

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ALISO CANYON FACILITY MONITORING NETWORK PLAN

August 2016

Deputy Executive Officer
Science and Technology Advancement
Matt Miyasato, Ph.D.

Assistant Deputy Executive Officer
Science and Technology Advancement
Laki Tisopulos, Ph.D., P.E.

Authors:

Jason C. Low, Ph. D
Atmospheric Measurements Manager

Solomon Teffera
Acting Laboratory Services Manager

Andrea Polidori, Ph. D
Quality Assurance Manager

TABLE OF CONTENTS

I.	Background.....	1
II.	Objectives and Monitoring Locations.....	3
III.	Implementation Schedule.....	5
IV.	Organization and Procurement of Equipment, Supplies and Services	7
V.	Continuous Monitoring.....	9
VI.	Triggered Samples	11
VII.	24-Hour Integrated Samples	12
VIII.	Mobile Platform Measurements.....	14
IX.	Background Air Monitoring	14
X.	Incident Response	14
XI.	Meteorology.....	15
XII.	Quality Control/ Quality Assurance.....	15
XIII.	Reporting.....	17
XIV.	Potential Modifications and Contingency Planning	17

FIGURES

Figure 1:	Complaint Distribution in the Communities Surrounding the Aliso Canyon Facility	3
Figure 2:	Fixed Locations for Ambient Air Measurements for Aliso Canyon Monitoring	4
Figure 3:	Current and Proposed Continuous Methane Monitoring Sites.....	9
Figure 4:	24-Hour Integrated Sampling Sites	13

TABLES

Table 1:	The Overview, Timeline and Conditions of the Plan	6
Table 2:	Ambient Monitoring and Analysis Program Organization.....	7
Table 3:	List of Continuous Methods	10
Table 4:	Triggered Sample Collection Media and Analytical Methods	11-12
Table 5:	24-Hour Integrated Sample Collection Media and Analytical Methods	12

APPENDICES

Appendix A	Analyte List and SCAQMD Detection Limits for U.S EPA TO-14 Method.....	18
Appendix B	Analyte List and SCAQMD Detection Limits for U.S. EPA TO-15 Method.....	19
Appendix C	Analyte List and SCAQMD Detection Limits for U.S. EPA Method 25.1	20
Appendix D	Analyte List and SCAQMD Detection Limits for SCAQMD Method 307-91.....	21
Appendix E	Chain of Custody Form	22

I. Background

Southern California Gas Company (SoCalGas) operates the Aliso Canyon Underground Natural Gas Storage Facility (Facility), located at 12801 Tampa Avenue, Northridge, CA 91326. The Facility's underground storage reservoir has the capacity to store over 80 billion cubic feet of natural gas. SoCalGas operates approximately 115 injection/withdrawal wells at the Facility. SoCalGas injects natural gas into the underground reservoir at the Facility when the demand for natural gas is low and withdraws it when the demand for natural gas is high.

On October 23, 2015, SoCalGas discovered that a well-used to inject and withdraw natural gas from the underground storage reservoir (known as Well SS-25) was leaking. Despite numerous attempts by SoCalGas to stop the leak, natural gas continued to leak from the underground reservoir through Well SS-25 and its surroundings until initially controlled on February 11, 2016. The Division of Oil, Gas and Geothermal Resources (DOGGR) certified Well SS-25 as permanently sealed on February 18, 2016.

On October 24, 2015, the South Coast Air Quality Management District (SCAQMD) received the first **air quality complaint** (Figure 1) resulting from sulfur type odors associated with the natural gas leak from Well SS-25. Since that time, SCAQMD has received **more than 2,300 complaints** from residents in the communities surrounding the Facility. Odors are from odorant compounds (including tetrahydrothiophene and t-butyl mercaptan) that are added to natural gas and can be smelled at very low levels (around or below 1 part per billion - ppb). The human nose is very sensitive and has the ability to detect this type of odor below the detection level of any currently available monitoring device.

Although, since February 18, 2016, the frequency of air quality complaints has been reduced, SCAQMD inspectors are continuing to respond to air quality complaints and collect air samples as part of their ongoing investigation of this incident. SCAQMD commenced air monitoring on October 26, 2015 and since that time, in conjunction with the California Air Resources Board (CARB), has installed and operated 9 continuous monitoring stations which have been operating since December 2015. In addition, and at the same time as continuous fixed site monitoring deployment, SCAQMD initiated methane surveys using a Lycor-equipped mobile platform in the nearby communities. SoCalGas also commenced air monitoring on October 30, 2015 and since that time has collected over 3,700 grab samples, and over 2,200 time integrated samples, as of June 1, 2016. In addition, SCAQMD is collecting 24-hr integrated canister samples from four locations for laboratory analysis. Since early February 2016, SCAQMD has also conducted daily scheduled inspections and mobile platform monitoring on-site at the Facility.

Results of these ongoing monitoring efforts indicate that since February 11, 2016, methane monthly average levels, maximum daily hourly maximum, and frequency of samples exceeding 5 ppm are significantly reduced compared to the data from the December 2015 to February 11, 2016 time frame. Levels of benzene for time integrated samples during the measurement period were comparable to typical levels for the South Coast Basin, as determined recently from the Multiple Air Toxic Exposure Study IV (MATES IV, 2015). A few grab samples in November and early December 2015 showed some snap shot concentrations of elevated levels of hydrogen sulfide (H₂S). Since then, grab samples and time integrated samples have not shown higher than

