 396-3249
Assistant Deputy Executive Officer	Engineering and Compliance	(909) 396-3104
Assistant Deputy Executive Officer	Science and Technology Advancement	(909) 396-3123
Health Effects Officer	Planning Rules and Area Sources	(909) 396-2582
Media Manager	Media	(909) 396-3687
Senior Enforcement Manager	Engineering and Compliance	(909) 396-3332
Quality Assurance Manager	Monitoring and Analysis	(909) 396-3283
Senior Enforcement Manager	Monitoring and Analysis	(909) 396-2391
Atmospheric Measurements Manager	Monitoring and Analysis	(909) 396-2269
Compliance Emergency Response Coordinator	Engineering and Compliance (Air Quality and Analysis Supervisor)	(909) 396-2317
Compliance Emergency Response Supervisor	Engineering and Compliance (Supervising Inspector)	(909) 396-2319
Monitoring Emergency Response Principal Instrument Specialists	Special Monitoring (Principal Air Quality Instrument Specialist)	(909) 396-2148

¹² Phone numbers are for office hours; after hours calls should go to 1-800-CUT-SMOG.

Other ERT staff members include two Supervising Air Quality Inspectors, two Air Quality Inspectors, eight Air Quality Instrument Specialists (rotating on call with two active at any given time), and eight Air Quality Chemists (rotating on call with one available at any given time). Additional staff is being sought for this program.

Typical Criteria for Initiating SCAQMD Action/ Engagement

One or more of the following conditions would typically apply to deploy the ERT:

- i. Request is received from CHP, local police, fire protection agency, health department, or other appropriate government agency.
- ii. Incident occurs where, in the judgment of the SCAQMD Executive Officer or his/her designee, support activity will be in the best interest to inform or protect the public.
- iii. Incident occurs where there is good reason to believe that there are potentially significant amounts of emissions being released that would endanger public health and/or cause violations of one or more air pollution control rules, regulations, or laws.

Limitations to District Action/Disengagement

SCAQMD responds to situations and only engages where there is no threat or danger to the life or health of ERT personnel. Upon arrival at the scene, if conditions at the scene warrant it, the On-Scene Coordinator (OSC) will make the determination whether to continue the response effort or to withdraw the ERT from the danger area. Both the first response agency Incident Commander and the Operations Coordinator (OC) will be immediately apprised of this decision. Limitations to SCAQMD emergency response support include, but may not be limited to, the following:

- i. Situations requiring the use of Level A or B personal protective equipment: ERT personnel will not be authorized to support these incidents under any circumstances.
 - ii. Under no circumstances will ERT personnel enter the "hot zone". Samples required from these areas will be taken by first response agency personnel, after sampling method instruction by ERT members.
- e. Analytical Services
- The SCAQMD's Monitoring and Analysis Unit responds to local ambient monitoring requests, including meteorological and sampling services as part of the SCAQMD's emergency response program. Table B-2 lists the unit's analytical capabilities.

Table B-2 SCAQMD Analytical Capabilities

Instrument	Vendor	Analyte	Method
GC/MS	Agilent	VOC (Trace level)	TO-15
Gas chromatography (GC)/ mass spectrometry (MS)	Agilent	VOC (Screening Level)	
GC/ total combustion analyzer (TCA) flame ionization detector (FID)	Finnigan	carbon monoxide, methane, carbon dioxide, ethylene, ethane	Method 25.1 and 25.3
GC/thermal conductivity detector (TCD)	Finnigan	helium, hydrogen, oxygen, nitrogen, carbon monoxide, and oxides of nitrogen	Method 10.1
GC/ Sulfur chemiluminescence detector (SCD)	Agilent	Sulfur Compounds	SCAQMD (Modified IO3.1)
Inductively coupled plasma (ICP)-MS	Perkin Elmer	Metals	
X-ray fluorescence (XRF)	Panalytical	Metals	SCAQMD
Polar Light Microscope	Olympus	Bulk Material (including asbestos)	U.S. EPA/600/R-93/116
Stereo Light Microscope	American Optical	Bulk Material (general)	U.S. EPA/600/R-93/116
X-ray Diffraction (XRD)	Panalytical	Asbestos samples Fallout samples Crystalline silica Unknown crystalline	NIOSH SILICA, CRYSTALLINE, by XRD
FTIR Spectrometer with attached NIC-PLAN infrared (IR) Microscope	Nicolet	Fallout samples Unknown Paints	

2. Local Emergency Response Agency Assets and Resources

Local emergency response jurisdiction over refineries is somewhat less centralized in the South Coast Basin than in the Bay Area. There are four primary local agencies that provide emergency preparedness and response services for South Coast refineries. The Los Angeles City Fire-Hazmat Department (LAFD) has jurisdiction over the Phillips 66 Wilmington, Valero Wilmington, and Tesoro Wilmington refineries. The Los Angeles County Fire Department (LACoFD) responds primarily to incidents at the Paramount Petroleum refinery in Paramount and to the portions of the Phillips 66 and Tesoro refineries not under the jurisdiction of LAFD. The Los Angeles County Fire Department's Health Hazardous Materials Division (LACoFD-HHMD) has CUPA jurisdiction over the Tesoro Carson, Paramount Petroleum Paramount, and ExxonMobil Torrance facilities. The City of Torrance Fire Department (TFD) responds to incidents and oversees the RMP for the ExxonMobil

Torrance refinery, thereby acting as a participating (supporting) agency (PA) under CUPA. The City of El Segundo Fire Department (ESFD) has jurisdiction over the Chevron El Segundo Refinery.

LAFD and the Los Angeles City Police Department (LAPD) hazmat specialists comprise the Los Angeles Joint Hazard Assessment Team (LAJHAT) along with the Federal Bureau of Investigation (FBI), Los Angeles City Public Health Department (LAPHD) and Los Angeles County Public Health Department (LACoPHD.) LAJHAT responds to hazmat incidents within the City as well as within the larger region by request.

a. Preparedness and Response Programs

LACoFD

LACoFD has four Type I rated Hazardous Materials Task Forces (HMTF) capable of entering the hot zones in refinery incidents for mitigation operations. LACoFD Hazmat Station 105 in Compton is the unit that will respond to the major refineries in the area; however, other units can assist or respond, as needed.

LACoFD-HHMD

LACoFD-HHMD has a designated the Emergency Operations Section to fulfill part of its CUPA implementation function and includes the following:

- i. Review and approve industrial facility RMPs.
- ii. Conduct site inspections to verify compliance.
- iii. Investigate accidental releases and complaints including felony violations of State hazardous waste laws.
- iv. Review and approve assessment and mitigation work plans for sites contaminated with hazardous substances.
- v. Oversee the work of private environmental consultants to ensure that appropriate cleanup standards are met.
- vi. Provide 24 hour response to hazardous material incidents throughout Los Angeles County. For a large refinery incident, LACoFD-HHMD will not enter the hot zone, but will assist LACoFD by acting as safety/health officer and conducting perimeter monitoring.

The Emergency Operations Section Staff ensures public health and safety by identifying unknown substances and their associated health hazards, maintaining air monitoring instruments and response management procedures, and coordinating multi-agency responses.

LAFD

LAFD is responsible for incident response and CUPA program administration for the three refineries located in the Wilmington community of the City of Los Angeles and can assist with response at the two refineries in the cities of Torrance and Carson. Joint Hazmat Assessment

Teams, consisting of hazardous materials specialists from LAFD, LAPD, FBI, and public health agencies, commonly respond with LAFD to hazardous materials incidents.

ESFD

ESFD is the CUPA for Chevron El Segundo. ESFD is responsible for emergency planning, administration, and compliance functions for Chevron El Segundo, as well as responding to hazmat emergencies up to the operations level. The Department is capable of setting up a perimeter and controlling entry, but does not actively mitigate an on-site incident (i.e., go into refinery and turn valves, plug leaks, etc.). ESFD is certified to perform refinery-type rescue operations including confined space rescue, but generally defers to the Chevron El Segundo Fire Department (CFD) unless requested to assist.

TFD

TFD has a close working relationship with LACoFD-HHMD personnel for joint oversight of the ExxonMobil Refinery. The TFD Hazardous Materials Team also collaborates proactively with the refinery on safety audits, drills, training, exercises, risk management and community outreach. TFD attributes a positive working relationship to a decade-old settlement agreement reached with ExxonMobil after a serious safety incident occurred there in the 1990s.

b. Stationary and Deployable Equipment

LACoFD

LACoFD conducts all air monitoring with hand-held Draeger tubes or four/six-gas meters. Responders will enter the hot zone with appropriate PPE for the suspected product to conduct air monitoring.

LACoFD-HHMD

LACoFD-HHMD maintains a number of field portable and handheld analyzers that measure O₃, combustible gases, H₂S, VOCs, O₂, and SO₂. Additionally, hazmat teams have colorimetric tubes and Draeger CMS with various tubes and chips that measure for specific compounds.

LAFD

LAFD squads are equipped with Draeger Tubes, Draeger Chips, and portable analyzers. With a diverse range of Draeger samplers, the Department can detect and measure O₂, H₂S, LEL, CO, and various specific compounds. The data are transmitted via the Integrated Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) Area Wireless Assessment, Reconnaissance, and Evaluation (AWARE) data management system. This system is capable of transmitting data to an IC or technical reference workstation for broadcast or distribution, as required.

TFD

TFD has deployable analyzers and colorimetric tubes that can be used for analyzing air contaminants during an incident. These devices can detect HF, NH₃, CO, H₂S, VOC's, SO₂, chlorine (Cl₂) arsine, phosphine, and terrorist agents.

ESFD

ESFD uses portable PID/FID and multi-gas detectors to measure toxic and combustible gases. They also utilize Draeger Tubes to measure the quantities of known compounds.

A more detailed itemization of local agency monitoring equipment is compiled and presented in Appendix B.

c. Staffing

The four response agencies in the South Coast that either provide direct support or assist as needed on industrial facility emergency air releases at industrial facilities each have hazmat response personnel with specific training for refinery and other industrial emergencies.

LACoFD

Each LACoFD HMTF has three shifts with a crew of nine personnel each. In addition, there are many LACoFD members trained to the hazardous materials technician/specialist level not regularly assigned to any of the HMTFs, but can be called to staff or augment any of the HMTFs on an as-needed basis. Table B-3 lists the contacts for the HMTFs.

Table B-3 LACoFD Emergency Response Contact List

Title	Section	Contact Phone
Hazardous Materials Coordinator, Captain	Del Valle Regional Training Center 28101 Chiquito Canyon Rd., Castaic, CA 91384	(661) 257-8002 (o) (213) 598-7562 (c)
Station Captain	HMTF 105 18915 S. Santa Fe Ave, Compton, CA 90221-5907	(310) 632-1634
Station Captain	HMTF 43 921 Stimson Ave., Industry, CA 91745-1687	(626) 968-1978
Station Captain	HMTF 150 19190 Golden Valley Road, Santa Clarita, CA 91351	(661) 250-2708
Station Captain	HMTF 129 42110 6th Street West, Lancaster, CA 93534-7134	(661) 940-7700

LACoFD-HHMD

LACoFD-HHMD HHMD is a separate division of LA County Fire. They are staffed to respond to ~2,000 of the smaller incidents per year while the HMTFs respond to ~200 of the larger incidents per year. Table B-4 lists the LACoFD-HHMD Emergency Response staff.

Table B-4 LACoFD-HHMD Emergency Response Staffing List

Title	Section	Contact Phone
Assistant Chief HHMD	Emergency Operations Section	(323) 890-4043
Supervising HazMat Specialist	Emergency Operations Section	(323) 890-4086
Supervising HazMat Specialist	Emergency Operations Section	(323) 890-4087
Supervising HazMat Specialist	Emergency Operations Section	(323) 890-4088
Responders (18)	Emergency Operations Section	(323) 890-4317

LAFD

LAFD responds to hazmat incidents with task forces and dedicated hazardous materials units. Task forces consist of up to 18 technicians, 2 engines, a hazmat squad vehicle, and an ambulance. The task force squad vehicle is equipped with all of additional computers and equipment necessary for hazardous materials response. The dedicated hazardous materials units are fully staffed and able to respond directly in a single vehicle. Table B-5 lists the LAFD Emergency Response staff.

Table B-5 LAFD Emergency Response Staffing List

Title	Section	Contact Phone
LAFD Hazmat Task Forces (4) Approximately 18 members per Task Force	Emergency Services Bureau	(213) 978-3820
LAJHAT	Homeland Security Division	(818) 919-2554
Certified Decontamination Companies (6)	Emergency Services Bureau	(213) 978-3820

TFD

A TFD hazmat team, consisting of an engineer and four technicians, responds with the hazmat unit staffed with a captain, two engineers, and two firefighters drawn from its normal fire response crews.

ESFD

ESFD does not have a vehicle dedicated to hazmat response, but has hazmat response gear on its various other vehicles. The Department's Environmental Safety Manager, located in its Environmental and Safety Division, can be reached at (310) 524-2242.

d. Analytical Services

LAFD, LACoFD-HHMD, TFD, and ESFD do not have analytical capabilities or retain contract laboratory services for air monitoring samples. Should air sampling and analysis be necessary for a refinery event, these agencies would request support from SCAQMD. LAFD can utilize the Joint Hazard Assessment Team to collect air samples and analyze them with its GC/MS to inform immediate actions during an emergency response.

3. Refinery Emergency Response Assets and Resources

a. Preparedness and Response Programs

The South Coast refineries have individually established programs for monitoring air contaminant releases both internally and, to some degree, at and beyond the fence line in neighboring communities. These programs are generally responsive to regulations for industrial and public safety and risk management. Emergency protocols and procedures are maintained in the refineries' internal standard operating procedures and are summarized in their RMPs.

ExxonMobil Torrance

ExxonMobil has requested proprietary treatment of all submitted information pertaining to the Company's Torrance Refinery.

Phillips 66 Wilmington

Phillips 66 Wilmington contracts with Marine Spill Response Corporation & Stars Contractors (MSRC) for assistance in incident response. Additionally, Phillips 66 has a companywide Incident Management Assist Team (IMAT). IMAT is comprised of an internal Phillips 66 team of trained emergency response professionals who maintain volunteer qualifications and are capable of supporting an ICS response structure at any of the company sites.

Paramount Petroleum Paramount

The Paramount Petroleum Refinery has established partnerships and contracts with National Response Corporation (NRC), MSRC, and West Coast Environmental Solutions (WCES). NRC is the largest commercial Oil Spill Response Organization in the U.S. and maintains stockpiles of oil spill equipment for immediate response. MSRC provides marine oil spill response and environmental damage mitigation services. WCES is a

California Department of Fish and Game Oil Spill Response Organization; their services include field VOCs, LEL, CO, O₂, H₂S, and SCAQMD Rule 1166 – VOC contaminated soil emissions monitoring.

b. Stationary and Deployable Equipment

Chevron El Segundo

Chevron utilizes permanent on-site stationary air monitoring equipment with single sensors or a combination of sensors for H₂S, SO₂, NH₃, CO and combustible gases, vapors, and hydrocarbons (shown in % LEL). Stationary air monitoring equipment is strategically positioned in process areas and buildings. Air monitoring equipment in process areas display concentration and alarms on control room consoles. Control buildings are equipped with gas detection systems that alarm and shut down the HVAC system when toxic concentrations of combustible gases and vapors (% LEL), H₂S, SO₂, NH₃, CO are detected at the inlet. In addition, they use a number of portable systems listed in Appendix B to actively monitor potential concerns during an emergency response. All staff wear personal H₂S gas monitors while operating within plants and process areas in the refinery. Emergency Response personnel wear 4 gas personal meters. Chevron has an in house laboratory which has gas chromatography analysis capability.

In a significant event, the CFD Battalion Chief dispatches air monitoring technicians (from Health, Environmental, & Safety staff and/or fire fighters) downwind or to select locations based on observations, odor reports, etc. Direct reading instruments as listed in Appendix B are used to measure constituents of concern based on the scenario (plant involved and episode specifics). Results are relayed back to the IC or a designated person in the command structure. The unified command will then use the monitoring results to help determine public actions to be taken.

Valero Wilmington

Valero has various types of stationary equipment deployed within their fence line for on-site monitoring. The stationary on-site equipment includes Rexnord H₂S sensors, Gas-tech type HF acid sensors, and Rexnord LEL sensors. All of the equipment is strategically stationed around the refinery. The Gas-tech type HF sensor immediately alerts the South Coast Air Quality Management District office when in alarm. Valero has twenty-six MX6 iBrid Multi-Gas portable monitors at the refinery. Six of the portable gas monitors are designated for emergency response. Additionally, Valero has a meteorological station located on top of the facility engineering building.

