SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Staff Report
Proposed Rule 1148.2 – Notification and Reporting Requirements for Oil and Gas Wells and Chemical Suppliers

April 2013

Deputy Executive Officer
Planning, Rule Development, and Area Sources
Elaine Chang, DrPH

Assistant Deputy Executive Officer
Planning, Rule Development, and Area Sources
Laki Tisopulos, Ph.D., P.E.

Planning and Rules Manager
Planning, Rule Development, and Area Sources
Susan Nakamura

Author: Ed Eckerle – Program Supervisor
Eugene Kang – Air Quality Specialist
Tim Kobata - Air Quality Specialist

Contributors: Shah Dabirian, Ph.D. – Air Quality Specialist
James Koizumi – Air Quality Specialist

Reviewed by: Barbara Baird – District Counsel
Megan Lorenz – Senior Deputy District Counsel

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
GOVERNING BOARD

Chairman: WILLIAM A. BURKE, Ed.D.
Speaker of the Assembly Appointee

Vice Chairman: DENNIS YATES
Mayor, City of Chino
Cities Representative, San Bernardino County

MEMBERS:

MICHAEL D. ANTONOVICH
Supervisor, Fifth District
Los Angeles County Representative

BEN BENOIT
Councilmember, City of Wildomar
Cities of Riverside County

JOHN J. BENOIT
Supervisor, Fifth District
Riverside County Representative

MICHAEL A. CACCIOTTI
Councilmember, City of South Pasadena
Cities Representative, Los Angeles County, Eastern Region

JOSIE GONZALES
Supervisor, Fifth District
San Bernardino County Representative

JOSEPH K. LYOU, Ph.D.
Governor's Appointee

JUDY MITCHELL
Mayor Pro Tem, Rolling Hills Estates
Cities Representative, Los Angeles County, Western Region

SHAWN NELSON
Supervisor, Fourth District
County of Orange Representative

DR. CLARK E. PARKER, SR.
Senate Rules Appointee

JAN PERRY
Councilmember, City of Los Angeles
City of Los Angeles Representative

MIGUEL PULIDO
Mayor, City of Santa Ana
Cities Representative, Orange County

EXECUTIVE OFFICER:
BARRY R. WALLERSTEIN, D.Env.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

INTRODUCTION

The purpose of Proposed Rule 1148.2 is to collect information from oil and gas field production facilities to better quantify potential air emissions from well development activities including drilling, well completion, and well reworks. The proposed rule is the first step of a two-step approach. Proposed Rule 1148.2 requires ~~owners and~~ operators of oil and gas wells to notify the South Coast Air Quality Management District (SCAQMD) prior to conducting well drilling, well completion, and well reworks. The proposed rule also requires the submittal of reports to the SCAQMD after completion of these activities.

BACKGROUND

On September 18, 2012, the ~~South Coast Air Quality Management District (~~SCAQMD~~)~~ staff conducted a symposium on hydraulic fracturing in the South Coast Air Basin. The symposium included participants from academia, government, industry, and environmental groups and focused on environmental issues and potential hydraulic fracturing impacts.

At the October 5, 2012 Board meeting, SCAQMD staff provided a report on the symposium that included a summary and comments received. Based on the comments and input received at the symposium, the Governing Board directed staff to initiate rule development to include reporting on the chemicals used during hydraulic fracturing conducted in oil and gas production activities, and possible additional reporting and public notification requirements. The Governing Board also directed SCAQMD staff to determine whether existing SCAQMD regulations adequately cover oil and gas production activities when hydraulic fracturing is used. SCAQMD staff was given 120 days to report to the Board's Stationary Source Committee on the initiation and progress of the rule development. SCAQMD staff briefed the Stationary Source Committee on its findings and the rule development, and a summary of Proposed Rule 1148.2 – Notification and Reporting Requirements for Oil and Gas Wells and Chemical Suppliers.

During the evaluation of hydraulic fracturing for oil and gas well operations, the SCAQMD staff concluded that there are potential air emissions associated with hydraulic fracturing from particulate matter during mixing hydraulic fracturing fluids, and hydrocarbons and possibly toxic emissions from flowback fluids that return to the surface. Upon further analysis, the SCAQMD staff found that drilling and rework operations have similar emission sources as well completion activities such as hydraulic fracturing. The SCAQMD staff evaluated these emissions sources relative to existing rules and regulations. SCAQMD staff found regulatory gaps in existing SCAQMD rules that~~either~~ did not cover these operations~~ or an existing rule could cover the operations, even though it was not the intent of that rule~~.

RULE APPROACH

The SCAQMD staff will be implementing the Governing Board's directives in a two step approach. The first step is the development of Proposed Rule 1148.2 (PR 1148.2). The purpose of PR 1148.2 is to gather air quality-related information on oil and gas well drilling, completions, and work~~s~~ activities~~y~~ in order to identify the magnitude and type of emissions associated with these operations. The proposed rule has a notification requirement and two reporting requirements for emission sources and chemical use during drilling, well completions, and well reworks. PR 1148.2 applies to ~~owner or~~ operators of oil and gas wells as well as chemical

suppliers that provide chemicals used for drilling, well completions, and well reworks. The second step will include a report to the Governing Board on the information collected in the first step, in which SCAQMD staff will seek guidance from the Governing Board regarding whether staff should continue with data collection and notification, and/or develop new requirements to reduce emissions from oil and gas well drilling, well completion, and well reworks.

PROPOSED RULE 1148.2

Proposed Rule 1148.2 applies to onshore oil and gas wells in the South Coast Air Basin. The proposed rule requires that ~~owner or~~ operators of oil and gas wells submit a notification to the Executive Officer 10 days to 24 hours before they conduct drilling, well completion, or rework activities. The notification includes basic information about the ~~owner or~~ operator, the well location, the type of activity that will be conducted, and the distance to the nearest sensitive receptor up to 1,500 feet from~~of~~ the well.

Reporting requirements focus on emissions and chemical use during drilling, well completion, and rework activities. The proposed rule also includes two reporting requirements: (1) emission sources, and (2) chemical reporting. For emission sources there are three emission source categories subject to~~that~~ the proposed rule ~~requires reporting~~: (1) ~~from~~ combustion equipment; (2) fugitive dust emissions from on-site mixing operations; and (3) potential hydrocarbon and toxic emissions from drilling fluids and flowback fluids that return to the surface. The proposed rule also includes chemical reporting requirements for ~~owner or~~ operator and suppliers of chemicals. The proposed rule includes specific requirements for non-trade secret and trade secret chemicals. In addition, the proposed rule specifies the type of chemical use information that will be posted on the SCAQMD's website. Chapter 2 of the Staff Report includes a summary of Proposed Rule 1148.2. For specific requirements, please refer to the proposed rule.

AFFECTED SOURCES

Based on an evaluation of ~~District~~ SCAQMD records of the Rule 222 Filing Program for the "Oil Production Well Group" category, there are 241 facilities operating approximately 4,321 onshore oil and gas wells in the South Coast Basin. Due to the geography of the region, the affected facilities are often located in urban areas, and sometimes located in close proximity to residential and other sensitive receptors. Activities covered in the proposed rule, such as drilling, have shown based on SCAQMD complaint information to be the source of nuisance complaints for odors.

IMPACT ASSESSMENT FOR PROPOSED RULE 1148.2

Implementation of Proposed Rule 1148.2 will not result in emission reductions as it is an administrative rule with no pollution control requirements for control measures. The purpose of the proposed rule is collect information to better quantify and understand the intensity of air emissions associated with drilling, completion, and rework activities for oil and gas wells.

SCAQMD staff has reviewed Proposed Rule 1148.2 and because it only consists of feasibility or planning studies for possible future actions, which have not been approved, adopted or funded, staff has concluded that it is exempt from the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines §15262 – Feasibility and Planning Studies, and CEQA Guidelines

§15306 - Information Collection. If approved by the Governing Board a Notice of Exemption will be prepared for the proposed project pursuant to CEQA Guidelines §15062 - Notice of Exemption.

CHAPTER 1: BACKGROUND

INTRODUCTION

The purpose of Proposed Rule 1148.2 is to collect information from oil and gas field production facilities to better quantify potential air emissions from well development activities including drilling, well completion, and well reworks. The proposed rule is the first step of a two-step approach. Proposed Rule 1148.2 requires ~~owners and~~ operators of oil and gas wells to notify the SCAQMD prior to conducting well drilling, well completion, and well reworks. The proposed rule also requires the submittal of reports to the SCAQMD after completion of these activities.

HYDRAULIC FRACTURING SYMPOSIUM

On September 18, 2012, the SCAQMD staff conducted a symposium on Hydraulic Fracturing in the South Coast Air Basin. The symposium was conducted in two sessions. The first session focused on environmental issues with presentations regarding local practice, chemicals used in the fluids, air quality related health impacts, and seismic impacts. The second session addressed potential hydraulic fracturing impacts and included a roundtable discussion. Participants included academic, governmental, industry, and environmental experts. Presentations were provided by U.S. EPA, California Division of Oil, Gas, and Geothermal Resources (DOGGR), SCAQMD staff, Western States Petroleum Association, and Senate Committee on Natural Resources and Water~~state legislative efforts~~.

At the October 5, 2012 Board meeting, SCAQMD staff provided a report on the symposium that included a summary and comments received. Based on the comments and input received at the symposium, the Governing Board directed staff to initiate rule development to include the following:

1. When hydraulic fracturing is used in oil and gas production activities to report the chemicals used. Additional reporting information will be determined as part of the rule development process. The proposed rule may include other reporting and public notification requirements.
2. Determine if existing SCAQMD regulations adequately cover oil and gas production activities when hydraulic fracturing is used. Develop additional provisions to ensure that air emission impacts are minimized. In determining the need for additional regulatory actions under No. 1 above, evaluate best available control technologies (BACT), toxic best available control technologies (T-BACT), and best management practices.
3. A report on the initiation and progress of rule development will be provided to the Board's Stationary Source Committee within 120 days.

RULEMAKING APPROACH

The SCAQMD staff will be implementing the Governing Board's directives in a two step approach. During the first step, SCAQMD staff will gather data on activities related to drilling, well ~~and~~ completions, and ~~activities of oil and gas wells and~~ well reworks through Proposed Rule 1148.2. In addition as part of the proposed rule, the SCAQMD staff will gather information identifying existing practices, if any, used to minimize air quality impacts from well drilling, completion, and rework activities~~y~~. Lastly, the proposed rule will include requirements for ~~owners or~~ operators of onshore oil and gas wells, and suppliers of chemicals, to report the chemicals used in the drilling and well completion fluids.

The second step will include a report to the Governing Board on information collected in Step 1. It is expected that the SCAQMD staff will report to the Governing Board no later than 2 years after facilities are required to report information to the SCAQMD as required under Proposed Rule 1148.2. During this second step, the SCAQMD staff will analyze information collected Step 1 and present findings and recommendations to the Governing Board. The SCAQMD staff will seek guidance from the Governing Board regarding whether SCAQMD staff should continue with data collection and notification and/or develop new requirements to reduce emissions from oil and gas well drilling, completion, and rework activities~~y~~.

PUBLIC PROCESS

Proposed Rule 1148.2 is being developed through a public process. A working group was formed to discuss the proposed rule in greater detail and provide input to SCAQMD staff throughout the rule development process. The working group is comprised of a variety of stakeholders including private business representatives, consultants, environmental and community groups, and public agency representatives. The Working Group met six times throughout the rulemaking process on December 12, 2012, January 15, 2013, ~~and~~ January 24, 2013, February 14, 2013, March 6, 2013, and April 2, 2013. ~~An additional working group meeting is scheduled for February 14, 2013.~~ PR 1148.2 was presented at the Stationary Source Committee on January 18, 2013 and March 15, 2013 where public testimony and further comments from several Governing Board members were heard. Additionally, a Public Workshop was held on~~has been scheduled for~~ January 30, 2013. In response to public requests, two Public Consultation Meetings were held in the communities of Baldwin Hills and Wilmington on February 20, 2013, to present the proposed rule and receive public comment. Comments and responses to those comments are provided in Appendix A of this report.

The rule development process also includes coordination with the Natural Resources Agency of California, Department of Conservation, Division of Oil and Gas, and Geothermal Resources (DOGGR). Members of the working group urged SCAQMD staff to coordinate with DOGGR staff on PR 1148.2. Coordination with DOGGR staff is ongoing. SCAQMD staff is consulting with DOGGR staff so that the proposed rule is consistent with and not in conflict with DOGGR's regulations.

Rule development for PR 1148.2 began in November 2012 with the release of the first draft rule language on January 11, 2013. SCAQMD staff's efforts to provide multiple opportunities for participation in the rule development included three working group meetings, stationary source committee briefing, and a public workshop prior to the scheduled February 1, 2013 Set Hearing for PR 1148.2. Nonetheless, based on public comments, the SCAQMD staff recommended to the Governing Board at the February 1, 2013 Set Hearing that the hearing for PR 1148.2 be set for an additional 30 days with the hearing of the proposed rule on April 5, 2013.

~~Initial Comments~~

~~The public has expressed several concerns.~~ To date, sixteen~~four~~ comment letters have been received. There have been concerns that the rule may not be needed, and that the SCAQMD staff can acquire data and air quality related information through a collaborative process rather than a rule. By adopting PR 1148.2, SCAQMD staff believes that information would be collected in a more timely fashion and would be more complete. In addition, a rule approach would allow SCAQMD to collect more data and better standardize the data and information

collection process. Additionally, voluntary surveys may not be able to gather all necessary data, nor is there any penalty for failure to provide data or providing false data where the report is required. ~~f~~Falsification is subject to civil penalties under Health and Safety ~~c~~Code 42402.4.

Scope of PR 1148.2

Some industry representatives have commented~~Another concern is~~ that the proposed rule goes beyond the scope of the original Governing Board's directive. On October 5, 2012, the Governing Board directed staff to initiate rule development to (1) require reporting of chemicals used when hydraulic fracturing is conducted in the Basin; (2) determine if existing SCAQMD regulations adequately cover oil and gas production activities if conducting hydraulic fracturing; and (3) report on the initiation and progress of rule development at the Governing Board's Stationary Source Committee within 120 days (on or before February 15, 2013). During the evaluation process of hydraulic fracturing for oil and gas well operations, the SCAQMD staff concluded that other sources of potential air emissions existed during drilling, well completions and well reworks that were similar to hydraulic fracturing. The SCAQMD staff evaluated these emissions sources relative to existing rules and regulations. SCAQMD staff found regulatory gaps in existing SCAQMD rules that ~~either~~ did not cover these operations~~ or an existing rule could cover the operations, even though it was not the intent of that rule~~. Emissions data is needed for these other emission sources as explained later in section "Oil and Gas Development Processes and SCAQMD Rules".

Need for Proposed Rule 1148.2

Proposed Rule 1148.2 is needed to collect sufficient data and information in order to evaluate the type and magnitude of air emissions coming from oil and gas well drilling, completion, and rework activities as well as the current practices in the industry for controlling air emissions resulting from the processes used. The SCAQMD does not have emissions data on the types of oil and gas production activities that are covered under the proposed rule. In a report from the Office of Inspector General, "EPA Needs to Improve Air Emissions Data for the Oil and Natural Gas Production Sector" released February 20, 2013, it was found there are deficiencies in emission data for well completions for oil and gas processes. EPA stated that with limited data, human health risks are uncertain, states may design incorrect or ineffective emission strategies, and EPA's decisions about regulating industry may be misinformed. The SCAQMD staff believes that the notification requirements, emissions reporting, and chemical use reporting under Proposed Rule 1148.2 combined with emissions monitoring and sampling will provide the SCAQMD with needed emissions data on drilling, well completion, and rework activities for oil and gas wells within the South Coast Air Basin.

Proposed Rule 1148.2 will also inform the SCAQMD staff and the public on the amount and type of well completion activities that are occurring. Under the proposed rule, the notification requires operators to pre-notify if an operator will be conducting drilling, well completion, or rework activities. Well completions include gravel packing, acidizing, and hydraulic fracturing, or any combination thereof. Notifications of these activities will give the SCAQMD staff and the public a sense of the number and types of well completion activities that are being conducted. As additional data is collected over time, the SCAQMD can monitor changes in the number and types of activities.

SCAQMD staff believes that a regulatory approach is the appropriate method to collect emissions and chemical use data. The SCAQMD staff believes that this approach allows for information to be collected in a more timely fashion and would be more complete than voluntary surveys. In addition, a rule approach would allow SCAQMD staff to collect more data and better standardize the data collection process. Additionally, voluntary surveys, as suggested by industry representatives, may not be able to gather all necessary data, nor is there any penalty for failure to provide data or providing false data where the report is required.

Meetings with WSPA and CIPA

A meeting between representative of Western States Petroleum Association (WSPA) and the California Independent Petroleum Association (CIPA) took place on January 3, 2013. Representatives from both associations expressed the desire for SCAQMD staff to participate in a ~~technology~~ meetings~~seminar~~ where oil and gas well experts would further describe the drilling, well completion, well rework, and hydraulic fracturing process, as well as the practices typically employed to minimize the related air emission potential. The meeting was held on February 26, 2013 at the offices of THUMS Long Beach Company along with a site tour of their oil production facility on Island White located in the Long Beach Harbor. The presentation comprised of an overview of how drilling, well completion, and rework operations are conducted at the THUMS island sites, including historical oil production data and trends. The tour of the oil production facility included observation of a drilling operation and an injection well acidizing operation. A summary of this meeting and site visit was made available to the PR 1148.2 Working Group on March 6, 2013~~Though this seminar has not yet taken place, SCQAMD staff welcomes this invitation and is ready and willing to participate in any technical seminar or further site visits~~.

~~There has been an additional concern expressed that the rule development process is moving too quickly, and that affected parties may need additional time to evaluate and comment on the proposed rule. There is a belief that the SCAQMD staff would also benefit from a delay so as to gain better understanding of which processes involved need to be included in the proposed rule, and which ones do not have any significant air pollution potential. SCAQMD staff is committed to bringing the proposed rule to the Governing Board on March 1, 2013, but is open to a later date if it is concluded that additional time is warranted.~~

Review of Supporting Studies

SCAQMD staff has been made aware by the oil and gas industry of several supporting studies that were referenced in the Technical Support Document in the federal New Source Performance Standards (NSPS) for the recently adopted NSPS covering the crude oil and natural gas production source category. The newly revised NSPS covers primarily onshore natural gas well production undergoing hydraulic fracturing. There are supporting studies that assess the air emission potential from oil well production and well completion activities that would be covered under PR 1148.2. The SCAQMD has evaluated these studies to determine if they have an impact on the proposed rule development. See Appendix B for a summary of the studies reviewed by SCAQMD staff.

The U.S. EPA produced one main technical support document (TSD) and one supplemental technical document for the adopted NSPS. Emissions were estimated for completions and recompletions. Both oil and gas wells were evaluated. However, only gas wells were evaluated

with and without hydraulic fracturing. PM and NOx emissions were not evaluated. Basic emissions methodology to estimate emissions used an approximate gas composition ratio of VOCs and HAPs in methane. Methane emissions were determined from EPA's GHG inventory, EPA's Inventory of Greenhouse Gas Emissions and Sinks: 1990-2008 (Inventory). The supplemental TSD document provides an evaluation of the emission factor for hydraulically fractured gas well completions and recompletions. The paper also evaluates changes to the NSPS for storage vessels

Contained in the primary technical support document is a listing of fifteen additional reports and studies that the U.S. EPA reviewed by the agency for consideration in the adopted regulation. Of the fifteen supporting studies, six specifically evaluated the green house gas emissions from the oil and gas development, production, and distribution process. Four studies evaluated either the economic, availability, and/or production side of the industry, and five out of the total fifteen studies evaluated non-GHG air emissions from some aspect of the oil or gas well processes.

In general, all five of the studies evaluating non-GHG emissions estimated VOC emissions. Of these, HAPs were estimated in two of the five. Both VOCs and HAPS were not calculated directly, but rather estimated using natural gas emissions as a surrogate. This is similar to what the U.S. EPA did in their TSD's. Exhaust emissions from drilling and well completion equipment were also estimated in three of the five studies.

In addition to the studies discussed above, WSPA submitted a study conducted by the Environmental Defense Fund (EDF). The EDF study is entitled *Greater Focus Needed on Methane Leakage from Natural Gas Infrastructure.* The SCAQMD reviewed this study and concluded that the study focuses on GHGs in the natural gas production and distribution network. There is no information in the study that ~~on the focus of PR 1148.2 which~~ deals with well drilling, well reworks, and well completions.

While there is some useful information from the TSDs and five of the studies the SCAQMD staff reviewed, the information is incomplete and lacks sufficient detail to fully assess the emissions from well drilling, well reworks, and well completions (including hydraulic fracturing on oil wells). Most of the studies dealt with natural gas development and production and did not focus on oil well development (the primary well activity in the Basin). In addition, natural gas was used as a surrogate for VOC and HAP emission estimates in both TSDs and at least one of the studies ~~to include VOC and HAP emissions~~. This not only omits the types of HAPs emitted, but is an indirect measurement tool that doesn't reflect the actual emissions. In fact in a response to a comment on why oil wells were not included in the Final NSPS for hydraulic fractured natural gas wells, U.S. EPA in their Federal Register Notice for the Final regulations stated that "… the EPA does not have sufficient data on VOC emissions during completion of hydraulically fractured oil wells to set standards for these operations at this time." Thus, the U.S. EPA concluded that the existing information, including the studies documented by industry for SCAQMD staff to consider, did not represent sufficient information to warrant setting emission controls on oil well completions using hydraulic fracturing.

The SCAQMD staff further concludes that the TSDs and studies evaluated showed significant gaps in the emissions provided. For instance, no studies evaluated PM emissions from the dry material mixing operations conducted for drilling, reworks, and well completion operations. One

study which included the emissions for hydraulic fracturing on oil and gas wells only included the emissions from the engines that drive the fracturing fluid pumps, and did not include the emissions from the flowback. In addition, while the TSDs for the NSPS estimated VOC and HAP emissions from oil well completions and recompletions, it did not estimate the emissions from oil wells undergoing hydraulic fracturing. In at least two of the five studies estimating non-GHG emissions, the SCAQMD staff could not obtain the referenced appendices in order to evaluate the detailed emission estimation methodologies (including emission factors). However, the SCAQMD is pursuing additional avenues to obtain the necessary supporting documentation. Finally, the SCAQMD staff noted that all the studies lacked detail on the specific emission sources covered under PR 1148.2 involved in the estimate. For instance, no information on the size, type, and hours of operation were provided for the equipment exhaust emissions provided.