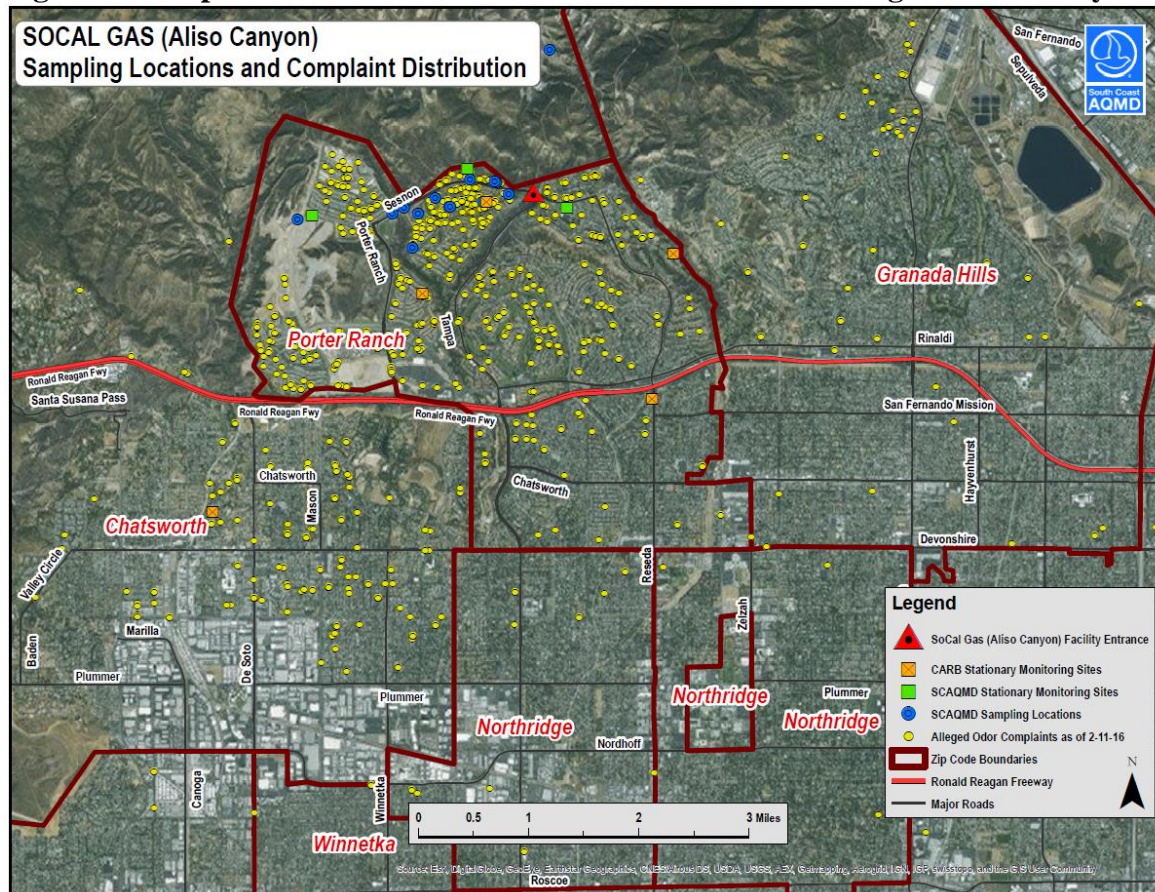
expected ambient H₂S levels. Also, since January 2016, SCAQMD has deployed continuous H₂S monitors which have shown levels not exceeding 10 ppb.

Pursuant to Condition 10 of the Stipulated Order for Abatement issued to SoCalGas by the SCAQMD Hearing Board on January 23, 2016, SoCalGas is obligated to provide SCAQMD funding to develop, staff and implement a continuous air monitoring plan for the duration of the Order for Abatement (until January 31, 2017). Pursuant to a separate agreement, SoCalGas will fund the implementation of certain elements of this monitoring plan for the duration of the Order for Abatement in fulfillment of its obligation under Condition 10 thereof.

Subsequent to issuance of the Order for Abatement, SCAQMD and CARB jointly established criteria for pollutants of concern that were released from the Well SS-25 leak. The criteria were set at expected typical background levels for these pollutants in the communities surrounding the Facility prior to the leak at Well SS-25. Although not a requirement of the Order for Abatement, SCAQMD intends to continue monitoring efforts until it is shown that the Facility is not adversely impacting local air quality and the baseline air quality conditions in the surrounding communities are determined.

This monitoring plan may be amended periodically as conditions and operations at the Facility change or as new information becomes available.

Figure 1: Complaint Distribution in the Communities Surrounding the Aliso Canyon Facility

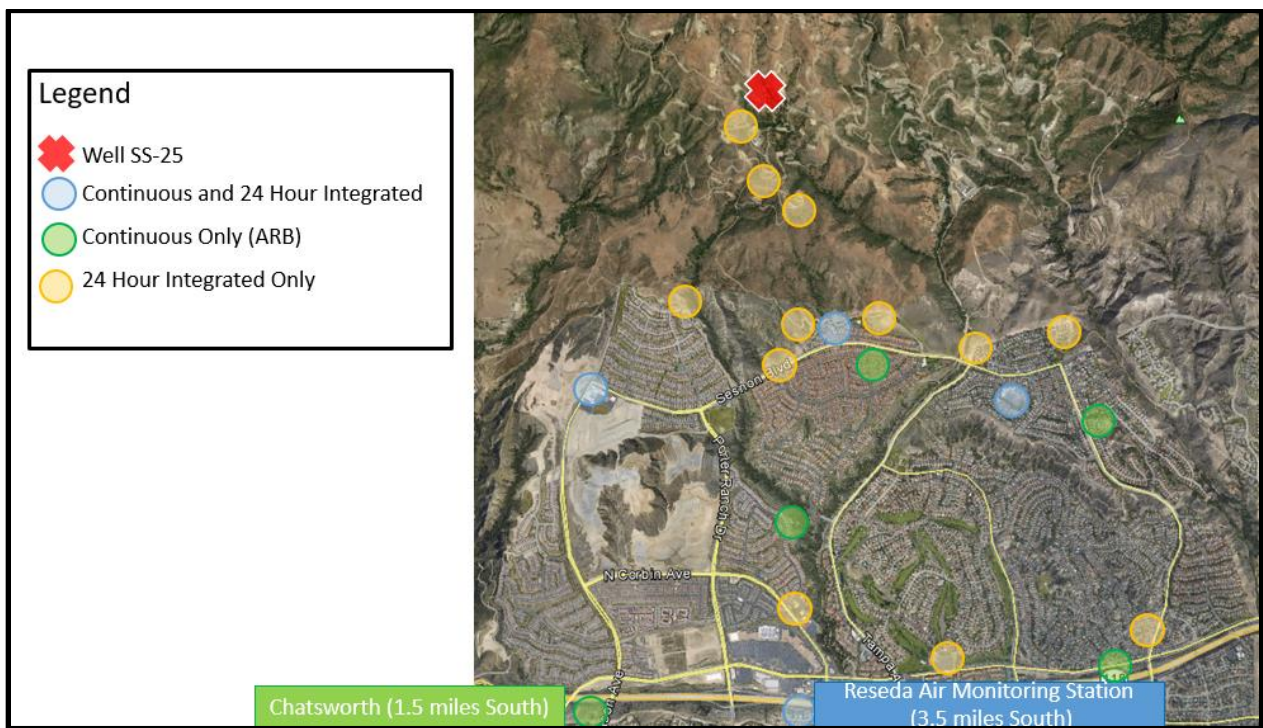


II. Objectives and Monitoring Locations

The objectives of this air monitoring plan (Plan) are to outline the methods recommended to measure and characterize ambient air pollutant levels in communities near the Facility; measure and assess potential air pollution impacts due to the natural gas leak; and respond to community concerns regarding potential air quality impacts in the event the Facility resumes normal operating conditions. The timeframe for implementing the Plan is explained in Table 1 and may be adjusted as conditions change and new information becomes available.