Tesoro Wilmington/Carson

The Tesoro Wilmington/Carson refinery complex is a contiguous facility under the shared jurisdiction of LACoFD-HHMD and LAFD. The refinery has a variety of portable air monitoring equipment and can analyze collected samples in-house or with contracted services. The refinery uses mass spectrometry to analyze samples and a Photovac Voyager gas chromatograph to analyze in samples for benzene. Tesoro maintains contracts with third parties to conduct off-site air quality monitoring during drills and incidents.

ExxonMobil Torrance

ExxonMobil has requested proprietary treatment of all submitted information pertaining to the Company's Torrance Refinery.

Phillips 66 Wilmington

The Phillips 66 Wilmington refinery utilizes single sensors or a combination of sensors for fixed atmospheric monitoring around selected facility operations and fence lines. This instrumentation monitors for H₂S, SO₂, NH₃, and hydrocarbons. Additional instrumentation detects combustible gases, vapors, and hydrocarbons, providing concentrations shown by percent of total volume.

The Phillips 66 facilities maintain a network of fixed H₂S, SO₂, and NH₃ monitors that provide measurement data and alarm signals to operators at satellite control rooms or the centralized control center. At the Wilmington facility, the monitors adjacent to the nearest communities are wired to the refinery's centralized control center.

Paramount Petroleum Paramount

Paramount Petroleum - Paramount has a flare auto sampler measuring LEL and H₂S. Also, additional stationary sensors measuring LEL, H₂S, and NH₃ are located throughout the facility. There are a total of forty sensors at the facility including the flare auto sampler. The refinery has field portable analyzers that can measure O₂, LEL, H₂S, CO, PID, SO₂, and NH₃. All staff wear personal H₂S monitors while within in the refinery perimeter. Because the refinery is relatively small, Paramount management considers its process unit monitoring system to be tantamount to a fence line monitoring system.

A detailed listing of the stationary and portable equipment for the above refineries is provided in Appendix B.

c. Staffing

Each refinery located within SCAQMD's jurisdiction has a full-time, in-house fire-hazmat department on duty 24 hours a day. Each refinery's RMP contains detailed procedures and contact information for initiating

emergency notifications, investigations, and responses. Refinery personnel conduct periodic exercises, some of which include local agency responders and emerging management officials. Table B-6 provides a listing of key emergency response positions and contact information for each South Coast refinery.

Table B-6 Refinery Emergency Contact Personnel

Chevron El Segundo Emergency Response Staffing List		
Title	Section	Contact Phone
Battalion Chief (BC)	Chevron Fire Department	(310) 615-5172
Fire Fighter	Chevron Fire Department	(310) 615-5172
Safety/IH Staff	Health, Environment and Safety Division	On-call via BC
Environmental Staff	Health, Environment and Safety Division	On-call via BC
Contracted Staff	HES contracted safety professionals	As needed/various
Valero Wilmington Emergency Response Staffing List		
Title	Section	Contact Phone
Industrial Hygienist	Industry Hygiene	(562) 491-6792
Safety Manager	HSE	(562) 491-6688
Emergency Services Superintendent	Emergency Response and Planning	(562) 495-5460
Environmental Manager	Environmental Department	(562) 491-6890
Director EHS	Environmental, Health and Safety	(562) 491-6608
Tesoro Wilmington and Carson Emergency Response Staffing List		
Title	Section	Contact Phone
Environmental Unit Lead	Environmental Response	(310) 816-8100
Laboratory Services Manager	Laboratory Services	(310) 816-8100
Health Dept./Carson	H&S	(310) 816-8100
Site safety during incidents	Fire Brigade Members/H&S	Radio channel C-1
ExxonMobil Torrance Emergency Response Staffing List (ExxonMobil has requested proprietary treatment of all submitted information pertaining to the Company's Torrance Refinery.)		

Table B-6 Refinery Emergency Contact Personnel (cont'd)

Phillips 66 Wilmington Emergency Response Staffing List		
Title	Section	Contact Phone
Safety Officer	Incident Command System	(310) 952-6000
Industrial Hygiene Specialist	Incident Command System	(310) 952-6000
Health & Safety Specialist	Incident Command System	(310) 952-6000
Emergency Response Team	Incident Command System	(310) 952-6000
Health & Safety Shift Supervisor	Health & Safety (non-ICS)	(310) 952-6000
Industrial Hygienist	Health & Safety (non ICS)	(310) 952-6000
Paramount Petroleum Paramount Emergency Response Staffing List		
Title	Section	Contact Phone
Head Operator	Operations	(562) 531-2060
Shift operators	Operations	(562) 531-2060
Safety Representatives	Safety & Security	(562) 531-2060 Ext. 2677

d. Analytical Services

Chevron El Segundo

Chevron primarily uses direct reading instruments for incident response. If they need to take grab samples or charcoal cartridges for laboratory analyses, they can analyze them in-house or with their contracted laboratory Bureau Veritas.

Valero Wilmington

Valero has contracted with Pacific EH&S Services for third party off-site air monitoring and services for the refinery.

Tesoro Wilmington/Carson

Tesoro has an in-house quality assurance (QA)/quality control (QC) laboratory with mass spectrometry and gas chromatograph equipment. Additionally, Tesoro has contracted with Test America, Quantum Analytical Services, Inc., Travelers Industrial Hygiene Laboratory, and Cal Science Lab to analyze air samples.

ExxonMobil Torrance

ExxonMobil has requested proprietary treatment of all submitted information pertaining to the Company's Torrance Refinery.

Phillips 66 Wilmington

Phillips 66 Wilmington operates its own laboratory which is equipped with a gas chromatograph that is used to analyze grab samples for events that are considered to have only on-site consequences with no community impacts. For incidents that could potentially have off-site consequences,

the facility contracts with Bureau Veritas in Costa Mesa, CA, Galson in Alameda, CA, EMSL / LA Testing in Pasadena, CA, and DataChem in Simi Valley, CA for testing and analytical services.

Paramount Petroleum Paramount

Instrumentation currently on-site is direct reading that does not require laboratory analysis. Post event sampling is sent to regional laboratories depending on the type of material collected.

4. Release Modeling and Forecasting

SCAQMD has the capability to do dispersion modeling of accidental releases on an as needed basis. The range of expertise in the District includes screening models, dispersion models such as AERMOD, and grid-based models. Additionally, SCAQMD staff can utilize other models in support of wildfires, other events, and in the development of short-term forecasts of release site conditions. Examples of the additional models are the California and Nevada Smoke and Air Committee (CANSAC) products and the National Weather Service's Weather Research and Forecasting models. CANSAC provides experimental forecast products of fire weather, smoke dispersion/transport, and fire danger/behavior.

As described in Section III. A.4. for release modeling and forecasting assets in the Bay Area, refineries in the South Coast area also prepare RMPs under the Clean Air Act Section 112(r) and the CalARP program. Tables B-7a and B-7b summarize some key elements of the RMPs for the refineries in the South Coast area.

Table B-7a Refinery RMP Highlights

Refinery	Tesoro ¹³			Phillips 66	
	Wilmington (Refinery)	Carson (Tank Farm)	Carson (Sulfur Recovery Plant)	Carson	Wilmington
RMP Date	6/19/2009	6/16/2009	6/19/2009	6/18/14	6/24/14
Worst case-toxic	NH ₃ , H ₂ S	N/A	H ₂ S	H ₂ S	NH ₃
Worst case – flammable	Butane and Flammable Mixture	Pentane and Butane	No Data to Report	Flammable Mixture, Butane	Butane
Alternate scenarios	H ₂ S, NH ₃ , Flammable Mixture Flammable Mixture Pool Fire	Pentane Pool Fire	H ₂ S, NH ₃	Butane, H ₂ S, NH ₃ , NH ₃ (aqua)	H ₂ S, sulfuric acid (H ₂ SO ₄), NH ₃ (aqua)
Release model(s)	RMP*COMP urban, PHAST 5.2	RMP*COMP urban	RMP*COMP urban, PHAST 5.2	RMP*COMP urban, U.S. EPA Equations/Tables, SLAB	RMP*COMP, SLAB, TNT

¹³ Tesoro's South Coast Refinery is located in Wilmington and under the jurisdiction of LAFD. The refinery's sulfur recovery plant and North Area tank farm are located in Carson under the jurisdiction of LACoFD. Tesoro Wilmington submitted a CalARP plan for its sulfur recovery plant but not under the federal U.S. EPA RMP rule because it is not a covered process according to the federal rule.

Table B-7b Refinery RMP Highlights

Refinery	ExxonMobil Torrance	Chevron El Segundo	Paramount Petroleum ¹⁴ Paramount	Valero Wilmington
RMP Date	6/19/14	12/01/2010	2/1/2009	1/15/13
Worst case-toxic	HF / HF Acid	NH ₃ , NH ₃ (aqua), H ₂ S, H ₂ S and flammable liquid	NH ₃ (aqua)	HF / HF Acid
Worst case - flammable	Flammable Mixture Vapor Cloud Explosion	Pentane Boiling Liquid Expanding Vapor Explosion (BLEVE)	Flammable Mixture Vapor Cloud Explosion	Butane Vapor Cloud Explosion, Propane Pool Fire
Alternate scenarios	HF / HF Acid, NH ₃ , H ₂ S, Flammable Mixture Vapor Cloud Explosion	H ₂ S and flammable liquid, NH ₃ (aqua)	NH ₃ (aqua), Flammable Mixture BLEVE	NH ₃ (aqua), H ₂ S, HF / HF Acid, NH ₃
Release model(s)	RMP*COMP urban	RMP*COMP, U.S EPA/ CEppo	RMP*COMP urban	SLAB, RMP*COMP

The modeled RMP public health risk assessments are intended to be a planning tool for local monitoring decisions and emergency responders only. Because the risk assessment model is based on a prescribed release scenario with no real-time inputs, it has limited suitability for making immediate public health and safety decisions during an actual event if real-time source and atmospheric data are available.

Tesoro Wilmington/Carson

Tesoro utilizes SAFER Real-Time (<http://www.safersystem.com>) in conjunction with multiple meteorological stations on site to estimate the transport and dispersion of releases. SAFER Real-Time provides rapid updates and visualizations based on actual weather and gas sensor data. SAFER Real-Time analysis tools display concentrations at any point, dosage and/or building infiltration. The tool aids in drills, employee awareness, what-if analysis, and validation of emergency response plans. The software is customized according to plant site characteristics and designed to address each plant's specific issues.

¹⁴ The Paramount Petroleum Refinery RMP is undergoing a five year renewal process in conjunction with an upgrade to process renewable fuels. Paramount Petroleum anticipates the RMP renewal to be complete in late 2014. A preliminary analysis shows that although several worst case scenarios resulting from the upgrade could produce hazards outside the refineries boundaries, identical or larger hazards currently exist.

Phillips 66 Wilmington

Phillips 66 Wilmington Refinery operates a sophisticated “refinery watch software” package which has the capability to predict release trajectories. In a cooperative effort with state and federal agencies, Phillips 66 also maintains a service contract with MSRC, as well as with The Response Group, a private consultant that employs the ALOHA spill and release trajectory modeling software.

Chevron El Segundo, Valero Wilmington, Torrance, and Paramount Petroleum Paramount did not report any incident modeling capabilities other than what was required for their RMPs.

LACoFD

LACoFD performs modeling with CAMEO and ADASHI software.

LAFD

LAFD hazmat squads and the Joint Hazard Assessment Team commonly utilize ADASHI and CAMEO for plume modeling. Additionally, LAFD utilizes the AWARE system deploying a special vehicle with capabilities to model and plot plumes.

ESFD

ESFD performs modeling and forecasting with CAMEO/ALOHA.

LACoFD-HHMD

LACoFD-HHMD did not report capabilities for modeling and forecasting.

TFD

TFD did not report capabilities for modeling and forecasting.

5. Partnerships and Mutual Aid

SCAQMD

SCAQMD has no formal agreement with other agencies; however, as indicated earlier, SCAQMD deploys the ERT based on requests from State or local agencies. SCAQMD’s Executive Officer, or his/her designee, can also initiate technical support at their discretion for each incident.

SCIMO

Founded in the 1970s, the Southern California Industrial Mutual Aid Organization (SCIMO) is the principal mutual aid corporation serving the refining industry. SCIMO combines the fire-fighting, rescue, oil spill, and hazmat response capabilities of the refining, petrochemical, pipeline, aircraft manufacturing and power generation industries in the Southern California area.

SCIMO members include industrial companies, associated municipal fire departments, and government agencies working cooperatively in greater Los Angeles Area. SCIMO maintains a contingent of highly trained personnel and a well-maintained repository of more than seventy pieces of specialized equipment, including:

- a. High-volume foam pumpers.
- b. Foam trucks, foam tenders.
- c. Over 60,000 gallons of foam concentrate.
- d. Specialized industrial rescue and hazardous materials vehicles.

Additional SCIMO services include monthly coordination meetings and supplementing IC teams with personnel and industrial hygiene support for community monitoring during emergencies. Operations are jointly controlled under the unified command system with local response agencies and SCIMO members (Table B-8).

Table B-8 Members and Associates of SCIMO¹⁵

Response Agencies	Private Companies
City of Burbank Fire Department	Air BP
City of Los Angeles Fire Department	Tesoro Carson Refinery
City of Long Beach Fire Department	Tesoro Pipe Line
City of Compton Fire Department	Tesoro Terminal and Distribution
City of El Segundo Fire Department	Castrol Lubricates
City of Torrance Fire Department	Chevron Refinery
Los Angeles County Fire Department	Phillips 66 Refinery
Orange County Fire Authority	ExxonMobil Refinery
CalOES	Kinder Morgan Pipeline
State Fire Marshall - Office of Pipeline Safety	Lomita Rail Terminal
	NuStar Energy Terminal
	Plains All American Pipeline
	Paramount Refining
	Shell Pipeline
	Shell Terminals and Distribution
	Tesoro Wilmington Refinery
	Tesoro Logistics / Pipelines / Terminals
	THUMS
	Valero Refining
	Vopak Terminals

¹⁵ The SCIMO Business Office in Carson reports that staff is in the process of updating information at the SCIMO website including membership information, estimated to be completed by August 2014.

Chevron El Segundo

The Chevron El Segundo Refinery Fire Department and PSM Group developed an Emergency Response Plan in conjunction with the City of El Segundo CUPA. In addition to listing how the refinery responds to emergencies, it also covers agreements and protocols for emergency response and Incident Command. This plan is reviewed by all parties annually. The Chevron Fire Department receives mutual assistance from the ESFD to provide paramedic level emergency medical service and transport service, as well as back up the Chevron Fire Department on emergency responses. Chevron coordinates and leads monthly meetings with leadership team members from the El Segundo Police Department, ESFD, Manhattan Beach Police Department, Manhattan Beach Fire Department, and the South Bay Regional Public Communications Authority. The meetings cover any emergency responses at Chevron, community impacts, agency inspections and notifications, security issues, upcoming events such as shutdowns, significant plant modifications, and any other related items that might impact South Bay cities.

Chevron is also a member of the South Bay Fire Chiefs Association which includes monthly meetings with fire chiefs from South Bay cities, LAFD, and LACoFD. The Chevron Fire Department is a member of the South Bay Chiefs Emergency Operations Section where the Chevron Fire Chief Officer attends bi-monthly meetings on training and operational policy for the South Bay City fire departments.

LACoFD

LACoFD is the Region 1 leader for the State Master Mutual Aid Plan. The agency has mutual and automatic aid agreements between many of its neighboring agencies and refineries. It works with U.S. EPA and SCAQMD during responses.

LACoFD-HHMD

Los Angeles County does not have a formal agreement, but uses SCAQMD for air monitoring.

LAFD

LAFD shares borders and has mutual aid agreements with many smaller response agencies throughout the region. In Torrance, LAFD has a mutual aid agreement with TFD for providing aid for incidents at the ExxonMobil Torrance Refinery. In Carson, it has a mutual aid agreement with LACoFD for providing aid at the Tesoro Carson Refinery.

TFD

TFD participates in the CalOES Fire and Rescue State Regional Mutual Aid System – Region 1, Area G. CalOES promotes and encourages mutual aid among emergency management agencies within delineated operational regions.