SCAQMD staff also reviewed an additional U.S. EPA report (not part of the above studies) as part of the rulemaking for PR 1148.2. In February 2013, the U.S. EPA released "EPA Needs to Improve Air Emissions Data for the Oil and Natural Gas Production Sector" which was initiated by their Office of Inspector General to determine whether the U.S. EPA has the data needed to make key decisions regarding air emissions from oil and natural gas production. The Inspector General's Office concluded that the "U.S. EPA has limited directly measured air emissions data for criteria and air toxic pollutants for several key oil and gas production processes and sources. For example U.S. EPA lacked data on well completions and evaporative ponds." In addition, the Inspector General's Office concluded that the majority of emission factors used by the agency to estimate emissions for the oil and gas production sector are of average or below average quality. This means that they are based on limited or insufficient data.[1] Finally, they stated that "with limited data, human health risks are uncertain, states may design incorrect or ineffective emission control strategies and EPA's decisions about regulating industry may be misinformed."[2]

OIL AND GAS DEVELOPMENT PROCESSES AND SCAQMD RULES

Staff has evaluated the following five~~four~~ major activities occurring at oil and gas fields during development and production of a well: site preparation, drilling, well completion, ~~and~~ well production, and reworks and the potential emission sources within each of these activities. For each of the emission generating activities, the applicable rules or regulations were identified. As discussed below, the analysis shows that emission sources associated with site preparation and well production are adequately covered by existing SCAQMD rules or other regulatory programs. However, SCAQMD staff did find potential emission sources for drilling, well completions, and rework activities that existing SCAQMD rules did not fully regulate.

Site Preparation

The selected site for oil or gas well drilling requires a number of activities to prepare the site for drilling to begin. A pad, footings for equipment, and access roads in the area where the drilling will take place must be cleared and leveled with bulldozers, excavators, and other types of earth-moving equipment. On some drilling sites, a below-ground-level cellar may be excavated to provide space for pieces of equipment at the top of the wellbore.

1 U.S. Environmental Protection Agency, Office of Inspector General, EPA Needs to Improve Air Emissions Data for the Oil and Natural Gas Production Sector, Report No. 13-P-0161. February 20, 2013.
2 Ibid.

SCAQMD's Rule 403 regulates fugitive dust emissions that would occur during excavation and grading activities by requiring limits on visible emissions beyond the property line of the emission source along with opacity limits. Other requirements include watering and stabilization of soils during earth-moving activities. Off-road equipment and on-road vehicles used to support site preparation activities generate criteria pollutant emissions such as nitrogen oxides (NOx) and respirable particulate matter (PM_{10}) and ($PM_{2.5}$). These types of equipment are required to meet specific engine exhaust emission limits based on applicable Tier standards pursuant to state and federal regulations for off-road equipment and on-road vehicles. State and federal regulations include requirements for new and in-use equipment.

There are currently no regulatory requirements that require use of the cleanest equipment for site preparation ~~planning preparation~~. Through the California Environmental Quality Act, some projects may require use of the cleanest equipment to minimize emissions from site preparation.

Drilling

Drilling a well requires the use of large amounts of equipment including a derrick, draw works, crown and traveling blocks, steel cables, mud pumps, a rotary table, drill pipes, drill collars, and a drill bit. Drilling can be done vertically or horizontally with the use of global positioning system equipment, and are done in stages based on the zones that are encountered. Based on information from the U.S. Energy Information Administration, the average well depth is approximately 5,000 ft for an oil well and 6,500 feet for a gas well. During drilling, the rotary drill bit chips away at the formation while strings of casing of multiple sizes are cemented in the drill hole in order to protect it from water and loose earth and to prevent contact with fresh water zones. Drilling fluid (drilling mud) is pumped into the hole through the drill pipe and serves a variety of functions including cooling the drilling bit, pushing the cuttings to the surface, controlling the formation pressure, and supporting the sides of the well. As the drilling mud reaches the surface, it travels through a shale shaker that screens and removes the cuttings, and then into a pit or tank from which it is pumped and re-circulated back down the well to repeat its purpose. The weight of the drilling mud also helps to prevent high-pressure gas, oil, or salt water from flowing out of the hole and is controlled or conditioned by using special weighting material, such as barite, salt, bentonite, etc. There are different chemicals that may be added to the drilling mud from time to time to achieve desired mud properties.

Re-circulated drilling mud may be a source of entrained contaminants and possible toxic compounds while drilling through hydrocarbon-bearing zones. There is a concern for potential volatile organic compound (VOC) and toxic emissions in the re-circulated drilling mud if it is open to the atmosphere as it returns to surface and into open pits or tanks during separation of cuttings and other conditioning activities. There are currently no existing SCAQMD rules that are intended to regulate these aspects of the drilling process at oil and gas field production facilities.

Well Completion

After multiple tests are performed to determine whether the formation contains enough oil or gas to warrant well completion, the final series of casing is cemented and sealed to the walls of the well. The casing is perforated by detonating explosive charges in the producing zone which allows the oil or gas from the producing formation to enter the well. In some cases, the

formation may not have optimal permeability properties or other conditions that either result in obstruction of flow or poor flow rates. In order to improve or stimulate well production, a number of well completion or stimulation techniques may be used. Below is a description of some of these techniques.

Acidizing – This method involves the introduction of acids into the wellbore. Acidizing can be used either as a maintenance process where the intent is to initiate a wellbore cleanup, or as a well completion technique such as well stimulation. When acidizing is used as a well completion technique, the process involves the injection of acids under pressure to remove an impediment to production by dissolving acid-soluble solids. This process is normally termed matrix acidizing and is performed at pressures below the formation fracturing pressure. When acidizing is used as a well stimulation technique, the intent is to fracture the surrounding formation by utilizing injection pressures above the formation fracturing pressure. This procedure is referred to as fracture acidizing or acid fracking. Fracture acidizing is similar to hydraulic fracturing in that it is designed to open up channels in the rock formation so as to provide additional conduits for oil or gas to flow into the well. Some of the most common acids used in either acidizing processes include Hydrochloric (HCl), Hydrofluoric (HF), and Acetic (CH3COOH).

Gravel Packing – This sand-control method involves installation of a steel screen between the wellbore and the casing. This area is packed with prepared gravel of a specific size that is designed to prevent formation sand from entering and mixing with the produced fluids in the wellbore. The varying types and degrees of gravel packing depend on how the gravel is placed (using hydraulic pressure or circulation).

High-Rate Gravel Packing – This method involves the use of water, sand, gravel, and chemical additives to place sand and gravel near the well itself to limit entry of formation sands and fine-grained material into the wellbore. Gravel small enough in size to prevent formation of fine particles to enter and mix in the wellbore is pumped in at a high-rate of pressure and held in place by the well perforations. Although this method is not intended to increase the permeability of the producing formation, fractures are still created with similar fluids that are used in other well completion techniques intended to fracture formations.

Hydraulic Fracturing – This process involves the use of water, sand (proppant), and chemical additives under high pressures that are sufficient to create cracks or fractures in the formation. This mixture is injected down the well and out of the perforated holes of the well casing to create fractures in the formation. The chemical additives aid in the transport of the proppant down the well and into cracks, while the proppants prop the fractures open, thereby allowing the oil and gas to flow more easily out of the well.

Preparation of the fluids used in well completion techniques described above can involve onsite mixing of proppants or gravel with the carrier fluid, and may result in potential particulate matter emissions. Materials used for proppants varying in type (e.g., crystalline silica, ceramic beads) are commonly delivered by trucks and loaded into sand movers. The proppant is transferred by a conveyer belt and into hoppers where it is mixed with well completion fluids prior to being injected down the well. Fugitive dust may be released at hatches and ports of the sand movers during refilling operations, and from the transfer between open conveyor belts and transfer

points. SCAQMD Rules 403, 404, and 405 regulate particulate emissions. ~~Although SCAQMD~~ SCAQMD Rule 403 addresses fugitive dust~~, the rule's intent is to control fugitives~~ from open storage piles, earth-moving activities, construction/demolition activities, disturbed surface areas, and vehicular movement. SCAQMD Rules 404 and 405 ~~also relate to the control of particulate matter emissions, however,~~ sets concentration and mass emission rate limits that can only be tested by source testing of point sources where there is a stack; and are not designed or intended to reduce emissions from fugitive particulate sources from well drilling, well completions and well reworks.

Another potential emission concern from well completion activities relates to the manner in which well completions fluids that return to the surface or "flowback" is collected, treated, and stored. As the well completion fluids come into contact with the formation and hydrocarbon-bearing zones, the resulting flowback may be entrained with a variety of formation materials, including brines, heavy metals, radionuclides, and organics. This is in addition to the chemical additives originally injected during the well completion used to prepare the well or fracture the formation. Although the chemical additives represent~~s~~ only a small percentage of the total makeup of the well completion fluid, the high volumes of the fluids used during the process can be translated to significant amounts of the chemicals overall. Flowback that returns to the surface and goes into pits or tanks that are open to the atmosphere has the potential to emit organic compounds and hazardous or toxic air pollutants into the air. SCAQMD Rule 1176 sets forth requirements for wastewater that is stored or collected in sumps that are a part of a facility's wastewater system, however, there is no existing SCAQMD rule for oil and gas field facilities that collect and store flowback wastewater in portable tanks or other containments that are not part of a wastewater system.

Well Production

Following drilling and well completion operations, the well is ready to begin the oil/gas extraction process referred to as "production." Oil reservoirs contain varying amounts of oil, water, and gas, and the physical and chemical properties of these constituents varies greatly from one reservoir to another. While some wells are capable of producing oil or gas exclusively, the following discussion focuses on wells which produce both oil and gas. The major components of petroleum production involve bringing the well fluids to the surface, separating the liquids, solids, and gaseous constituents, and performing various treatments to remove impurities and prepare the petroleum products for sale.

In primary recovery, well fluids consisting of crude oil, natural gas, water (i.e., "produced water"), and solids (sediment, sand, etc.), are either pumped to the surface or flow to the surface from natural reservoir pressure. Primary recovery is employed during the initial stages of oil production from a particular reservoir, but typically around 30% of the original oil in place can be produced using these methods. In many cases, enhanced oil recovery methods are needed to improve hydrocarbon recovery efficiency. Secondary recovery methods improve the recovery of reservoir hydrocarbons by adding energy, in the form of pressure, to the reservoir, thereby reestablishing or supporting the natural reservoir pressure which pushes the oil through the reservoir to the producing wells. One common method of secondary recovery called a "waterflood" re-injects produced water (or water from other sources) into the reservoir through injection wells to pressurize the reservoir. Another method uses natural gas injection to pressurize the reservoir and prevent or slow the natural decline of reservoir pressure that occurs

as reservoir fluids and gas are recovered through producing wells. Tertiary recovery methods utilize materials not normally found in the reservoir to improve hydrocarbon recovery. In most cases, a substance is injected into the reservoir, where the substance reacts to help mobilize the oil or gas, and is removed from the reservoir with the hydrocarbons. Steam injection is an important method used in California due to the state's abundance of heavy crude oil. This method injects steam into the formation where heat from the steam lowers the viscosity of the heavy crude oil so it will flow more readily towards producing wells. Steam can be injected continuously in a "flood", or on an intermittent basis. Other examples of tertiary recovery methods include: "fireflooding," or in-situ combustion, whereby air is injected into the reservoir to support combustion of reservoir hydrocarbons, generating heat and pressure which helps improve oil/gas recovery; miscible injection, in which an oil-miscible fluid, such as carbon dioxide or an alcohol, is injected into the reservoir to reduce the oil density and cause it to rise to the surface more easily; and chemical flooding, which combines the waterflooding technique with the use of special chemicals such as polymers and surfactants, to reduce the capillary forces trapping the residual oil or to thicken the injected water to a viscosity similar to the oil it displaces. SCAQMD Rule 1148 regulates Thermally Enhanced Oil Recovery Wells and sets limits on VOC emissions from both wells that are connected to vapor recovery control systems and those that are not.

When the well fluids reach the wellhead, they may contain a wide variety of substances including, crude oil, natural gas, produced water, sand, silt, and any additives used to enhance extraction. The fluids are transported via pipeline to a treatment plant, where the crude oil, natural gas, produced water, and solid contaminants are separated and treated. During the treatment process, the gas is separated from the oil and water, and the solids and water are separated from the oil. Treatment plants vary in size and complexity, and may take many different forms depending on the treatment needs of each site. Typically, treatment plants include a well flow-line manifold in addition to separators, free water knockout vessels, heaters (for heavy crude oil), heater-treaters, wash tanks, stock tanks, wastewater separators or oil/water separators, sumps, pits, ponds, and a vapor recovery unit. Wastewater treatment and separation processes are regulated under SCAQMD Rule 1176 – VOC Emissions from Wastewater Systems. Rule 1176 requires that sumps and wastewater separators be covered with either a floating cover equipped with seals or a fixed cover, equipped with a closed vent system vented to an air pollution control system.

When well fluids reach the surface, they typically flow to a well manifold that connects with each well in a given field. From the manifold, the fluids are directed to either a test or a production separator. Under normal operating conditions, the fluids flow to a production separator where gas is separated from the mixture. The oil/water stream then flows to a free water knockout vessel, heater-treater, a wash tank, and an oil/water separation vessel where water is removed from the oil. Once sufficient water has been removed from the oil, the oil is piped to an oil storage or stock tank, and then transported via pipeline or tankers to refineries, where petroleum products are made. SCAQMD Rule 1148.1 – Oil and Gas Production Wells, reduces VOC emissions from well cellars as well as from sources of untreated process gas located at oil and gas production facilities. SCAQMD Rule 1173 – Fugitive Emissions of Volatile Organic Compounds, intends to limit emissions from VOC leaks from components such as valves, fittings, pumps, compressors, pressure relief devices, diaphragms, hatches, sight glasses, and meters at oil and gas production fields, natural gas processing plants, and pipeline

transfer stations. SCAQMD Rule 463 – Organic Liquid Storage, reduces volatile organic compounds (VOC) from the storage of organic liquids in stationary above-ground tanks with a minimum capacity of 19,815 gallons, and gasoline storage in stationary above-ground tanks with a capacity between 251 and 19,815 gallons.

Gases removed during the treatment process are typically treated and sold, however, they may also be used as fuel for onsite equipment, re-injected into the reservoir for pressure maintenance, or vented to the atmosphere (usually only during emergency upset conditions). Gas collected from separators and oil treaters, along with vapors from storage tanks, may be conditioned through the dehydration and sweetening processes, in which water, hydrogen sulfide, and sometimes carbon dioxide are removed from the gas stream. Following gas treatment, the gas may then be sold as "pipeline quality" dry natural gas, suitable for transmission.

Some of the equipment used in the production process that require SCAQMD permits include separators, tanks, vessels, heaters, boilers, vapor recovery units, internal combustion engines, and clean-out sumps. All wellheads, except for those with steam injection, are exempt from written permit requirements per SCAQMD Rule 219(n)(1) – Natural Gas and Crude Oil Production Equipment. However, oil and gas wells subject to SCAQMD Rule 1148.1 are required to file for equipment registration pursuant to SCAQMD Rule 222 – Filing Requirements for Specific Emissions Sources Not Requiring a Written Permit Pursuant to Regulation II.

Rework

As defined in PR 1148.2, rework means any operation subsequent to drilling that involves deepening or redrilling, or <u>well production stimulation or treatment activity of an existing well (i.e., acidizing, gravel packing, hydraulic fracturing, and any combination thereof such as frac-packing)</u>~~permanently altering in any manner the casing of a well or its function~~. Well rework operations, or workovers, are typically conducted to restore or improve oil and/or gas production from an existing formation when it has fallen off substantially or ceased altogether. Well rework operations may include production stimulation techniques such as hydraulic fracturing, completion of a new producing zone, or re-fracture of a previously fractured zone. An example of when a rework may be necessary is when the casing has been perforated and rock or sand particles clog the casing perforations ~~and~~ cutting off or reducing production. Rework would be necessary in this case to restore production from the well. Rework operations are often very similar to the operations performed during the initial well completion, and are usually performed by well service contractors specializing in well maintenance. Because rework operations are similar to typical well completion operations, it is expected that air quality impacts would be similar as well.

SUMMARY CONCLUSION OF OIL AND GAS PROCESSES AND SCAQMD RULES

Based on the SCAQMD staff's review of oil and gas processes site preparation and production activities are generally covered under existing rules and regulations and other programs. Regarding site preparation, there are existing state and federal regulations for new and in-use equipment. Emissions can be further minimized by using the cleanest available construction equipment. As discussed above, there are a number of SCAQMD rules regulating emissions from oil and gas well production activities.

There were three areas where the SCAQMD staff found potential emission sources and regulatory gaps: (1) drilling, (2) well completions, and (3) well rework activities. The potential emission sources are combustion sources used during these three activities, particulate emissions from mixing dry materials, and hydrocarbon and possibly toxic emissions as drilling fluids and flowback fluids return from the well to the surface. As discussed in Chapter 2, the applicability Proposed Rule 1148.2 includes more than "hydraulic fracturing" since SCAQMD staff's analysis found similar emission sources from other processes for oil and gas wells that are currently unregulated. Additional information is needed about these emission sources to assess the type and magnitude of emissions and existing emission control techniques or devices, if applicable.

OTHER PROPOSED REGULATORY ACTION

Senate Bill 4 and Assembly Bill 7

On December 3, 2012, Senator Fran Pavley (27th Senate District of California) and Assemblymember Bob Wieckowski (25th Assembly District) proposed Senate Bill 4 and Assembly Bill 7, respectively. The virtually identical bills would regulate hydraulic fracturing operations at oil and gas sites throughout the state. Both bills would require DOGGR to work in consultation with the Department of Toxic Substances Control (DTSC), the California Air Resources Board (CARB), and the State Water Resources Control Board (SWRCB) to adopt regulations specifically targeted at hydraulic fracturing operations. The principal differences in the bills are the proposed effective dates. AB 7 would require the proposed regulations to take effect January 1, 2014, while the proposed regulations under SB 4 would take effect January 1, 2015. Other minor differences exist between the proposed legislation, however, the main text of the bills are virtually identical.

The bills direct DOGGR to consider revisions to "the rules and regulations governing the construction of wells and well casings to ensure the integrity of wells, well casings, and the geologic and hydrologic isolation of the oil and gas formation during and following hydraulic fracturing, and full disclosure of the composition and disposition of hydraulic fracturing fluids." Full disclosure of the composition and disposition of the hydraulic fracturing fluids would include such information as: the date of hydraulic fracturing operations; a complete listing of the chemical constituents of the hydraulic fracturing fluids used; the trade name, supplier and description of the intended purpose of each additive in the hydraulic fracturing fluid; total volume of fluids used; the source, volume, and disposition of all water used during hydraulic fracturing; disposition of all hydraulic fracturing fluids other than water; the presence of any radiological components or tracers; and the location and extent of the fracturing surrounding the well induced by the treatment. The bills would require hydraulic fracturing related information to be posted to a publicly available website, such as fracfocus.org, with some exceptions for information claimed to be subject to trade secret protections. Both bills would also require operators to notify DOGGR at least 30 days prior to performing hydraulic fracturing operations and complete the treatment within one year of the date of notice. The bills also require a post-hydraulic fracturing report to DOGGR, with the information being posted on the DOGGR website. DOGGR would also be required to provide an annual report to the legislature regarding hydraulic fracturing in the exploration and production of oil and gas throughout the state.

In addition to SB 4 and AB 7, a number of other similar California bills related to hydraulic fracturing have been proposed. These include AB 288 (Assemblyman Levine), AB 669

(Assemblyman Stone), AB 982 (Assemblyman Williams), and SB 395 (Senator Jackson). In summary, AB 288 would prohibit hydraulic fracturing activity until written approval is received from DOGGR and allow regulators to establish a fee for permits involving fracturing. AB 669 proposes that well operators must have a wastewater disposal plan approved by the regional water quality board prior to drilling. AB 982 would require drillers to include a groundwater monitoring plan with the notice of intent to drill, detailing their water use. SB 395 would require the Department of Toxic Substances Control to regulate wastewater from hydraulic fracturing as a hazardous substance.

DOGGR Discussion Draft of Regulations for Hydraulic Fracturing

On December 18, 2012, The Department of Conservation/Division of Oil, Gas, and Geothermal Resources (DOGGR) released a "discussion draft" of regulations for hydraulic fracturing ("fracking"). According to DOGGR, the "discussion draft" is an informal starting point for discussion by key stakeholders (including industry representatives, the environmental community, other regulatory agencies, and members of the public) in preparation for the formal rulemaking process. The formal rulemaking process is anticipated to begin in early 2013. The "discussion draft" regulation is similar in some respects to the proposed regulations in SB 4 and AB 7 and includes provisions for: pre-fracturing well testing; notification to DOGGR prior to hydraulic fracturing operations; posting of submitted hydraulic fracturing notification forms on the DOGGR website; monitoring during and after fracturing operations; posting chemicals used in fracturing fluid on a "Chemical Disclosure Registry" website (i.e., fracfocus.org website, or other similar website); disclosing trade secret chemical information to DOGGR and health professionals in response to a spill or release of hydraulic fracturing fluid or for the purpose of diagnoses or treatment of an individual; and storage and handling of hydraulic fracturing fluids.

In regard to how the proposed regulation ensures that hydraulic fracturing will not contaminate the air, DOGGR has stated in a document related to the public questions received on the "discussion draft" that the various air quality control districts are evaluating the need for regulations to address fugitive air emissions associated with hydraulic fracturing. DOGGR is in discussions with the Air Resources Board and the local air districts to ensure that the proposed regulations dovetail with their regulatory efforts. Similar to the discussion draft, PR 1148.2 contains provisions for notifications and reporting of hydraulic fracturing operations, however, differs in that the information required is related to air quality data that is not specified in the DOGGR's discussion draft. PR 1148.2 covers other activities in addition to hydraulic fracturing, including well drilling, acidizing, gravel packing, and rework activities. It should be noted that the requirements in the DOGGR's discussion draft are intended to ensure integrity of the well casing in order to protect groundwater and provide disclosure of chemicals used in hydraulic fracturing, whereas the purpose for PR 1148.2 is to collect and evaluate information on well activities that may have potential air quality impacts.