This Plan includes the collection of data for both short and long term air quality assessments, consisting of a combination of near real-time and time-integrated measurements to provide information to the public and stakeholders on the current level of pollutants in the community, and provide information for comparison to previous health studies, long-term health reference standards, and health assessments being conducted. There is high spatial resolution of the monitoring sites due to the nature of the incident and the complex nature of the topology and meteorology (Figure 2). The exact locations of some of the monitoring sites are confidential since these are at private residential properties and may be released at a later time if approval is granted. SCAQMD has coordinated with other state and local agencies on site selection and the type of measurements.

Figure 2: Fixed Locations for Ambient Air Measurements for Aliso Canyon Monitoring



III. Implementation Schedule

This Plan calls for a four-phase implementation to verify compliance with the criteria jointly established by SCAQMD and CARB on a continuous basis. The first phase of the Plan requires monitoring at the level that occurred during the period of the leak at Well SS-25, while subsequent phases allow for gradual reductions in the monitoring intensity as air quality in the communities near the Facility returns to typical levels and continues to remain at those levels. Furthermore, this Plan is intended to compile information that will serve as a baseline for pollutants of concern that can be used in subsequent air quality and health studies. Also, it is intended to assess air quality over a longer time horizon to address potential air quality concerns from the community in the event the Facility returns to normal operating conditions from its current reduced operating capacity.

Each phase has a presumptive timeframe (identified in Table 1) that is tied to the date on which DOGGR certified that the leak at Well SS-25 was sealed. However, transitioning from one phase to the next is also dependent upon certain conditions being satisfied, and the presumptive timeframes may be modified in the event that these conditions are not satisfied. These additional conditions are:

- Ambient concentrations of pollutants of concern generally at or below the air quality criteria established by SCAQMD and CARB (temporary, intermittent exceedances attributable to the Facility, and exceedances that cannot be attributed to the Facility, would not be a basis for not moving from one phase to the next)
- Acceptable interlaboratory comparisons between SCAQMD and SoCalGas contract lab(s) (although SoCalGas is not required to continue its own monitoring for the purposes of providing such comparisons)
- Absence of any unforeseen changes in circumstances that would cause concern regarding potential adverse community impacts
- Majority of relocated residents moved back to their homes (only applicable for moving from Phase I to Phase II)
- Continued absence of unexplainable verified nuisance complaints attributable to the Facility
- Each phase to be conducted for a minimum of 30 days

Table 1: The Overview, Timeline and Conditions of the Plan

Description	Phase I		Phase II		Phase III		Phase IV	
Time Frame	Current		Presumptively June 15, 2016 to July 15, 2016		Presumptively July 16, 2016 to September 16, 2016		Presumptively September 17 to January 31, 2017	
Conditions for moving to the next Phase	Measurements showing typical ambient levels of pollutants; Interlaboratory Comparisons are Acceptable; No other species or operational activity to cause concern for community impacts		Continued measurements showing typical ambient levels of pollutants; No other species or operational activity to cause concern for community impacts; Majority of residents moved in and continued low level of nuisance reports		Continued measurements showing typical ambient levels of pollutants; No other species or operational activity to cause concern for community impacts		Measurements have been conducted appropriately to determine typical ambient concentrations for the area near Aliso Canyon and to provide continued community monitoring for potential natural gas emissions	
	# Sites	Frequency	# Sites	Frequency	# Sites	Frequency	# Sites	Frequency
Fixed Ongoing Measurements								
Continuous								
Methane	4	Hourly	4	Hourly	2	Hourly	1	Hourly
Methane (ARB)	5	Hourly	5	Hourly	0	N/A	0	N/A
H2S	3	Hourly	3	Hourly	2	Hourly	1	Hourly
Total Sulfur	2	Hourly	2	Hourly	2	Hourly	1	Hourly
Benzene (ARB/SCAQMD*)	2	Hourly	1	Hourly	1*	Hourly	1*	Hourly
24 Hour Integrated Samples								
Methane/ Ethane	4	1 in 3 Day	4	1 in 3 Day	2	1 in 6 Day	1	1 in 6 Day
Methane/ Ethane (SoCalGas Sites)	12	Daily	5	1 in 3 Day	0	0	0	0
Speciated VOC	4	1 in 3 Day	4	1 in 3 Day	2	1 in 6 Day	1	1 in 6 Day
Speciated VOC (SoCalGas Sites)	12	Daily	5	1 in 3 Day	0	0	0	0
Mobile Platform Community Measurements								
Methane (LICOR)	Nearby Community	Daily	Nearby Community	Twice Weekly	Nearby Community	As needed	Nearby Community	As needed
On Site Inspections (2 Inspectors/ 1 Special Monitoring or QA)								
SS-25 FLIR	Aliso Canyon Facility	Daily	Aliso Canyon Facility	Twice Weekly	Per Normal Inspection Schedule/ As needed	Per Normal Inspection Schedule/ As needed	Per Normal Inspection Schedule/ As needed	Per Normal Inspection Schedule/ As needed
Well Inspections	Aliso Canyon Facility	Daily	Aliso Canyon Facility	Twice Weekly	Per Normal Inspection Schedule/ As needed	Per Normal Inspection Schedule/ As needed	Per Normal Inspection Schedule/ As needed	Per Normal Inspection Schedule/ As needed
Mobile Platform	Aliso Canyon Facility	Daily	Aliso Canyon Facility	Twice Weekly	As needed	As needed	As needed	As needed
Other								
Passive VOC Survey	Nearby Community	Every Two Weeks	0	0	0	0	0	0
Flight Measurements (ARB)	Every Two Weeks	Every Two Weeks	Every Two Weeks)	Every Two Weeks	As needed	As needed	As needed	As needed
Event Response (Nuisance, Immediate Air Quality Concern)								
Triggered Samplers	3	Instantaneous methane level > 5 ppm	3	Instantaneous methane level > 5 ppm	2	Instantaneous methane level > 5 ppm	1	Instantaneous methane level > 5 ppm
Ongoing Inspector Nuisance Complaint Response	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
Incident Response Program (E&C and STA)	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed

IV. Organization and Procurement of Equipment, Supplies and Services

Ambient air measurements conducted by SCAQMD are under the organizational structure as depicted in Table 2. The information provided is similar to that required by the United States Environmental Protection Agency (U.S. EPA) for certain federal monitoring programs.