ESFD

ESFD has a mutual aid agreement with Los Angeles County that responds at the Chevron El Segundo Refinery from the nearest fire station with a HazMat Unit. In some cases, the South Coast Air Quality Management District may provide emergency air monitoring for incidents at the Refinery.

6. Advisory and Stakeholder Groups

SCAQMD

SCAQMD collaborates with the California Air Response Planning Alliance (CARPA), the local emergency planning committee (LEPC OES Region VI Planning District), the Interagency Refinery Task Force (IRTF), and several other committees on response to emergency air releases.

Community Awareness and Emergency Response

Community Awareness and Emergency Response (CAER) organizations are non-profit public benefit corporations of public emergency response agencies, local government officials and facilities, and businesses that use, store, handle, produce, or transport hazardous materials. The nationwide mission of CAER groups is to actively enhance public health and safety. CAERs core objectives are: 1) safe industrial facility operations, 2) coordinated emergency response, 3) an effective safety sharing forum, and 4) a trust-based relationship with the community.

There are three CAER organizations that cover refineries and adjacent communities in the Los Angeles Area: South Bay CAER, Beach Cities CAER, and Long Beach CAER. The Chevron and ExxonMobil refineries are members of Beach Cities CAER. The Tesoro, Valero, and Phillips 66 refineries, as well as the Shell Oil storage and distribution facility, are members of South Bay CAER. Long Beach CAER has refinery pipelines that transit through its area and borders the Phillips 66 and Tesoro refineries. The South Bay CAER meets monthly except during the summer months and December.

Chevron El Segundo

The Chevron El Segundo refinery has an established community advisory panel that has been in place since 2001. The general mission of the group is to improve communication between management of the facility and residents of the surrounding communities.

The group is made up of twenty individuals representing a broad cross-section of interests from the communities of El Segundo and Manhattan Beach. The group meets monthly with the refinery general manager, the Health Environment and Safety Manager, the Public and Government Affairs Manager, and with other refinery staff as appropriate.

Standing topics at the meeting include the current safety performance of the facility, a review of the facility's annual environmental performance scorecard, facility operations, and key projects related to facility improvements and major capital projects in the facility. The program will also periodically include various guests, such as local oversight agency representatives, elected officials, etc. and representatives from our corporate organization.

Valero Wilmington

Valero participates in the advisory council and stakeholder groups CAER and the Wilmington Chamber of Commerce stakeholder groups.

Tesoro Carson/Wilmington

Tesoro has a community advisory panel in the Wilmington community and also sponsors emergency response functions of the local American Red Cross.

ExxonMobil Torrance

ExxonMobil has requested proprietary treatment of all submitted information pertaining to the Company's Torrance Refinery.

Phillips 66 Wilmington

The Phillips 66 Community Advisory Council (CAC) was launched in 1995 and provides an opportunity for refinery management to share information about the refinery with the members. The goal of CAC is to create an atmosphere of open communication and partnership with neighboring communities. CAC is comprised of approximately eighty community leaders including: school principals and staff, neighbors, public safety officers, elected officials, nonprofit organizations, and homeowners' associates from the areas surrounding the facilities in Carson and Wilmington.

CAC is instrumental in helping distribute information to stakeholders. Each quarterly CAC meeting features a brief presentation on refinery operations, a health and safety update, community relations update, question and answer session and an opportunity for each community leader to talk about their own activities.

Refinery personnel communicate with pre-identified schools, local businesses, and public officials and safety personnel along with other stakeholders, regularly and in the event of an incident.

Paramount Petroleum Paramount

Paramount Petroleum maintains close but informal communications and reporting relationships with immediate neighbors, schools and the surrounding business and residential community.

LACoFD

The LACoFD is an active trainer for the Community Emergency Response Teams (CERTs) whose purpose is to prepare communities to become self-sufficient in the event of a major disaster affecting their neighborhoods. Part of the training is devoted to the understanding/identification of hazardous materials and safety precautions necessary in the event of a major disaster.

ESFD

Beach Cities CAER provides a resource of companies for emergencies. In addition, Chevron has a CAP that includes residents from Manhattan Beach and El Segundo.

7. Public Alert and Communication Systems

SCAQMD

SCAQMD can use various methods to notify and inform the public during incidents with unplanned air releases.

a. Advisories

The SCAQMD Meteorology Section has authority to issue air quality forecasts, episode alerts, and notifications to the public (including smoke advisories and other advisories for air pollution events and emergencies). The advisory is drafted with input from various SCAQMD divisions, such as the Media Office, Engineering & Compliance, Science & Technology Advancement, Legislative & Public Affairs, and the Health Effects Officer. The advisory is drafted from a template containing the incident specific information and uploaded to the SCAQMD website. The advisory is also sent to subscribers of the SCAQMD Air Alerts system via email, fax, text messaging, and social networks. SCAQMD staff may also be deployed to the field directly to personally hand-deliver advisories to those communities most directly affected by an emergency incident. The advisory can be modified when warranted by changing conditions and new information.

b. Enhanced SCAQMD Website

In an event potentially affecting regional air quality, when data and information release is ready for public distribution, the SCAQMD adds a

link to an event website from the announcement section on its home page where additional links to an advisory or media release, air quality maps, forecasts, health tips, and other information are provided. Social media sites such as Eblast, Twitter, and Facebook are used in addition to the SCAQMD website to release public advisories.

- c. SCAQMD Listserv/Enviroflash
SCAQMD operates a listserv system (eNewsletterPro) to send messages to people who sign up on their website. SCAQMD also uses Enviroflash to send air quality alerts to individuals that sign up. SCAQMD Listserv has approximately 1.5 million email addresses.
- d. Reverse 411
Reverse 411 can be used to send messaging to specific areas within the South Coast Air Basin in high priority or very localized events.
- e. Media Response
In the event of large events, interviews may be requested. The media office will be the lead in conducting information release to the news media in accordance to the SCAQMD Media Relations Response Plan for Emergencies.
- f. Call Line (1-800-CUT-SMOG)
During normal office hours (Tuesday through Friday, 7a.m. through 7p.m.), SCAQMD's Call Center staff answer phone inquiries from the public and direct them to the appropriate information or SCAQMD staff member. To assist Public Information with answering questions directly, the wildfire ERT will work with the Public Information supervisor to provide current information. During off hours, an automated voice system can be reached (1-800-CUT-SMOG) to obtain forecast and advisory information. Complaints or requests for emergency incident response support received off hours are routed to a standby supervisor for handling. Complaints can also be made through the SCAQMD's web site at:

<http://www3.aqmd.gov/webappl/complaintsystemonline/NewComplaint.aspx>
- g. Fire Safety and Asbestos Cleanup Flyers
In areas where structures are threatened or damaged from fire, earthquakes, or local or regional natural disasters, SCAQMD distributes information to impacted businesses and communities regarding asbestos hazard recognition, safety, and, where appropriate, mitigation, in accordance with Rule 1403.

Chevron El Segundo

As part of routine community engagement activities, the Chevron El Segundo Refinery maintains a 24 hour community hotline to respond to questions or concerns raised by residents. Information from callers is gathered and provided to both fire department personnel and the public affairs department for appropriate follow-up. Responses include direct contact with the concerned resident and one or more visits to their location to assess the nature of the problem, or other support as necessary.

In addition, as part of the unified command structure, the adjacent cities also maintain specific public alert systems which are activated by their public safety personnel as required. These include:

ALERT El Segundo

The City of El Segundo utilizes the Everbridge Mass Notification System for Citizen Alerts. This system, which is activated by the El Segundo Police Department, provides emergency notifications by communicating the alerts to businesses and residents via listed phone numbers. Residents may also register to be contacted on their cell phone, business phone, and Email at www.elsegundo.org.

Nixle Alerts¹⁶

The El Segundo Police Department has added a new communication service that sends pertinent and timely information to assist the community. This service does not replace the Everbridge critical incident notification system, but focuses on different types of situations. The Nixle Community Information System allows the El Segundo Police Department to create and publish messages to be delivered to subscribers free of charge instantly via cell phone text message and/or email. To sign up to receive these notifications, an individual must visit www.nixle.com to register.

Manhattan Beach Community Awareness and Emergency Response System

The City of Manhattan Beach uses Reverse 911, a computerized telephone calling system that can notify residents and businesses via recorded phone messages in the event of an emergency. When the emergency is over an “all clear – emergency over” telephone message will be sent. Listed and unlisted land line telephone numbers are already included in the database and do not need to be registered. If households do not have a land line, and instead uses a cellular or voice-over-internet protocol (VoIP) number and would like to be notified on that device, they must register the telephone number at <https://citymb.onthealert.com>. Only the Manhattan Beach Police and Fire Department personnel are authorized to activate this system.

¹⁶ Nixle is a privately held U.S. corporation that offers free and paid notification services for local police departments, county emergency management offices, municipal governments and their agencies.

City of Hawthorne and Los Angeles County Alerting

The Alert LA County Mass Notification System is a reverse 911 system. The primary function is to allow Los Angeles County emergency services personnel to contact county residents and businesses in cases of local or regionalized emergencies. This system can be activated by command officers from the Los Angeles County Fire Department or Sheriff's Department through the Los Angeles Sheriffs Communications Center.

Valero Wilmington

Valero Wilmington uses a Dell software program called AlertFind. During an event, a user sends a voicemail, text message, or email and FindAlert contacts all users programmed into the contact list. The system can be programmed to send to home phones, mobile phones, and/or office phones. Once the message is delivered, AlertFind tracks responses so that the message creator knows in real time who has received the message, who has responded, and what actions to take. AlertFind also comes with an Incident Collaboration Center (ICC), which provides a central portal for collaboration and information sharing.

The Valero Wilmington Facility also uses the Community Alert Notification System.

Tesoro Wilmington and Carson

Tesoro reports that its notifications are limited to the Los Angeles County Fire Department, Los Angeles County Sheriff's Department, and the Los Angeles Police Department.

ExxonMobil Torrance

ExxonMobil has requested proprietary treatment of all submitted information pertaining to the Company's Torrance Refinery.

Phillips 66 Wilmington

During an actual incident, refinery personnel work within an IC under the National Incident Management System (NIMS) and use the Incident Command System to disseminate information on a timely basis through official UC statements. Phillips 66 personnel also use the media as a vehicle to reach stakeholders.

The Refinery uses a reverse 911 system to notify the community of an incident. Additionally, the www.Phillips66.com website contains a Phillips 66 operations information center to provide timely updates on company facilities. The refinery also has Facebook and Twitter accounts that can be used to direct stakeholders to the latest updates. This system has been used to communicate during natural disasters (e.g. hurricanes and tornados) and to

provide operational updates. Phillips 66 corporate headquarters is in the process of implementing the Public Information and Emergency Response (PIER) System that allow greater agency interface to expedite messaging.

Phillips 66 also maintains a 24-hour community awareness hotline which allows members of the public to report concerns. This hotline is available in either English or Spanish. Additionally, depending upon the incident, Phillips 66 personnel participate in joint press briefings and conduct town hall meetings.

Paramount Petroleum Paramount

Paramount Petroleum maintains a community contact list including the administrative officials at local schools, building management in nearby residential complexes, and city safety officials. The refinery communicates regularly with the city of Paramount's Public Information Officer, City Manager, as well as the manager at the City of Bellflower. Additionally, the facility consults regularly with school administrative officials regarding air quality.

ESFD

ESFD uses a contract through Everbridge that provides emergency notification electronically through telephone, computer, cell phone, pager, fax, or other digital media. Additionally, the City of El Segundo has a radio station (1040 AM) for emergency status reports, special emergency lighting along main corridors for notification status, and can use the Los Angeles County notification system through a company called 21st Century.

TFD

TFD utilizes the audible sirens of Torrance CWS as a primary means of alerting residents of an incident. According to TFD, the system is owned and maintained by ExxonMobil, but TFD has authority to activate the sirens for any major event for which public awareness is urgent.

8. Preparedness and Response Training

SCAQMD

Personnel assigned to the SCAQMD's ERT are selected based upon their education, training, expertise, and willingness to proactively support the mission of emergency response support. All ERT members are in an ongoing HAZWOPER training program. Additionally, SCAQMD trains ERT members in hazard recognition, the use of safety equipment (e.g., self-contained breathing apparatus), first aid, cardiopulmonary resuscitation (CPR), use of personal monitoring equipment, and safety precautions when responding to the scene of an airborne hazardous materials release.

While ERT members are thoroughly safety-trained and equipped, the technical assistance provided only requires work in the periphery of a scene, and does not allow entering the defined hazardous area or “hot zone”. The SCAQMD deploys a knowledgeable, well-developed ERT that can handle the unpredictable nature of airborne hazardous materials incidents.

ERT members must have successfully completed specific, specialized training before being assigned to field incident response duties. At minimum, all ERT members are required to complete a certified 40 hour hazardous awareness course covering various topics such as identifying hazards, personal safety, personal protective equipment, etc. Also, a certified course on incident command must be completed. Additionally, all ERT members will complete a physical examination, annual refresher training, first aid, and a breathing apparatus fit test.

Chevron El Segundo

As part of its commitment to the Community Mutual Aid program, the Chevron Fire Department participates in and conducts training with surrounding fire departments (El Segundo, Manhattan Beach, and Los Angeles County). Chevron also sponsors the attendance of firefighters from the City of El Segundo and Manhattan Beach at the Chevron Corporate Fire School at Texas A&M University, a weeklong classroom and field course in industrial firefighting techniques.

Cross-training also takes place between the various South Bay refineries (including Tesoro, Conoco/Phillips, and Valero). Chevron also helps train students from local community college fire protection programs in industrial firefighting.

Chevron also conducts an annual table-top emergency exercise every year with on-call air monitoring staff from its Health, Environmental, and Safety (HES) Department. Chevron Fire Department (CFD) uses gas monitoring instruments routinely as part of their job, as do many of the HES staff. CFD and HES staff members participate in ICS drills periodically as part of oil spill response. Members of CFD participate in other emergency response training (rescue, firefighting, etc.) as part of their regular refresher curriculum.

Valero Wilmington

Valero Wilmington has 110 emergency responders that receive annual classroom and hands on training in the use of air monitoring equipment that is used at the refinery. All emergency responders participate in six drills and/or exercises annually per shift. Each exercise/drill includes the use of air monitoring equipment. During SCIMO exercises, each participating organization is required to provide monitoring equipment for their own personnel. During the exercise, each participating member is assigned a

specific site to monitor until the area has a safe atmosphere. Valero also has an emergency response atmospheric monitoring plan that they implement during these types of emergencies, training, and drills.

Tesoro Wilmington and Carson

Tesoro conducts monthly Emergency Response Team drills, including simulated incidents with potential off-site impact. Tesoro participates in twice-yearly drills with SCIMO. Tesoro also maintains contracts with third parties to conduct off-site air quality monitoring during drills and incidents.

ExxonMobil Torrance

ExxonMobil has requested proprietary treatment of all submitted information pertaining to the Company's Torrance Refinery.

Phillips 66 Wilmington

Phillips 66 Wilmington ERTs are trained in accordance with National Fire Protection Association (NFPA) Standard 1081, OSHA 29 CFR 1910.156, California Code of Regulations 8 CCR §3411, and other applicable State and federal regulations. Phillips 66 works with LAFD to host onsite emergency response and site orientation training for firefighters. Also, the refinery sponsors agency firefighters to attend off-site firefighting schools.

Phillips 66 coordinates emergency response tabletop and field exercises that exercise ICS and ERT capabilities. Phillips 66 initiated and hosted a mutual aid drill at its Wilmington facility in 2013 that is planned to be concluded in 2014 with a follow-up drill requiring cooperation from Phillips 66 IMAT, SCIMO, USCG, LAFD, and other federal, State and local agencies. These drills typically involve one or more air release components.

Paramount Petroleum Paramount

Paramount Petroleum's ERT members attend, participate, and successfully complete a series of monthly qualification tests, exercises, and drills. These training and field exercises include training on the use of monitors as well as practice on the use of air monitoring equipment. Monthly training materials are distributed to the Shift Supervisors, who serve as Incident Commanders, on the first workday of each month. The Shift Supervisor / Incident Commander's ensure all members of their ERT receive the training within the month, assist in coordinating the training schedule for their team members, and ensure the team's members successfully pass their qualification tests.

LACoFD

All LACoFD first responders are trained to the hazardous materials first responder operations level. Additionally, HMTFs members train to a minimum of the hazardous materials technician level with many receiving the

specialist rating. Training includes plume modeling, air monitoring, field training exercises, table top exercises, incident review, and scenario planning/overview.