The SCAQMD staff has been following the rulemaking of DOGGR's regulation for hydraulic fracturing. On February 12, 2013, the SCAQMD staff attended a workshop conducted by DOGGR regarding their discussion draft. Discussion and comments were given regarding provisions for pre-fracturing well testing, advance notification, monitoring during and after fracturing operations, disclosure of materials used in fracturing fluid, trade secrets, storage and handling of hydraulic fracturing fluids, and other topics not presently considered in the discussion draft. The rule is expected to be finalized by the end of the year.

AFFECTED SOURCES

SCAQMD Rule 222 currently requires owners and operators of oil and gas wells to register each well group (consisting of no more than four well pumps at a crude oil production and handling facility) subject to Rule 1148.1. Rule 1148.1 – Oil and Gas Production Wells, applies to onshore oil producing wells, well cellars and produced gas handling activities at onshore facilities where oil and gas are produced, gathered, separated, processed and stored. The Rule 222 equipment registration for oil wells is a streamlined alternative to the standard air quality permitting process.

Based on an evaluation of ~~District~~SCAQMD records of the Rule 222 Filing Program for the "Oil Production Well Group" category, there are 273~~241~~ facilities operating approximately 4,614~~4,321~~ onshore oil and gas wells in the South Coast Basin. Due to the geography of the region, the affected facilities are often located in urban areas, and sometimes located in close proximity to residential and other sensitive receptors. Based on well records from the California Division of Oil, Gas, and Geothermal Resources (DOGGR), there are approximately 6,136 oil, gas, and geothermal wells that are active or idle in the Los Angeles, Riverside, San Bernardino, and Orange County regions. The discrepancy between the number of wells accounted for by Rule 222 and DOGGR is mainly due to the fact that DOGGR's program includes geothermal and injection wells.

Proposed requirements for reporting the chemicals used during well drilling, completion, and reworks will~~may~~ affect the suppliers of chemicals used during these processes. Under the proposed requirements, well ~~owners/~~operators and/or their chemical suppliers are required to submit to the ~~District~~SCAQMD a comprehensive listing of the chemicals contained in the drilling fluids, well completion fluids, and materials used during reworks. This information, excluding certain "trade secret" information, will then be reported by the ~~District~~SCAQMD on a publicly available website. There are various companies throughout the nation that supply the multitude of chemicals used during drilling, well completion, and well rework operations.

CHAPTER 2: SUMMARY OF PROPOSED RULE 1148.2

OVERVIEW

PROPOSED RULE 1148.2

OVERVIEW

The purpose of Proposed Rule 1148.2 is to gather air quality-related information on oil and gas well drilling, completion, and reworks activities in order to identify the magnitude and type of emissions associated with these operations. The proposed rule has a notification requirement and two reporting requirements regarding drilling, well completions, and well reworks. As discussed below, the proposed rule applies to owner or operators of oil and gas wells as well as chemical suppliers that provide chemicals used for drilling, well completions, and well reworks. The following describes the key elements of Proposed Rule 1148.2.

PROPOSED RULE 1148.2

As discussed in more detail below, PR 1148.2 sets forth requirements to allow SCAQMD staff to gather data necessary to assess the type and magnitude of potential emissions from oil and gas well drilling, well completion, and rework activities.

Applicability

Subdivision (b) specifies the applicability of Proposed Rule 1148.2. The proposed rule applies to any owner or operator of an onshore oil or gas well located in the DistrictSCAQMD that is conducting drilling, well completion activities, and well reworks. In addition, the proposed rule applies to suppliers that are selling or distributing chemical ingredients an additive directly to the owner or operator of an onshore oil or gas well for use as a drilling fluid, well completion fluid, or rework.

Definitions

Subdivision (c) includes definitions of the following terms used in the proposed rule. Please refer to subdivision (c) of PR 1148.2 for the definitions. It should be noted that most of the definitions were taken from existing or proposed regulations of the Department of Conservation, Division of Oil and Gas and Geothermal Resources in order to maintain consistency with terms already used and accepted by the oil and gas production industry.

- Acidizing
- Air toxic
- Chemical family
- Drilling
- Drilling fluid
- Flowback fluid
- Gravel packing
- Hazardous air pollutant
- High rate gravel pack
- Hydraulic fracturing
- Hydraulic fracturing fluid
- Onshore oil or gas well
- Owner or oOperator
- Proppant
- Rework
- Sensitive Rreceptor
- Supplier

~~▪ Toxic Air Contaminant~~
▪ Trade secret
▪ Well
▪ Well ~~C~~completion
▪ Well ~~C~~completion ~~F~~fluid
▪ Well ~~P~~production ~~S~~stimulation or treatment ~~A~~activity

Notification Requirements

Subdivision (d) requires the ~~owner or~~ operator of an oil or gas well to notify the Executive Officer no more than 10 days and no less than 24 hours prior to drilling a well, completing a well, or reworking a well. The purpose of this provision is to provide notification to the Executive Officer prior to drilling, well completion, or rework activities. This provision would become effective ~~90~~ 60 days from date of rule adoption.

Under this provision, the ~~owner or~~ operator is required to notify the Executive Officer with the following information:

- Name and contact information of the ~~O~~owner ~~or~~ and operator of the subject well(s);
- Well name(s) and API well number(s) (if available);
- Geographical coordinates of the subject well(s);
- Nearest sensitive receptor within 1,500 of the subject well(s); specifying the:
  - Sensitive receptor type (e.g., residence, school, hospital)
  - Name of facility, if applicable;
  - Location address; and
  - Distance from the closest property line~~outer boundary~~ of the sensitive receptor to the subject well(s);
- Expected start date(s) and identification of general activities to be conducted (e.g., drilling, well completion, and reworking).

Under the proposed rule, the ~~owner or~~ operator is required to identify the nearest sensitive receptor within 1,500 feet of the subject well. The ~~owner or~~ operator must provide the type of sensitive receptor such residence, school, day care, hospital, etc., and the name of the facility, if known. In addition, the proposed rule requires that the distance from the closest property line of the nearest sensitive receptor to the subject well be provided. ~~The outer boundary is the point closest to the subject well.~~

During the working group meetings and public workshops, some environmental and community groups commented that the notifications submitted to the SCAQMD should be made available to the public. As a result, the SCAQMD staff added a provision that requires the Executive Officer to make all notification information received under subdivision (d) available to the public on a website within 24 hours of receipt.

Reporting Requirements

Proposed Rule 1148.2, subdivision (e) includes two reporting requirements for: (1) emission sources and (2) chemical reporting. Both reporting requirements begin 60~~90~~ days after the date of adoption of the proposed rule. Reporting requirements specify that information be reported electronically using a format approved by the Executive Officer. Emission source reporting and

chemical use reporting ~~are~~ must be submitted no later than 60~~30~~ days after the last activity, or if more than one operation is being conducted, after the last activity in the series of operations associated with drilling, well completion or rework. One report may be submitted for a series of activities, unless the time between each individual activity within a series exceeds fourteen days. It should be noted that the reporting period was initially proposed to be 30 days, however, during working group meetings, some industry representatives commented that 30 days was not sufficient time to complete and submit reports. As a result, the SCAQMD staff extended the reporting period from 30 to 60 days.

Emission Source Reporting

The purpose of the emission source reporting is to gather specific information on drilling, well completions, and reworks to better quantify potential emissions from these activities. Emission source reporting focuses on the following three source categories that occur during drilling, well completions and reworks: (1) emissions from combustion equipment; (2) fugitive dust emissions from on-site mixing operations; and (3) potential hydrocarbon emissions from drilling fluids and flowback fluids that return to the surface.

Combustion Equipment – Drilling, well completion, and rework activities utilize a variety of non-road equipment. Although these activities are temporary, they can be intense due to the equipment size and the amount of equipment. Also, the frequency in which these operations are conducted may play a substantial role in understanding the magnitude of emissions from construction equipment used for drilling, well completion, and rework activities. Under subparagraph (e)(1)(C), the ~~owner or~~ operator must report the type of equipment, size, engine tier, fuel type, and hours of operation for combustion equipment used during drilling, well completion, and rework activities. The engine tier represents the emission standard that the engine is certified to meet by CARB and EPA. This information will allow the SCAQMD staff to quantify combustion emissions.

Fugitive Dust Emissions – Under subparagraph (e)(1)(D), the ~~owner or~~ operator is required to report on the amount and type of dry materials used on site when making drilling mud and ~~hydraulic fracturing~~ well completion fluid. The purpose of this provision is to gather information on the potential fugitive dust emissions and their composition, that might occur when mixing dry materials, the techniques used to mix these fluids, and use of air pollution techniques, devices, and/or practices used to control fugitive emissions or odors. This provision applies to dry materials that are added and mixed onsite into drilling and well completion fluids.

Drilling Fluids, Well Completion Fluids and Flowback Fluids – Under subparagraph (e)(1)(E), the ~~owner or~~ operator is required to report information regarding drilling, well completion, and flowback fluids. Under this subparagraph, the ~~owner or~~ operator must provide the volume of well completion fluids used and volume of flowback fluids recovered. For drilling fluids and flowback fluids, the ~~owner or~~ operator must provide the methods used for collecting, storing, conditioning, separating, and/or treating drilling fluids and/or flowback fluids as it returns to the surface. The SCAQMD staff is interested in learning if fluids are collected in a closed or open system and any air pollution control techniques, devices, and/or practices used to control volatile organic compounds or odors. Lastly, the ~~owner or~~ operator must provide the final disposition of

recovered drilling and flowback fluids. The SCAQMD staff is interested in learning if the fluids are recycled and/or disposed of and the method in which recycling and/or disposal occurs.

SCAQMD Sampling and Monitoring – In order to supplement the data gathered under PR 1148.2, the SCAQMD staff will visit drilling, well completion, and rework activities to conduct sampling and monitoring specific activities. The site visits will also provide opportunities for SCAQMD staff to observe operations of concern and the types of air pollution control techniques that are utilized. Information received under the notification requirements of the proposed rule will help inform staff of the dates and times for various planned activities. The SCAQMD staff plans on using devices such as portable handheld ~~vapor~~ analyzers to measure PM, VOC, and H_2S emissions. Sampling methods may include the use of dust traps to capture particulate matter emissions and evacuated canisters to capture VOC emissions where they will be analyzed to determine information such as particle size and toxic compound composition. Findings from surveying and sampling activities will also help staff determine if more comprehensive air monitoring or sampling is necessary. Use of portable analyzers will allow the SCAQMD staff to collect more samples as there is minimal set up time involved and these methods are less resource intensive. Use of air monitoring data and air and chemical sampling will give the SCAQMD staff a sense of the concentration and type of air pollutants associated with the operations of concern, if any.

Supplier Requirements

Proposed Rule 1148.2 includes provisions for suppliers. Suppliers are entities selling or distributing a chemical directly to the ~~owner or~~ operator of an onshore oil or gas well for use as a drilling fluid, well completion fluid, or rework fluid. Under paragraph (e)(2), a supplier that provides a chemical directly to an ~~owner or~~ operator of an oil or gas well for drilling, well completion, or rework shall provide information on each chemical trade name product. Under PR 1148.2, chemical trade name products are considered to be any additive used in a drilling or well completion fluid, regardless of whether or not it is known under a trade or brand name in the oil and gas well production industry. The information required shall include the name of each chemical ~~compound~~ trade name product, ~~and the~~ chemical abstract service number, and purpose of the chemical trade name product.~~,~~ In addition, for each chemical trade name product, the supplier shall provide either the total mass, or volume and density, ~~or mass concentration,~~ of each chemical ingredient used in the chemical trade name product.~~and~~ The ~~the~~ maximum concentration in percent by mass, and whether the chemical ingredient is an air toxic ~~hazardous air pollutant or a toxic air contaminant~~ shall also be provided. If the supplier claims chemical information protected as trade secret ~~and does not provide the owner or operator with information needed to satisfy the chemical use reporting requirements of the proposed rule~~, the supplier must provide the ~~owner or~~ operator with the identity of any chemical information that is not being disclosed based on a claim of trade secret protection and the basis for the claim, as well as substitute information which includes the identification of the chemical family or similar descriptor of any chemical ingredient claimed as a trade secret, and whether or not the chemical ingredient is an air toxic ~~hazardous air pollutant and/or toxic air contaminant~~. The supplier is required to provide ~~this~~ information to the ~~owner or~~ operator within ten days after the chemicals are ~~sold~~ delivered to the ~~owner or~~ operator.

If the supplier claims any chemical information protected as trade secret, the supplier must provide the detailed information referenced above for each chemical trade name product~~claimed as trade secret~~, as well as the name and API number of the affected well to the Executive Officer within sixty days after the chemicals have been delivered to the operator. ~~The supplier must provide the Executive Officer with the name of each chemical compound and chemical abstract service number, trade name, volume and density or mass concentration, each chemical ingredient used in the trade name and the maximum concentration in percent by mass, the chemical family or similar descriptor, and whether the chemical is a hazardous air pollutant or a toxic air contaminant.~~

Operator Chemical Use Reporting Requirements

Under this provision, there are requirements for the ~~owner and~~ operator of a well ~~for~~ to identify chemicals that are used during drilling, well completion, and rework activities. Under paragraph (e)(~~5~~4), the ~~owner or~~ operator of an onshore well is required to submit an electronic report, using a format that is approved by the Executive Officer that provides information on the chemicals used during each well activity.~~, that provides the~~ For chemical trade name products not claimed protected as trade secret, the information shall include: name of each chemical ~~compound~~ trade name product;~~,~~ chemical abstract service number, purpose of the chemical trade name product; either the total mass, or volume and density of each chemical ingredient used in the chemical trade name product; maximum concentration in percent by mass for each chemical ingredient;~~trade name, volume and density or mass concentration, each chemical ingredient used in the trade name and the maximum concentration in percent by mass, whether or not the chemical is claimed as trade secret and if so~~ the chemical family or similar descriptor of the chemicals being claimed as a trade secret., and whether the chemical is a air toxic~~hazardous air pollutant under the Clean Air Act or a toxic air contaminant under state law~~. In addition to identifying the well name and API number of the affected well, ~~The~~ the proposed rule also requires that the ~~owner or~~ operator report supplier information such as the company name, address, contact, and phone number.

Chemicals that are used during the drilling, well completion, and rework activities will return to the surface. As these chemicals return to the surface, it is important for the SCAQMD staff to understand the types of chemicals, the volume and density or mass, and maximum concentration in percent by mass to better assess if there are potential volatile organic compounds, toxic air contaminants, or hazardous air pollutants that may be a concern for air quality or public health. The SCAQMD staff is concerned that if specific information is omitted, the SCAQMD staff cannot fully assess potential air quality or public health issues.

~~The proposed rule requires that the owner or operator report all chemical ingredients used in a chemical trade name, including chemical information claimed as trade secret, to the Executive Officer.~~ A ~~reporting entity~~supplier claiming trade secret must provide a justification for the basis for claiming trade secret. Trade secrets, with the exception of emission data, may include, but are not limited to, any formula, plan, pattern, process, tool, mechanism, compound, procedure, production data, or compilation of information which is not patented, which is known only to certain individuals within a commercial concern who are using it to fabricate, produce, or compound an article of trade or a service having commercial value, and which gives its user an opportunity to obtain a business advantage over competitors who do not know or use it. (Gov.

Code Sec. 6254.7(d)). When a member of the public requests to inspect a public record or the ~~District~~SCAQMD makes information received under subdivision (f) available on its website, claims that certain information constitutes a trade secret will be subject to evaluation under the ~~District's~~SCAQMD Public Records Act Guidelines and the California Public Records Act. If the ~~District~~SCAQMD determines that the justification for claiming trade secret is inadequate, the ~~District~~SCAQMD shall promptly notify the entity who claimed trade secret that the information will be released after 15 calendar days from the date of such notice. Such an entity shall also be advised of its right to bring appropriate legal action to prevent disclosure, and of its right to further respond.

~~For chemicals claimed as trade secret, the owner or operator must also provide the chemical family or similar descriptor.~~

SCAQMD Website Posting of Chemicals

Subdivision (f) identifies the information that the Executive Officer will make available on the SCAQMD website. Trade secret information is treated differently than non-trade secret information. For all non-trade secret chemical ~~compounds~~ingredients, the proposed rule requires the following information be posted on the SCAQMD's website and made available to the public for each event by ~~owner or~~ operator name, well name and API well number (if available), location, and date of activity:

- Name of chemical ingredient~~compound~~;
- Chemical abstract service (CAS) number;
- Purpose of the chemical ingredient;
- ~~Volume or mass of chemical used; and~~
- For each chemical trade name product:
- - the total volume and density; or
- - total mass;
- For each chemical ingredient used in the chemical trade name product, the maximum concentration by mass; and
- Identification of the chemical~~(s)~~ that are an air toxic ~~hazardous air pollutant and/or toxic air contaminant~~.

For all trade secret chemical compounds, the proposed rule requires the following information be posted on the SCAQMD's website and made available to the public for each event by ~~owner or~~ operator name, well name and API well number (if available), location, and date of activity:

- Chemical family or similar descriptor; and
- Identification of the chemical~~(s)~~ that are an air toxic ~~hazardous air pollutant and/or toxic air contaminant~~.

CHAPTER 3: IMPACT ASSESSMENT

EMISSION IMPACTS OF PROPOSED RULE 1148.2

SOCIOECONOMIC ASSESSMENT

CALIFORNIA ENVIRONMENTAL QUALITY ~~ANALYSIS~~ACT

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

EMISSION IMPACTS OF PROPOSED RULE 1148.2

Implementation of Proposed Rule 1148.2 will not result in emissions reductions as it is an administrative rule with no proposed requirements for control measures. The purpose of the proposed rule is collect information to better quantify air emissions associated with drilling, completion, and rework activities for onshore oil and gas wells.

SOCIOECONOMIC ANALYSIS

PR 1148.2 would require ~~owners/~~operators of an onshore oil or gas well to report air quality-related information on oil and gas well drilling, well reworks~~ing~~, and well completion activities. In addition, PR 1148.2 would require chemical suppliers to report any information required in the proposed rule regarding chemical ~~compounds~~ ingredients contained in the drilling fluids, well completion fluids, and rework operations that is not provided to an ~~owner or~~ operator based on claims of trade secret.

Affected Industries

Based on the ~~District's~~SCAQMD permitting database for registered wells, ~~T~~the proposed rule would affect 273~~241~~ oil and gas wells operation facilities. Out of 273~~241~~ facilities, 224~~206~~ are located in Los Angeles County, and the remaining 49~~35~~ are located in Orange County. Eighty one~~three~~ percent of the affected facilities belong to the sector of crude petroleum and natural gas extraction [North American Industrial Classification System (NAICS) 211111], and the remaining facilities belong to the sectors of petroleum and petroleum products merchant wholesalers (NAICS 424720), and support activities for oil and gas operations (NAICS 213112).

In addition, based on the ~~District~~SCAQMD's research, the proposed rule would affect a number of chemical suppliers, who are mostly ~~of which are~~ located outside of California, but who supply chemicals to operators performing well drilling, completion and rework activities within the ~~District's~~SCAQMD jurisdiction. The suppliers mainly belong to sectors of all other miscellaneous chemical product preparation (NAICS 325998), and other chemical and allied products merchant wholesalers (NAICS 424690). The suppliers cannot be individually identified.

Small Businesses

The SCAQMD defines a "small business" in Rule 102 as one that employs 10 or fewer persons and that earns less than $500,000 in gross annual receipts. In addition to the SCAQMD's definition of a small business, the federal Small Business Administration (SBA), the federal Clean Air Act Amendments (CAAA) of 1990, and the California Department of Health Services (DHS) also provide definitions of a small business.

The SBA's definition of a small business uses the criteria of gross annual receipts (ranging from $0.75 million to $35.5 million), number of employees (ranging from 50 to 1,500), megawatt hours generated (4 million), or assets ($175 million), depending on industry type (US SBA, 2013). The SBA definitions of small businesses vary by 6-digit North American Industrial Classification System (NAICS) code.

The CAAA classifies a facility as a "small business stationary source" if it: (1) employs 100 or fewer employees, (2) does not emit more than 10 tons per year of either VOC or NOx, and (3) is a small business as defined by SBA.

Oil or gas well facilities (NAICS 211111) with fewer than 500 employees and petroleum products merchant wholesalers (NAICS 424720) with fewer than 100 employees are considered small by SBA. Support activities for oil and gas operations (NAICS 213112) with gross annual sales of less than $7 million are considered small by SBA.

Out of the 273~~241~~ oil or gas well operations in the ~~District~~SCAQMD, information on employees and sales for 191~~169~~ facilities is available, based on the 2013 Dun and Bradstreet data. Under the SCAQMD definition of small business, 66~~64~~ facilities are considered small. Based on the SBA and CAAA definition of small businesses, there are 120~~105~~ and 118~~103~~ small businesses, respectively.

Compliance Cost

Under the proposed requirements, well ~~owners/~~operators are required to notify the ~~District~~ SCAQMD of the start date of any activity covered under the proposed rule. These same operators and chemical suppliers have to submit reports of chemicals used in their operations. In addition, well ~~owners/~~operators are required to report equipment usage and other information regarding the subject activities for the first two years after adoption of the proposed rule.

According to the California Division of Oil, Gas, and Geothermal Resources, there were about 380 notifications in 2009 and 710 in 2012 received for well~~s~~ drilling and well reworks within Los Angeles, Orange, Riverside, and San Bernardino Counties. These estimates represent a higher-end estimate because they include injection notifications, as well as for off-shore wells which are not subject to PR 1148.2.

Based on staff's estimation, ~~each oil or gas well facility could spend from~~ a half an hour to one~~two~~ hour~~s~~ is needed to complete a notification, and four to 12 hours to complete equipment and chemical reporting for each event. The estimated hourly wage to complete these tasks is assumed to be $39.60 to $58.48.[1] Based on the above assumptions, the annual compliance cost is estimated to be $7,524 to $41,521 for notifications, and $60,192 to $498,250 for equipment reporting (for the first two years), and another $60,192 to $498,250 for chemical reporting requirements, respectively. Since the cost for the proposed rule was estimated using the annual notification information from the California Division of Oil, Gas, and Geothermal Resources and not on the number of wells or facilities, the cost by industry based on facility or well count cannot be determined.