Table 2: Ambient Monitoring and Analysis Program Organization

Position	Responsibilities	Upward Lines of Communication
Deputy Executive Officer: Science Technology Advancement	Accountable for the successful accomplishment of project objectives	Executive Officer, Executive Council, and Governing Board
Deputy Executive Officer: Information Management	Accountable for computer, software, hardware, and communications support	Executive Officer, Executive Council, and Governing Board
Assistant Deputy Executive Officer: STA	Accountable for the successful accomplishment of project objectives	Deputy Executive Officer: Science Technology Advancement
Laboratory Services Manager	Responsible for preparation of sampling media and analysis of samples submitted to laboratory	Assistant Deputy Executive Officer: Science Technology Advancement
Atmospheric Measurements Manager	Responsible for establishment, operation and maintenance of monitoring stations including Special Monitoring sites and of Special Monitoring group operations	Assistant Deputy Executive Officer: Science Technology Advancement
Quality Assurance Manager	Responsible for verifying, reviewing, developing, documenting, and implementing QA/QC practices and procedures; Technical lead for mobile platform measurements	Assistant Deputy Executive Officer: Science Technology Advancement
Principal Air Quality Chemists	Responsible for laboratory operations of the Ambient VOC, Toxics, and PM Analysis work groups	Laboratory Services Manager
Senior Air Quality Chemists	Responsible for supporting Ambient VOC, Toxics and PM work group operations, and 2 nd level data validation	Principal Air Quality Chemist
Air Quality Chemist and Assistant Air Quality Chemists	Responsible for following Good Laboratory Practices (GLPs) in the analysis of samples and adhering to procedures delineated in SOPS and Operational Assistance Guides (OAGS)	Principal Air Quality Chemist
Laboratory Technicians	Responsible for following GLPs for the preparation of samples or sampling media and adhering to procedures delineated in SOPs and OAGs	Principal Air Quality Chemist
Principal Air Quality Instrument Specialist	Responsible for Special Monitoring group operations	Atmospheric Measurements Manager
Senior Air Quality Instrument Specialist	Responsible for supporting Special Monitoring operations and 2 nd level data validation	Principal Air Quality Instrument Specialist
Air Quality Instrument Specialists I and II	Responsible for following documented procedures including SOPs and OAGs in sample collection from field sites and/or repair and calibration of instruments	Principal Air Quality Instrument Specialist

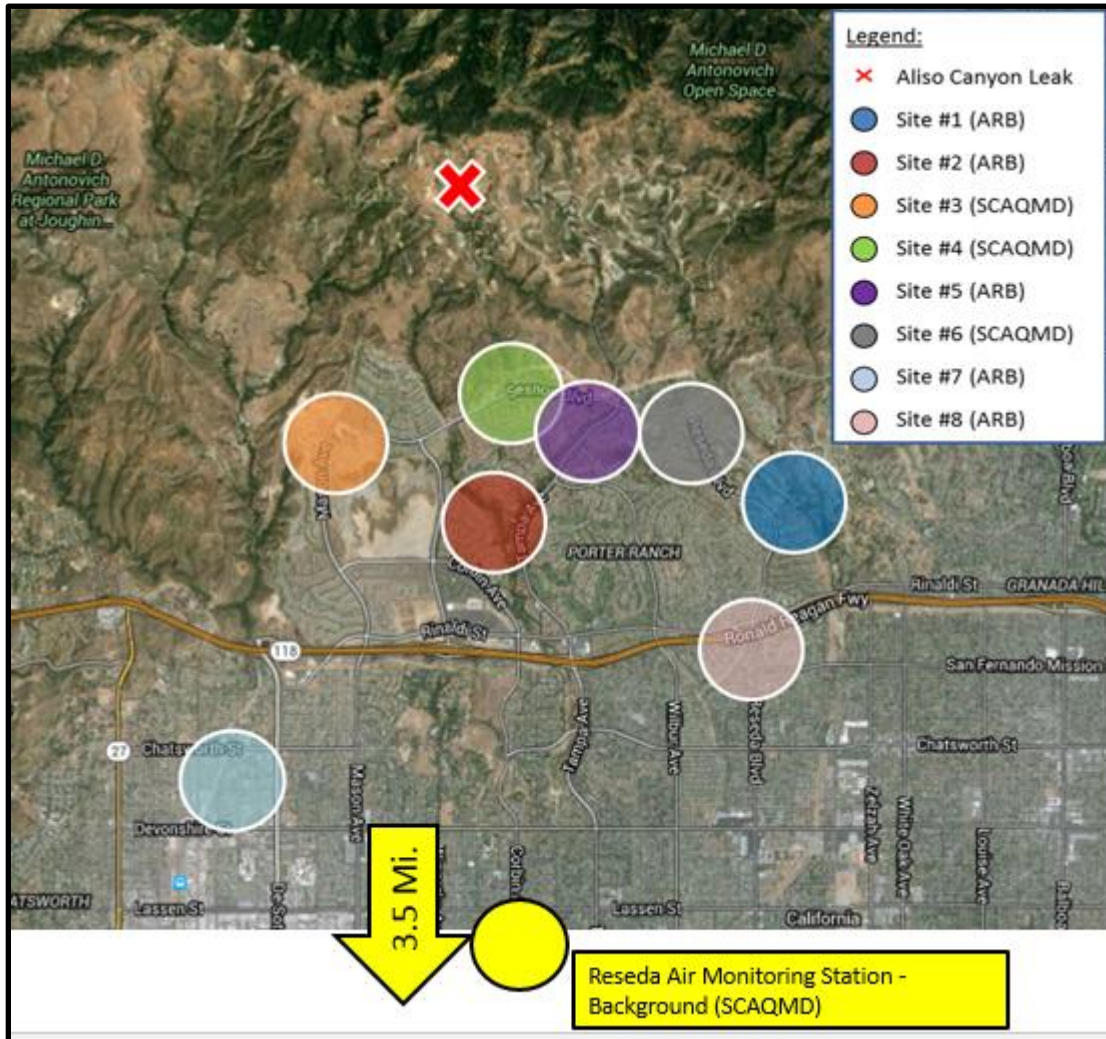
Air Quality Specialist	Responsible for data interfaces and conducting and validating mobile platform measurements	Quality Assurance Manager
------------------------	--	---------------------------

Equipment, supply and services procured by SCAQMD will be subject to the provisions of Section 6 of the Quality Management Plan for Environmental Measurements (2010).