LACoFD-HHMD

LACoFD-HHMD has participated in SCAQMD task forces and planning committees in the past but not doing so at this time.

LAFD

LAFD companies routinely train with their refinery fire departments and personnel. Topics cover several aspects of refinery emergencies, including air monitoring.

TFD

All TFD responders are trained to the First Responder Operational Level; hazmat team members are trained to the level of Hazardous Materials Specialists. Multi-company drills are planned to provide the necessary training to maintain these skill levels. When possible, these drills take place within businesses in the community. This provides an opportunity to develop relationships with the business community and department personnel. It also provides a review of the hazard potentials that are located in each facility. TFD's hazmat team also participates in monthly company level training, as well as equipment maintenance training.

ESFD

ESFD participated in a major physical drill in 2005 for an aqueous ammonia spill with approximately fifty firefighters that involved Los Angeles County, Manhattan Beach, and Los Angeles City.

9. Innovative Approaches

This section discusses research or demonstrations of emerging technologies or systems for monitoring, modeling or responding to fugitive or unplanned upset emission releases. Participating refineries and agencies have been polled to voluntarily provide this content.

SCAQMD

SCAQMD is conducting technical evaluations of different emerging techniques such as solar occultation flux, UV- differential optical absorption spectroscopy (DOAS), Open Path Fourier Transform Infra-Red (OP-FTIR), Differential Absorption Light Detection and Ranging (DIAL) and multi-metals ambient measurements technologies that may be capable of monitoring routine and emergency air release emissions from refineries.

Solar occultation flux uses the sun as the light source and an FTIR or UV detector to measure the average pollutant concentration across the measurement path. In this case, the measurement path is vertical. In order to measure the concentrations around an industrial source, the measurement device is installed in a specially equipped van, which is slowly driven along the perimeter of the facility. Measurement signal strength and a global positioning system (GPS) enables determination of pollutant concentrations along the perimeter of the site.

UV-DOAS fence line monitoring is an “open-path” technology. An electromagnetic energy source is used to emit a beam of electromagnetic energy (ultraviolet radiation) into the air towards a detection system some distance from the energy source (typically 100 to 500 meters). The electromagnetic energy beam interacts with components in the air in the open path between the energy source and the detector. The detector measures the disruptions in the energy beam to determine an average pollutant concentration across the open path length.

The most commonly used OP-FTIR techniques employ a long wavelength light source that has characteristic absorption bands for many organic compounds plus CO and SO₂. Open path FTIR systems can be installed in three basic configurations: Bistatic in which a separate light source is directed at the receiver; Monostatic in which the light source originates at the detector and is reflected back by a mirror; and Passive in which only ambient radiation is received by the detector. The highest sensitivities are achieved by the bistatic configuration, but it requires electric power and operator access at both ends of the path. Path lengths may be up to 1000 meters with bistatic systems and cryogenically cooled detectors, but 100 meter paths are more typical.

DIAL technology was developed in the 1960's and first applied to measure pollutants at petrochemical facilities by National Physical Laboratories in the U.K. DIAL makes use of pulsed lasers which reflect off particles in the air to provide information about pollutant concentration. Typically these lasers are scanned across a vertical plane perpendicular to the wind direction. A two dimensional concentration map is constructed and used in conjunction with the perpendicular wind speed to measure the mass flux of emissions. Since all DIAL vendors who take measurements at petrochemical facilities currently are based in the U.K., the cost of the measurement techniques can be prohibitive.

Multi-metals ambient measurements technology uses an ambient-optimized version of a continuous emissions monitor based on reel-to-reel filter tape sampling with X-ray fluorescence analysis of metals. SCAQMD is evaluating the feasibility of near-real-time metals measurement as well as the feasibility of apportioning these metals to potential fugitive emission sources.

ExxonMobil Torrance

ExxonMobil has requested proprietary treatment of all submitted information pertaining to the Company's Torrance Refinery.

Phillips 66 Los Angeles

Phillips 66 proactively responds to community odor complaints and safety concerns. Upon receiving the community concern or inquiry, refinery operations personnel are required to complete checks of their process units and equipment to determine the source of the odor. Also, refinery personnel equipped with atmospheric monitoring equipment are dispatched into the community to conduct air monitoring. These responses are coordinated through the shift operations and safety supervisors. These supervisors are required to follow-up as soon as possible with the person raising the concern. Typically a Phillips 66 representative will also contact the person the next business day as an added assurance.

Paramount Petroleum Paramount

Paramount Petroleum personnel conduct physical odor patrols along the perimeter of the property and in pertinent community zones each shift. The physical reviews are conducted with multi-gas detectors. The results are recorded and presented with shift documentation. Staff performing the audits are trained in the detection of refinery related odors and possible contaminants.

LAFD

The collaboration of LAFD, LA Police Department, FBI, and LAcOPHD to form the LAJHAT enables a coordinated multiagency response to incidents in the city as well as in the region. LAJHAT uses the Integrated Chemical, Biological, and Explosive (ICBRNE)/AWARE system, an open-standard based sensor data communication system. ICBRNE/AWARE enables data communication strategies that do not depend on proprietary or closed data acquisition systems, which greatly improves interoperability.

10. Identified Needs

This section discusses needs that have been identified and conveyed in public documents or technical improvement efforts that are still in planning or development stages. These will be addressed in detail in the Objectives 2 and 3 reports.

ESFD believes, based on past experience, that earlier notification of internal incidents and joint command activation by refineries is necessary to protect public health from potential off-site consequences of release events. ESFD now depends on the local industry and the public to notify 911 for odors or

other signs that may represent hazards. ESFD investigates these complaints, makes necessary investigations, and if appropriate refers them to other agencies (e.g., hazmat, SCAQMD, etc.).

LACoFD-HHMD notes that improvements in availability and training for air modeling capability would be helpful. The Department desires to develop the capability to do perimeter monitoring, but needs instruments and education. LACoFD-HHMD currently has some telemetry capabilities but needs the ability to establish a Wi-Fi link to their main computer.

LACoFD-HHMD has also noted that current regulations are written for long term penalties, believes the daily maximum fine does not serve as a deterrent for sources to reduce the risk for incidents that are over in a day, and desires a better deterrent. The county wants to expand its capabilities for monitoring by being able to detect at lower detection limits.

11. Documentation

Documentation includes practices, procedures, and guidance prepared and maintained to address emergency response actions to address a non routine, unplanned air contaminant release.

SCAQMD publishes an Annual Air Monitoring Network Report that describes its air monitoring system. The latest report is available at: <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-monitoring-network-plan/final2014-annual-air-quality-monitoring-network-plan.pdf?sfvrsn=2>).

An Emergency Response Settlement Agreement between the City of Torrance and ExxonMobil in 2009 resulted in a formal radio communication and joint incident command protocol that has been heralded by the Torrance Fire Department as a major achievement in collaboration. That protocol is attached by reference and provided in Appendix D-2, along with other relevant technical reference documents.

C. San Joaquin Valley

The southern San Joaquin Valley has a long history of oil production and refining. The refineries are relatively small and have been in and out of operation, or at reduced capacity for years - a result of diminished local oil production and other logistic and economic factors. The refineries currently operate at partial capacity and are seeking opportunities to fulfill specialty and niche refining needs. All three refineries (Alon USA, Kern Oil, and San Joaquin Refining) are located within or near the Bakersfield metropolitan area in Kern County.

1. Air District Assets and Resources

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is a regional public health agency responsible for air quality management in the eight counties in the San Joaquin Valley air basin: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and the Valley air basin portion of Kern. The District works with local, State, and federal government agencies, the business community and the residents of the Valley to reduce emissions that create harmful air quality conditions.

a. Monitoring Network

SJVAPCD and ARB currently operate 33 permanent monitoring stations in the San Joaquin Valley for measurement of criteria pollutants. The District also measures VOCs in support of the Photochemical Assessment Monitoring Station (PAMS) program. Additionally, the network gathers meteorological data that enables the District and other agencies to conduct assessments and studies of pollution dispersion trends.

b. Stationary Equipment

Between the SJVAPCD and ARB, there are currently ten fixed air monitoring stations in Kern County, of which seven are located in the Bakersfield area, measuring O₃, NO₂, PM₁₀, PM_{2.5}, CO, VOCs, and meteorology. By the end of 2015, it is anticipated that the District's near-road monitoring station in Bakersfield will be operational, bringing the total number of fixed stations in the area to eight. The focus of the near-road site will be to measure NO₂ and meteorological parameters.

c. Deployable Equipment

In addition to the fixed air monitoring network, SJVAPCD currently utilizes a suite of field portable monitors to measure gaseous and particulate air pollutants. This equipment is used to supplement information available through the stationary air monitoring network during emergency incidents and episodes.

Current deployable monitoring capabilities include:

- i. Hand-held single and multi-gas monitors capable of detecting and/or measuring combustible gases and H₂S.

- ii. Field portable toxic vapor analyzers which measure and log organic and inorganic vapor concentrations.
- iii. Summa[®] canisters and Tedlar[®] bags to conduct instantaneous (“grab samples”) and extended period sampling for toxics, hydrocarbons, and sulfur compounds. Samples are sent to contracted laboratories for analysis.
- iv. Suites of colorimetric sample tubes to measure VOCs, H₂S, and other gases.
- v. High-volume filter samples that can be collected and analyzed for asbestos, trace metals, and other specific particulate matter components.
- vi. Field portable real-time monitors to measure particulate matter concentrations.
- vii. Mobile air monitoring van capable of monitoring particulate matter and ozone concentrations and meteorological parameters in real-time.

In addition to the current equipment, the District is planning to procure a FLIR GF 300 infrared camera to identify VOCs.

d. Staffing

SJVACPD has not historically functioned as an emergency response agency, but participates in a technical advisory capacity in support of the emergency incident command (IC) team. SJVAPCD provides technical assistance and can assess atmospheric concentration of specific air pollutants through SJVAPCD’s air monitoring network, the use of deployable monitoring equipment, or the collection and analysis of additional air samples, if necessary. SJVACPD’s Technical Services and Air Quality Analysis Divisions are able to provide modeling support during regional emergency air release incidents and episodes and SJVAPCD is able to utilize its Real-time Air Advisory Network (RAAN) to inform the public of local air quality conditions on an hourly-basis. Additionally, SJVACPD operates an on-call complaint and incident response program, which makes field staff available 24 hours a day, 7 days per week to respond to incidents (See Table C-1 for a list of emergency response staff leads).

e. Analytical Services

SJVACPD contracts with various local and regional laboratories with a wide range of technical and testing expertise. These contracts cover a range of constituents including particulates and particulate speciation, asbestos, trace metals, toxics, hydrocarbons, and sulfur containing compounds. Laboratory analysis of air samples can take a few hours to several days.

Table C-1 SJVAPCD Emergency Response Staffing

Position Title	Section	Contact
Deputy Air Pollution Control Officer (APCO)	Compliance	(559) 230-5954
Deputy APCO	Permit Services	(559) 230-5878
Deputy APCO	Strategies and Incentives	(559) 230-5815
Chief Communications Officer	Outreach and Communications	(559) 230-5850
Director of Compliance	Compliance	(559) 230-5958
Director of Strategies and Incentives	Strategies and Incentives	(559) 230-5908
Director of Permit Services	Permit Services	(559) 230-5904
Compliance Manager	Compliance (Southern Region)	(661) 392-5521
Program Manager	Strategies and Incentives	(559) 230-5806

2. Local Emergency Response Agency Assets and Resources

There are three principal local emergency response agencies that provide the San Joaquin Valley emergency response services for refinery-related incidents: Kern County Fire-Hazmat Department (KCFD), Kern County Environmental Health Department (KCEHD), and the Bakersfield City Fire-Hazmat Department (BFD). KCEHD is the CUPA overseeing emergency preparedness activities for all three refineries.

a. Preparedness and Response Programs

All three San Joaquin Valley refineries (Alon USA, Kern Oil, and San Joaquin Refinery) are located within the Kern County jurisdiction; however, Alon USA and San Joaquin Refining are on the border of Bakersfield's city limits. KCFD will initially respond to incidents at the Alon USA and San Joaquin Refineries, but BFD will be called in if additional units are needed. Both KCFD and BFD have established hazardous release preparedness and response programs in place that conform to CUPA and CalOES standards. BFD's hazardous materials team is OES Type 1 certified.

b. Stationary and Deployable Equipment

Each of the three response agencies serving the Bakersfield area maintains a typical suite of first responder portable analyzers with an array of sensors for detection of the following: LEL, O₂, H₂S, CO, NH₃, acidity, Cl₂, hydrogen cyanide (HCN), and VOCs. Instrument detail for each agency is provided in Appendix A.

c. Staffing

The three response agencies in San Joaquin Valley are staffed with personnel with specific training for refinery and other industrial emergencies. They can either provide direct support or assist as needed on industrial facility emergency air releases.

KCEHD

In addition to its CUPA role, KCEHD has a hazardous materials emergency response team with its own equipment and response capabilities. Table C-2 lists KCEHDs emergency response staff.

Table C-2 Kern County Environmental Health Emergency Response Staffing

Title	Section	Contact Phone
Hazardous Materials Specialist, WMD Specialist, ASO, IC, Public Health Officer	KCEH Emergency Response Team	(661) 549-9927 (24/7)
CUPA Program Supervisor	KCEH Emergency Response Team – Lead	(661) 340-1493 (c) (661) 862-8774 (o)

KCFD

KCFD is an all risk fire department staffed and trained to respond to hazardous materials, confined space rescue, low/high angle rescue, vehicle accidents, river rescues, air rescues, wild land fires, and earthquakes. KCFD does not do air monitoring/sampling other than for hot-zone release purposes to assist with mitigation.

BFD

BFD is a fully capable fire department with a Type I certified hazardous materials response team. Table C-3 lists the BFD emergency response staff.

Table C-3 Bakersfield Fire Department Emergency Response Staffing

Title	Section	Contact Phone
Deputy Fire Chief	Command	(661) 326-3911
Battalion Chief as Public Info Officer	Command	(661) 326-3911
Battalion Chief in charge of Hazmat	Operations	(661) 326-3911
Prevention Director	Safety	(661) 326-3659
Hazmat Specialist	Asst. Safety	(661) 326-3979
Captain	Hazmat Team Hazmat Group Supervisor	(661) 665-0587
Captain	Hazmat Team Hazmat Operations	(661) 665-0587
Engineer	Hazmat Tech Ref	(661) 665-0587
Engineer	Decon Leader	(661) 665-0587
Engineer	Entry Team Leader	(661) 665-0587
Firefighter	Entry Team Member	(661) 665-0587
Firefighter	Entry Team Member	(661) 665-0587
Alternates	Generally 10 per shift	(661) 665-0587
Hazmat Team:	30 regular & 50 alternates	(661) 665-0587

d. Analytical Services

KCEHD utilizes several contract services for laboratory analyses. The laboratory employed depends on the desired analyte. Analyses are generally performed during normal business hours and not for emergency analysis. KCFD and BFD do not have or utilize laboratory services.

3. Refinery Emergency Response Assets and Resources

a. Preparedness and Response Programs

The refineries perform process unit air monitoring for worker protection and equipment safety. Onsite alarms and response protocols are in place and are periodically reviewed and/or inspected by KCEHD. One refinery described below conducts fence line monitoring for off-site consequences as part of the new county-wide requirement for designated high risk CalARP facilities.

b. Stationary and Deployable Equipment

Alon USA

The Alon USA Refinery maintains a system of fixed monitors and alarms within the refinery that monitor for LEL, methane (CH₄), H₂S, NH₃, O₂, and meteorological data. NH₃ and H₂S monitors are associated with various process, transfer, and storage units, and they transmit signal alarms to the main board operator in the event of a leak or rupture. Alon USA

purchased a van with portable air monitoring equipment for use by SJVAPCD. The equipment includes a mass spectrometer, a GC mass spectrometer, and purging and cleansing equipment.

Alon USA has established contracts with National Response Corporation (NRC), Total Western, Inc., and MP Environmental. NRC is the largest commercial oil spill response organization in the US and maintains stockpiles of oil spill equipment for immediate response. Total Western, Inc. is a multi-functional refinery orientated piping, maintenance, and HAZWOPER certified contractor with offices less than five minutes from the refinery gate. MP Environmental is a HAZWOPER certified contractor with expertise in hazardous materials handling, containment, and transport. All three contractors' response capabilities include related air monitoring.