Reporting requirements for chemical suppliers would apply only if they choose not to report ~~such~~ information claimed as trade secret to the well ~~owner/~~operators. The cost for this requirement cannot be estimated at this time due to the lack of data on the number of suppliers and uncertainty related to amount of time spent to report ~~compounds~~ ingredients contained in the drilling fluids, well completion fluids, and rework operations.

[1] Hourly wages are based on BLS May 2011 California State Occupational Employment and Wage Estimates (Retrieved from http://www.bls.gov/oes/current/oes_ca.htm#17-0000)
Lower-end wages are median hourly wages for the "Surveyors" occupational category, while higher-end wages are median hourly wages for "Petroleum Engineers" category.

Largely depending on the wages of the employees completing the reports, the total annual compliance cost of PR 1148.2 is estimated to be $127,908 to $1,038,021 for the first two years and $67,716 to $539,771 for every year thereafter.

Rule Adoption Relative to the Cost-Effectiveness Schedule

On October 14, 1994, the Governing Board adopted a resolution that requires staff to address whether proposed rules being considered for adoption are presented in rank order by cost-effectiveness as defined in the Air Quality Management Plan (AQMP). The proposed rule is not part of the 2012 AQMP; therefore, the ranking order of cost-effectiveness is not applicable here.

CALIFORNIA ENVIRONMENTAL QUALITY ~~ANALYSIS~~ACT

SCAQMD staff has reviewed PR 1148.2 and because it only consists of feasibility or planning studies for possible future actions, which have not been approved, adopted or funded, staff has concluded that it is exempt from CEQA pursuant to CEQA Guidelines §15262 – Feasibility and Planning Studies, and CEQA Guidelines §15306 - Information Collection. If approved by the Governing Board a Notice of Exemption will be prepared for the proposed project pursuant to CEQA Guidelines §15062 - Notice of Exemption.

~~DRAFT~~ FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

Requirements to Make Findings

California Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the SCAQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report.

Necessity

The SCAQMD Governing Board finds and determines that a need exists to adopt Proposed Rule 1148.2 because potential air emissions from activities associated with oil and gas well drilling, well completions, and well reworks are not adequately regulated by existing SCAQMD rules or other state or federal regulations. In addition, there is insufficient information available to know the air emission potential of these processes. The SCAQMD does not have emissions data on the types of oil and gas production activities that are covered under the proposed rule. In a report from the Office of Inspector General, "EPA Needs to Improve Air Emissions Data for the Oil and Natural Gas Production Sector" released February 20, 2013, it was found there are deficiencies in emission data for well completions for oil and gas processes. EPA stated that with limited data, human health risks are uncertain, states may design incorrect or ineffective emission strategies, and EPA's decisions about regulating industry may be misinformed. The SCAQMD staff believes that the notification requirements, emissions reporting, and chemical use reporting under Proposed Rule 1148.2 combined with emissions monitoring and sampling will provide the SCAQMD with needed emissions data on drilling, well completion, and rework activities for oil and gas wells within the South Coast Air Basin. Consequently, Proposed Rule 1148.2 is needed to collect sufficient data and information in order to evaluate the type and amount of air emissions coming from the oil and gas well drilling, reworks, and completions, as well as the current practices in the industry for controlling air emissions resulting from the processes used.

Authority

The SCAQMD Governing Board has authority to adopt Proposed Rule 1148.2 pursuant to the California Health and Safety Code Sections 39002, 40000, 40701, 40702, 40725 through 40728, 41508, 41511, and 41700.

Clarity

The SCAQMD Governing Board finds and determines that Proposed Rule 1148.2 is written or displayed so that its meaning can be easily understood by the persons directly affected by the rule. Proposed Rule 1148.2 has gone through a public process to determine if there is sufficient clarity in the proposed rule language. This public process included establishing a working group made of the oil and gas well production industry, environmental organizations, and the public at large. Significant input from the participating stakeholders ensures that the proposed rule is clear and written in a manner that it can easily be understood by the affected industry.

Consistency

The SCAQMD Governing Board finds and determines that Proposed Rule 1148.2 is in harmony with and not in conflict with or contradictory to, existing statutes, court decisions or state or federal regulations. The SCAQMD staff worked with the California Department of Conservation/Division of Oil, Gas, and Geothermal Resources (DOGGR) to ensure consistency with their existing oil and gas well regulations and their proposed hydraulic fracturing discussion draft. This effort included consultations with DOGGR staff on industry practices, the implementation of DOGGR regulations, and on avoiding inconsistencies with DOGGR regulations and PR 1148.2. The SCAQMD staff also attended a public workshop on the DOGGR's proposed hydraulic fracturing discussion draft.

Non-Duplication

The SCAQMD Governing Board has determined that Proposed Rule 1148.2 will not impose the same requirements as any existing state or federal regulations. The pre-production activities applicable under Proposed Rule 1148.2 are also regulated by the California Department of Conservation/Division of Oil, Gas, and Geothermal Resources (DOGGR) and the U.S. EPA. Under California Code of Regulations, Title 14, Division 2, Chapter 4, DOGGR requires that all well drilling, reworks, and well abandonment and plugging not occur unless the well ~~owner or~~ operator files a notification with the state agency. Following the notification process, DOGGR issues a permit for the proposed action. These permits are posted on DOGGR's website, often well after the specific activity is conducted. The notification requirements under Proposed Rule 1148.2 would notify the SCAQMD staff and public before the specific activity is conducted. However, these notification provisions are a necessary undertaking since it is the mission of the SCAQMD to take all necessary steps to protect public health from air pollution, with sensitivity to the impacts of its actions on the community and businesses. This can only be accomplished through a comprehensive program of regulation requiring notification of the contents and materials used in activities specified in the proposed rule. DOGGR does not currently require such notification.

The PR 1148.2 requirements to report chemical usage and information on the well drilling, well completions, and well rework activities are not required under any existing DOGGR regulations. DOGGR's proposed hydraulic fracturing regulation scheduled for completion by the end of 2013, does require operators to report non-trade secret chemical ingredients used in hydraulic

fracturing fluids. In the case of hydraulic fracturing fluid chemicals, PR 1148.2 requires reporting directly the SCAQMD, while DOGGR's proposal only requires the operator to post the non-trade secret chemical ingredients on a chemical disclosure registry similar to FracFocus. PR 1148.2 goes beyond DOGGRs existing and proposed regulations by requiring chemicals used in well drilling and other well completion fluids. Therefore, the reporting requirements of PR 1148.2 are also non-duplicative with DOGGR's regulations.

Under U.S. EPA's NESHAPS 40CFR Part 63, U.S. EPA is requiring flowback controls, notification, reporting, and recordkeeping of operators whenever a natural gas well is hydraulically fractured. Oil production wells are excluded from the NESHAPS regulation. Similar to DOGGR's regulation, the notification provisions of the federal NESHAPS requires general ~~owner/~~operator and well identification information whereas Proposed Rule 1148.2 requires identification of the owner/operator and subject well, identification and location of the nearest sensitive receptor within 1,500 feet of the subject well, expected start date of the activity, and identification of the type of well activity performed. The reporting requirements of federal NESHAPS focus on compliance with the "green completion" provisions of the regulation but do not require~~ing~~ chemical list reporting. These requirements are different than Proposed Rule 1148.2 and as a result, the proposed rule is not duplicative with the federal NESHAPS. Staff is committed to revisit the proposed rule to resolve potential conflicts or duplication, should similar regulations be adopted by other agencies that adequately address air quality/air toxic concerns.

Reference

By adopting Proposed Rule 1148.2, the SCAQMD Governing Board references the following statutes which SCAQMD hereby implements, interprets or makes specific: California Health and Safety Code Sections 41700 (nuisance), 40460(c) (emission inventory, 40913(a)(5) (emission inventory), 41511 (determination of emissions from a source); and Federal Clean Air Act Section 112 (Hazardous Air Pollutants).

REFERENCES

REFERENCES

Anadarko Petroleum Corporation, 2008. Reduced Emission Completions in DJ Basin and Natural Buttes. Producers Technology Transfer Workshop. http://www.epa.gov/gasstar/documents/workshops/2008-tech-transfer/rocksprings5.pdf

Armendariz, Al. 2009. Emissions from Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements. Prepared for Environmental Defense Fund.

California Code of Regulations, Title 14 - Department of Conservation, Division 2 – Division of Oil, Gas, and Geothermal Resources, Chapter 4 - Requirements, Article 1- Onshore Well Production

California Legislature, 2012. Assembly Bill No. 7, Introduced by Assembly Member Wieckowski. An act to amend Section 3213 of, and to add Article 3 (commencing with Section 3150) to Chapter 1 of Division 3 of, the Public Resources Code, relating to oil and gas. Article 3 - Hydraulic Fracturing.

California Legislature, 2012. Senate Bill No. 4, Introduced by Senator Pavley. An act to amend Section 3213 of, and to add Article 3 (commencing with Section 3150) to Chapter 1 of Division 3 of, Public Resources Code, relating to oil and gas. Article 3 – Hydraulic Fracturing.

California Department of Conservation; Division of Oil, Gas, and Geothermal Resources, 2012. Pre-Rulemaking Discussion Draft – Development, Regulation, and Conservation of Oil and Gas Resources – Environmental Protection – Hydraulic Fracturing.

California Department of Conservation; Division of Oil, Gas, and Geothermal Resources, 1993. California Oil, Gas, and Geothermal Resources, An Introduction.

California Department of Conservation; Division of Oil, Gas, and Geothermal Resources, 2012. Online Well Record Query - http://owr.conservation.ca.gov/WellSearch/WellSearch.aspx

Cardno ENTRIX, 2012. Hydraulic Fracturing Study PXP Inglewood Oil Field.

Code of Federal Regulations, Title 40- Protection of Environment, Parts 60 & 63, Oil and Natural Gas Sector: New Source Performance Standards and National Emissions Standards for Hazardous Air Pollutants Reviews; Final Rule.

Daniel J. Soeder and William M. Kappel, 2009. USGS: Water Resources and Natural Gas Production from the Marcellus Shale, pg. 5.

Eastern Research Group, Inc., 2007. Emissions from Oil and Gas Production Facilities. Prepared for the Texas Commission on Environmental Quality.

Eastern Research Group, Inc., 1999. Preferred and Alternative Methods for Estimating Air Emissions from Oil and Gas Field Production and Processing Operation. Prepared for the U.S. Environmental Protection Agency.

Ellwood, B., 2009. Reduced Emissions Completions Jonah Case Study. EnCana. http://www.epa.gov/gasstar/documents/workshops/2009-annual-conf/08ellwood.pdf

ENVIRON International Corporation, 2005. Oil and Gas Emission Inventories for the Western States. Prepared for Western Governors' Association.

ENVIRON International Corporation, 2008. Recommendations for Improvements to the Central States Regional Air Partnership's Oil and Gas Emission Inventories Prepared for Central States Regional Air Partnership.

ICF Consulting, 1999. Estimates of Methane Emissions from the U.S. Oil Industry. Prepared for the U.S. Environmental Protection Agency.

Independent Petroleum Association of America, 2008. Oil and Gas Producing Industry in Your State.

Kalfayan, Leonard, 2008. Production Enhancement With Acid Stimulation, 2nd Edition.

Marathon, 2007. Excape Completion Process Reduces Gas Emissions and Speeds Well Completions. 14th Annual Natural Gas Star Workshop. http://www.epa.gov/gasstar/documents/workshops/2007-annual-conf/06_phil_snider.pdf

Mian, Mohammed A., 1992. Petroleum Engineering Handbook for the Practicing Engineer, Volume II.

New York State Department of Environmental Conservation, 2009. Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program (DRAFT).

Public Resources Code, California Laws for Conservation of Petroleum and Gas, Division 3 – Oil and Gas, Chapter 1 – Oil and Gas Conservation.

Radian International LLC., 1996. Methane Emissions from the Natural Gas Industry, Vol. 2: Technical Report. Prepared for the Gas Research Institute and Environmental Protection Agency. EPA-600/R-96-080b. June 1996.

Radian International LLC., 1996. Methane Emissions from the Natural Gas Industry, Vol. 3: General Methodology. Prepared for the Gas Research Institute and Environmental Protection Agency. EPA-600/R-96-080c.

Radian International LLC., 1996. Methane Emissions from the Natural Gas Industry, Vol. 5: Activity Factors. Prepared for the Gas Research Institute and Environmental Protection Agency. EPA-600/R-96-080e.

Radian International LLC., 1996. Methane Emissions from the Natural Gas Industry, Vol. 6: Vented and Combustion Source Summary Emissions. Prepared for the Gas Research Institute and Environmental Protection Agency. EPA-600/R-96-080f.

Radian International LLC, 1996. Methane Emissions from the U.S. Petroleum Industry, draft report for the U.S. Environmental Protection Agency.

South Coast Air Quality Management District, 2004. Final Staff Report for Proposed Rule 1148.1 – Oil and Gas Production Wells and Proposed Amended Rule 222 – Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II.

US Department of Labor, 2012. Worker Exposure to Silica During Hydraulic Fracturing.

US Department of Labor, 2009. Oil and Gas Well Drilling and Servicing eTool - http:// www.osha.gov/SLTC/etools/oilandgas/index.html

US Energy Information Administration. Average Depth of Crude Oil and Natural Gas Wells 2003-2008. http://www.eia.gov/dnav/pet/pet_crd_welldep_s1_a.htm

US Energy Information Administration, 2010. Annual U.S. Natural Gas Wellhead Price. Energy Information Administration. Natural Gas Navigator. Retrieved December 12, 2010. http://www.eia.doe.gov/dnav/ng/hist/n9190us3a.htm.

US Environmental Protection Agency (US EPA), Office of Inspector General, 2013. EPA Needs to Improve Air Emissions Data for the Oil and Natural Gas Production Sector, Report No. 13-P-0161.

US Environmental Protection Agency (US EPA), Office of Compliance, 2000. EPA Office of Compliance Sector Notebook Project – Profile of the Oil and Gas Extraction Industry.

US Environmental Protection Agency (US EPA), 2010. Greenhouse Gas Emissions Reporting From the Petroleum and Natural Gas Industry: Background Technical Support Document. Climate Change Division. 84-89 pp.

US Environmental Protection Agency (US EPA), 2010. Methodology for Estimating CH4 and CO2 Emissions from Natural Gas Systems. Greenhouse Gas Inventory: Emission and Sinks 1990-2008.

US Environmental Protection Agency (US EPA), 2010. Methodology for Estimating CH4 and CO2 Emissions from Petroleum Systems. Greenhouse Gas Inventory: Emission and Sinks 1990-2008.

US Environmental Protection Agency (US EPA), Office of Air and Radiation, 2011. Oil and Natural Gas Sector: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution – Background Technical Support Document for Proposed Standards.

US Environmental Protection Agency (US EPA), 2005. Reduced Emission Completions (Green Completions). Natural Gas STAR. Producers Technology Transfer Workshop. Slide 12.

US Environmental Protection Agency (US EPA), 2006. Reducing Methane Emissions During Completion Operations. Natural Gas STAR. Annual Implementation Workshop. http://www.epa.gov/gasstar/documents/vincent.pdf

Werline, R. Natural Gas Star Workshop, 2009. http://www.epa.gov/gasstar/documents/workshops/okcity2009/devon_completions.pdf

APPENDIX A: COMMENTS AND RESPONSES

The following responses to comments were included into the Staff Report after the February 1, 2013 Set Hearing. Underline formatting to reflect additions has been omitted for ease of reading.

Response to Comments

1. Comment: It is critical that key stakeholders with extensive operational experience in oil field operations play an active role in rule language development. It is suggested that SCAQMD staff conduct a consultation meeting where experts and representatives from such agencies as the California Division of Oil, Gas, and Geothermal Resources (DOGGR) discuss the basics of drilling, well completion, and associated hydraulic fracturing as well as the air emission aspect of these activities.

Response: A meeting with industry representatives and the City of Long Beach staff was held February 26, 2013. The meeting included a presentation by industry stakeholders and a tour of the THUMS oil production facility in Long Beach. A summary of this meeting and site visit was made available to the PR 1148.2 Working Group on March 6, 2013. Throughout the rule development process for PR 1148.2, the SCAQMD staff has been working with the PR 1148.2 Working Group to facilitate a discussion between stakeholders in order to develop affective rule language. In addition to industry representatives, the PR 1148.2 Working Group includes community, environmental, and agency members who have participated in providing input to the proposed rule language.

2. Comment: Reference was made of communications directly with industry representatives and the prospect of forthcoming technical meetings not open to all members of the Working Group. All members of the Working Group should have access to all technical discussions and presentations, correspondence, attendance sheets, and meeting notes.

Response: Industry representatives invited the SCAQMD staff to participate in a meeting to learn more about oil and gas drilling and well completions and associated air emissions. The SCAQMD staff presented a brief summary of the meeting to the PR 1148.2 Working Group on March 5, 2013 meeting. The SCAQMD staff requested the presentation materials from the meeting and will distribute these presentations to the working group once received. Since the meeting was scheduled by industry representatives and the invitation was directed to the SCAQMD staff, it was up to the industry whether to extend the invitation to other stakeholders. The SCAQMD staff suggests that working group representatives contact industry representatives if they would like to participate in a site tour similar to the tour the SCAQMD staff participated in.

For additional discussion, the commenter is referred to the response to comment #1.

3. Comment: We are concerned with the timeliness of rule related documents. We received documents at 10:00 AM on the day of the public workshop, which is insufficient time to provide comments on the documents. The District should extend the public comment period to February 8, 2013 in order to allow sufficient time for public comments to be incorporated into the draft rule documents prior to the next Working Group meeting on February 14, 2013.

Response: Based on comments received, the SCAQMD staff recommended at the February 1, 2013 Set Hearing that the hearing for PR 11489.2 be delayed one month to allow additional time to work with stakeholders. In addition, two additional public consultation meeting were held on February 20, 2013 and the public comment period was extended to March 8, 2013. The Public Hearing for PR 1148.2 has been postponed to April 5, 2013; therefore, the written public comment period has been extended to March 8, 2013. Public comments may also be submitted verbally or in writing at the April 5, 2013 Governing Board meeting.

4. Comment: Additional public workshops should be held in every city where oil and gas well operations are taking place. These cities include: Long Beach, Wilmington, Carson, Inglewood, Lawndale, Culver City, and Montebello. Also, we support a delay in the public hearing date for PR 1148.2, so that these additional public meetings can be held prior to the Board hearing.

Response: The Public Hearing for PR 1148.2 has been postponed until April 5, 2013. In addition, two Public Consultation Meetings were added in the Baldwin Hills and Wilmington area. The times and locations for the meetings are noted below:

February 20, 2013 - 2:00 P.M.
West Angeles Church of God in Christ
Multipurpose Building
3045 Crenshaw Blvd Los Angeles, CA

February 20, 2013 - 6:00 P.M.
Wilmington Senior Citizen Center
1371 Eubank Ave.
Wilmington, CA

5. Comment: We are concerned that drilling equipment currently is not using the best available pollution control equipment because odors are present whenever drilling operations take place. We are concerned with environmental

impacts from equipment breakdowns and spills on drilling sites, which impact sidewalks, gutters, and storm drains in residential areas.

and

Ensure that oil and gas operations do not result in unsafe exposures for nearby communities or contribute to worsening air quality in the region. Require the use of best emissions control technology to minimize releases from wells, development and extraction processes, and associated equipment. Include green completions during well production, leak detection and control for all equipment and transmission lines, vapor recovery units and other BACT for all processing, treatment and transportation units.

Response: The purpose of PR 1148.2 is to gather air quality-related information on oil and gas well drilling, well completion, and well reworks. If the proposed rule is adopted, SCAQMD staff will analyze the data collected as part of the rule and conduct on-site observations and monitoring of oil and gas well operations to collect information on controls being used. Findings from the analysis and monitoring will be used to quantify emissions and potential health risks from these operations, and determine if any further regulatory actions, including implementation of best available control technologies, are necessary to reduce emissions from oil and gas well drilling, well completion, and well rework activities.

Existing SCAQMD regulations for public nuisances (e.g., Rule 402) continue to apply to any oil and gas well operations. Public concerns and/or complaints regarding odors or other air quality-related issues from oil/gas well operations may continue to be reported to the District via the 1-800-CUT-SMOG hotline or the online Complaint Reporting System on the SCAQMD website (www.aqmd.gov). Reports or complaints of chemical spills impacting drilling sites, public rights-of-way, or storm drains should be directed to the appropriate agencies having jurisdiction over such matters, such as the local fire department, law enforcement agency, and/or regional water quality control board.

6. Comment: The proposed rule should include requirements for establishment of an Environmental Justice Mitigation Fund in order to help compensate residents who are negatively impacted by oil and gas well activities.

Response: Proposed Rule 1148.2 does not include an Environmental Justice Mitigation Fund. The Governing Board will receive the commenter's request through this staff report. In addition, the commenter can make this comment to the Governing Board at the Public Hearing on April 5, 2013.

Scope and Applicability of PR 1148.2

7. Comment: The proposed rule may go beyond the directive of the Governing Board which was specifically focused on hydraulic fracturing-related activities by including all pre-production processes.

Response: At the October 5, 2012 SCAQMD Governing Board meeting, staff was directed to initiate rule development to include the following: Require reporting of chemicals used when hydraulic fracturing is conducted in the Basin; determine if existing SCAQMD regulations adequately cover oil and gas production activities if conducting hydraulic fracturing; report on the initiation and progress of rule development at the Board's Stationary Source Committee within 120 days (on or before February 15, 2013).

As directed by the Board, SCAQMD staff researched and analyzed hydraulic fracturing operations related to oil and gas extraction and production. During this analysis, staff found that other activities related to oil and gas well drilling, well completion, and well reworks may have similar potential air quality impacts as hydraulic fracturing activities. For example, one of the potential sources of air emissions from hydraulic fracturing operations involves the pressurized injection of fracturing fluids into the wellbore and subsequent flowback of these fluids, which may contain VOCs, methane, and hydrogen sulfide carried back to the surface from the oil/gas reservoir, in addition to the myriad of chemicals contained in the base fracturing fluid. There is a potential for airborne emissions from the flowback fluids where these fluids may be open to the atmosphere upon returning to the surface. Other operations, such as well drilling, well acidizing, and gravel packing also involve the injection or placement of fluids into the wellbore, where they may come in contact and mix with reservoir fluids/gases, and return to the surface where there is a potential for airborne emissions when these fluids are exposed to the atmosphere. Based on these findings, staff recommended that oil and gas well drilling, well completion, and well rework activities occurring at any time during the life of an oil or gas well, including hydraulic fracturing, be included in the scope of the proposed rule so that additional data and information may be collected to further assess potential emissions from these operations. For further discussion of this issue, the commenter is referred to the response for comment # 9.