V. Continuous Monitoring

In order to provide the public with near real-time information about potential air pollution emissions related to the Facility and their potential distribution into the neighboring communities, continuous monitoring has been conducted in several locations in the community adjacent to the Facility perimeter (Figure 3).

Figure 3: Current and Proposed Continuous Methane Monitoring Sites



Continuous measurements (Table 3) will provide appropriate data to assess duration and levels of certain pollutants that may be observed from natural gas releases from the Facility.

Table 3: List of Continuous Methods

Ambient Species	Proposed Site(s)	Continuous Monitor Type	Measurement Principle	SCAQMD Standard Operational Procedures	Minimum Reporting Limit
Methane/Non-Methane Hydrocarbon monitor	3, 6	Mocon Methane/Non-Methane Analyzer	Flame Ionization Detector	SOP00138	0.5 ppm
Methane/Non-Methane Hydrocarbon monitor	4	Thermo Model 55c Non-Methane Hydrocarbon Analyzer	Flame Ionization Detector	SOP00145	0.5 ppm
Methane/Hydrogen Sulfide	3, 4, 6 Background	Picarro Model G2204	Cavity Ring Down Spectroscopy	SOP00157	5 ppb
Methane	1, 2, 5, 7, 8	Picarro /LGR	Cavity Ring Down Spectroscopy	ARB	5 ppb
Total Sulfur	3, 4, 6	Ecotech	Chemiluminescence with Catalyst Converter	<i>Serinus 57 Total Reduced Sulfur Analyser User Manual, Version 1.0 (Ecotech)</i>	5 ppb
Benzene	5, 7 (ARB)	IO Analytical	GC FID	ARB	0.4 ppb

A. Methane

During Phase I, CARB and the SCAQMD are combining their continuous methane monitoring efforts to display the near real-time methane monitoring data at nine sites. Prior to February 11, 2016, methane concentrations above typical ambient air levels were consistently measured at Site #4 (closest site to Well SS-25), and to a lesser extent, at Site #2 (farthest site from Well SS-25). Therefore, additional methane monitors were deployed at the SCAQMD Reseda air monitoring station to fully characterize methane emissions and spatial gradients. Continuous methane reporting limits are equal to or less than 0.5 ppm.

B. Hydrogen Sulfide (H2S)

In November and December 2015, hydrogen sulfide (H2S) was detected in several “instantaneous” grab samples collected by SoCalGas. During Phase I, SCAQMD is conducting continuous H2S measurements at Sites #3 and #4, which have shown typical ambient levels of H2S to date. Reporting limits for continuous H2S are equal to or less than 5 ppb.

C. Total Sulfur

Odorizing compounds such as tetrahydrothiophene (THT) and t-butyl mercaptan are added to natural gas to provide an alert that natural gas is present. These compounds may cause a nuisance and temporary health effects if smelled. In combination with the continuous H₂S measurements (Sites #3 and #4), the continuous total sulfur measurements at one or more of these sites provide useful information relative to the detection of these sulfur odorant components in near real-time, and can provide a mechanism for public odor advisory. Continuous total sulfur reporting limits are equal to or less than 5 ppb.

D. Benzene

CARB has been conducting near real-time benzene measurements at Sites #5 and #7 since early February 2016. Measurements at both locations have shown hourly concentrations within typical Basin averages for ambient air. SCAQMD will coordinate with CARB to review the continuous benzene data with other benzene measurements to assess continuous benzene monitor deployment.

VI. Triggered Samples

When a continuous monitor measures concentrations of a pollutant above a specified concentration threshold, it automatically triggers an instantaneous grab sample to be collected. These samples are then retrieved and brought back to the laboratory for analysis. Before February 18, 2016, those trigger levels were 20 ppm, 30 ppm and 20 ppm methane at Site #3, #4 and #6, respectively, and after February 18, 2016, were changed to 5 ppm for all three sites. These triggered samples provide an instantaneous snapshot of the area during times when there is the presence of significantly higher levels of methane detected from the continuous measurements, and provide information for shorter term exposure assessment. Triggered samples are not intended to be representative of background air, nor are collected for an assessment of long-term exposure.

The list and types of triggered samples are listed in Table 4.

Table 4: Triggered Sample Collection Media and Analytical Methods

Ambient Species	Proposed Site(s)	Sample Media	Analytical Method Based Upon	Analytical Principle	SCAQMD Standard Operational Procedures	Minimum Reporting Limit
VOC	3, 4, 6	Canister	U.S. EPA TO-14	Gas Chromatography/Flame Ionization Detector	SOP00007	0.3 ppb
VOC	3, 4, 6	Canister	U.S. EPA TO-15 (alternate to TO-14 in certain samples)	Gas Chromatography/Mass Spectrometry	SOP00008B	0.3 ppb
Methane, CO, CO ₂ , Ethane	3, 4, 6	Canister	U.S. EPA Method 25A	Total Carbon Analyzer	Method 25.1	0.5 ppm Methane

Sulfur Species	3, 4, 6	Tedlar Bag	SCAQMD Method 307-91	Chemiluminescence	SCAQMD Method 307-91	1.0 ppb
----------------	---------	------------	----------------------	-------------------	----------------------	---------

Triggered samples for the analysis of methane and VOCs are collected using 6-liter, non-reactive Silco®, or equivalent, canisters. Triggered samples for sulfur species analysis are collected in new 10 L Tedlar bags.

The analytes measured and the detection limits achievable using methods TO-14, TO-15, Method 25.1 and SCAQMD Method 307-91 are reported in Appendices A, B, C and D, respectively.

All samples are analyzed for the primary natural gas constituents of interest including methane, benzene, toluene, ethylbenzene and xylenes (BTEX). The gas odorants tert-butyl mercaptan and tetrahydrothiophene (collectively, “odorants”) are analyzed in all Tedlar bag samples. Additional constituents may be sampled and analyzed as part of the chosen analytical program.