As part of their conditional use permit for a current expansion project, KCEHD will require Alon USA Refinery to install a fence line monitoring system with a meteorological station and make the information available to the public via the Internet.

Kern Oil

KCEHD requires Kern Oil to maintain a fence line monitoring system that measure LEL and H₂S as part of the new county-wide requirement for high risk CalARP facilities to do basic perimeter monitoring. The collected air quality data is not disseminated to the public or KCEHD. The facility also has portable personal gas monitors carried by operations and maintenance personnel.

San Joaquin Refining

The San Joaquin Refinery maintains eleven ground level, fixed H₂S sensors located within the facility. The H₂S sensors, along with small personal protection environmental monitors that attach to workers' belts, are used exclusively to monitor worker safety and not to detect potential exposures to the community. The refinery does not own or operate any deployable air monitoring equipment and relies on local fire/hazmat for support during unanticipated releases with possible offsite consequences.

c. Staffing

Each refinery maintains a staff of trained fire and/or incident response personnel on site at all times. This staff is responsible for controlling and mitigating upset conditions that could result in hazardous releases both on- and off-site. San Joaquin Refinery does not have its own fire brigade and relies on KCFD and BFD for emergency response. See Table C-4 for a list of emergency response staff.

Table C-4 Emergency Response Staffing

Title	Section	Contact Phone
Alon USA		
Refinery Head Operator	Operations	(661) 326-4200
Vice President, SW Region	Operations	(562) 212-3377
Environmental Manager	Environmental, Health & Safety	(661) 201-8152
Environmental Advisor	Safety	(661) 865-7943
Kern Oil		
Safety & Health Advisor	Incident Response	(661) 845-0761
EHS Coordinators (3)	Incident Response	(661) 845-0761
Environmental Advisor	Incident Response	(661) 845-0761
San Joaquin Refining Co.		
Operations Chief (Refinery Manager)	Administration	(661) 852-2513
Planning Chief (Safety Manager)	Safety Department	(661) 852-2516
Information Officer (VP Operations)	Operations	(661) 852-2509
Logistics Chief (Purchasing Agent)	Administration	(661) 852-2529
Finance Chief (VP Operations)	Operations	(661) 852-2509
Shift Supervisors	Operations	(661) 852-2509
Maintenance Supervisors	Operations	(661) 852-2509

d. Analytical Services

Kern Oil and San Joaquin Refining do not have laboratory services in place other than for basic process chemistry. Alon USA states that for emergencies, it would send collected samples to contract laboratories in the region depending on the type of material collected, with immediate analysis turnaround.

4. Release Modeling and Forecasting

SJVAPCD has extensive modeling experience and expertise in permitting-related health risk assessment and AB 2588 Air Toxics “Hot Spots” health risk assessment, and in actual emergency/accidental release impacts analysis. The District maintains a toxic/criteria emission factor repository and continues to research new emission factors as part of its routine toxic and stationary/area-wide annual emissions inventory. The emission factor

repository would provide the initial basis of emissions estimates for an emergency until more specific data are made available. The District develops and maintains its own model-ready meteorological data available for direct input into their dispersion models. In most cases, the meteorological data is no more than a day old. In addition, the District is assisting with a study being conducted by the U.S. EPA's Office of Air Quality Planning and Standards on meteorological forecasting models. The forecasting models allow development of meteorological data based on the location of an emergency when no other data is available. The generated meteorological data and District expertise could be used for rapid worst-case scenario modeling during an incident.

As described in Section III. A.4. for release modeling and forecasting assets in the Bay Area, refineries in San Joaquin Valley also prepare RMPs under the Clean Air Act Section 112(r) and the CalARP program. Table C-5 summarizes some key elements of the RMPs for Alon USA and Kern Oil. San Joaquin Refinery is not required to submit a State or federal RMP because it stores chemicals below the flammability and toxicity criteria of the regulations. Both the State and federal regulations require RMPs when the facility stores or uses flammable liquids at or above the 10,000 pound threshold with a NFPA flammability rating of 4; the highest NFPA flammability rating for materials at the San Joaquin Refinery is 3.

Table C-5 San Joaquin Valley Area Refinery RMPs - General Overview

Refinery	Alon USA	Kern Oil ¹⁷
Location	Bakersfield	Bakersfield
RMP Date	7/31/13	6/20/2014
Worst case-toxic	NH ₃	NH3(aqua)
Worst case – flammable	Flammable Mixture	LPG
Alternate scenarios	NH ₃ , Flammable Mixture	LPG
Release model(s)	RMP*COMP urban	RMP*COMP rural

The modeled RMP public health risk assessments are intended to be a planning tool for local monitoring decisions and emergency responders only. Because the risk assessment model is based on a prescribed release scenario with no real-time inputs, it has limited suitability for making immediate public health and safety decisions during an actual event if real-time source and atmospheric data are available.

Alon USA, Kern Oil, and San Joaquin Refinery perform predictive release modeling and forecasting to fulfill periodic RMP and CalARP program requirements, and as required for facility expansions or process changes under the California Environmental Quality Act (CEQA).

¹⁷ KCEHD has rejected the 6/20/14 Kern Oil submission and given the refinery 60 days to resubmit due to a disagreement on the U.S. EPA verification process.

KCEHD has the capability to run RMP*COMP, CAMEO, ALOHA, an in-house GIS plume model, and Wireless Information System for Emergency Responders (WISER).

ALOHA is part of the CAMEO software suite, a system of software applications used widely to plan for and respond to chemical emergencies. CAMEO integrates a chemical database, data management tools, an air dispersion model, and mapping capability. All modules work interactively to share and display critical information in a timely fashion. It is one of the tools developed by U.S. EPA and the National Oceanic and Atmospheric Administration (NOAA) to assist front-line chemical emergency planners and responders. They can use CAMEO to access, store, and evaluate information critical for developing emergency plans. In addition, CAMEO supports regulatory compliance by helping users meet the chemical inventory reporting requirements of the Emergency Planning and Community Right-to-Know Act.

WISER is a system to assist first responders in identification of hazardous materials during a response. The system was created by the United States National Library of Medicine and can be downloaded free of charge from their website. WISER provides a wide range of information on hazardous substances, including substance identification support, physical characteristics, human health information, and containment and suppression advice.

BFD has the capability to run the CAMEO model. KCFD presently does not have modeling capabilities.

5. Partnerships and Mutual Aid Agreements

SJVAPCD participates with the California Air Response Planning Alliance (CARPA) and its members to provide expeditious information regarding any incidents in order to protect public health and the environment.

San Joaquin Refining and Kern Oil are members of the Kern County Fire & Safety Group. A mutual aid agreement is in place pertaining to the storage of fire foam in totes maintained by the Kern County Fire Department for use at the refineries. BFD and KCFD have a joint powers agreement for fire and hazmat support. Both departments work in close partnership with KCEHD and are routinely dispatched together for incidents posing a public health exposure risk.

6. Advisory and Stakeholder Groups

SJVAPCD

SJVAPCD holds bi-monthly meetings with its Environmental Justice Advisory Group (EJAG) to educate the public and community stakeholders about current District activities and air quality in general. Also, EJAG reviews overarching District programs and strategies to provide feedback to the District.

Alon USA

Alon USA maintains communications with immediate neighbors and the larger community. The facility has set up a community call line where community members can call with concerns. Alon USA is also a participant in LEPC.

Kern Oil

Kern Oil participates in the Local Emergency Planning Commission (LEPC, Region 5), that provides a chemical hazard forum for emergency management agencies, responders, industry, and the public. Participants meet quarterly to prepare for, evaluate, train, coordinate, and communicate chemical hazards in the community and develop regional hazardous material emergency plans. The mandatory CalARP regional plans are reviewed and updated as necessary, and provide information about chemicals in the community to citizens, government agencies and emergency responders.

San Joaquin Refining

San Joaquin Refining has a member and an alternate member on the Local Emergency Planning Committee (LEPC). These members have been participating on the committee for nine years. SJR members represent all of industry in the Region V LEPC.

Local Emergency Response Agencies

KCFD, BFD, and KCEHD are agency co-sponsors of LEPC Region 5 that broadly coordinates the hazardous materials training for hospitals, industry, and jurisdictional response teams. The LEPC meets quarterly to address hazardous materials preparedness and response capabilities. Additionally, BFD participates regularly in a community-oriented group, Kern Environmental Enforcement Network (KEEN), bringing together Kern County residents and government agencies to solve local issues that threaten the health of community members. More information on KEEN can be found at www.KernReport.org.

7. Public Alert and Communication Systems

In the event of an emergency, SJVAPCD is capable of issuing press releases, providing regular public updates via the District's social media accounts, and posting updates to its main website, valleyair.org. For more severe incidents,

SJVAPCD can hold conference calls, set up an incident specific Twitter account, and email all county public health directors and contacts with specific information and updates. District public outreach staff would participate in the Joint Information Center (JIC) at or near the incident location to handle media inquiries.

The joint Bakersfield City and Kern County Emergency Communication Center (ECC) serves as the combined 911 dispatch center for BFD and KCFD. The ECC uses a “Reverse 911” telephone alerting system to dial phone numbers within any geographical area and send hundreds of recorded messages per hour to instruct on “Sheltering-in-Place” or other protective measures, as well as any non-emergency messages.

Refineries and local response agencies rely on ReadyKern for alerting the public during emergencies. ReadyKern is the County’s web-based emergency notification system. It requires individual registration by citizen’s who wish to receive emergency alerts. These alerts are sent via phone and email to all subscribed citizens.

8. Preparedness and Response Training

SJVAPCD

SJVAPCD does not conduct emergency training, drills, or exercises that cover offsite air release responses, but is interested in working with the state to develop an emergency training program.

KCEHD

KCEHD completes emergency response drills related to monitoring equipment, tactics, safety, operations, and personal protective equipment on a monthly basis. These drills include training on a wide variety of monitoring and detection equipment. The agency also participates in emergency drills and training with KCFD on regular bases. This joint training includes hazardous materials emergency response drills at select facilities in the community.

KCFD

KCFD uses a combination of Department of Homeland Security grants and internal funding to train their HazMat responders. They typically use the California Specialized Training Institute for training, but recently took advantage of training offered by Union Pacific in Colorado for ten of their staff.

BFD

BFD conducts quarterly training drills with all of its approximately thirty regular members and fifty alternate Hazmat team members. The department

conducts some of its training on-site as well as at railroads and regulated fixed-facility industries. Periodically, BFD trains with KCEHD and the Bakersfield Police Department's SWAT team.

Alon USA

Alon USA trains its staff on emergency response during its monthly safety and daily tailgate meetings. Additionally, the refinery trains staff on any process or site changes as spelled out in the facilities RMP management of change system.

Kern Oil

Kern Oil conducts regular safety training that includes hazardous chemical release and exposure. Kern Oil also conducts a yearly drill in coordination with BFD.

San Joaquin Refinery

San Joaquin Refinery has an emergency incident command procedure that utilizes in-house staff during an emergency. The Safety Manager conducts annual refresher training on the procedure, including a table-top exercise. KCFD reviews the refinery's emergency incident command capabilities during its quarterly inspections.

9. Innovative Approaches

This section discusses research or demonstrations of emerging technologies or systems for monitoring, modeling or responding to fugitive or unplanned upset emission releases. Participating refineries and agencies have been polled to voluntarily provide this content.

KCEHD has initiated a requirement for specified high risk facilities to install and maintain chemical detection sensors surrounding the facility for early detection and monitoring for possible offsite migration of unplanned air releases. As a condition of a pending permit, KCEHD will also require Alon USA to post air monitoring data and alerts online, along with meteorological data from their weather station.

Through innovative modeling analysis, SJVACPD has established a system to provide to the public localized O₃ and PM_{2.5} concentration estimates in unmonitored areas. Although this system's capability is currently focused on providing historical air quality estimates, the District plans to expand this localized air quality estimation service to a real-time basis, which could prove to be helpful in an air quality emergency situation.

In addition, SJVACPD has made significant investments in expanding its hardware/software for regional modeling of air quality. Through these tools, these models can also be used to support the analysis of projected atmospheric dispersion and air quality impacts related to emergency incidents.

10. Identified Needs

SJVAPCD is interested in working with the State to develop a program to conduct emergency training, drills, and exercises that cover offsite air release responses.

KCFD is evaluating the possibility of adding an additional hazmat unit in eastern Kern County where there are a large number of chemical facilities. Although the three refineries in San Joaquin Valley are not located in eastern Kern County, the fire department would be able to supplement units that normally respond to the refineries.

11. Documentation

Documentation includes practices, procedures, and guidance prepared and maintained to address emergency response actions to address a non-routine, unplanned air contaminant release.

SJVAPCD responds to complaints and incidents through its Complaint Response Guidelines. These guidelines are intended to provide for timely response to concerns from the public, and SJVAPCD is currently in the process of updating these guidelines to make additional enhancements to the District's procedures. Additionally, SJVAPCD publishes an Annual Monitoring Network Report that describes the District's air monitoring system. The 2014 Annual Monitoring Network Report is available at:
<https://www.valleyair.org/aqinfo/Docs/2014-Air-Monitoring-Network-Plan.pdf>)

D. San Luis Obispo

The Phillips 66 Santa Maria refinery is the only major refinery located in San Luis Obispo County, adjacent to State Highway 1 on the Nipomo Mesa. The refinery has been in operation for more than 50 years, operating within 200 acres of the refinery's 1,780 acre site. The remainder of the site is limited to agriculture use and provides a buffer between the refinery operations and the surrounding community. The surrounding San Luis Obispo County community is a mix of rural and urban residential, golf courses, light commercial, agricultural uses, federal refuge areas and State recreational parks. The community of Nipomo's rural and urban areas are less than 2 miles east and downwind of the refinery, in the path of the prevailing northwest and west winds. The San Luis Obispo County cities of Oceano, Arroyo Grande, and Grover Beach are located within 5 miles and north of the refinery. In Santa Barbara County, the small community of Guadalupe is roughly five miles southeast of the refinery - downwind based on the prevailing winds. In Santa Barbara County, the City of Santa Maria is roughly eleven miles southeast of the refinery - downwind based on the prevailing winds. The Santa Maria refining facility processes crude oil brought by pipeline from producers all over California's Central Coast region, refines it into a semi-finished product, and ships it via pipeline to the Phillips 66 Rodeo refinery where it is finished into marketable petroleum products.

1. Air District Assets and Resources

The San Luis Obispo County Air Pollution Control District (SLOAPCD) has developed strong relationships with their local emergency response agencies, due to the presence of the Diablo Canyon Power Plant (DCPP) in the County. Strict regulations related to power plant safety have enabled San Luis Obispo County to develop enhanced emergency preparedness and response procedures for large scale air quality related emergencies.

a. Monitoring Network

SLOAPCD's air monitoring network was designed to monitor the region's air quality attainment status for criteria pollutants under the federal Clean Air Act. The District network presently consists of 10 permanent air quality monitoring stations that provide the District with data for determining air quality assessments and for conducting special air quality related studies. There are three SLOAPCD permanent air pollution monitoring stations that could provide air sampling data during an incident at the Phillips 66 Refinery. Additionally, ARB operates an air pollution monitoring station in the City of Santa Maria in Santa Barbara County, downwind of the refinery based on prevailing winds that would provide data during an incident at the refinery.

b. Stationary Equipment

The District's stationary air monitoring equipment supports a variety of federal, State, and local monitoring programs within the District's jurisdiction. Using this equipment, the Air Pollution Control Officer (APCO) can predict or declare public health advisories. The District's stationary monitors and their locations are further described in Appendix B.

c. Deployable Equipment

In addition to the fixed air monitoring network, SLOAPCD currently utilizes a set of field portable monitors to measure gaseous and particle air pollutants. This equipment supplements information collected from the fixed air monitoring network during an emergency incident. Portable instrument measurements and field observations, including visible emission evaluations, can also be used by the APCO to declare or predict potential health advisory episodes. Current deployable monitoring capabilities include:

- i. Field portable monitors to identify particulate concentrations.
- ii. Hand held multi-gas monitors capable of detecting combustible gases and H₂S.
- iii. Field portable toxic vapor analyzers which measure and log organic and inorganic vapor concentrations.
- iv. Summa[®] canisters or Tedlar[®] bags to collect instantaneous air samples ("grab" samples). Canisters are sent to a local laboratory for analysis.
- v. High-volume filter samples that can be collected and analyzed by local contract laboratories for asbestos, trace metals, and other specific particulate matter components.
- vi. Hand held and field portable meteorological equipment for current weather and climatology data collection.
- vii. Suites of colorimetric tubes to measure concentrations of present gases.