8. Comment: We are concerned that the initial Board directive was for staff to prepare a report on progress regarding research on hydraulic fracturing operations, but the report has developed into a new rule. More timely and thoughtful consideration should be taken to develop an appropriately considered rule.

and

The pace of this rulemaking has been rushed. As a result, there has been insufficient time provided to ensure a well written rule or to adequately explore alternatives. Our concern is that the rule is likely to create unnecessary burdens without yielding the desired results. We urge the District to slow their rulemaking pace in order to adequately educate themselves on the activities they intend to regulate, which should involve further outreach to experts (DOGGR, other agencies, and industry).

Response: At the October 5, 2012 Governing Board Meeting, staff presented a report on the Technology Symposium for Hydraulic Fracturing in the South Coast Air Basin. This report also included three recommendations. The third recommendation was for staff to provide a report on the *initiation and progress of rule development* to the Board's Stationary Source Committee within 120 days.

On January 18, 2013, the SCAQMD staff presented the progress of rule development on Proposed Rule 1148.2 to the Board's Stationary Source Committee. During the presentation, SCAQMD staff highlighted the proposed approach for rulemaking, the rulemaking process, the method used to establish the applicability of sources to under Proposed Rule 1148.2, and Proposed Rule 1148.2 requirements. The purpose of Proposed Rule 1148.2 is to gather air quality-related information on oil and gas wells and to identify existing practices, if any, used to minimize air quality impacts from drilling and well completion activities.

Proposed Rule 1148.2 has two main components: notification and reporting. The proposed rule does not include any pollution control requirements. The basic concepts of the proposed rule have not changed since the first draft was released on January 11, 2013. Many of the changes in the proposed rule are based on comments received during the working group meetings and public workshops.

Based on comments received, the SCAQMD staff recommended at the February Board Meeting to delay the hearing for 30 days so the proposed rule would be considered for adoption by the Governing Board on April 5, 2013. This will allow an additional month for the affected sources and the public to provide input into the development of the proposed rule. The commenter is referred to the response for comment #9 on the issue of expanding the scope of the proposed rule beyond hydraulic fracturing.

9. Comment: We question the need to expand the scope of the rulemaking to some of the activities mentioned in the December 12, 2012 Working Group meeting, specifically activities such as post-production well completion stimulation, workovers, and routine well maintenance activities that occur later in the life of producing wells. The scope should be defined to address activities with significant emissions potential while keeping the

amount of data manageable and avoiding unnecessary and duplicative agency notification and reporting burdens for industry.

and

The need to expand the scope of the rulemaking beyond hydraulic fracturing and to well "reworks" is unsubstantiated since: 1) rework activities are generally much less significant in nature (i.e., smaller volumes of materials and shorter duration); and 2) the regulatory gaps identified by Staff (e.g., venting and flaring of flowback emissions) are generally not relevant to rework activities that occur in mature producing wells.

Response: The SCAQMD staff was directed by the Governing Board to initiate rule development to include reporting on the chemicals used during hydraulic fracturing conducted in oil and gas production activities, and possible additional reporting and public notification requirements. The Governing Board also directed the SCAQMD staff to determine whether existing SCAQMD regulations adequately cover oil and gas production activities when hydraulic fracturing is used.

During the evaluation of hydraulic fracturing for oil and gas well operations, the SCAQMD staff concluded that there are potential air emissions associated with hydraulic fracturing from particulate matter during mixing hydraulic fracturing fluids, and hydrocarbons and possibly toxic emissions from flowback fluids that return to the surface. Upon further analysis, the SCAQMD staff found that well drilling, well rework, and other well completion operations have similar emission sources as well completion activities such as hydraulic fracturing. The SCAQMD staff evaluated these emissions sources relative to existing rules and regulations. SCAQMD staff found existing SCAQMD rules either did not cover these operations or a rule existed, however, it was not the intent of the rule to cover such operations.

At the Stationary Source Board Committee meeting on January 18, 2013, SCAQMD staff presented these findings to the committee and recommended that additional operations beyond hydraulic fracturing be included in the proposed rule. One of the Committee members commented that it was not the intent to limit the scope to hydraulic fracturing if staff's evaluation suggested that that there are other emission sources with similar regulatory gaps.

10. Comment: Hydraulic fracturing is of great concern to the public and additional public notification requirements should be included in the proposed rule. The rule title is misleading to the public because it does not mention hydraulic fracturing.

Response: Proposed Rule 1148.2 includes a provision that requires posting of pre-project notification information on the District's website within 24 hours of receipt from the owner/operator (see paragraph (d)(4) of the proposed rule). The notification will specify the type of activity that is being conducted. So if a person is primarily concerned with "hydraulic fracturing" they can focus on those types of notices.

The title of the proposed rule is broad enough to include the various activities that are covered under the proposal while providing a sufficient description of the proposed rule. The proposed rule includes notification and reporting for a variety of activities. If the title were to include "hydraulic fracturing" it would also be appropriate to include the other activities that are covered under the proposed rule such as drilling, reworks, well completions which includes hydraulic fracturing, acidizing, and gravel packing or any combination thereof, making the rule title very lengthy.

11. Comment: Proposed Rule 1148.2 is not needed, because it duplicates existing regulations. Health and Safety Code section 42303 already requires sources to report air quality information and AQMD Rule 109 already contains requirements for recordkeeping. The reporting requirements in PR 1148.2 are not needed since industry already reports most of the same information to DOGGR and CARB. In addition, AB 32 already requires reporting of greenhouse gas emissions. The proposed rule's recordkeeping and reporting requirements place an unnecessary burden on industry.

and

We believe Proposed Rule 1148.2 is not needed because it does not meet the California Health and Safety Code requirements specifying that rules adopted by the District must be within the scope of the District's regulatory authority; and be consistent with existing laws and regulations. Additionally, the proposed rule is duplicative of comprehensive draft regulations of DOGGR that address the same topic of disclosure.

Response: We understand the commenter's When the SCAQMD staff evaluated the existing rules and regulations governing well drilling, reworks, and well completion activities, gaps were identified in the existing regulatory framework controlling the emissions from these activities. In addition, the information submitted to DOGGR and CARB is not sufficient to address the emission sources applicable under PR 1148.2. The DOGGR information is related to well integrity drilling requirements while the CARB information (through the PERP Registration Program) does not provide enough information to calculate the emissions from combustion

equipment used during each well event. Finally, while AB 32 does require reporting of green house gasses (GHG), the focus of PR 1148.2 is on VOC, NOx, particulates, and air toxics emissions form well drilling, reworks, and well completions.

The information being reported under Proposed Rule 1148.2 is needed. The SCAQMD did extensive review to find emissions data on drilling, reworks, and well completion activities. As discussed in Chapter 2, there is some information available regarding oil and gas operations but very little to no information regarding particulate emissions from mixing operations and VOC and toxic emissions data from flowback fluids.

Health and Safety Code 42303 – Requirements for Information, provides the SCAQMD with the authority to collect information which discloses the nature and extent of air contaminants for a permitted source. While this authority could have been used to evaluate the emission potential of well operations from individual permit holders, the SCAQMD staff felt that a rule approach was the best mechanism to collect the necessary information. Drilling, well completion, and rework operations occur over a relatively short duration. However, these operations may be intense and may occur frequently. The notification requirements will provide the SCAQMD staff of when these operations will take place so staff can observe and conduct emissions monitoring and sampling. The reporting requirements under the proposed rule allow the SCAQMD to collect this information in an efficient and systematic manner. The SCAQMD staff believes that the results will be more comprehensive as all oil and gas wells conducting these operations will be required to submit emissions and chemical use reports.

In regards to the issue that PR 1148.2 places an unnecessary burden on industry, the SCAQMD Governing Board considers the operations conducted at oil and gas production facilities of sufficient concern to warrant an evaluation of their practices. In order to limit the impact on industry, the emissions reporting provisions of PR 1148.2 will sunset in two years after rule adoption.

12. Comment PR1148.2 is unnecessary, overly burdensome to industry, and is not the best approach to gather data. Instead of the current approach, we recommend a cooperative approach, which would include data sharing between industry and District staff, and industry-hosted workshops on pre-production operations for District staff. The State Oil and Gas Supervisor, Tim Kustic, also proposed a similar alternate approach to gather data at the January 15 Working Group meeting.

Response: The commenter is referred to the Response to Comment # 11. The SCAQMD staff believes that a rule approach to collect emissions data is

the appropriate approach. As discussed in Response #11, there is not sufficient emissions data. Oil and gas forecasts indicate that the potential for more oil production activities may substantially increase in California. Collecting data through a rule approach will allow the SCAQMD staff to collect emissions data more effectively and efficiently. Information is required to be submitted electronically using an approved format, ensuring that data will be submitted in a consistent format so SCAQMD staff can conduct analyses efficiently.

13. Comment: We strongly recommend that SCAQMD focus the scope of the proposed rule and any voluntary data gathering on hydraulic fracturing, not all well completion techniques. Given the EPA's data and conclusions, SCAQMD should consider a more focused, phased approach starting with gas wells and then moving to oil wells if warranted. A summary of EPA's air emissions analysis that informed their decision to only address natural gas wells completed or recompleted with hydraulic fracturing in the NSPS is below:

Well Completion Category	**Emissions (Mcf/event)**	**Emissions (tons/event)**		
	Methane	Methane	VOC	HAP
Natural gas well completion without Hydraulic fracturing	38.6	0.8038	0.12	0.009
Natural gas well completion with hydraulic fracturing	7623	158.55	23.13	1.68
Oil well completions	0.34	0.0076	0.00071	0.0000006
Natural gas well recompletion without hydraulic fracturing	2.59	0.0538	0.0079	0.0006
Natural gas well recompletion with hydraulic fracturing	7623	158.55	23.13	1.68
Oil well recompletions	0.057	0.00126	0.001	0.0000001

EPA's air emissions analysis spanned several studies conducted over the past few decades and showed that emissions from natural gas wells completed or recompleted without hydraulic fracturing, and all oil well completions, had minimal emissions compared to natural gas wells completed or recompleted with hydraulic fracturing. EPA found that wells completed only with acidizing and/or high-rate gravel packing (i.e., not hydraulically fractured) generate significantly less air emissions.

High rate gravel packing should not be included in the scope of this rule because there are minimal air emissions relative to hydraulic fracturing (both conventional and high volume hydraulic fracturing) operations. In comparison to hydraulic fracturing operations, HRGP operations use less

water and sand, lower injection pressures, and have significantly lower flowback volumes. These differences result in minimal to no risk of emissions from the dry materials that are used and less potential for ingredients used in the process to be emitted. Equipment run time for HRGP operations are also reduced in comparison to hydraulic fracturing operations, resulting in fewer emissions from mobile and portable equipment.

Acidizing operations should also be excluded from the scope of this rule because there are minimal emissions from this process. The volumes of water, acid, and additives used are much lower than those used for hydraulic fracturing and HRGP operations, and the injected fluids are not intended to fracture the formation. The quantity of flowback from acidizing is minimal in comparison to hydraulic fracturing, and the flowback is more neutral because the acid is typically broken down or "spent" following the process of dissolving the basic minerals in the formation. Finally, acidizing is typically performed in a closed system in which the materials used or generated as flowback are not readily exposed to the atmosphere.

Response: The SCAQMD staff has reviewed the Technical Support Document (TSD) in the federal New Source Performance Standards (NSPS) for the recently adopted NSPS covering the crude oil and natural gas production source category. The newly revised NSPS covers primarily onshore natural gas well production undergoing hydraulic fracturing. The U.S. EPA produced one main TSD and one supplemental TSD for the adopted NSPS. Emissions were estimated for completions and recompletions. Both oil and gas wells were evaluated. However, only gas wells were evaluated with and without hydraulic fracturing. PM and NOx emissions were not evaluated. The supplemental TSD document provides an evaluation of the emission factor for hydraulically fractured gas well completions and recompletions. The paper also evaluates changes to the NSPS for storage vessels.

The emissions methodology to estimate emissions in the TSDs was based on methane emissions determined from U.S. EPA's GHG inventory, EPA's Inventory of Greenhouse Gas Emissions and Sinks: 1990-2008 (Inventory). U.S. EPA then used an approximate gas composition ratio of VOCs and HAPs in methane from previous studies as a multiplier to estimate VOC and HAP emissions. The reference for this gas composition ratio approximation (retrieved by SCAQMD staff from the NSPS rule development docket) provided documentation on data sources for gas well production, but lacked detail on oil well production. It was unclear to SCAQMD staff on how and where the oil well data was collected.

The SCAQMD staff considers the emission methodology for completions and recompletions in the TSD to be insufficient to warrant removing oil well drilling or well completions and recompletions from inclusion in the proposed rule. The methodology used by EPA is an indirect measurement tool that doesn't reflect the actual emissions at our local well sites. In addition, because the estimates for HAPs originate from a natural gas surrogate, it potentially omits certain HAPs not found or tested for in the surrogate gas. The SCAQMD staff further concluded that the TSDs showed significant gaps in the emissions provided. For instance, the TSD did not evaluate PM emissions from the dry material mixing operations conducted for drilling, reworks, and well completion operations. In addition, while the TSDs for the NSPS estimated VOC and HAP emissions from oil well completions and recompletions, it did not estimate the emissions from oil wells undergoing hydraulic fracturing.

The SCAQMD staff disagrees with the comment that high rate gravel packing should not be applicable under the proposed rule. This method involves the use of water, sand, gravel, and chemical additives to place sand and gravel near the well itself to limit entry of formation sands and fine-grained material into the wellbore. Gravel small enough in size to prevent formation of fine particles to enter and mix in the wellbore is pumped in at a high-rate of pressure and held in place by the well perforations. Although this method is not intended to increase the permeability of the producing formation, fractures are still created with similar fluids that are used in hydraulic fracturing and other well completion techniques intended to fracture formations. Since similar fluids are used, there is the potential for air emissions from the flowback process, regardless of the volumes injected.

The SCAQMD staff disagrees with the comment that acidizing should be excluded from the scope of the proposed rule. This method involves the introduction of acids into the wellbore. Acidizing can be used either as a maintenance process where the intent is to initiate a wellbore cleanup, or as a well completion technique such as well stimulation. When acidizing is used as a well completion technique, the process involves the injection of acids under pressure to remove an impediment to production by dissolving acid-soluble solids. This process is normally termed matrix acidizing and is performed at pressures below the formation fracturing pressure. When acidizing is used as a well stimulation technique, the intent is to fracture the surrounding formation by utilizing injection pressures above the formation fracturing pressure. This procedure is referred to as fracture acidizing or acid fracking. Fracture acidizing is similar to hydraulic fracturing in that it is designed to open up channels in the rock formation so as to provide additional conduits for oil or gas to flow into the well. Some of the most common acids used in either acidizing processes include Hydrochloric (HCl), Hydrofluoric (HF), and

Acetic (CH3COOH). The SCAQMD staff is concerned with the potential air emissions from these operations and includes them in the proposed rule so we can gather additional information on the practices and chemical additives involved.

The SCAQMD staff disagrees with the comment that the information presented in TSDs strongly suggest that oil wells do not represent an air emission problem, and therefore the proposed rule should only focus on gas wells undergoing hydraulically fracturing. In fact in a response to a comment on why oil wells were not included in the Final NSPS for hydraulic fractured natural gas wells, U.S. EPA in their Federal Register Notice for the Final regulations stated that "… the EPA does not have sufficient data on VOC emissions during completion of hydraulically fractured oil wells to set standards for these operations at this time." Thus, the U.S. EPA concluded that the existing information, including the additional studies documented by industry for SCAQMD staff to consider, was incomplete and lacking sufficient information to warrant setting emission controls on oil well completions using hydraulic fracturing. In contrast, the goal of Proposed Rule 1148.2 is to close this information gap and provide the SCAQMD staff with enough knowledge to evaluate whether oil and gas well drilling, well reworks and well completion activities represent an air emission problem that needs further controls.

14. Comment: Storage tanks are a significant source of VOCs and greenhouse gases, and should be considered as emission sources for this rule. If tanks are included in the rule's applicability, then more detail will need to be included in rule requirements.

Response: The reporting of the number and sizes of storage tank is excluded from the proposed rule. However, the manner in which flowback fluids are collected and stored are part of the reporting requirements under PR 1148.2 (e)(1)(E)(ii). Through this data collection process, the SCAQMD staff plans on collecting emissions samples during the collection and handling of flowback fluids of which would include emissions samples from storage tanks that are used to collect flowback fluids.

Existing Regulations for Oil and Gas Wells

15. Comment: Many of the activities described in staff presentation for the December 12, 2012 Working Group as "pre-production" activities may already be covered by existing SCAQMD rules and/or existing CARB regulations for emission reporting and control. Emissions from these activities are negligible particularly considering stringent emission controls already in place.

Response: The reference to pre-production activities has been removed and the proposed rule is now applicable to all well drilling, well reworks, and well completions. The SCAQMD staff has determined that there are gaps in the applicability of existing SCAQMD rules to these processes and PR 1148.2 is needed in order to determine their emission potential. The SCAQMD staff considers it premature to conclude that the emissions from these processes are negligible. One of the purposes of PR 1148.2 is to determine the magnitude and type of emissions.

16. Comment: We believe Rules 401 and 403 apply to fugitive dust emissions from mixing of drilling mud and hydraulic fracturing fluid and that Rules 404 and 405 could also be interpreted to apply. Rule 401 imposes visible emissions limits on the "discharge into the atmosphere from any single source of emissions whatsoever" and Rule 403 imposes requirements on "any activity or man-made condition capable of generating fugitive dust." It specifically prohibits "the emissions of fugitive dust from any active operation" if that dust "remains visible in the atmosphere beyond the property line f the emission source" and requires the use of "best available control measures" for activities described as (importing/exporting of bulk materials" and "stockpiles/bulk material handling." Rules 404 and 405 limit, respectively, the concentration and the mass of particulate matter contained in a "discharge into the atmosphere from any source." SCAQMD staff should conduct further investigation as to whether or not there is a "rule gap" related to this activity.

Response: SCAQMD staff agrees that Rule 401- Visible Emissions, would apply to any visible emissions from operations related to well drilling, well completion, and well rework operations. Potential sources of visible emissions during well drilling, well completion, and well rework operations may include internal combustion engines (used to power drilling equipment, pumps, compressors, and other related equipment) and particulate emissions from mixing/blending dry materials with drilling and/or well completion fluids. Rule 403 would also apply to certain activities related to oil and gas well operations, including site preparation activities (i.e., earth-moving, excavation, and grading activities) and dust emissions from motor vehicle movement. However, the intent of the rule is to control fugitive dust from open storage piles, earth-moving activities, construction/demolition activities, disturbed surface areas, and vehicular movement, and would generally not apply to fugitive dust emissions from well drilling, well completion, or well rework operations.

SCAQMD Rule 404- Particulate Matter- Concentration and Rule 405- Solid Particulate Matter- Weight, establish emission rate and concentration thresholds for particulate matter emissions from various sources. However, the rule thresholds can only be tested by source testing of point sources where there is a stack present, and are not designed or

intended to regulate or reduce emissions from fugitive sources. Review of existing SCAQMD regulations found that fugitive dust emissions from oil and gas well drilling, well completion, and well rework operations would not be subject to Rules 403, 404, or 405. Additionally, staff's review of oil and gas well operations found that crystalline silica (a known human carcinogen) is a common proppant added to hydraulic fracturing fluids. Typically, dry crystalline silica is added to the hydraulic fracturing fluid via conveyors/hoppers prior to the fluid being injected into the wellbore. Since crystalline silica is a known air toxic and emissions may occur during the mixing/blending process, staff believes that further evaluation of the processes is necessary in order to determine if visible emission limits are sufficiently health protective of nearby receptors, particularly in cases where air toxics may be present.

17. Comment: Emissions related to drilling and hydraulic fluid as it returns to the surface (flowback) may not be controlled by existing SCAQMD rules. However, these emissions are subject to reporting under two existing CARB regulations: Portable Equipment Registration Program (PERP) and the Greenhouse Has (GHG) Mandatory Reporting Regulation (MRR). PERP annual reporting requires any emissions from drilling rigs that perform oil well drilling and completion activities, including venting or flaring. CARB's October 2010 revised MRR requires portable equipment emission to be reported annually and requires third-party verification.

Response: The PERP regulation requires registration of the portable equipment used at well sites during drilling and well completion operations. The SCAQMD staff evaluated the possibility of acquiring information on portable combustion engines used at well sites from the PERP registration program, but concluded that the information made available through the program was not sufficient to estimate emissions and a need still existed to require that this information be reported under the proposed rule. The PERP program does require operators to report the Tier level and engine family identification of each piece of equipment. However, due to a recent program change in 2011, CARB no longer requires operators to report annual activity data. As a result, emissions cannot be calculated for the available PERP information from each well drilling, rework or completion event was unavailable. In addition, the identity and specifications on each piece of equipment was not discernable from the PERP registration identity because rather than identify one unique piece of equipment with one registration permit, the PERP registration permits included multiple pieces of equipment under one permit.

The statewide GHG reporting regulation does require reporting of well drilling and completion operations. However, GHGs are not the focus of PR 1148.2. PR 1148.2 seeks to determine the magnitude of VOC, NOx, particulate emissions and identify the type and amount of toxic emissions,

if any, emitted by oil and gas well drilling, reworks, and completion activities. Therefore, the statewide GHG reporting regulation cannot be used as a replacement for the reporting requirements in PR 1148.2.

18. Comment: Flowback fracturing fluids in the Los Angeles Basin are not directed to open pits as is common practice in other areas of the country, they are directed to fluid handling systems subject to the requirements of rules such as 463, 1173, 1176, and 1178. Flowback fluid is closely monitored for the first sign of hydrocarbons and is directed, if not already directed, to a closed system in compliance with the requirements of Rule 1148.1(d)(6). It is also closely monitored for safety reasons. Also, Rule 1148.1(h)(2) requires such activities to be conducted in a manner which minimizes emissions to the atmosphere. If gas is flared during flowback activities, it is with the use of a properly permitted flaring device. Therefore we believe emissions from fracturing fluid flowback are minimal and the operations are already regulated.