The samples subject to sulfur analysis are delivered to the laboratory for the analysis to be conducted within the required 24-hour holding time. Reporting limits for each method are as noted above (Table 4). Reporting limits are verified for each laboratory used in the program.

VII. 24-Hour Integrated Samples

24-hour integrated canister samples are collected on a daily schedule from midnight to midnight. These samples are primarily collected for assessing daily exposure and for long-term assessments. The analytical methods are based upon standardized U.S. EPA methods (Table 5) that provide select air toxics data that is comparable with previous air toxics assessments such as the Multiple Air Toxics Exposure Study (MATES).

Table 5: 24-Hour Integrated Sample Collection Media and Analytical Methods

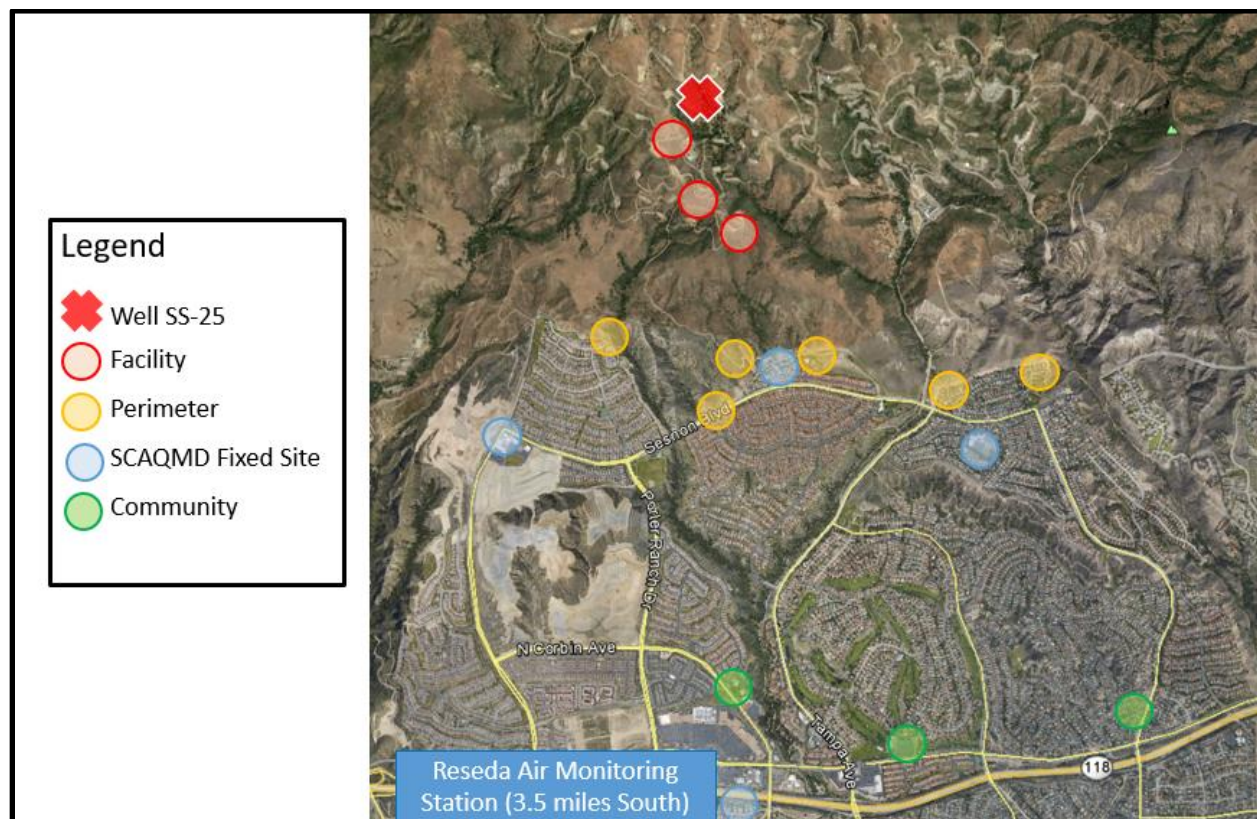
Ambient Species	Sample Media	Analytical Method Based Upon	Analytical Principle	SCAQMD Standard Operational Procedures	Minimum Reporting Limit
VOC	Canister	U.S. EPA TO-14	Gas Chromatography/Flame Ionization Detector	SOP00007	0.3 ppb
VOC	Canister	U.S. EPA TO-15 (alternate to TO-14 in certain samples)	Gas Chromatography/Mass Spectrometry	SOP00008B	0.3 ppb
Methane, CO, CO ₂ , Ethane	Canister	U.S. EPA Method 25A	Total Carbon Analyzer	Method 25.1	1 ppm Methane

In locations where power is not accessible, 24-hour integrated samples are collected using 6-liter, non-reactive canisters (i.e., Silco) with similarly passivated flow controllers.

The locations of these samples are a combination of sites on the Facility, at the Facility perimeter and in the community (Figure 4). Three sampling sites are located inside the Facility (SS-3H, SF-1 and SF-2/5) near and downwind of Well SS-25. Six (6) Property Boundary sampling sites are initially located along the southern Facility property boundary. These six sites were chosen because of their downwind and down slope locations between Well SS-25 and the adjoining community to the south. As such, these locations were expected to provide a conservative representation of natural gas constituent concentrations that may have been observed in the community during the period of the leak.

In addition, 24-hour integrated canister samples are collected at six community sites and one background sampling site, the Reseda air monitoring station (AMS), to assess community exposure at those locations and to provide gradient information. At the sites where continuous measurements are being conducted, the canisters are filled using a Xontech 910 Sampler (SCAQMD SOP#00080).

Figure 4: 24-Hour Integrated Sampling Sites



Adjustments of the sample locations may be made to address data assessments and odor complaints as documented by the SCAQMD and other assessment such as those conducted by LACDPH. Periodic survey measurements with passive tubes are conducted which may give guidance to the 24-hour integrated sampling for VOCs. For sampling performed at additional locations, the initial results are evaluated to determine the appropriate scope of continued monitoring at that location.

VIII. Mobile Platform Measurements

Mobile survey measurements in and around areas adjacent to the Facility (e.g., Porter Ranch, Northridge, Granada Hills, etc.) Are taken to better characterize methane concentration levels and concentration gradients within the community and to support the fixed site methane monitoring efforts. For this purpose, a state-of-the-art methane analyzer (LI-COR 7700) and a Global Positioning System (GPS) were mounted on top of a hybrid vehicle and driven around Porter Ranch and other surrounding areas of the San Fernando Valley (SCAQMD SOP00158).