The District supports the County ICS as requested by assessing atmospheric information and determining concentrations of specific air pollutants through: 1) the District's air monitoring network, 2) use of mobile instrumentation, or 3) collection of additional air samples for subsequent laboratory analysis. District staff can provide meteorological guidance for consultation, provide technical advice, and supply emergency workers with equipment for sampling in close proximity to emergency incidents.

All requests for instrument and data support are evaluated on a case-by-case basis depending upon the requirements of the IC or on-scene compliance and enforcement staff. Appendix B provides a comprehensive list of SLOAPCD's deployable instruments and equipment available for emergency air monitoring.

d. Staffing

The SLOAPCD emergency response team supports responding county public safety agencies in a technical advisory capacity, during incidents with regional air quality impacts. SLOACPD has created an Emergency Response Team (ERT) steering committee to formulate and implement procedures and policies for incidents the District defines as “health advisory episodes”. Health advisory episodes related to refinery incidents include smoke and unplanned gaseous releases of toxic or non-criteria pollutants that can cause potential distress and complaints from the local community. In the case of a health advisory episode, the APCO makes daily summaries of air monitoring data and disseminates them to the public via press, radio, television, and other communication media.

The APCO also notifies school officials of the event and includes health warnings in accordance with the county health officer recommendations, including predicted or actual specific pollutant levels, predicted duration of the event, and predicted or affected receptor areas.

The District’s ERT includes engineering, enforcement, and technical staff. The APCO and District’s Public Information Officer (PIO) also play an important role in the function of the ERT. The ERT staff is categorized into field and supporting roles. The field staff is provided with full hazardous response training, support staff receives the first responder operational training, and all staff have some knowledge of the ICS model. The safety and well-being of District staff members take precedent at all times. The District’s ERT is not equipped or trained to be primary responders and do not enter hot zone environments.

When an incident occurs within San Luis Obispo County that necessitates an air monitoring response, emergency action is typically initiated by OES (County, State, or federal). The local agency then investigates and the ICS structure is formed. During the operational portion of the response, the incident is managed using the ICS structure. If the incident has an air quality component, the APCD will be included in the response generally as an Environmental Unit within the ICS Operations Section. When the District is involved in the incident, staff works within the ICS guidelines to investigate air impacts of the incident, and update and request support from other county agencies, such as County Environmental Health, as needed. Table D-1 lists the emergency response staff.

Table D-1 SLOAPCD Emergency Response Staffing

Title	Section	Contact
Director/APCO	SLOAPCD	(805) 781-5912
Engineering and Compliance Manager	Engineering	(805) 781-5937
Planning, Outreach & Monitoring Manager/PIO	Planning & Outreach	(805) 781-5998
Air Quality Specialist (4)	Compliance	(805) 471-9073
Air Quality Specialist (2)	Monitoring	(805) 471-9073
Air Quality Specialist (2)	Planning & Outreach	(805) 781-5998

e. Analytical Services

SLOAPCD does not have sole service contracts in place for analyzing air samples collected during an emergency. The District has identified various local and regional laboratories that are available to test for a wide range of constituents such as hydrocarbons, particulates, asbestos, metals, and specific carcinogens such as benzene. Laboratory analysis of air samples can take a few hours to several days or more.

2. Local Emergency Response Agency Assets and Resources

a. Preparedness and Response Programs

The San Luis Obispo Regional Hazardous Materials Response Team (SLORHMRT) has ongoing preparedness and training programs. It is overseen by a governing body that includes local fire chiefs, County Director of Environmental Health, and County OES (non-voting member). The team has developed extensive procedures and field response protocols and is supported by a well-equipped primary response vehicle as well as other smaller support units within the county. The team manager coordinates ongoing training with area responders, including administrative and resource related functions. San Luis Obispo County OES has a federally required emergency operations center funded primarily by PG&E ratepayers for responses at DCP. The center is available for use as needed for any hazardous material incident or other emergency response.

b. Stationary and Deployable Equipment

SLORHMRT is equipped with portable and hand-held air monitoring equipment which is used to evaluate leaks, spills and releases containing unknown chemical and toxic substances. Using a combination of monitoring instrumentation, shipping manifests, chemical reference books, and computer modeling, the team identifies hazardous chemicals and provides recommendations to support protective actions for the community. The teams monitoring and sampling capabilities include:

- i. Various handheld and field portable gas detectors capable of measuring levels of O₂, toxic/combustible gases, and VOCs.

- ii. Colorimetric gas detector tubes to measure the concentration of gases present.
- iii. Ultrasonic leak detection instrumentation to test and locate leaks in pressurized lines and systems.

Appendix B provides detailed information on the instrumentation that SLORHMRT uses.

c. Staffing

SLORHMRT is a multi-agency team comprised of 30 members from CalFire, San Luis Obispo City Fire, Arroyo Grande Fire, Paso Robles City Fire, Atascadero Fire, San Luis Obispo County Environmental Health, and the California Men’s Colony. The team is well-trained on and experienced with the region’s hazards. The team does not have 24 hour capability due to limited funding. See Table D-2 for a list of emergency air monitoring staffing.

Table D-2 SLORHMRT Emergency Air Monitoring Staffing

Title	Section	Contact
Battalion Chief	South Coast Battalion	(805) 903-3412
Fire Captain	Station 22	(805) 473-7171
Fire Apparatus Engineer	Station 22	(805) 473-7171
Fire Captain Hazmat Tech/Spec	Station 36	(805) 237-3155

d. Analytical Services

The SLORHMRT does not retain any contractors for analytical laboratory services. The team relies on their portable equipment for identification and evaluation of hazardous chemicals.

3. Refinery Emergency Response Assets and Resources

a. Preparedness and Response Programs

In the event of an uncontrolled release of potentially toxic chemicals and/or explosion at the Phillips 66 Santa Maria Refinery, the refinery’s industrial hygienist or designee will perform “emergency exposure air monitoring” in cooperation with the emergency response efforts. The IH Monitoring Response Team consists of the Industrial Hygienist, shift supervisors, and support staff. The monitoring is conducted primarily to help quantify atmospheric exposures to the immediate community and to help identify personal protection requirements for emergency responders during extended response efforts. The monitoring program is coordinated with the tactics and management operations of the Santa Maria Facility ICS. The monitoring uses deployable and fixed facility instrument/sampling systems to determine air contaminants within the facility, downwind of process units, and in the community with priority

given to local residents, schools, community centers, or local businesses. The facility coordinates with local agencies on the community monitoring sites selected and establishes at least one monitoring station at approximately one-half to one mile radius from the facility.

b. Stationary and Deployable Equipment

The refinery has a variety of handheld multi gas analyzers, gas specific analyzers, colorimetric tubes, and swab kits that provide direct readouts of LEL, H₂S, CO, O₂, SO₂, VOC, NH₃, benzene, phenol, sulfuric acid, and lead. Also, plant staff can use organic vapor monitors/badges, low flow sampling pumps with charcoal tubes, glass lined Summa[®] canisters, and Tedlar[®] collection bags to collect samples for later laboratory analysis for H₂S, SO₂, polynuclear aromatics, asbestos fibers, phenol, sulfuric acid, and inorganic lead. The refinery also has a meteorological station with wind speed/direction readily available through its distributed data control system. SLOAPCD operates the Mesa 2 station for Phillips 66, monitoring for SO₂, PM₁₀, PM_{2.5}, and meteorological data.

c. Staffing

The refinery has an Industrial Hygiene Atmospheric Monitoring Plan as part of its emergency response procedures to handle unplanned air releases staffed with technical, health and safety, and operations personnel. Table D-3 lists the Phillips 66 emergency air monitoring staff.

Table D-3 Phillips 66 Santa Maria Emergency Air Monitoring Staffing

Title	Section	Contact
Health and Safety Team Lead	Safety and Emergency Response	(805) 343-3275
Operations/Tech Services Support	Operations/Tech Services Department	(805) 343-3289
Operations Support	Operations/Tech Services Department	(805) 343-3244
Operation Shift supervisors (9)	Operations/Tech Services Department	(805) 343-3214
Industrial Hygienist	Safety and Emergency Response	(805) 343-3298
Safety Coordinators	Safety and Emergency Response	(805) 343-3249

d. Analytical Services

For collected air samples requiring further analysis, Phillips 66 uses the Bureau Veritas North American Laboratory in Novi, Michigan. Bureau Veritas is an American Industrial Hygiene Association accredited laboratory. The laboratory is a full-service analytical service provider.

4. Release Modeling and Forecasting

SLOAPCD

Release modeling and forecasting of offsite release consequences has been performed by SLOAPCD for the following scenarios; special studies for ambient air pollutants such as PM and smoke, source specific emission evaluations, air quality forecasting and modeling, screening risk assessments using AERMOD and the Hotspots Assessment and Reporting Program (HARP), meteorological forecasting, and dose assessment for DCPD.

HARP is a tool that assists air districts and regulated facilities with the programmatic requirements of the State Air Toxics Hotspots Program. HARP is a single integrated software package used to promote statewide consistency, efficiency, and cost-effective development of facility and emission inventories and health risk assessments. HARP can also be used for other types of health risk assessments required by other regulatory programs (e.g., facility permitting).

SLORHMRT

SLORHMRT uses basic plume modeling software such as ALOHA to model vapor dispersion movement and transport.

Phillips 66

The Phillips 66 Santa Maria Refinery conducts off-site consequence analyses using the worst case potential models as described in RMP and CalARP regulation. Phillips 66 determined that the Santa Maria Refinery poses no potential impact to any off-site receptors, allowing the refinery to qualify for Program Level One – the lowest risk reporting level.

Under the Air Toxics Hot Spots Act, the Phillips 66 facility had Reese-Chambers system consultants conduct the Health Risk Assessment modeling of routine plant emission for offsite consequences. Reese-Chambers has the capability to do modeling for the refinery as needed.

Phillips 66 or its consultants utilize ADIOS, ALOHA, and SAFER Real Time to model possible releases during emergency response activities.

- a. ADIOS (Automated Data Inquiry for Oil Spills) is NOAA's oil weathering model that is an oil spill response tool that models how different types of oil undergo changes in a marine environment. Working from a database of more than a thousand different crude oils and refined products, ADIOS quickly estimates the expected characteristics and behavior of spilled oil.
- b. ALOHA is an atmospheric dispersion model used for evaluating releases of hazardous chemical vapors, including toxic gas clouds, fires, and explosions. Using inputs about the release ALOHA generates a threat

zone estimate. A threat zone is the area where a hazard (such as toxicity, flammability, thermal radiation, or damaging overpressure) is predicted to exceed a user-specified level of concern.

- c. SAFER Real-Time[®] is a tool for emergency management of chemical releases. During an event, Real-Time[®] provides rapid updates and visualizations based on actual weather and gas sensor data. Real-Time[®] analysis tools determine estimated concentrations at any point, dosage and/or building infiltration. In addition, Real-Time[®] can be customized according to plant site and designed to address each plant's specific issues, which can assist with drills, employee awareness, what-if analysis, and validation of emergency response plans.

Real-Time[®] contains a wide array of preset models including fire and explosion, multi-component evaporation, building infiltration and exfiltration, tank and pipe, dispersion, complex terrain, and particulate and specialized chemicals such as HF and TiCl₄. Real-Time[®] automation reduces the amount of required knowledge and training needed for employees to use the system. The combustion analysis model is another feature of Real-Time[®] and this model analyzes any chemical fire, transitioning seamlessly from analyzing a toxic impact to a product of combustion, and determines downwind dispersion of combustion products, airborne particles, unburned hazardous materials and soot deposition.

5. Partnerships and Mutual Aid

Using the CalOES Operational Area model, SLO County ERT assembles various hazardous materials technicians and specialists from differing fire departments that train, prepare, and respond to hazardous material incidents throughout the county regardless of jurisdiction.

SLOAPCD has established partnerships and mutual aid agreements with the following agencies: SLO County OES, CUPA, CAPCOA, and CARPA.

The Phillips 66 Santa Maria Refinery's Emergency Response Air Monitoring/Sampling Plan includes contact information for the Center for Toxicology and Environmental Health – Emergency Response Division. Additionally, the refinery has a contract with Stantec Consulting Services for emergency air response monitoring. The contractor is available for fence line and ambient air monitoring with local analytical support. Lastly, Phillips 66 partners with CalFire and the SLO County Hazardous Materials Response Team.

SLOARMRT's partnerships and agreements are spelled out in the San Luis Obispo County Fire and Rescue Mutual Aid Plan, the Five Cities Mutual Aid Agreement, and the San Luis Obispo County Hazardous Materials Emergency Response Plan. Additionally, the response team is part of the California Fire and Rescue Mutual Aid System, has a mutual aid agreement with the Santa Barbara County Fire-Hazmat Department, and an informal agreement of support with the Ventura County Fire-Hazmat Department.

6. Advisory and Stakeholder Groups

SLOAPCD regularly participates in the quarterly SLO County OES Emergency Response Committee meetings for DCPD and the monthly Fire Safety Council's meetings. Phillips 66 also consults with SLOAPCD and CalFire. Regular correspondence and training opportunities are coordinated through these advisory groups.

7. Public Alert and Communication Systems

The County uses standard warning and communication systems in conjunction with social media to warn the community of potential hazards and provide accurate incident information. These messages and alerts are reviewed and coordinated between OES, SLOAPCD, and the County Public Health officer. The systems consist of an Emergency Alert System, TENS system, Route Alerting, Wireless Emergency Alerts, NOAA Weather Radio, Phone Assistance Center, 211, and the Diablo Canyon Early Warning System.

The Emergency Alert System provides emergency information and actions necessary to the general public over local radio and TV stations. TENS is a reverse 911 system that provides emergency information to citizens in a designated area. The County uses informational campaigns to notify cell phone users to register their numbers so they can be notified on reverse 911 calls. Route Alerting is a form of alert and notification that is used frequently in small scale emergencies or during rapidly changing situations in a designated area. In route alerting, emergency officials drive or walk through an affected or potentially affected area alerting residents of the emergency and actions that need to be taken. Wireless Emergency Alerts (WEA) are free informational text-like messages that are sent to WEA-enabled cellphones within range of cell towers within San Luis Obispo County. Emergency alert radio signals are provided by the NOAA National Weather Service (NWS) and can be heard on NOAA weather radios.

Social media such as Twitter and Facebook are used to supplement the traditional forms of emergency notification. In addition to notifications, phone assistance centers can be established during major emergencies to provide a place for people to call for assistance during emergencies. The County is working to direct citizens to 211 in all of its emergency communications.

The Phillips 66 Santa Maria refinery uses RapidNotify, a web-based incident notification system, to warn its neighbors of incidents at its facility during an emergency. RapidNotify is a mass notification service for emergency and non-emergency communication that provides notification via telephone.

8. Preparedness and Response Training

Overall, the County's emergency management structure benefits greatly from the federal requirements related to nuclear power plant emergency planning. While smaller exercises are conducted on a regular basis, the County conducts a full scale exercise related to a simulated response to a problem at the DCP, at least every two years. Routine training and preparedness drills at DCP often require exercise components which include: plume dispersion modeling and tracking, evacuations, shelter-in-place activities, emergency information dissemination to the public, and other important community protective actions. As a result, these exercises benefit the County in other areas since many of these activities can be modified and used for refinery related emergencies. Additionally, the County EOC trains, coordinates, and prepares for interaction with field ICs, coordinated distribution of news releases and media briefings using a Joint Information Center (JIC), collaboration with responding organizations through their Department Operations Centers (DOC), and other emergency logistical and interagency coordination activities.

All SLOAPCD Compliance and Engineering staff has completed training courses and many maintain intermediate levels of training based on their identified roles and involvement in the District's ERT. In the past, all SLOAPCD staff received training on the general NIMS framework which provides concepts and principles of how to manage basic emergencies as SLOAPCD staff can be called to serve the County in times of emergencies. APCO and Compliance staff members complete FEMA's standard ICS100/200 series training, which provides background on their agency's role and alignment within the incident command structure. Compliance and Engineering staff maintain annual training certificates in HAZWOPER, and participate in emergency air monitoring training workshop offered by groups like ARB and CARPA. The District also participates in drills and exercises with the DCP quarterly, holds annual preparedness meetings with the refinery response team, and exercises with the California Fish and Wildlife's Office of Spill Prevention and Response (OSPR) focusing on oil and gas related incidents.