Response: Although some industry stakeholders have indicated that flowback fluids are not typically directed to open pits/tanks in operations conducted in Los Angeles, the SCAQMD does not have sufficient information about the standard procedures and practices of oil and gas well operators in the Basin to confirm these statements. The information and data to be gathered as part of PR 1148.2 will help the SCAQMD staff to determine the level and extent of any air pollution controls currently being implemented during oil and gas well drilling, well completion, and well rework operations. SCAQMD staff analysis of oil and gas well operations found potential emission sources of concern from well completion activities related to the collection, treatment, and storage of well completion fluids that return to the surface (i.e, "flowback"). As the well completion fluids come into contact with the formation and hydrocarbon-bearing zones, the resulting flowback may be entrained with a variety of formation materials, including brines, heavy metals, radionuclides, and organics. This is in addition to the chemical additives originally injected during the well completion activities used to prepare the well or fracture the formation. Flowback that returns to the surface and goes into pits or tanks that are open to the atmosphere has the potential to emit organic compounds and hazardous or toxic air pollutants into the air. SCAQMD Rule 1176 sets forth requirements for wastewater that is stored or collected in sumps that are a part of a facility's wastewater system, however, there is no existing SCAQMD rule for oil and gas field facilities that collect and store flowback wastewater in portable tanks or other containments that are not part of a wastewater system.

19. Comment: SCAQMD staff should further investigate emission control requirements of SCAQMD Rules 1173 and 1148.1, both of which apply to oil and gas production to determine if there are gaps in the regulations.

Response: SCAQMD Rule 1148.1 – Oil and Gas Production Wells, reduces VOC emissions from well cellars as well as from sources of untreated process gas located at oil and gas production facilities. SCAQMD Rule 1173 – Fugitive Emissions of Volatile Organic Compounds, intends to limit emissions from VOC leaks from components such as valves, fittings, pumps, compressors, pressure relief devices, diaphragms, hatches, sight glasses, and meters at oil and gas production fields, natural gas processing plants, and pipeline transfer stations. Generally, these regulations apply to oil and gas production operations, which involve the actual extraction, separation, and treatment of crude petroleum and natural gas. PR 1148.2 focuses primarily on oil and gas well drilling, well completion, and well reworks, which are well development operations that typically occur prior to the extraction of oil or natural gas.

20. Comment: It is critical that the SCAQMD staff coordinate with DOGGR as it moves forward on hydraulic fracturing rulemaking to ensure that regulatory overlap or conflicting requirements are avoided. Many of the requirements proposed for PR 1148.2 duplicate DOGGR requirements.

Response: SCAQMD staff has coordinated efforts with DOGGR throughout the rulemaking process in order to avoid duplicative or conflicting requirements. While some aspects of the proposed requirements in PR 1148.2 may be similar to DOGGR's initial discussion draft hydraulic fracturing rulemaking, it is important to note that the principal focus of PR 1148.2 is the air quality related impacts from oil and gas well operations. For example, while DOGGR's draft requirements may require well owners or operators to report chemical usage only during hydraulic fracturing operations, the proposed requirements in PR 1148.2 would require well owners or operators to report chemical usage for all well drilling, well completion, and well rework operations, with an emphasis on information related to substances with potential for airborne emissions (i.e., particulates from mixing of dry materials, emissions from internal combustion engines, and emissions from well completion fluids).

21. Comment: With regard to confidentiality and trade secret information, the District should refer to Rule 403 for gas monitoring and inspection and use the same approach with this rule. Operators must keep records and report to the District, and then the District makes a determination. DOGGR has a similar process for well drilling operations. Operators must submit all chemical information and then highlight information that is to be excluded as confidential. The District should refer to existing procedures and rules for requirements for reporting of confidential information.

Response: Rule 403 – Fugitive Dust applies to dust emissions from construction and demolition activities crossing property lines. There are no confidentiality

and trade secret requirements in the rule. As a result, the SCAQMD staff is unclear what parts of this rule the commenter wants us to use in PR 1148.2.

The proposed rule has provisions for trade secrets. A source claiming trade secret protection must provide a justification for the basis for claiming trade secret. Trade secrets, with the exception of emission data, may include, but are not limited to, any formula, plan, pattern, process, tool, mechanism, compound, procedure, production data, or compilation of information which is not patented, which is known only to certain individuals within a commercial concern who are using it to fabricate, produce, or compound an article of trade or a service having commercial value, and which gives its user an opportunity to obtain a business advantage over competitors who do not know or use it. Gov. Code Sec. 6254.7(d). When a member of the public requests to inspect a public record or the SCAQMD makes information received under subdivision (f) available on its website, claims that certain information constitutes a trade secret will be subject to evaluation under the District's Guidelines for Implementing the California Public Records Act. If the District determines that the justification for claiming trade secret is inadequate, the District shall promptly notify, by certified mail, the entity who claimed trade secret that the information will be released after 15 calendar days from the date of such notice. Notice will also be provided by email. Such an entity shall also be advised of its right to bring appropriate legal action to prevent disclosure, and of its right to further respond.

22. Comment: The fugitive dust emissions from mixing drilling mud and hydraulic fracturing fluid are expected to be minimal since the mixing processes involve a liquid with high water content. Hydraulic fracturing fluids are often mixed and prepared by third party suppliers off-site and not under the control of the operator of the well site where they are being used. Proppant materials (usually silica sand) are transported to the well site in closed containers and added to the fracturing fluids at the well site in a closed system with very limited potential to cause fugitive emissions. Mixing drilling muds generally occurs onsite and typically involves manual addition of bagged solid materials such as bentonite clay and barite to the liquid drilling mud stream though a mixing hopper and at a rate that minimizes dust. The dust issues from these operations are worker protection issues and subject to OSHA regulations.

Response: The proposed rule requires that operators provide the identity, amount, and method of mixing and combining of dry materials used in well drilling, well reworks, and well completion operations. The SCAQMD staff is concerned about type, amount, and particle size of particulate emissions from the mixing operations. In the initial evaluation of these processes, SCAQMD staff concluded that dry mixing processes have the potential to

create fugitive dust emissions. The SCAQMD staff is also concerned with the potential toxicity of some dry materials such as crystalline silica used in the hydraulic fracturing process, which is a known air toxic. Emissions reporting, chemical use data, and emissions monitoring and sampling will be used to better understand the amount, type, particle size, and emission rate of fugitive dust emissions. Based on this information, the SCAQMD staff can better assess if existing practices are sufficient or additional measures are needed.

The SCAQMD staff agrees that worker exposure to fugitive dust from dry material mixing operations at the well site are subject to OSHA regulations. However, depending on the extent of these dust emissions, there may be localized air quality impacts that may impact nearby receptors.

Emissions from Oil and Gas Well Operations

23. Comment: The SCAQMD staff is encouraged to study the increasingly broad number of studies on Hydraulic Fracturing, including studies by the EPA and Environmental Defense Fund which comment specifically on air emissions.

Response: The SCAQMD staff has provided a summary of the TSDs and studies which had non-GHG emissions information in Appendix B of the Staff Report. In addition, the commenter is referred to the response for comment #13 for further discussion of our review of the TSDs and a recent report from the U.S. EPA titled "EPA Needs to Improve Air Emissions Data for the Oil and Natural Gas Production Sector" in February 2013.

SCAQMD staff has been made aware by the oil and gas industry of several supporting studies that were referenced in the Technical Support Document in the federal New Source Performance Standards (NSPS) for the recently adopted NSPS covering the crude oil and natural gas production source category. The newly revised NSPS covers primarily onshore natural gas well production undergoing hydraulic fracturing. There are supporting studies that assess the air emission potential from oil well production and well completion activities that would be covered under PR 1148.2. The SCAQMD has evaluated these studies to determine if they have an impact on the proposed rule development. We specifically evaluated whether the studies contained any estimates on: (1) PM emissions from dry mixing operations; (2) VOC and toxic emissions from flowback during well completions and when drilling fluids return to the surface; and (3) other air quality data related to well drilling, reworks, and well completions.

Contained in the primary technical support document is a listing of fifteen additional reports and studies that the U.S. EPA reviewed by the agency for consideration in the adopted regulation. Of the fifteen supporting studies, six specifically evaluated the green house gas emissions from the oil and gas development, production, and distribution process. Four studies evaluated either the economic, availability, and/or production side of the industry, and five out of the total fifteen studies evaluated non-GHG air emissions from some aspect of the oil or gas well processes. One study did not have emission information.

In general, all five of the studies evaluating non-GHG emissions estimated VOC emissions. Of these, HAPs were estimated in two of the five. Both VOCs and HAPS were not calculated directly, but rather estimated using natural gas emissions as a surrogate. This is similar to what the U.S. EPA did in their TSDs. Exhaust emissions from drilling and well completion equipment were also estimated in three of the five studies.

In addition to the studies discussed above, WSPA submitted a study conducted by the Environmental Defense Fund (EDF). The EDF study is entitled *Greater Focus Needed on Methane Leakage from Natural Gas Infrastructure.* The SCAQMD reviewed this study and concluded that the study focuses on GHGs in the natural gas production and distribution network. There is no information on the focus of PR 1148.2 which deals with well drilling, well reworks, and well completions.

The SCAQMD staff further concludes that the studies evaluated showed significant gaps in the emissions provided. For instance, no studies evaluated PM emissions from the dry material mixing operations conducted for drilling, reworks, and well completion operations. One study which included the emissions for hydraulic fracturing on oil and gas wells only included the emissions from the engines that drive the fracturing fluid pumps, and did not include the emissions from the flowback. In at least two of the five studies estimating non-GHG emissions, the SCAQMD staff could not obtain the referenced appendices in order to evaluate the detailed emission estimation methodologies (including emission factors). However, the SCAQMD is pursuing additional avenues to obtain the necessary supporting documentation. Finally, the SCAQMD staff noted that all the studies lacked detail on the specific emission sources covered under PR 1148.2 involved in the estimate. For instance, no information on the size, type, and hours of operation were provided for the equipment exhaust emissions provided.

24. Comment: Emissions from drilling mud flowback are not significant. Hydrocarbons will only be present in the drilling fluid when the well has been drilled through a hydrocarbon-bearing zone, usually near the bottom of the well.

Even then, one of the primary purposes of drilling mud is to balance the pressure at the bottom of the well by preventing hydrocarbons from entering the wellbore and migrating to the surface. This is critical to maintain the safety of personnel and equipment in the vicinity of the drilling operations as well as to prevent excess emissions.

Response: We agree that the potential for emissions would most likely occur when the drilling equipment reaches the hydrocarbon production zone. However, the SCAQMD staff is concerned about the potential VOC emissions from the well drilling process when the drilling mud returns to the surface. SCAQMD staff does not yet know whether these emissions are significant. The notification requirements of PR 1148.2 will provide the opportunity for SCAQMD staff to be on-site during the drilling process to monitor or collect samples in order to determine the magnitude of emissions.

Comments Regarding Draft Rule Language (dated 1/29/2013) – Purpose and Applicability

25. Comment: We suggest the title of the rule should read: NOTIFICATION AND REPORTING REQUIRMENTS FOR~~OF PRE-PRODUCTION OPERATIONS OF~~ OIL AND GAS WELLS AND CHEMICAL SUPPLIERS.

and

We suggest that the purpose of the rule should be to gather air quality-related information on oil and gas well drilling, completion, and rework activities.

and

We suggest the Applicability of the rule should read: "This rule applies to any owner or operator of an onshore oil or gas well located in the District that is conducting <u>oil or gas well</u> drilling, completion, and reworks. In addition, . . ."

Response: The proposed rule title, purpose and applicability have been revised to reflect the suggested revisions.

26. Comment: We propose amendments to the language in the PR 1148.2 "purpose" and "applicability" sections, for consistency with other recommended rule revisions and to ensure that hydraulic fracturing operations occurring during any time in the life of a well would be subject to the proposed rule. The proposed draft rule dated January 16, 2013 would not apply to wells hydraulically fractured after well completion. The proposed amendments are as follows: 1) Purpose- "The purpose of this rule is to gather air

quality-related information on oil and gas well drilling, well completion operations, rework, and hydraulic fracturing operations occurring at any time in the life of a well."; 2) Applicability- "This rule applies to any owner or operator of an onshore oil or gas well located in the District that is conducting oil or gas well drilling, well completion operations, rework, or hydraulic fracturing operations occurring at any time in the life of a well. In addition, this rule applies to suppliers as defined in paragraph (c)(13)."

Response: The commenter's recommended change will result in adding "at any time in the life of a well" in both the purpose and applicability provisions of the proposed rule. The SCAQMD staff considers the proposed addition is redundant and unnecessary because the notification and reporting provisions already apply any time a well is drilled, undergoes a well completion or well rework operation.

Comments Regarding Draft Rule Language (dated 1/29/2013) - Definitions

27. Comment: Definitions for hydraulic fracturing and flowback should be added and should be consistent with industry usage and with the proposed DOGGR definitions.

Response: The definition for hydraulic fracturing was based on the DOGGR definition, while the definition for flowback (or flowback fluid) was based on U.S. EPA's NSPS. There are some minor differences between the proposed rules' definitions and the original source's definition, but there is basic consistency between the two sources.

28. Comment: Proposed Rule 1148.2 should include a definition for acidizing that says, "ACIDIZING means pressurized injection of acids into a well and surrounding rock units in order to induce removal of near-well formation damage and other damaging substances, or opening of the rock matrix and/or cemented fractures and thereby increase the rock unit fracture permeability."

Response: A definition for acidizing has been added to the proposed rule. The definition was based on Schlumberger's Oil Field Glossary and while not matching the commenter's proposed definition, it is similar.

29. Comment: Proposed Rule 1148.2 should include a definition of contractors and subcontractors that says, "CONTRACTORS AND SUBCONTRACTORS means any legal entity having a specific agreement with the responsible owner or operator for well drilling, completion, or rework."

Response: The definition for Owner or Operator has been modified to include contractors and therefore PR 1148.2 will now require any contractor or

subcontractor to be subject to the chemical reporting requirements of the proposed rule.

30. Comment: Proposed Rule 1148.2 should change the Drilling Fluid definition by adding the word "bore." DRILLING FLUID means fluid used to lubricate the drill string, line~~,~~ the bore walls of a well, . . .

Response: The addition of the word "bore" does not increase the clarity of the definition and is unnecessary. Thus, the definition remains unmodified.

31. Comment: The definition for "flowback fluid" should be change by adding "abandoned" to the last sentence. The definition of "flowback fluid" would state, "…The flowback period ends with either well shut in, abandoned, or when the well is producing...

Response: The proposed change to the definition has not been incorporated because the phrase "well is shut in" includes "abandoned" well.

32. Comment: Proposed Rule 1148.2 should include a definition for "Gravel Pack" that states that, "Gravel pack means a method of well completion that uses water, gravel, and additives to place sand and gravel near the well itself with the objective of limiting entry of formation sands and fine-grained material into the wellbore.

Response: The proposed definition has been added to the proposed rule.

33. Comment: Proposed Rule 1148.2 should change the definition of Hydraulic Fracturing by adding several words: HYDRAULIC FRACTURING means a technique used in stimulation a formation or zone during completion and reworking that involves the highly pressurized injection of hydraulic fracturing fluid, which is a carrier fluid mixed with chemical additives~~,~~ and proppant into an underground geological formation . . . enhancing formation fracture permeability and perhaps the production of oil or gas from a well.

Response: The definition for Hydraulic Fracturing is based on the definition that DOGGR includes in their Discussion Draft for Hydraulic Fracturing. The SCAQMD has left the definition unmodified in order to remain consistent with the proposed DOGGR regulation.

34. Comment: Proposed Rule 1148.2 should include a definition of Hydrogen Sulfide and Sulfur-Containing Gases: HYDROGEN SULFIDE AND SULFUR-CONTAING GASES means odorous gases which may be deadly to life and injurious to health and regulated for public and occupational health and safety.

Response: The definition proposed by the commenter is not needed since PR 1148.2 does specify any requirements or reference hydrogen sulfide or sulfur containing air contaminants. Although the proposed rule does not include emissions reporting for hydrogen sulfide, the SCAQMD staff does intend to conduct emissions monitoring for hydrogen sulfide.

35. Comment: The proposed rule should include a definition of "owner or operator" that states that the, "Owner or operator means the owner and/or operator of a future or existing well and all agents, contractors, subcontractors, or consultants under any direct or indirect agreement between them and the owners and/or operators."

Response: A definition for Operator has been added to the proposed rule. While, the definition included in the proposed rule does not match the one proposed by the commenter, it is consistent with DOGGR's rules and would include contractors who perform operations at oil and gas wells.

36. Comment: Proposed Rule 1148.2 should change the definition of "rework" to read, "REWORK means~~, for the purpose of this rule,~~ any operation subsequent to drilling or reworking ~~performed after the well is completed~~ that involves deepening ~~or~~, redrilling, or permanently altering in any manner the casing and/or bore walls of a well or its function~~, or other activities to restore or implve the ability of the well to produces oil or gas~~."

Response: The definition for Rework has been modified, but does not match the commenter's proposed language. The modified version included in the draft proposed rule is more focused on the SCAQMD's intent to cover any redrilling or well production stimulation or treatment activity on an existing well.

37. Comment: Proposed Rule 1148.2 should change the definition of "supplier" to read, "Supplier means~~, for the purpose of this rule,~~ an entity selling or distributing an additive directly to the owner or operator or their contractors and subcontractors of an onshore oil or gas well for use as ~~a~~ well drilling ~~fluid~~, well completing ~~fluid~~, or rework fluids.

Response: The definition for Supplier has been modified to remove the phrase "for the purpose of this rule." Other proposed changes have not been made because they don't change the intent of existing language and don't add any additional clarification. The proposed rule includes a definition for operator that would apply to a contractor or subcontractor that is using chemicals for drilling, well completion, and/or rework activities.

38. Comment: The "toxic air contaminant" should state that, "Toxic air contaminant means ~~is~~ an air pollutant . . .

Response: The definition "Toxic Air Contaminant" has been removed and replaced by "Air Toxic" which better reflects the existing terminology used to reflect "Air Toxic" and "Hazardous Air Pollutant."

39. Comment: The proposed rule should include a definition of "Trade Secret" that states, "Trade secret means any chemical claimed and verifieid by the District as exempt from the Public Records Act and is maintained as a secret and not made available to the public by the suppliers, contractors, owners, or operators.

Response: A definition for Trade Secret has been added to the proposed rule. While the definition does not match the commenter's proposed language, it is consistent with the definition provided in the District's Guidelines for Implementing the California Public Records Act and section 6254.7(d) of the California Government Code.

40. Comment: Proposed Rule 1148.2 should change the definition of "Well Completion" to read, "Well Completion means the activities and methods, including gravel packing and well production stimulation activities, of preparing a well for the production of oil and gas, by which one or more flow paths for hydrocarbons are established between the producing units~~reservoirs~~ and the surface.~~ including but not limited to, hydraulic fracturing or refracturing, acidizing, and high rate gravel pack and the method by which one or more flow paths for hydrocarbons are established between he reservoir and the surface.~~

Response: The definition for Well Completion has been modified to remove any reference to a specific completion activity such as Gravel Packing, and instead references "Well Production Stimulation and Treatment". Well Production Stimulation and Treatment Activity means acidizing, gravel packing, hydraulic fracturing, or any combination thereof.

41. Comment: Proposed Rule 1148.2 should change the definition of "well completion fluid" to read, "WELL COMPLETION FLUID means a carrier fluid mixed with physical and chemical additives used for the purpose of preparing a well for the production of oil and gas, or used in a well production stimulation activity~~, including but not limited to, hydraulic fracturing or refracturing, acidizing, and high rate gravel packing~~.

Response: The definition for Well Completion Fluid was modified as proposed.

42. Comment: Proposed Rule 1148.2 should add a definition of "well production stimulation activity" that states, "well production stimulation or treatment activity means

Response: A definition for Well Production Stimulation *and Treatment* Activity was added to the proposed rule. Rather than use general terms to define the process, specific treatment activities were specified in the definition. The SCAQMD staff concluded that it was better to define it using the actual activities involved; acidizing, gravel packing, hydraulic fracturing, or any combination thereof.

43. Comment: We propose an amendment to the PR 1148.2 definition of "rework," to be consistent with the existing definition used in Title 14 California Code of Regulations, Division 2, Chapter 4, Development Regulation and Conservation of Oil and Gas Resources. However, we propose that the following activities be excluded from the definition of "rework," because they do not generate any significant air emissions (except from mobile and portable equipment, which are already adequately regulated under CARB's PERP regulations): changing well type; perforating new or existing perforations in casing; running or removing liners; cementing liners; placing or drilling out any plug (cement, sand, mechanical); running a wireline tool that has the ability to drill through a cased borehole. These activities do not involve the injection of dry or liquid materials and do not result in fluid returning to the surface. These activities would not generate any of the data (with exception of mobile and portable equipment used) that SCAQMD staff proposes collecting in PR 1148.2 part (e). Additionally, to avoid duplicative reporting requirements, we propose that the owner/operator be required to submit only one report in cases where one rework event may involve multiple rework activities such as redrilling and plugging a well. Based on the discussion above, we propose the following definition: "Rework means any operation subsequent to drilling that involves deepening, redrilling, plugging, or permanently altering in any manner the casing of a well or its function. For the purposes of proposed rule 1148.2, rework includes the following activities: deepening a well, redrilling a well, and plugging a well. Only one notification or report needs to be submitted for each rework event even if multiple rework activities are performed."

and

We propose adding clarification for what "plugging" refers to in the definition of "rework" as defined in the California Code of Regulations, Title 14, Division 2, Chapter 4, Section 1720 ("Rework means any operation subsequent to drilling that involves deepening, redrilling, plugging, or permanently altering in any manner the casing of a well or its function"). The rule should clarify that minor plugging activities during routine well maintenance operations (e.g., setting a temporary bridge plug), unless accompanied by other "rework" activities, are not subject to the notification and reporting requirements of the rule.