The LI-COR 7700 is an open-path instrument capable of measuring methane concentrations as low as single parts per billion (ppb) at rates as fast as 40 times per second with high accuracy and precision. This technology has previously been used and validated by the Environmental Defense Fund (EDF), Google Earth Outreach, and Colorado State University (CSU) for mapping methane plumes rising from leaking natural gas pipes below streets:
<https://www.edf.org/climate/methanemaps>.

Several routes in and around Porter Ranch and neighboring communities were selected for these surveys. SCAQMD staff will consider future routes at locations such as schools and outlying communities that are reporting potential impacts. Mobile surveys will continue to be conducted during different times of the day (e.g., morning, afternoon and evening) and under different meteorological conditions.

IX. Background Air Monitoring

The SCAQMD Reseda air monitoring station is located approximately 8 miles south of Well SS-25 and outside the area of odor complaints reported to SCAQMD (Figure 1). This station is sited to meet U.S. EPA criteria for monitoring representative background concentrations of pollutants in the area ([Air Quality Monitoring Network Plan](#), SCAQMD, 2015).

X. Incident Response

In the event that immediate assistance is requested from a first responding agency, or an event is deemed to have potential air quality impacts in the community of immediate concern, SCAQMD may be notified through the use of the 24-hour hotline (1-800-CUT-SMOG) or SCAQMD may initiate its own response under its emergency response policy. In a similar manner, SCAQMD will notify first responding agencies, other agencies, and the public if an event is detected by SCAQMD measurements.

XI. Meteorology

Meteorological measurements will continue at the three existing meteorological sites operated by SoCalGas (Sesnon FW, Porter Twin Tanks, and MA5A) and SCAQMD's Reseda and Santa Clarita air monitoring stations. SoCalGas will provide meteorological data from these monitoring stations to SCAQMD on a monthly basis, or more frequently, if needed. The meteorological measurements will generally adhere to the criteria as set forth by U.S. EPA ([QA Handbook for Air Pollution Measurement Systems: "Volume IV: Meteorological Measurements Version 2.0" EPA-454/B-08-002, March 2008](#)).

XII. Quality Control/ Quality Assurance

General quality assurance guidelines that are appropriate for this air monitoring plan are documented in the SCAQMD Quality Management Plan (2010) and SCAQMD Quality Assurance Project Plan for Special Monitoring (2013). Quality control criteria are listed inside the respective method standard operational procedure (SOP) identified in Tables 2, 3 and 4. Instrument specific quality control checks are documented in the respective SOPs.

A. Field Instrument Checks

SCAQMD instrument specialists perform a number of functions when conducting field checks including observing and recording all required data for each sampler's maintenance sheet, chain-of-custody forms (Appendix E), and sample identification tag. All times are checked and reset if the time is more than ± 5 minutes Local Standard Time. Flow settings are checked and adjusted if not within $\pm 5\%$ of the calibrated setting.

B. Tedlar Bags

New Tedlar bags are used for each sample. Before and after each sampling the bag is inspected for any breach of the bag or sampling inlets. The sampled bags are transported in a manner to avoid direct sunlight. Bags are retrieved and submitted to SCAQMD's Laboratory with enough time to analyze the samples within 24 hours from the end of sampling. For each lot of bags, blanking with zero air and challenging with a known reference standard is conducted for quality assurance purposes.

C. Canisters

Canister cleaning and associated quality control provisions are conducted in accordance with SCAQMD SOP00091. This procedure describes the application of heat and vacuum to clean canisters to achieve less than 0.2 ppbv of targeted compounds and less than 10 ppbC Non Methane Organic Compound (NMOC) content.

D. Trailer Fixed Platforms

The fixed sites use trailers for which the operation and maintenance of the trailers is described in SCAQMD SOP00134.

E. Chain-of-Custody

Chain-of-custody forms (Appendix E) are necessary to identify and control the disposition of the samples through the multiple steps of preparation, sampling, retrieval, analysis, and data reporting. As appropriate, by sample type, completed chain-of-custody forms accompany all samples collected. These forms are originated by the field operators, delivered to the SCAQMD Laboratory, and submitted to the assigned Laboratory staff. The Laboratory is responsible for storing all chain-of-custody documents.

F. Laboratory Analysis

On each day a canister or Tedlar bag sample is analyzed, SCAQMD Laboratory chemists conduct a gas chromatograph standard check using a gas standard and observe and record all unusual sample conditions. Periodically, calibrations and method detection limit determinations are conducted as determined by the analytical SOP.

For the TO-14 and TO-15 analyses, routine external performance evaluations are conducted by outside agencies (i.e., U.S. EPA) and corrective action is conducted if the evaluation results are outside the accepted criteria.

G. Data Validation

a. Continuous Measurement Data

Data from continuous instruments is incorporated into the SCAQMD data management system (DMS) which conducts basic automated validation functions. Information from instrument maintenance sheets and/or logbooks, along with results of technical quality control evaluations, can be incorporated for the second level validation by a Senior Air Quality Instrument Specialist or Air Quality Specialist.

b. Laboratory Data

The chemists are responsible for receiving field samples, maintaining and storing chain-of-custody documents, performing and documenting QC activities, performing Laboratory audit analyses, and conducting preliminary data analysis for outliers and out-of-control conditions. The Principal Chemist is responsible for final raw data review; making final evaluation of data validity based on satisfactory reports from QA supervisor and field supervisor; and assessment of Laboratory precision data. The Laboratory Services Manager conducts the final review of the draft report and finalizes the report upon signature.

XIII. Reporting

Timely and accurate reporting to the SCAQMD website (www.aqmd.gov) is the primary mechanism to distribute the data to the public and other stakeholders. Also, other agencies such as CARB (www.arb.ca.gov) and Los Angeles County Department of Public Health (<http://publichealth.lacounty.gov/>) display data related to the Aliso Canyon Facility.

A. Continuous Measurements

Hourly average values from continuous measurements are posted to the SCAQMD and CARB websites in near real-time. These values are preliminary as only the automated data validation would have been conducted. Second level validation corrections are applied in the DMS and available.

B. Laboratory Data

Data from samples collected are reported in the form of the final laboratory report on the SCAQMD website. The samples are classified by the type of sample as Complaint Air Sampling Data, Triggered Grab Sample Data (Section V), or 24-Hour Integrated Sample Data (Section VI). Complaint Air Sampling data are from samples that are collected by SCAQMD inspectors when responding to community concerns or when conducting a visit to the area. Other samples collected are distinguished separately on the SCAQMD website.