Phillips 66's emergency response partners are CalFire and the SLO Hazardous Materials Response Team. The refinery conducts annual facility emergency response drills that typically include outside agencies.

9. Innovative Approaches

This section discusses research or demonstrations of emerging technologies or systems for monitoring, modeling or responding to fugitive or unplanned upset emission releases. Participating refineries and agencies have been polled to voluntarily provide this content.

No innovative approaches have been identified for San Luis Obispo.

10. Identified Needs

San Luis Obispo County Environmental Health Services has noted its concern that the refinery RMP does not fully account for possible public risks due to process related chemical hazards. The present RMP addresses material storage hazards only, that are deemed negligible under present operating conditions. The District would like to see hazards addressed more broadly in the RMP requirements.

On behalf of SLORHMRT, CalFIRE states their greatest need is adequate funding. The team does not have 24 hour response capability. Current funding for the hazmat team is tied to an established grant and agreement. The grant's joint powers agreement, created many years ago, does not allow for amendments related to funding increases. Additional funding is necessary since growth in local industry has increased over time, but funding for the hazmat team obligations has remained stagnant. To achieve a more consistent and robust funding stream for hazmat responsibilities, CalFire suggested a possible modification to the health and safety code.

CalFire and SLORHMRT would also like to have formalized memorandum of understanding (MOUs) with Phillips 66 modeled after the DCPD emergency response program. Currently, Phillips 66 is responsible for conditions at the refinery and CalFire is responsible for any off site consequences. CalFire feels it is important that this agreement is written into the MOU.

11. Documentation

Local documentation includes practices, procedures, and guidance prepared and maintained to address emergency response actions for an unplanned air contaminant release. Reference documents reviewed for this inventory are listed in Appendix C-4. The SLOAPCD 2014 Annual Air Monitoring Network Report describing the District's monitoring is available at: <http://www.slocleanair.org/images/cms/upload/files/2014%20network%20plan-FINAL.pdf>).

E. State and Federal Agencies

1. ARB

ARB's Office of Emergency Response (OER) directs and executes ARB's support of local air districts, local public health and environmental health departments, and other agencies during air quality emergency events. The group also coordinates with local, State, and federal agencies on statewide training and preparation for major air releases. OER develops and maintains internal response protocols within the fundamental framework of the Standardized Emergency Management System (SEMS) and its formal ICS, making response actions and procedures congruent with regional, state, and national response actions.

A thorough overview of ARB's capabilities and response procedures is provided as Appendix C of the ARB/CAPCOA July 2013 Project Plan for this study.

a. Preparedness and Response Programs

OER is prepared to respond to many types of intentional or unintentional air release incidents and natural disasters. Trained field staff generates data about air quality impacts, including chemical identity and concentration, potential exposure scenarios, geographic dispersion, and toxicological analysis of air concentrations. Field assets generate real-time ambient concentration data for particulates and a range of toxic industrial compounds. Together, these assets support IC decisions for protective actions, including evacuation, shelter-in-place, and re-entry. These assessments also form the basis of emergency public health advisories. During non-emergency times, OER participates in regular planning, preparedness, and systems assessment efforts.

b. Stationary and Deployable Equipment

OER uses both stationary and portable air quality measurement equipment. This equipment provides air contamination assessments and forecasts either remotely or on-scene, depending on circumstances and need. The equipment is always maintained in a condition of active preparedness. Staff also has the responsibility of investigating means, methods, and techniques to meet OER's mission more effectively. OER uses data from existing stationary air monitoring networks when available and deploys portable monitoring equipment in regions lacking these resources. See Table E-1 for a list of OER's deployable equipment.

Table E-1 OERs Deployable Monitoring Instrumentation

Instrument Name	Analyte(s)	Type	Data
AreaRAE Multi-gas Monitor	Chemical	Field Portable	Real-time
Coastal Environmental Weatherpak	Meteorology	Field Portable	Real-time
FTS Weather Stations	Meteorology	Field Portable	Near Real-time
Casella Microdust	Particulates	Hand-held	Real-time
EBAM Beta Attenuation Particulate Monitor	Particulates	Field Portable	Near Real-time
ppbRAE VOC Monitor	VOC	Hand-held	Real-time
SUMMA® Canister	VOC	Hand-held	Requires Lab Analysis
Draeger Tubes	VOC/Organics/Inorganics	Hand-held	Near Real-time
Deployment Support Equipment			
Multiple Role Response Vehicle	Communications and Equip Support	Mobile Bus	Real-time Communications
SEE Wireless Monitoring System	Communications and Equip Support	Field Portable	Real-time Communications

c. Staffing

OER is staffed to provide technical advice and resource support to California air districts and public safety agencies during air quality related incidents. As part of its advisory and support function, OER works closely with federal, State, and county level response agencies to coordinate activities, share information, and maintain awareness of the event. OERs team of knowledgeable experts, drawn for various programs within ARB, are called upon during air quality related incidents to deploy its resources.

As dictated by need, OER collaborates with expert staff from other ARB Divisions including: Air Quality Planning and Science Division, Research Division, and the Chairman’s Office of Public Affairs. OER also participates in planning and communication strategies with the emergency response programs of CalEPA, with the ultimate goal of seamless joint operations, communications, and interoperability. The OER team maintains active training and preparedness, with simulations and practical exercises, within and among the emergency response community to ensure effective deployment of all responding resources and assets. See Table E-2 for list of ARBs staff.

Table E-2 ARB Office of Emergency Response Staffing

Title	Section	Contact
Branch Chief Quality Management	Monitoring and Laboratory Division	(916) 322-0960
Office of Emergency Response		
Chief	Office of Emergency Response	(916) 323-4294
Air Pollution Specialists (3)	Office of Emergency Response	
Air Resource Technician (1)	Office of Emergency Response	

d. Analytical Services

The ARB's Monitoring and Laboratory Division Northern Laboratory Branch provides analytical and support services as needed for gaseous and particulate samples collected on various media, and contracts for supplemental analytical services for chemical assessments. The emergency response group also has access to services from other State agency (e.g., DTSC and CDPH) and contract laboratories.

e. Modeling Services

The ARB's Modeling and Meteorology Branch (MMB) utilize HYSPLIT and AERMOD models for simulations of unanticipated aerosol releases and plume release assessments. AERMOD is the preferred U.S. EPA model for both simple and complex terrain. HYSPLIT is generally used by the group to create basic trajectories and wind roses.

2. U.S. EPA

U.S. EPA's emergency response program responds to chemical, oil, biological and radiological releases, and large-scale national emergencies, including homeland security incidents. U.S. EPA provides support when requested or when state and local first responder capabilities have been exceeded. In carrying out these responsibilities, U.S. EPA coordinates with other federal agencies, states, tribes, and local governments. This effort is coordinated through specialized staff trained in emergency response protocol and procedure.

Proposed Refinery Regulations

U.S. EPA has proposed fence line monitoring to control fugitive emissions from refineries as part of its work to amend the National Emission Standards for Hazardous Air Pollutants (NESHAPS). The agency is proposing to approximate a refinery's fugitive emissions by requiring them to measure benzene adjusted for background concentration. The adjusted benzene concentration serves as a surrogate for all of the facility's fugitive emissions and then used to control them from their various sources. U.S. EPA reviewed six methods for measuring fugitive emissions at a refinery's fence line and selected passive diffusive tube monitoring networks based on feasibility and a cost/benefit analysis.

U.S. EPA reviewed available monitoring methods and determined that the following were technically feasible and appropriate for monitoring organic HAP from fugitive emission sources at the fence line of a petroleum refinery on a long-term basis: (1) passive diffusive tube monitoring networks; (2) active monitoring station networks; (3) UV-DOAS fence line monitoring; and (4) open-path FTIR. U.S. EPA determined two methods, differential

absorption LIDAR (DIAL) monitoring and solar occultation flux monitoring, were not appropriate for continuous monitoring at petroleum refineries, but useful for short-term studies.

Proposed Chemical Safety Regulations

As part of Presidential Executive Order (EO) 13650 - Improving Chemical Facility Safety and Security issued on August 1, 2013, U.S. EPA participated in the Chemical Facility Safety and Security Working Group (Working Group) with the Departments of Labor, Homeland Security, Justice, Agriculture, and Transportation to enhance safety and reduce risk at chemical facilities. The Working Group was tasked to identify ways to improve operational coordination with State, local, tribal, and territorial partners; to enhance Federal agency coordination and information sharing; to modernize policies, regulations, and standards to enhance safety and security in chemical facilities; and to work with stakeholders to identify best practices to reduce safety and security risks in the production and storage of potentially harmful chemicals.

A thorough analysis of the current operating environment, existing regulatory programs, and stakeholder feedback resulted in immediate actions and a consolidated Federal Action Plan of future actions to further minimize risks. The action plan is organized by five thematic areas: strengthen community planning and preparedness, enhance federal operational coordination, improve data management, modernize policies and regulation, and incorporate stakeholder feedback and develop best practices.

The Working Group issued a report in May of 2014 “Executive Order 13650, Actions to Improve Chemical Facility Safety and Security – A Shared Commitment”. The report summarizes Working Group progress with a focus on actions to date, findings and lessons learned, challenges, and priority next steps.

U.S. EPA Region IX Emergency Response Program

U.S. EPA Region IX's Emergency Response Program is staffed with federal on-scene coordinators and response team contractors which deploy to environmental disasters, hazardous materials releases, and inland oil spills that threaten human health and/or the environment. U.S. EPA's response program can assist with monitoring tasks, assessments, coordination of federal efforts, and provide support and information to, local, state, and regional response communities.

a. Preparedness and Response Programs

National Response System (NRS)

NRS routinely and effectively responds to a wide range hazardous substance releases. It is a multi-layered system of individuals and teams from local, state, and federal agencies, industry, and other organizations.

These groups share expertise and resources to ensure that response activities are timely, efficient, and minimize threats to human health and the environment.

At the heart of the system is the National Contingency Plan (NCP). The NCP ensures that the federal government's resources and expertise are available immediately for emergencies that are beyond the capabilities of local and state responders. The NCP provides the framework for the NRS and establishes how it works.

When releases are serious enough to be considered "Nationally Significant Incidents," the National Response Framework (NRF) is activated, and works in conjunction with the NRS and NCP. The NRF is the federal government's comprehensive, all-hazard approach to crisis management. It provides a mechanism for coordinating federal assistance to state governments and localities.

Emergency Response Program Authority

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) gives U.S. EPA's Superfund Emergency Response program the authority to respond to emergencies involving these substances and to pollutants or contaminants that pose "imminent and substantial danger to public health and welfare or the environment." CERCLA's hazardous substances are defined in terms of those substances either specifically designated as hazardous under the CERCLA or those substances identified under other laws. In all, the law includes references to four other laws to designate more than 800 substances as hazardous, and to identify many more as potentially hazardous due to their characteristics and the circumstances of their release.

b. Stationary and Deployable Equipment

National Equipment Management System (NEMS)

The NEMS database is an interactive system between participating regional equipment warehouses and the U.S. EPA WebEOC system¹⁸. WebEOC allows for resource requests to be submitted in the field through any mobile device. The received requests can then be routed to the appropriate department, allowing staff to manage all related activity. Equipment inventory information is captured and displayed in WebEOC in real-time. The National Equipment List in WebEOC reflects the participating warehouse inventory status of U.S. EPA field equipment. U.S. EPA Region IX assets are listed in Table E-3.

¹⁸ WebEOC is a privately developed response management system designed for integrated tracking, deployment, and monitoring of both equipment and personnel. CalOES has also acquired WebEOC for centralized asset tracking at the State level.

Table E-3 U.S. EPA Region IX Deployable Monitoring Instrumentation

Instrument Name	Analyte(s)	Type	Data
MultiWarn	Acid Gases	Hand-held	Real-time
Cannonball2	Acid Gases	Hand-held	Real-time
PhD Ultra Gas Meter	Acid Gases	Hand-held	Real-time
HazCat Kit	Chemical	Field Portable	Near Real-time
Single Point Monitor (SPM)	Chemical	Field Portable	Real-time
Smiths Detection HazMatID (FTIR)	Chemical	Field Portable	Near Real-time
Draeger Chip Measurement System	Chemical	Hand-held	Near Real-time
UltraRAE 3000 PID	Chemical	Hand-held	Near Real-time
AreaRAE Multi-gas Monitor	Chemical	Field Portable	Real-time
Inficon HapSite	Chemical	Field Portable	Near Real-time
Travel IR	Chemical	Field Portable	Near Real-time
Grab Sampling Techniques	Chemical	Field Portable	Requires Lab Analysis
Jerome H2S	Hydrogen Sulfide	Hand-held	Real-time
WeatherHawk Meteorological Station	Meteorology	Field Portable	Real-time
Model TVA-1000B PID-FID Combination	Organics/Inorganics	Field Portable	Real-time
PM10 High Volume Air Sampler	Particulates	Field Portable	Requires Lab Analysis
AirCon 2 High Volume Air Sampler	Particulates	Field Portable	Requires Lab Analysis
General Motor Works Model GV2360 (TSP)	Particulates	Field Portable	Requires Lab Analysis
DataRAM	Particulates	Hand-held	Real-time

Table E-3 U.S. EPA Region IX Deployable Monitoring Instrumentation (cont'd)

Instrument Name	Analyte(s)	Type	Data
PQ200 PM2.5 Sampler	Particulates	Field Portable	Requires Lab Analysis
EBAM Beta Attenuation Particulate Monitor	Particulates	Field Portable	Near Real-time
Radeco	Particulates	Hand-held	Near Real-time
GilAir-5 Tri-Mode Personal Sampling Pump	Particulates/Gases	Hand-held	Real-time
SKC Universal Personal Air Sampling Pump	Particulates/Gases	Hand-held	Real-time
PUF Polyurethane Foam High Volume Air Sampler	Particulates/VOC	Field Portable	Requires Lab Analysis
Bullard Thermal Imaging Camera	Thermal Imaging	Hand-held	Real-time
SUMMA [®] Canister	VOC	Hand-held	Requires Lab Analysis
MicroFid	VOC	Hand-held	Real-time
MutiRAE PGM-50	VOC/Acid Gas	Hand-held	Real-time
Sapphire	VOC/Organics	Hand-held	Real-time
MDA Tapemeter	VOC/Organics/Inorganics	Hand-held	Real-time
Draeger Tubes	VOC/Organics/Inorganics	Hand-held	Near Real-time
TAGA Mobile Laboratories	Acid Gases	Mobile Bus	Real-time
Multiple Role Response Vehicle	Communications and Equip Support	Mobile Bus	Real-time Communications
VIPER Wireless Monitoring System	Communications and Equip Support	Field Portable	Real-time Communications

c. Staffing

U.S. EPA Region IX's Emergency Response Program is staffed with federal On-Scene Coordinators (OSCs) and response team contractors that deploy to environmental disasters and hazardous material releases which threaten human health and/or the environment. The U.S. EPA response team (Table E-4) can assist with monitoring tasks, assessments, coordination of federal efforts, and provide support and information to, local, state, and regional response teams. OSCs are the federal officials responsible for monitoring or directing responses to all hazardous substance releases reported to the federal government. OSCs coordinate the task and actions of the response contractor teams. U.S. EPA Region IX uses the environmental contracting firms Ecology and Environment, based in Oakland, and Weston Environmental Consultants, with offices in Carlsbad, Chatsworth, Vallejo, and Walnut Creek. The *Superfund Technical Assessment & Response Team (START)* contracts provide technical support to U.S. EPA's site assessment activities and response, prevention and preparedness activities. This support includes gathering and analyzing technical information, preparing technical reports on oil and hazardous substance investigations, and technical support for cleanup efforts.

Table E-4 U.S. EPA Region IX Emergency Response Staffing (San Francisco)

Emergency Response Preparedness and Prevention Branch 24 Hour Phone: (800)300-2193		
Title	Section	Contact
Assistant Director	Superfund Division	(415)972-3132
Emergency Response Section		
Chief	Emergency Response	(415)972-3063
On Scene Coordinators (11)	Emergency Response	
Environmental Contractors	Superfund Technical Assessment and Response Team	

d. Analytical Services

Environmental Response Laboratory Network (ERLN)

ERLN is U.S. EPA's national network of laboratories that can be accessed as needed to support large scale environmental responses. U.S. EPA established ERLN as a national network of laboratories that can be ramped up as needed to support large scale environmental responses. ERLN can provide consistent analytical capabilities, capacity to handle increased needs during a response, and quality data in a systematic, coordinated response and integrates capabilities of existing public sector laboratories with accredited private sector laboratories to support such responses.