Response: The definition for Rework has been modified to include any operation subsequent to drilling that involves deepening, redrilling, or well production stimulation or enhancement activity of an existing well. While this definition is not identical to DOGGR's definition it is necessary for the rework definition to be consistent with the purpose and applicability of PR 1148.2. Under the modified definition, activities that do not involve the injection of dry or liquid materials into the well, such as the examples the commenter lists, would not be applicable under the rework definition.

In regards to the comment concerning avoiding duplicative reporting requirements, PR 1148.2 (e) requires the submittal of a report within 60 days of the last activity, or if more than one operation is being conducted, the last activity in the series of operations on a single well, associated with drilling, well completion or rework. The intent of this language is to require one report for each well undergoing a drilling, well completion or rework event or any combination of events on the same well.

44. Comment: We propose an alternate definition of "well completion," based on EPA's definition (40 CFR Parts 60 and 63. Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants) of "well completion" and part of the Colorado Oil and Gas Conservation Commission's definition of "completion," as follows: "Well completion means the process that allows for the flowback of petroleum or natural gas from newly drilled wells to expel drilling and reservoir fluids and tests the reservoir flow characteristics. This process ends when the well is capable of producing oil or gas through the wellhead equipment from the ultimate producing interval after the production string has been run."

Response: The definition for Well Completion has been modified to include activities and methods, including well production stimulation or treatment activities, of preparing a well for the production of oil or gas, by which one or more flow paths for hydrocarbons are established between the reservoir and the surface. While this definition is not identical to the U.S. EPA's definition in their NSPS, the definition for well completion definition is consistent with the purpose and applicability of PR 1148.2.

45. Comment: We propose the addition of a definition for "well completion operation" in order to clarify that SCAQMD's rule is intended to apply to completion operations, rather than well completion, which refers to a well development phase. The proposed definition is based on EPA's definition (which includes only hydraulic fracturing of gas wells, consistent with the results of EPA's extensive review that shows that air emissions from oil wells and gas wells completed without hydraulic fracturing do not cause significant air emissions), but has been modified to include both oil and gas wells, in order to suit the District's intention. The proposed definition

follows: "Well completion operation means any oil or gas well completion with hydraulic fracturing or refracturing."

Response: The applicability PR 1148.2 includes oil and gas wells which undergo well drilling, well reworks, and well completions. The definition of well completion includes activities and methods, including well production stimulation or treatment activities, of preparing a well for the production of oil or gas, by which one or more flow paths for hydrocarbons are established between the reservoir and the surface. In order to further clarify this definition, a definition for Well Stimulation orTreatment Activities was added which specifically listed such activities to be acidizing, gravel packing, hydraulic fracturing, or any combination thereof. These changes address the commenter's concern because it states what operations are actually covered.

46. Comment: We propose the following definition: "High rate gravel packing is a sand control completion technique that is designed to limit sand in the formation from entering the wellbore along with hydrocarbons."

Response: The term "Gravel Pack" has been revised to "Gravel Packing" and the definition has been revised to mean, "a method that uses water, gravel, and additives to place sand and gravel near the well itself with the objective of limiting entry of formation sands and fine-grained material into the wellbore." This definition is intended to be inclusive of both high rate gravel packing and traditional gravel packing activities.

47. Comment: We propose the following revision to the definition of "drilling": "Drilling means digging or boring into the earth for the purpose of developing, extracting, or producing oil, gas, or other hydrocarbons but does not mean ~~include~~ remediation efforts to clean-up or remove contamination."

Response: The change proposed by the commenter does not clarify or change the meaning of the definition for drilling and is left unmodified.

48. Comment: We propose the following revisions to the definition of "flowback fluids": "FLOWBACK FLUID means the fluid that flows from an oil or gas well following a treatment, either in preparation for a subsequent phase of treatment or in preparation for a cleanup and returning the well to production. The flowback period begins when material introduced into the well during the treatment returns to the surface immediately following ~~well completion hydraulic fracturing or refracturing~~ the treatment. The flowback period ends with either well shut in, abandonment, or when the well is producing continuously to the flow line or to a storage vessel for collection, whichever occurs first."

Response: The definition for flowback fluid had been modified to clarify the meaning. The portion of the commenter's proposed change which deletes "well completion hydraulic fracturing or refracturing" has been incorporated.

49. Comment: The definition of "gravel pack" should be revised to include reworking also, since gravel packing is conducted during rework operations as well as initial well construction. The current definition appears to limit gravel packing operations to the initial well construction and would not apply to gravel packing conducted during reworks.

Response: The definition for "rework" has been revised to mean, "any operation subsequent to drilling that involves deepening, redrilling, plugging, or well production stimulation or treatment activity of an existing well." Well production stimulation or treatment activity has been defined to mean, "acidizing, gravel packing, hydraulic fracturing, or any combination thereof." This revision clarifies that PR 1148.2 is applicable to acidizing, gravel packing, and/or hydraulic fracturing activities conducted during initial well completion and during well rework operations.

50. Comment: We propose the following revision to the definition of "onshore oil or gas well": "ONSHORE OIL OR GAS WELL means a well <u>head</u> located on…"

Response: The definition for onshore oil or gas well originates from the DOGGR definition for onshore well. Where possible, the SCAQMD staff is trying to maintain consistency with DOGGR definitions. Therefore, the definition is left unmodified.

51. Comment: We propose the following revision to the definition of "rework": "REWORK means any operation subsequent to drilling that involves deepening or redrilling, or permanently altering in any manner the casing <u>and/or bore walls</u> of a well or its function."

Response: For explanation of the rework definition, the commenter is referred to the response to comment #43.

52. Comment: We propose the following revisions to the definition of "sensitive receptor": "SENSITIVE RECEPTOR means <u>the property boundaries of</u> any residence including...."

Response: The definition for sensitive receptor in PR 1148.2 is consistent with most recent AQMD rules and the definition CARB uses. Clarification has been added to require the of reporting the nearest sensitive receptor within 1,500 feet, by specifying that distance is measured from the sensitive receptor property line to the well.

53. Comment: We propose the following revisions to the definition of "well completion": "WELL COMPLETION means the activities and methods, including gravel packing and well production stimulation activities, of preparing a well for the production and/or injection of oil or gas, by which one or more flow paths for hydrocarbons are established between the ~~reservoir~~ producing unit(s) and the surface."

Response: For explanation of the well completion definition, the commenter is referred to the response to comments #40 and #41.

Comments Regarding Draft Rule Language (dated 1/29/2013) – Subdivision (d) Notification Requirements

54. Comment: Change the Notification Requirements to allow notification to be no less than 72 hours prior to the start of drilling, completion, or rework rather than 24 hours. Notification information should include the API well number, if available and should include information on the nearest sensitive receptor.

Response: PR 1148.2 has been amended to require the operator of an oil or gas well to notify the Executive Officer no more than 10 days and no less than 24 hours prior to drilling a well, completing a well, or reworking a well. These requirements are consistent with DOGGR's discussion draft for hydraulic fracturing and give sufficient time for the SCAQMD staff to plan for a site visit to conduct sampling or monitoring of the well for well operations applicable under PR 1148.2. The proposed rule specifies that the information submitted with the notification includes the API well number and identification of the nearest sensitive receptor within 1,500 feet, measured from the sensitive receptor property line and the subject well.

55. Comment: The proposed requirement for well operators to notify the District 24-hours prior to drilling, well completion, or rework operations is not feasible. 24 hours does not allow sufficient time for the District to post the information on the District website in order to notify the public of the well activities.

Response: The proposed rule requires the notification to be submitted electronically. This approach allows the SCAQMD staff to post the notifications of well operations applicable under PR 1148.2 to our website within 24 hours. It is expected that notifications will be posted well within the 24 hours. For

further discussion on the noticing requirements, please refer to the response to comment #54.

56. Comment: The 1,500 foot distance noted in the pre-notification requirements is not adequate. Many wells are located adjacent to houses, schools, child care centers, and transportation corridors.

Response: Under the proposed rule, the operator is required to identify the nearest sensitive receptor within 1,500 feet of the subject well. The operator must provide the type of sensitive receptor such residence, school, day care, hospital, etc., and the name of the facility, if known. In addition, the proposed rule requires that the distance from the closest property line of the nearest sensitive receptor to the subject well be provided. The outer boundary is the point closest to the subject well.

On the issue of whether 1,500 feet is the appropriate distance, the SCAQMD notes that most studies evaluating risk and distance show that risk from air toxics significantly drops off after 1,000 feet. The 1,500 feet distance was chosen because of the need to consider the exposure to odors from well operations applicable under PR 1148.2. Activities covered in the proposed rule, such as drilling, have shown to be the source of nuisance complaints for odor at distances up to 3,000 feet. The SCAQMD staff considers the 1,500 feet to reasonable based on health risk curves and odor complaints.

57. Comment: There are hundreds of oil wells in Wilmington which are located in residential areas and oil companies perform operations on these sites 24 hours per day, 7 days per week. We are concerned that well operators do not notify neighbors of upcoming well activities and the public does not get the opportunity to comment on oil drilling activities in their neighborhoods. We are concerned about traffic, noise, and odors from oil drilling operations and recommend coordination with various agencies to ensure that all permits are current and well operations are in compliance with applicable rules.

Response: The purpose of the proposed rule is to gather air quality-related information on oil and gas well drilling, well completion, and well rework operations. The proposed rule contains requirements for oil and gas well operators to notify the SCAQMD no more than 10 days and no less than 24 hours prior to the start of well drilling, well completion, or well rework operations. Proposed Rule 1148.2 also commits to posting these notification on the on the SCAQMD website within 24 hours of receipt. The operator would be required to provide the SCAQMD with information regarding the well, a description of activities to be conducted, and the identification of the nearest sensitive receptor within 1,500 feet of the subject well(s). While the SCAQMD staff is coordinating this rulemaking

effort with other regulatory agencies, particularly with the California Department of Conservation/Division of Oil, Gas, and Geothermal Resources (DOGGR), issues such as traffic and noise impacts are beyond the scope of the proposed rule.

58. Comment: We propose revision of the notification requirement in paragraph (d)(1) as follows: "…no more than 10 days and no less than ~~24~~ 72 hours prior to the start of drilling, well completion, or rework…"

Response: Please see the responses to comment # 54 and 55.

59. Comment: We propose the revision of subparagraphs (d)(1)(B) and (e)(1)(B) as follows: "API well number(s) ~~(if available)~~ and Operator's well name and number;"

Response: The subparagraphs (d)(1)(B) and (e)(1)(B) have been revised to require both the API well number and well name.

60. Comment: We propose the revision of paragraph (d)(2) as follows: "If the start date of the drilling, well completion, or rework as notified pursuant to paragraph (d)(1) is modified, the owner or operator of an onshore oil or gas well shall electronically notify the Executive Officer that the start date for the well specified in the notice has been modified and submit the updated start date."

Response: The SCAQMD staff considers the existing language in paragraph (d)(2) to be clear and has left the language unchanged.

61. Comment: To have a notice only to DOGGR and AQMD staff is unacceptable for an informed public and consent. We propose the addition of a new paragraph in subdivision (d): "The District shall post all notices within 24 hours of receipt, shall allow subscription to posting site, and shall directly notify subscribers of notice postings."

Response: Please refer to paragraph (d)(4) of the proposed rule. A provision was added where the SCAQMD will post notifications received on its website within 24 hours or receipt.

62. Comment: We propose the revision of paragraph (d)(3) as follows: "The notification time period in paragraph (d)(1) shall not apply to drilling, well completion, or rework operations that are necessary to avert a threat to life, health, property, or natural resources**,** and environmental quality…"

Response: The SCAQMD staff considers the existing language in paragraph (d)(3) and has left the language unchanged. Paragraph (d)(3) is also consistent with DOGGR requirements.

Comments Regarding Draft Rule Language – Subdivision (e) Reporting Requirements

63. Comment: The proposed requirements for "suppliers" do not appear to be feasible, because chemical suppliers do not typically contract with the well owners or operators. Typically, the suppliers are contracted with the contractors of the owner/operator. The proposed rule should define "owners and operators" to include all agents (e.g., contractors and subcontractors) of each entity.

Response: Proposed Rule 1148.2 has been modified to add a definition for "operator." This definition is consistent with DOGGR's definition.

64. Comment: Does the SCAQMD intend to conduct any further quantification and/or monitoring beyond the proposed reporting requirements in PR 1148.2? If so, the SCAQMD should apply the Blue Sky Program to oil and gas operations.

Response: Additional sampling and/or testing in the field is planned in order to supplement the data gathered as part of PR 1148.2. Part of the purpose of the notification requirements in PR1148.2 is to give District staff advance notice in order to observe as well as monitor and collect air samples from well drilling, completion, and rework operations. Findings from monitoring and sampling of well drilling, well completion, and well rework activities will help staff determine if more comprehensive air monitoring or sampling may be necessary.

The use of "Blue Sky" inspections have normally been conducted at refineries and bulk-loading facilities, but recently have been expanded to other operations such as oil field production facilities. These types of inspections involve several inspectors and focus on determining compliance with SCAQMD rules within the entire facility. However, the SCAQMD staff will assess the most effective means to conduct field inspections once the data is being gathered.

65. Comment: Some companies will be using electric drilling rigs and emission collection devices but since they are not combustion devices or equipment, no notice or reporting requirements would apply unless they incinerate/burn gases. As such, we propose revision of subparagraph (e)(1)(C) as follows: "identification of combustion equipment rated at greater than 50 brake horsepower that is used during the drilling, well completion, or reworks including the equipment type, engine size, fuel type, engine tier, and hours of operation and any air pollution control techniques, devices, and/or practices used to control unburned hydrocarbons, fugitive emissions, or odors."

Response: Subparagraphs (e)(1)(D) and (E) require the operator to report any air pollution control techniques, devices, and/or practices used to control volatile organic compounds, control fugitive emissions or odors. Electric drilling rigs would be part of a control technique that would be reported to the SCAQMD staff as part of PR 1148.2. The other portion of the reporting requirement is to gather information during mixing and flowback periods. Regardless of the type of equipment used, operators would be responsible for reporting this information.

66. Comment: We propose revision of clause (e)(1)(D)(ii) as follows: "method(s) in which dry materials are delivered/transfer by/from carriers at the site and added and mixed onsite into the drilling, ~~and~~ well completion, and reworking fluid(s);"

Response: Proposed Rule 1148.t is focused on collecting air quality related information regarding mixing and combining of dry materials on-site. Further, it is unnecessary to add the phrase "and reworking" since the complete list of activities applicable under this clause, is stated in the introductory language under subparagraph (e)(1)(D).

67. Comment: We propose a revision to clause (e)(1)(E)(i) as follows: "volume of well completion and rework fluids used and volume of flowback fluid recovered."

Response: The revision proposed by the commenter is unnecessary because the proposed rule language in subparagraph (e)(1)(E) refers to flowback fluid which is defined to occur during well completion or well rework.

68. Comment: We propose the addition of two new subparagraphs (e)(1)(F) and (e)(1)(G), as follows:

"(F) for storage and collection equipment (e.g., tankage of greater than 400 gallons or mounted wth air emissions control measures) used for well drilling, completion, and/or reworking provide:
- (i) numbers and sizes of tanks and number of vents, hatches, and/or other openings to the atmosphere;
- (ii) number of days/hours on site or in use, including idle and cleanout periods;
- (iii) any air pollution control techniques, devices, and/or practices used to control fugitive emissions or odors.

(G) for surface wellhead piping/valves (e.g., Christmas tree), blowout preventer, and casings provide:
- (i) numbers and sizes of piping, valves, flanges, vents, and other items typical of a fugitive emissions inventory and/or other openings to the atmosphere;

(ii) number of days/hours on site or in use, including idle and changeover periods;
(iii) any air pollution control techniques, devices, and/or practices used to control fugitive emissions or odors."

Response: The reporting of the number and sizes of storage tanks and ancillary equipment such as piping and valves is not included in the proposed rule. However, the manner in which flowback fluids are collected and stored are part of the reporting requirements under PR 1148.2 (e)(1)(E)(ii). The SCAQMD staff has determined that the best approach in evaluating the emission potential of a collection and handling system used by operators can be investigated through our proposed inspection sampling and monitoring program. In addition, SCAQMD Rule 1176 sets forth requirements for wastewater that is stored or collected in tanks that are a part of a facility's existing wastewater system.

69. Comment: We propose revision of subparagraph (e)(2)(A) as follows: "name of each chemical compound, ~~and~~ chemical abstract service (CAS) number, and chemical family;"

Response: For clarification purposes, a new subparagraph (e)(2)(F), has been added that states, "to identification of the chemical family or similar descriptor of any chemical information claimed protected as trade secret."

70. Comment: We propose revision of subparagraph (e)(2)(D) as follows: "identification of chemical information claimed as trade secret, the basis and justification for the claim of trade secret, and the chemical family or similar descriptor."

Response: The proposed change has been incorporated into subparagraph (e)(2)(E).

71. Comment: We propose the addition of a new subparagraph (e)(2)(F) as follows: "company name, address, contact, and phone number of the supplier(s) for any chemicals and the recipient(s)."

Response: The proposed change has been incorporated into subparagraph (e)(5)(H).

72. Comment: What is the penalty for chemical suppliers who do not comply with the reporting requirements under subdivision (e)?

Response: The maximum penalties for violating any SCAQMD rule are set by the provisions of California Health and Safety Code Section 42400 et seq.

73. Comment: We propose revision of paragraph (e)(5) as follows: "…chemical compounds contained in the drilling, ~~and~~ well completion, and rework fluids…"

Response: The proposed change is unnecessary because the term Well Completion Fluid is defined in terms of a Well Production Stimulation or Treatment activity which can occur either during a Well Completion or Rework operation.

74. Comment: We propose the addition of a new subparagraph under paragraph (e)(5) as follows: "name/number and API number of well, county, and location descriptors"

Response: The name and API well number have been added to subparagraph (e)(5)(A). The location descriptor suggested by the commenter is unnecessary since the well identification information will be used to keep track of the location of the well previously provided in the paragraphs (d)(1) and (e)(2).

Comments Regarding Draft Rule Language – Subdivision (f) Website Posting of Chemicals

75. Comment: We propose revision of subparagraph (f)(1)(A) as follows: "Name of the chemical compound and chemical family;"

Response: The use of chemical family is unnecessary because the proposed rule requires the SCAQMD to post both the chemical compound and CAS number which fully identifies the constituent. Chemical family is a more general identifier which is only used for chemical ingredients protected as trade secret.

76. Comment: We propose the addition of subparagraph (f)(2)(C) as follows: "Justification for designation as Trade Secret."

Response: Paragraph (f)(2) remains unchanged because the basis for claiming a chemical ingredient is a trade secret is directly provided to the SCAQMD under paragraphs (e)(2) and (e)(5).

Comments Received at Public Consultation Meetings Held on February 20, 2013

77. Comment: We propose that the scope of PR 1148.2 should be expanded to include maintenance activities because these operations occur very frequently and some of these activities may use chemicals that may become airborne. We are also concerned about the truck/engine emissions that may occur during maintenance activities.

Response: Proposed Rule 1148.2 does cover some maintenance activities of oil or gas production wells if any well drilling, well completion, or rework operation occurs. This would include acidizing of an existing well. The information

on the type, size, fuel, tier, and activity of the combustion support equipment greater than 50 horsepower associated with each well activity is required to be reported to the SCAQMD no later than 60 days following the event.

78. Comment: We propose that the SCAQMD develop a more active notification process for the public when conducting meetings in the community. Some suggested alternative methods of communication include: radio announcements of public meetings (Spanish and English); flyers/posters posted at local schools/residences; information updates via online social media (e.g., Twitter); online data feed or listserv to which stakeholders can subscribe; reverse-911 phone announcements for local residents; outreach to local businesses and residents via the local Chamber of Commerce.

Response: The SCAQMD staff appreciates the input and suggestions. The SCAQMD staff will look into other forms of communication and outreach methods inform the public of community meetings.

79. Comment: We propose revisions to PR 1148.2 to include requirements for chemical reporting before oil/gas well operations begin. We believe the proposed rule should include requirements for operators to submit notification at least 3 months in advance of oil/gas well operations, in addition to the existing proposed requirements for submitting notification no more than 10 days and no less than 24 hours prior to well drilling, well completion, or well rework operations. Residents in communities affected by well operations are interested in knowing what chemicals will be used for drilling, hydraulic fracturing, etc. before the operations begin. Prior disclosure provides SCAQMD and members of the public with the opportunity to collect baseline air quality and other data, which can clarify the relationship between oil and gas extraction activities and decreases in air quality. Other states have demonstrated the feasibility of such a requirement: prior disclosure is required by existing regulations in Wyoming (Wyoming Admin. Code Oil Gen. Ch. 3 §45) and proposed regulations in New York (Proposed 6 NYCRR §§ 552.1(c), 560.3(a)).

Response: SCAQMD staff recognizes that existing regulations in Wyoming and proposed regulations in New York require disclosure of chemical constituents of well stimulation fluids prior to commencement of operations. During the rule development, the SCAQMD staff considered requiring the reporting of chemicals used in the operations applicable under PR 1148.2 prior to the actual activity. However, the SCAQMD staff has concerns that reporting before the activity takes place requires the operators to report twice; once before the activity with estimated identity and usage of the chemicals, and again following the activity with the actual identity and usage. This is not only a burden on industry, but requires additional resources from the SCAQMD which would have to

reconcile the expected and actual data. In addition, the SCAQMD staff expects that after a period of time, certain patterns will emerge that will help provide information on of what chemicals are being used during specific operations.

80. Comment: We propose the addition of "storage tanks" to the reporting requirements of PR 1148.2.

Response: As stated in Response to Comment #14, SCAQMD staff has determined that the emission potential from flowback fluid collection and handling systems used by operators can be investigated through our proposed sampling and monitoring program.

81. Comment: We propose revisions to the chemical reporting requirements of PR 1148.2 to include reporting of all "additives" and chemicals used in oil well drilling, well completion, and rework activities. The current proposed rule requirements may allow operators to avoid reporting the use of proppants such as gravel and sand.

Response: To clarify the intent of the proposed rule, the SCAQMD staff has added a discussion in the staff report that intent of the proposed rule is to require the identify, quantity, and purpose of all ingredients, chemicals, and substances used on in well operations applicable under PR 1148.2. This would include any additives and the chemical constituents (if applicable) of these additives.

82. Comment: We propose the addition of a provision in PR 1148.2 which prohibits the use of "trade secret" chemicals in oil/gas well operations.