C. Mobile Measurements

Methane maps summarizing the mobile measurements results are posted on the SCAQMD website. All mobile data collected during this study and used to generate these maps is available upon request.

XIV. Potential Modifications and Contingency Planning

Periodic evaluation of this Plan will be conducted to assess the effectiveness and applicability of the measurements being conducted. Based on these periodic assessments of ambient air monitoring data and other factors, the elements of the Plan such as the number and location of sampling locations, target pollutants, and frequency of sampling may be adjusted. For example, enhanced monitoring will be considered if the monitoring indicates a substantial increase in levels or frequency of natural gas constituents observed and/or verified complaints in certain areas arise and/or increase. Increased frequency and expanded coverage of monitoring in areas will also be considered based on a review to determine the cause of the issue and requests for relevant activity of the Aliso Canyon Facility that potentially could produce increased emissions. Also, if some methods or measurement locations are deemed not appropriate or less of a priority, then those may be considered for discontinuation. If environmental conditions change or mitigation processes are implemented that may cause air quality concerns, then other measurement methods and locations may be added. This Plan can be modified based upon other compounds of concern that would be related to the Facility. Measurement options include but are not limited to conventional measurements (i.e. U.S. EPA methods) or advanced methods (i.e. remote sensing, aircraft). Lastly, this Plan may be modified based on the measurement criteria and objectives of the upcoming health study required by SCAQMD's Order for Abatement.

APPENDIX A

ANALYTE LIST AND SCAQMD DETECTION LIMITS FOR U.S EPA TO-14 METHOD

ethane	2,3-dimethylpentane
ethylene	3-methylhexane
acetylene	2,2,4-trimethylpentane
propane	n-heptane
propylene	methylcyclohexane
isobutane	2,3,4-trimethylpentane
n-butane	toluene
1-butene	2-methylheptane
trans-2-butene	3-methylheptane
cis-2-butene	n-octane
isopentane	ethylbenzene
1-pentene	m+p-xylene
n-pentane	styrene
isoprene	o-xylene
trans-2-pentene	n-nonane
cis-2-pentene	isopropylbenzene
2,2-dimethylbutane	n-propylbenzene
cyclopentane	m-ethyltoluene
2,3-dimethylbutane	p-ethyltoluene
2-methylpentane	1,3,5-trimethylbenzene
3-methylpentane	o-ethyltoluene
1-hexene	1,2,4-trimethylbenzene
n-hexane	n-decane
methylcyclopentane	1,2,3-trimethylbenzene
2,4-dimethylpentane	m-diethylbenzene
benzene	p-diethylbenzene
cyclohexane	n-undecane
2-methylhexane	n-dodecane

Reporting Limits for all the above analytes are 0.1 ppbC as propane or benzene

APPENDIX B

ANALYTE LIST AND SCAQMD DETECTION LIMITS FOR U.S. EPA TO-15 METHOD

Compound	SCAQMD Reporting Limit (ppb)
vinyl chloride	0.06
1,3-butadiene	0.07
2-propenal	0.11
methylene chloride	0.03
methyl tert butyl ether	0.02
2-Butanone MEK	0.08
chloroform	0.04
1,2-dichloroethane	0.05
benzene	0.04
carbon tetrachloride	0.04
1,2-dichloropropane	0.02
trichloroethylene	0.04
toluene	0.04
1,2-dibromoethane	0.04
tetrachloroethylene	0.05
ethylbenzene	0.04
m+p-xylene	0.1
styrene	0.11
o-xylene	0.05

APPENDIX C

ANALYTE LIST AND SCAQMD DETECTION LIMITS FOR U.S. EPA METHOD 25.1

Compound	SCAQMD Reporting Limit (ppm)
carbon monoxide	3
methane	1
carbon dioxide	1
ethane	1
NM/NEOC*	1

* Non-methane, non-ethane organic compounds

APPENDIX D

ANALYTE LIST AND SCAQMD DETECTION LIMITS FOR SCAQMD METHOD 307-91

Compound	SCAQMD Instrument Detection Limit (ppb)
methyl mercaptan	1
ethyl mercaptan	1
propyl mercaptan	1
isopropyl mercaptan	1
hydrogen sulfide	2
carbonyl sulfide	1
dimethyl sulfide	2
t-butyl mercaptan	1
tetrahydrothiophene	1

Reported as instrument detection limit. Unknown and uncalibrated compounds are calibrated with methyl mercaptan, which has an instrument detection limit of 1 ppb. Detection limits reported using Markes U-T6SUL-2S Sulfur Cold Trap.

APPENDIX E

CHAIN OF CUSTODY FORM

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
SAMPLE ANALYSIS REQUEST**

- DISTRICT INFORMATION
- INVOICE SOURCE
- LAP AUDIT
- LABORATORY NO _____

TO: SCAQMD LAB: <input checked="" type="checkbox"/> OTHER: <input type="checkbox"/> _____																															
SOURCE NAME: _____	I.D. No. _____																														
Source Address: _____	City: _____																														
Mailing Address: _____	City: _____ Zip: _____																														
Contact Person: _____	Title: _____ Tel: _____																														
Analysis Requested by: _____ Date: _____																															
Approved by: _____ Office: _____ Budget #: _____																															
REASON REQUESTED: Court/Hearing Board <input type="checkbox"/> Permit Pending <input type="checkbox"/> Hazardous/Toxic Spill <input type="checkbox"/>																															
Suspected Violation Rule(s) _____ Other <input type="checkbox"/> _____																															
Sample Collected by: _____ Date: _____ Time: _____																															
REQUESTED ANALYSIS:																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">City/Location</th> <th style="width: 10%;">Can#</th> <th style="width: 30%;">Start day / time/ duration</th> <th style="width: 10%;">Start vac</th> <th style="width: 10%;">End vac</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>		City/Location	Can#	Start day / time/ duration	Start vac	End vac																									
City/Location	Can#	Start day / time/ duration	Start vac	End vac																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Relinquished by</th> <th style="width: 25%;">Received by</th> <th style="width: 20%;">Firm/Agency</th> <th style="width: 15%;">Date</th> <th style="width: 15%;">Time</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>		Relinquished by	Received by	Firm/Agency	Date	Time																									
Relinquished by	Received by	Firm/Agency	Date	Time																											
Remarks: _____																															