3. California National Guard Civil Support Team (CST)

The California National Guard has two Civil Support Team (CSTs), located in Hayward and Los Alamitos, whose mission is to assess suspected chemical, biological, radiological, nuclear, and explosive events in support of local ICs and advise regarding appropriate actions. As part of their mission, CST units can deploy instruments to detect chemicals and utilize a variety of highly specialized plume dispersion modeling tools at their disposal to simulate how pollutants in the ambient environment disperse and react during transport.

a. Preparedness and Response Programs

CSTs are deployed at the request of law enforcement agencies for security and terrorism threats and not typically for environmental monitoring emergencies. The modeling systems available to CST are supported by the Homeland Security Infrastructure Program (HSIP). HSIP is an infrastructure geospatial data inventory that compiles geospatial data from federal agencies, commercial vendors, states, and local partners for use by Homeland Security authorities. These datasets allow for nationwide infrastructure information access to assist decision makers in analyzing threats and modeling for emergencies and other missions. The supported modeling is further described in the section on release modeling and forecasting.

- b. **Stationary and Deployable Equipment**
CSTs maintain a variety of sophisticated air monitoring instruments, both handheld and in a mobile laboratory. Many of these are suited for exotic, national security-related chemical threat analyses in real- or near real-time situations (e.g., biological or chemical warfare agents), such as the JCAD M4A1, Smith Detection LCD 3.3 Total Ion Chromatogram, Shimadzu GC/MS, and Smith Detection FTIR. Some CST instruments and analyzers are equally well suited to more common chemical release hazards, such as the AreaRAE system and the HapSite GC. These instruments can measure O₂, LEL, VOC, NH₃, and Cl₂.
- c. **Staffing**
The 9th and 95th CSTs are staffed with 21 to 22 full-time service members from both the Army and Air National Guard. The CSTs consist of seven specific sections comprised of specialists in each of the primary functional areas: Command, Operations, Communications, Decontamination/Logistics, Medical, Science, and Survey. They are capable of rapid response to chemical, biological, and radiological threats. The CSTs can provide expert advice to the on-scene IC via its electronic “reach-back” capabilities through the Unified Command Suite (UCS). Live reach-back to federal intelligence centers allows the CST and the IC to consult with civilian experts in science and medicine. The CST deploys to incident locations by the most expeditious means possible. The team is equipped to transport its assets by ground, helicopter, and fixed wing air platforms.
- d. **Analytical Services**
CST deployment teams are self-contained with respect to air contaminant monitoring, sampling, analysis, and modeling. All necessary tools (e.g., plume dispersion model data processing via NARAC or IMAAC) are on-site or available through reach-back to a federal technical center. Consequently, CSTs do not use or provide any third party analytical services.

4. Other Supporting State Entities

- a. **Preparedness and Response Programs**
Department of Toxic Substances Control (DTSC)
The DTSC Emergency Response Program (ERP) based in Sacramento provides statewide response to actual and potential releases of hazardous substances (solid, liquid, or airborne) that pose an acute threat to public health and/or the environment. The ERP interacts with a number of other State, federal, and local agencies in carrying out these emergency response activities. Requests for assistance are available 24 hours a day, and are handled by the emergency response duty officer.

California Department of Public Health (CDPH)

CDPH's primary emergency response duties associated with major toxic air releases include conducting hospital preparedness exercises and providing situational analysis concerning potential air exposure treatments to emergency healthcare.

b. Stationary and Deployable Equipment

DTSC

DTSC employs a combination of internal resources including field response technicians, specialized portable equipment and instrumentation, and external environmental contractors to complete its duties. DTSC's hand held instruments are used for routine field work measuring known chemicals, but can be used for air sampling during emergency response. All of DTSC's deployable equipment resources are listed in Table E-5 and Appendix B.

CDPH

CDPH has portable particulate analyzers and meteorological stations that can be deployed for air sampling during an incident. Additionally, CDPH Richmond currently has a stationary continuous ambient air multi-path analyzer in the vicinity of several refineries in the Bay Area capable of detecting unplanned emissions from these facilities. The analyzer is a Cerex 3000H UV designed to detect part per billion to percent level concentrations of multiple gases within a mixture. The instrument is mounted inside the CDPH Richmond Campus with the sampling probe positioned on the building's rooftop. The instrument is currently configured to analyze for NH₃, Cl₂, acrolein, benzene, SO₂, NO, toluene, and xylene. Table E-6 lists CDPH's deployable equipment.

Table E-5 DTSC Deployable Monitoring Instrumentation

Instrument Name	Analyte(s)	Type	Data
Draeger CMS	Gases	Field Portable	Real-time
Draeger PAC III	Gases	Field Portable	Real-time
GammaRAE II R	Radiation	Field Portable	Real-time
H ₂ S Analyzer	H ₂ S	Field Portable	Real-time
Hg Vapor Analyzer Model 431-X	Hg	Field Portable	Real-time
MSA Multi-gas Detector (Sirius)	Gases	Field Portable	Real-time
PDR-1000 AN	VOC	Field Portable	Real-time
ppbRAE 3000	VOC	Hand-held	Real-time
TVA-1000B	Inorganic	Hand-held	Real-time
VelociCalc	Inorganic, VOC	Hand-held	Real-time
MultiRAE Pro Monitors	H ₂ S,CO,LEL,O ₂ ,VOC,GAMMA	Hand-held	Real-time

Table E-6 CDPH Deployable Monitoring Instrumentation

Instrument Name	Analyte(s)	Type	Data
EBAM Beta Attenuation Particulate Monitor	Particulates	Field Portable	Near Real-time
MetOne Meteorology Station	Meteorology	Field Portable	Real-time

c. Staffing

DTSC and CDPH have full time staff and contractors who can respond to incidents with unplanned air releases. Table E-7 lists DTSC’s emergency response program staffing, while Table E-8 lists its available contractors. Table E-9 list CDPH’s Environmental Health Laboratory Branch staffing.

Table E-7 DTSC Enforcement and Emergency Response Program Staffing

Title	Section	Contact
Enforcement and Emergency Response Program		
Deputy Director		(916) 323-3847
Emergency Response Branch		
Supervising Hazardous Substances Scientist II	Emergency Response Branch	(916) 255-6572
Hazardous Substances Scientist (13)	Emergency Response Branch	

Table E-8 DTSC Enforcement and Emergency Response Environmental Contractors

Name	Location	Contact
NRC Environmental	Chico	(800)343-5488 http://www.nrcc.com
Clean Harbors (San Jose)	San Jose	(800)483-3718 http://www.cleanharbors.com/
Clean Harbors (San Diego)	San Diego	(800)645-8265 http://www.cleanharbors.com/
Environmental Dynamics	Gardena	(800)888-0702 http://environmentaldynamicsinc.com/
PARC Environmental (Fresno)	Fresno	(800)955-7761 http://www.parcenvironmental.com/
PARC Environmental (Sacramento)	Sacramento	(877)929-7272 http://www.parcenvironmental.com/

Table E-9 CDPH Environmental Health Laboratory Branch Staffing

Title	Section	Contact
Environmental Health Laboratory Branch		
Research Section Chief	Outdoor Air Quality and Environmental Forensics Laboratory	(510) 620-2818
Response Unit Leader	Emergency Preparedness Unit	(510) 620-2889
CBRNE Subject Matter Expert	Emergency Preparedness Unit	(510) 620-2903

d. Analytical Services

DTSC

DTSC operates environmental chemistry laboratories in Berkeley and Los Angeles. These laboratories function primarily to validate test methodologies and certify results of other private and governmental environmental chemistry laboratories. However, they can perform analyses in support of major environmental disasters if necessary.

CDPH

CDPH laboratory services perform the core public health analytical functions including disease surveillance, environmental and vector testing, toxicology, and monitoring the safety of drinking water, recreational water, and food supplies. They also serve as reference laboratories for private, commercial laboratories in their respective service areas. Laboratories have some ability to support data gathering for air contaminant emergencies, such as the E-BAM PM monitors located at the Richmond laboratory. CDPH can also assist in coordinating public health planning and data collection related to hazardous release and exposure events.

5. Release Modeling and Forecasting

ARB

The ARB's Modeling and Meteorology Branch (MMB), Air Quality Planning and Science Division utilizes HYSPLIT and AERMOD models for simulations of unanticipated aerosol releases and plume release assessments. AERMOD is the preferred U.S. EPA model for both simple and complex terrain. HYSPLIT is generally used by the group to create basic trajectories and wind roses.

California Department of Public Health (CDPH)

CDPH utilizes Sonoma Technology Institute's AIRNOW Tech air trajectories tools to estimate plume movement and behavior. These tools are adaptations of the HYSPLIT dispersion model and can be used to calculate a plume based on measurements made downwind of the release point.

California National Guard Civil Support Teams (CST)

The CSTs have a variety of resources to simulate how pollutants in the ambient environment disperse and react during transport. The CST modeling services are activated through CalOES usually by the lead law enforcement agency on scene. However, fire/hazmat or local, state, and federal jurisdiction can request service activation as well. The supported modeling tools that the Guard CSTs utilize are:

- a. Interagency Modeling and Atmospheric Assessment Center (IMAAC)
This complex modeling incorporates real-time location-specific meteorological data, demographic and geographic data, and first-hand observations about the release from the incident site. The National Response Plan designates the IMAAC as the single federal source of airborne hazards predictions during an Incident of National Significance (INS). IMAAC is responsible for producing and disseminating predictions of the effects from hazardous chemical, biological, and radiological releases.

IMAAC provides experts 24 hours-a-day to run the modeling system, assure quality of results, assist decision makers in the interpretation of model predictions, and provide plume models for real-world emergencies involving significant hazardous atmospheric releases.

Once activated, IMAAC: 1) collects information on the incident including time, location, and type of incident, 2) develops model predictions and standard reports showing health effects and protective actions, 3) refines predictions based on on-scene field measurements or updates from the incident responders, 4) distributes the products and reports to the appropriate parties, and 5) provides reach-back subject matter expert advice on interpretation and use of the products.

https://narac.llnl.gov/uploads/DHS_IMAAC_Fact_Sheet_4-05_vcuny.pdf
<http://www.dhs.gov/imaac>

- b. The Joint Effects Model (JEM) program provides a single, validated capability to predict and track dispersion of nuclear, biological, chemical, and toxic industrial chemical/material events and effects.

<http://www.jpeocbd.osd.mil/packs/Default.aspx?pg=1701>

- c. The Consequence Assessment Tool Set (CATS) provides a comprehensive package of hazard prediction models, casualty and damage assessment tools, and population and infrastructure data. CATS focuses on chemical, biological, radiological, and nuclear disaster analyses and supports a wide range of response applications and access to remote databases for custom analysis. Developed by the Defense Threat Reduction Agency (DTRA), CATS is available free of charge to federal, state, and local government emergency response organizations.

<http://www.esri.com/industries/public-safety/tools/cats>

- d. The Hazardous Predictions and Assessment Capabilities (HPAC) program is a forward deployable and/or reach back modeling tool available for government, government-related, or academic use. This software tool

assists in emergency response to hazardous agent releases and utilizes fast running, physics-based algorithms enabling users to model and predict hazard areas and human collateral effects in minutes. HPAC provides the capability to accurately predict the effects of HAZMAT releases into the atmosphere and their impact on civilian and military populations.

[http://www.acq.osd.mil/ncbdp/narp/Radiation Data/Specialized Radiological.htm](http://www.acq.osd.mil/ncbdp/narp/Radiation%20Data/Specialized%20Radiological.htm)

- e. The National Atmospheric Release Advisory Center (NARAC) provides tools and services to the Federal Government. NARAC maps the probable spread of hazardous materials released into the atmosphere and provides atmospheric plume predictions. NARAC is a national support and resource center for planning, real-time assessment, emergency response, and detailed studies of incidents involving a wide variety of hazards, including nuclear, radiological, chemical, biological, and natural emissions.

<https://narac.llnl.gov/>

6. Partnerships and Mutual Aid

CDPH

The CDPH Richmond Laboratory has an agreement to serve as a high hazard sample screening facility for the U.S. EPA Region IX.

7. Advisory and Stakeholder Groups

California Air Response Planning Alliance

The California Air Response Planning Alliance (CARPA) is an organized but informal forum of technical experts from local air districts, environmental and public health departments, State and federal emergency response agencies, and public information offices. CARPA pursues opportunities to improve response coordination and efficiency for responding to large hazardous air release incidents. Participants work together and in technical committees to strengthen the air quality response elements of emergency preparedness, mitigation, response, and recovery efforts. CARPA develops guidance and best practices for emergency air measurement, data interpretation, and data delivery through public information, health messaging, and communication of timely and actionable information. CARPA participation and support is voluntary.

<http://www.arb.ca.gov/carpa/carpa.htm>

CDPH Richmond

The CDPH Environmental Health Laboratory Branch participates in the CARPA Steering Committee, Contra Costa County Medical Health Preparedness Coalition, and the West Contra Costa County HazMat Emergency Communications Work Group.

8. Public Alert and Communication Systems

CDPH Richmond

CDPH participates in the California Health Alert Network (CAHAN). CAHAN is a State-sponsored, web-based system used to send warnings of impending or current situations that may affect the public's health. CAHAN also provides a collaborative work environment where emergency preparedness planning and response information can be shared between local and state health agencies and emergency response partners.

9. Preparedness and Response Training

CDPH

CDPH provides an on-line self-paced hospital response training course for mass casualties, with over 200 trained participants to date. CDPH also hosts a bimonthly County Healthcare Coalition tabletop exercise to identify response gaps and remedies while training about fifty participants per exercise.

Additional information can be found at: <http://www.cdphhospitaltraining.org/>

10. Innovative Approaches

This section discusses research or demonstrations of emerging technologies or systems for monitoring, modeling or responding to fugitive or unplanned upset emission releases. Participating refineries and agencies have been polled to voluntarily provide this content.

CDPH

CDPH is currently developing several innovative approaches to emergency response and preparedness. The laboratory has an emergency mobile laboratory for on-site hospital air monitoring, can activate a high-hazard sample screening and identification laboratory that is a stationary trailer located on the Richmond property, but outside of the facilities traditional laboratories. CDPH currently is developing and evaluating an aerial platform drone for plume sample collection of vapor and particulate phase, in cooperation with Air Cover Solutions. Air Cover Solutions is the manufacturer of the unmanned aircraft.

DTSC

DTSC provided a \$10,000 grant to help finance a pilot project that allows residents to monitor and quickly report potential environmental hazards in a highly industrialized section of Los Angeles County using cell phones, other mobile devices, and a community based monitor. The cutting-edge program in Wilmington - dubbed the Los Angeles Community Environmental Enforcement Network (LACEEN) - is one of the first to deploy a low-cost rooftop device to continuously monitor outdoor air pollutants at a home next to an oil refinery.

11. Identified Needs

This section discusses programmatic and resource needs that ARB and/or CAPCOA have identified through interview, stakeholder meetings and public documents. It includes technical improvement efforts that are still in planning or development stages. These needs will be addressed in detail in the Objectives 2 and 3 reports.

State needs were identified in the Governor's Interagency Working Group on Refinery Safety February 2014 report "Improving Public and Worker Safety at Oil Refineries".

Federal needs were identified in the May 2014 Occupational Safety and Health Administration report "Executive Order 13650, Actions to Improve Chemical Facility Safety and Security – A Shared Commitment".

12. Documentation

Documentation includes practices, procedures, and guidance prepared and maintained to address emergency response actions to address a non routine, unplanned air contaminant release. Reference documents to support this assessment for federal and State refinery air monitoring and emergency preparedness programs are provided in Appendices F and G.

V. LIST OF APPENDICES

- A. Locations of California Refineries and Air Monitoring Stations
- B. Monitoring Instrument Descriptions
- C. Air District Program Reference Documents
 - 1. Bay Area
 - 2. South Coast
 - 3. San Joaquin Valley
 - 4. San Luis Obispo
- D. Local Agency Program Reference Documents
 - 1. Bay Area
 - 2. South Coast
 - 3. San Joaquin Valley
 - 4. San Luis Obispo
- E. Refinery Program Reference Documents
 - 1. Bay Area
 - 2. South Coast
 - 3. San Joaquin Valley
 - 4. San Luis Obispo
- F. U.S. EPA and Federal Program Reference Documents
- G. ARB and State Program Reference Documents
- H. Technical Reference Documents
- I. Air Monitoring Contacts
- J. Internet Reference Sites
- K. Acronyms