Response: While the proposed rule does not prohibit the use chemicals claimed to be protected as trade secrets, it does require that the supplier report trade secret information to the SCAQMD so that the District can assess the air quality and public health impacts from the use of such chemicals. Moreover, a reporting entity claiming that chemical information is protected as trade secret must provide a justification for its claim that is subject to the District's evaluation. Trade secrets, with the exception of emission data, may include, but are not limited to, any formula, plan, pattern, process, tool, mechanism, compound, procedure, production data, or compilation of information which is not patented, which is known only to certain individuals within a commercial concern who are using it to fabricate, produce, or compound an article of trade or a service having commercial value, and which gives its user an opportunity to obtain a business advantage over competitors who do not know or use it.

83. Comment: We propose the establishment of a fund consisting of monies collected by SCAQMD from rule violation fines, which can be used to assist

communities impacted by oil/gas well operations. Many Wilmington residents' are negatively impacted by pollution from oil/gas well operations, and would benefit from financial assistance for medical expenses incurred due to health effects from environmental pollution.

Response: Please see the response to comment #6.

84. Comment: We propose a ban on hydraulic fracturing operations until SCAQMD adopts a regulation for hydraulic fracturing. We believe that potential air emissions from hydraulic fracturing operations should be calculated and estimated based on existing data instead of the current rule approach, which allows operators to continue to conduct hydraulic fracturing while the SCAQMD evaluates the air emissions from these operations.

and

We support a ban on fracking because even the best regulations cannot eliminate the hazards of this inherently dangerous activity. Nevertheless, we support the District's efforts to further delineate the air quality impacts through the proposed rule so these emissions can then be reduced. It is critical that SCAQMD not only track chemicals and emissions, but bind itself to actually controlling harmful chemicals and emissions from fracking and other operations. SCAQMD must begin implementing controls as soon as possible.

Response: To propose a ban or moratorium hydraulic fracturing is not justified given the state of the SCAQMD's knowledge of potential air emissions from such operations. The SCAQMD staff is implementing the Governing Board's directives on oil and gas well hydraulic fracturing in a two step approach. The first step is the development of Proposed Rule 1148.2. The purpose of PR 1148.2 is to gather air quality-related information on oil and gas well drilling, completions, and reworks activity in order to identify the magnitude and type of emissions associated with these operations. The existing data and information available on the potential air emissions from hydraulic fracturing is not sufficient at this time to estimate the potential air emissions from these and other operations applicable under PR 1148.2. If the commenter has data and information on the potential air emissions from PR 1148.2 operations that the SCAQMD staff has not reviewed, we encourage the commenter to make this available to us for evaluation. However, we have concluded that the adoption of PR 1148.2 is an appropriate approach in order to collect the necessary information and data to quantify the magnitude of the potential emissions from hydraulic fracturing and the other operations applicable under the proposed rule. For further discussion of the studies and documents reviewed by the SCAQMD staff, please refer to the responses

to comments #13 and #23. Additionally, please refer to response to comment #79.

85. Comment: We believe that SCAQMD should ban the use of dangerous chemicals, such as hydrogen fluoride, in oil/gas well operations.

Response: The goal of PR 1148.2 is to collect data and information about the processes involved in well drilling, well completion, and well reworks. The SCAQMD staff will analyze data and evaluate the activities and make recommendations to the Governing Board. If there are any toxic or hazardous air issues, the SCAQMD staff will report that information to the Governing Board.

86. Comment: We recommend that the SCAQMD staff develop air pollution control requirements for hydraulic fracturing operations before the expiration of the 2-year sunset date for reporting requirements. We believe that SCAQMD should immediately move forward to develop more stringent regulations for hydraulic fracturing as well as conventional drilling operations instead of the current approach which consists only of information and reporting requirements. We are worried that the draft rule's long data gathering period (two years), without further control measures specified now, may actually encourage the industry to speed up well development in anticipation of later regulation. We are concerned about this unintended impact of the rulemaking, however, we also understand and appreciate that the District is considering taking additional actions sooner.

Response: The two-year sunset date represents the expiration of the reporting requirements under PR 1148.2 (e)(1). This two year reporting period does not mean that the SCAQMD staff will wait two years to begin analyzing emissions data. As information becomes available, the SCAQMD staff will begin analysis. The two-year sunset date was chosen because the SCAQMD staff concluded that receiving information on the operational practices of well drilling, well completion, and well reworks for two years was sufficient in order to properly evaluate the air emission potential from the applicable operations. It should be noted that the remaining provisions such as the notification and chemical reporting requirements of the proposed rule do not expire after two years.

87. Comment: Additional public meetings should be held in Wilmington within the next 6 months so that SCAQMD can provide stakeholders with updates regarding findings from the information gathered as part of PR 1148.2.

Response: The SCAQMD staff will consider additional follow-up meetings once sufficient data has been collected to evaluate the emission potential from the covered well operations. We anticipate this period will be longer than

6 months, but it is difficult to accurately estimate the time it will take to make a preliminary evaluation. Staff intends to periodically brief the SCAQMD Governing Board's Stationary Source Committee on the progress of PR 1148.2.

Comments Received After February 20, 2013

88. Comment: We support the expeditious adoption of Proposed Rule 1148.2 in order to immediately begin monitoring, but we urge strengthening the proposed rule by making the requirements effective upon the date of adoption by the SCAQMD Governing Board.

Response: Sufficient time is needed for the affected sources and SCAQMD staff to develop the necessary mechanisms for electronic reporting and web posting of notifications and reporting. Making the proposed rule effective immediately upon adoption does not allow sufficient time to develop the electronic support mechanisms to support implementation of the proposed rule. In addition, the proposed rule's effective date of adoption has been revised from 90-days to 60-days from adoption.

89. Comment: We believe the proposed rule should include requirements for operators to provide specific maps of drilling locations for the public, because street addresses do not always provide adequate detail to determine exact locations.

Response: The proposed rule requires the operator to provide the geographical coordinates (latitude/longitude) of the well site, in addition to the location, well name, and API well number. The SCAQMD staff considers this information to be sufficient to identify the location of the well.

90. Comment: We believe the proposed rule should include requirements for operators to provide full disclosure of all chemicals used in hydraulic fracturing operations.

and

Regarding full public disclosure, the proposed rule should be strengthened. Requirement to disclose chemical constituents by CAS number, disclose the mass, indicate whether it has been designated as a toxic, and provide public disclosure of the information through an agency website are all supported.

Response: The proposed rule does require full disclosure of the chemicals used in each operation applicable under the proposed rule. However, in order to be compliance with state law and the District's own existing

confidentiality guidelines, the proposed rule does contain provisions for chemicals claimed as trade secrets to be partially omitted from what is released to the public. For further discussion on this trade secret provision, please refer to the responses for comments #21 and #82.

91. Comment: We believe the proposed rule should include requirements for operators to retroactively report any hydraulic fracturing activities conducted in the District during the Proposed Rule 1148.2 rulemaking process.

Response: Retroactive reporting is very difficult to implement for affected facilities and the SCAQMD. Operators would be required to collect information that may not be available making it difficult, if not impossible for the SCAQMD staff to verify the information. Implementing a rule with future effective dates sends a clear message to operators of what is expected and what is required.

92. Comment: We request that, following adoption of Proposed Rule 1148.2, the District publish an ongoing comprehensive map showing the locations of all hydraulic fracturing activities and all conventional drilling activities taking place within SCAQMD's jurisdiction.

Response: The development of a map showing the locations of all hydraulic fracturing activities and all conventional drilling activities taking place within SCAQMD's jurisdiction will be considered during the implementation period of PR 1148.2.

93. Comment: Based on recent studies, we believe the potential harms from hydraulic fracturing activities are severe. We want to prevent such severe impacts in California and the South Coast District. The following studies provide information regarding the potential harms from hydraulic fracturing activities:

1) Science News, 3/19/2012, Lisa McKenzie, Ph.D., MPH, Colorado School of Public Health, "Air Emissions Near Fracking Sites May Pose Health Risk, Study Shows"- This study was based on 3 years of monitoring, which found toxic and smog forming petroleum hydrocarbons in the air near the wells including benzene, ethylbenzene, toluene, xylene, trimethylbenzenes, aliaphatic hydrocarbons, heptanes, octane, and diethylbenzene. The report showed higher health impacts for both non-cancer and cancer impacts for nearby residents during short-term but high emission well completion, including respiratory and neurological impacts, eye irritation, headaches, sore throat, difficulty breathing;

2) The Denver Post, 2/19/2013, Mark Jaffe, "Study finds oil and gas drilling caused air pollution in West"- This study found oil and gas drilling caused ground level ozone and criteria pollutant emissions in the West.

Ozone pollution has become a problem in the Uintah Basin, with levels in 2011 reaching nearly double the federal health standard. Leaks from pipes and tanks and fumes from pumps, dryers, and compressors were found as major VOC sources, drill rigs and fracking were sources of nitrogen oxides and methane;

3) Natural Resources Defense Council, May 2012, Rebecca Hammer and Larry Levine, and Jeanne Van Briesen, Ph.D., PE, Carnegie Mellon University, "In Fracking's Wake: New Rules are Needed to Protect Our Health and Environment from Contaminated Wastewater"- The authors found that fracking generates massive amounts of polluted wastewater and brought radioactive materials to the surface, threatening drinking water, that federal and state regulations have not kept up with the dramatic growth in fracking, and must be significantly strengthened;

4) The Environmental Working Group found, "Across the United States, concerned citizens have brought to light the health and safety problems from fracking – such as air pollution and water pollution…It is unacceptable that state regulators have done almost nothing to govern, or even investigate, the risks…"

Response: The SCAQMD staff thanks the commenter for bringing these articles and studies to our attention. We have reviewed them and concluded that (other than the NRDC study which dealt with waste water) they support our contention that hydraulic fracturing and other well completion techniques have the potential to release air contaminants and should be further evaluated. The commenter should be aware that the SCAQMD staff plans to conduct emissions monitoring of PM, H2S, and VOCs from potential emission sources (e.g., mud tanks, mixing operations, flowback, storage tanks) utilizing portable handheld analyzers in order to supplement emissions data gathered through the reporting requirements of the proposed rule. Additional monitoring and sampling will be conducted if needed.

94. Comment: The proposed rule should include additional data collection that would help future emissions inventories, emission estimating for air quality planning, and emission reduction rule development for oil and gas well drilling operations, which is a significant nitrogen oxides (NOx) emitting activity. The proposed rule does not ask for all of the information that would be useful in assessing the impacts from future well drilling activities to fill the gaps noted in the February 14 Working Group presentation and the USEPA's report, "EPA Needs to Improve Air Emissions Data for the Oil and Natural Gas Production Sector."

Response: The SCAQMD staff is unsure what information the commenter refers to when stating that the proposed rule does not require sufficient information

necessary to develop emission inventories for planning and rule development, as well as to fill the gaps specified in our Working Group presentation and the U.S. EPA report cited. The proposed rule requires operators to gather air quality-related information on oil and gas well drilling, well completion, and well reworks which would allow staff to evaluate the air emission potential of these processes. The intent behind the data and information that is requested is to provide sufficient data and information such as equipment activity, identity and quantity of materials and fluid flowback used in the well processes, air pollution controls and commonly used practices used in well operations, and identification of the possible air toxics involved. SCAQMD staff feels confident that PR 1148.2 will accomplish this. Gaps in emission data (e.g., emission factors) can be closed by conducting sampling and monitoring.

95. Comment: We believe it is likely that well drilling could increase in the future due to new or future methods for stimulating oil production (i.e., acidizing, gravel packing, hydraulic fracturing, etc.). Obtaining appropriate data will allow a determination of whether well drilling activities for these methods of stimulating oil and gas production are higher in comparison to traditional well drilling activities, and provide information on whether new rule development for emissions reductions, particularly for well rig engine emissions, should be considered.

Response: The processes the commenter cites are already occurring in the Basin, and the adoption of PR 1148.2 will allow the SCAQMD to document the activities, including well rig engine emissions.

96. Comment: Use of CARB's PERP for drill rigs is inappropriate where drill rigs are used on a continuous basis, year after year, in active oil fields. The effects of the emissions are tantamount to a stationary source and should be subject to the same requirements as stationary sources. We believe that requiring the use of high tier diesel engines (Tier 3 or 4) or alternatively fueled/electric engines would substantially reduce NOx and DPM emissions as compared to current practice.

Response: The PERP regulation requires registration of the portable equipment used at well sites during drilling and well completion operations. The SCAQMD staff is not proposing to rely on the PERP registration process to be used as a surrogate for additional emission reductions on drilling and well completion equipment. The comment regarding the use of Tier 3 or 4 equipment is not relevant for PR 1148.2. No emission controls are being proposed on any of the equipment or processes applicable under the proposed rule. The purpose of PR 1148.2 is to gather air quality-related information on oil and gas well drilling, well completion, and well reworks. The SCAQMD staff will analyze the data collected and conduct

on-site observations and monitoring of oil and gas well operations to collect information on controls being used.

97. Comment: We believe the following data collection items should be added to part (e)(1) of the proposed rule: fuel consumption (to augment the other engine use data requirements as hours of use is not completely adequate in determining emissions); depth/length of the well bore as compared to other wells in the field; and the specific type of oil production stimulation used, if any.

Response: Two methods are commonly used to estimate exhaust emissions from portable engines: engine operating hours and fuel usage. The SCAQMD uses both, depending on the availability of activity data. For purposes of engines used at well sites, the SCAQMD staff considers hours of operation-based emission estimates to be superior considering that all the components for estimating emissions will be known or provided by the operator. These include (1) hours of operation, horsepower, load factor (based on type of equipment), and emission factor (based on Tier level).

In regards to the two other types of data, the SCAQMD is unsure how depth/length information will help in estimating the emissions from well drilling, well completions, and reworks. In addition, the specific type of well stimulation will be requested in the notifications already required under PR 1148.2 (d)(1)(E).

98. Comment: In the absence of reliable emission factors for well drilling, well completion, and well rework activities, the rule should include requirements for monitoring source-specific emissions for a meaningful sample of wells within any specific oil field and for production within specific formations underlying such fields. The sample data can be used to calculate emissions from wells within the same field or formation (e.g., create field and formation specific emission factors). Where source testing or other pollutant monitoring is not reasonable or feasible to monitor well drilling emissions then other available source specific factors should be monitored and collected, such as: drilling rig engines model years and tiers, and engine age/hours of operation; use of gas collection and flares to reduce VOC emissions from the wellhead; and use of odor reduction control measures at the wellhead to improve the emissions estimates for each drilling action.

and

We believe that, in order to fulfill its mandate to protect the health of nearby communities and the Basin, the District must develop a clear and enforceable plan for District staff to conduct air quality and emissions monitoring at the fracking sites identified from the notifications required

under the proposed rule. Emissions testing and local air quality monitoring are fundamental components of the District's responsibility to evaluate and reduce threats to air quality and protect public health.

Response: Although the proposed rule does not contain any requirements for emission monitoring or sampling, the SCAQMD staff is committed to conduct monitoring and sampling during the initial two-year notification and reporting period. The type of monitoring and sampling will include hand-held analyzers which can measure both PM and VOC concentration, as well as grab samples which will be able to speciate out individual constituents. Additional monitoring will be done based on the results of the hand-held and grab sampling program. In regards to combustion equipment emission estimates, please refer to the response to comment #97.

99. Comment: We believe the focus of the rule may be too limiting. Other sources of emissions may exist including vehicle trips, dust from well pad construction, and fugitive emissions from the well itself (including VOCs, hydrogen sulfide, and methane), related piping or tanks and from natural or man-made fissures or other openings (particularly where high pressure liquids may be applied to formations) away from the top hole.

Response: Dust from well pad construction and vehicle activities is already regulated under SCAQMD Rule 403 – Fugitive Dust. Fugitive emissions from piping and tanks will be evaluated under PR 1148.2 during any well drilling, well completion, or well rework operation. Pipes and tanks used during the oil and gas production process are already regulated under existing SCAQMD rules. Releases of substances from natural fissures are not part of the proposed rule. Finally, any emissions from a manmade release point during any of the processes covered under the proposed rule will be evaluated under the proposed rule.

100. Comment: We believe that all wells located on contiguous property owned, leased or operated by a field operator should be considered a stationary source and all planned new wells should be considered, in the aggregate, as a modification triggering new source review and attendant requirements, including implementation of BACT and obtaining emission offsets.

Response: The BACT and offset provisions of Regulation XIII- New Source Review do apply to oil field production facilities. However, the well drilling, well completion, and well reworks covered under PR 1148.2 would not be covered under Regulation XIII unless some new construction or modification was conducted to the equipment not exempt under Rule 219 - Equipment Not Requiring a Written Permit Pursuant to Regulation II. This equipment that would be subject to Regulation XIII includes waste water treatment collection, storage, and treatment systems; gas recovery

plants, and flares. The inclusion of wells and equipment used to support drilling, well completion, and well reworks in Regulation XIII is beyond the scope of the proposed rule, and is not being considered.

101. Comment: SCAQMD needs to coordinate with DOGGR and the appropriate local jurisdictions to make sure they are receiving information for all of the wells that these agencies know are being drilled, completed, or reworked. Coordination with these agencies will aid in the enforcement of this regulation.

Response: The SCAQMD staff has been coordinating with DOGGR throughout the rulemaking process. DOGGR is aware of the information that the SCAQMD will be collecting through implementation of PR 1148.2. The SCAQMD staff will continue to coordinate with DOGGR and any other agencies that are interested in receiving information.

102. Comment: Proposed Rule 1148.2 part (e)(1) Reporting Requirements should include the following:

a. Type and amount of fuel used, and the engine model year and tier level, by engine, for all of the stationary/portable equipment used for the drilling operation;
b. identification of gas collection or flaring control measures associated with the well drilling action;
c. identification of odor control measures associated with the well drilling action;
d. an estimate of the number of trips and VMT by vehicle class required for the on-road vehicles supporting the drilling operation;
e. injection pressure for wells where materials are injected into the formation;
f. depth and length of the well bore, with a comparison of the average historic depth and length of well bores for wells drilled into the specific formation;
g. whether horizontal drilling is being used and what percentage of wells currently active in the field are horizontally drilled wells;
h. all sensitive receptors within 1,500 feet should be identified, not just the closest sensitive receptor. This need not be by property but by range of street addresses or other such summarizing techniques;
i. identification of upsets and unintended releases;
j. identification of complaints received related to air quality/odor.

Response: Responses to comments are addressed individually:

a. For discussion of combustion equipment data please refer to the response to comment #97.

b. Information about gas collection and flaring devices is already required under 1148.2 (e)(1)(E).
c. Odor control measures and systems are already required under 1148.2 (e)(1)(E).
d. The offsite emissions from combustion equipment, including vehicles, is not the focus of PR 1148.2. CARB has primary authority over the direct emissions from vehicles.
e. As with the well length/depth mentioned in the response to comment #83, the SCAQMD staff is unsure how injection pressures will help us evaluate the air emissions from well drilling, well completions, and well reworks.
f. Please refer to the response to comment #97.
g. As with the well length/depth and injection pressures, the SCAQMD staff is unsure on knowing whether horizontal drilling is being used will help us evaluate the air emissions from well drilling, well completions, and well reworks.
h. It is sufficient for SCAQMD staff to know that at least one sensitive receptor is within the 1,500 feet radius. Once we know that one receptor is located within the 1,500 feet radius further evaluation can be conducted by SCAQMD staff to identify additional receptors.
i. SCAQMD staff is unsure of the type of upsets and unintended releases the commenter is referring to. However, SCAQMD Rule 430 – Breakdown Provisions, Title V, and RECLAIM already applies to oil field production facilities. These regulations and rules specify notification provisions for breakdowns, emergencies, and process upsets which result in excess air emissions.
k. Complaint information is readily available to SCAQMD staff from internal sources and is not needed as part of the reporting requirements of PR 1148.2.

103. Comment: Proposed Rule 1148.2 subdivision (f) SCAQMD Website Posting should include at a minimum, the well production stimulation activity used, and should also include all of the other non-confidential data collected through the proposed rule part (e).

Response: Proposed Rule 1148.2 already requires the posting of the notification notices for well drilling, well completion, and well reworks. The notification posted and available for public viewing will contain an identifier on what type of well completion or stimulation technique is being done. The proposed rule does require the chemical usage information prescribed under Proposed Rule 1148.2 subdivision (f) to be posted. However, trade secret information will not be posted.

104. Comment: We suggest that a "per well drilled" fee be added to this regulation that will provide funding necessary for SCAQMD to provide adequate staffing and monitoring equipment to enforce this regulation through on-site inspections and provide adequate staffing to complete the website posting notification in a timely manner.

Response: It is anticipated that the necessary resources for implementation of the proposed rule will be available with existing resources. Therefore, no fees are being added to the proposed rule. Should additional resources be necessary for implementation, staff will investigate supplemental sources of funding/staffing and, if necessary, make recommendations to the Board.

105. Comment: Our company is concerned with the potential duplication of reporting requirements with other government agencies and entities, potential delay in operations resulting from notification restrictions.

Response: The SCAQMD staff has structured the rule to ensure that PR 1148.2 is not duplicative and is consistent with other reporting requirements, where appropriate. The noticing and reporting requirements of PR 1148.2 ensure that only information involving potential air emissions from oil and gas well drilling, well completions and well reworks is included in the information requested. For instance, the proposed rule does not require information related to well depth, well casing information, well integrity data. However, it is inevitable that certain information such as well owner/operator and well location is common to both DOGGR's and SCAQMD's notification process. This type of well identification is necessary for both agencies to receive.

106. Comment: The proposed rule establishes a notification requirement for the purpose of collecting data to analyze the frequency of drilling, well completion, or rework of oil or gas wells in the District. However, it is not clear how making the information public, per paragraph (d)(4), assists the data collection or evaluation process. We believe it is appropriate for the SCAQMD to have access to all necessary information in order to conduct activities such as documenting work in sensitive areas, verifying the level of activity and potential emission sources, deploying inspectors to collect data, samples, verify appropriate workplace practices and insure that records are maintained on site. However, it is not clear how the public is expected to handle the information and what role the SCAQMD will play in clarifying its significance. We are concerned about the release of "raw" information to the public, who may not be able to evaluate the highly technical data and information. We are also concerned that the release of this information without proper context or explanation is likely to result in additional questions and frustration from the public. The SCAQMD must recognize its responsibility to assist the public to understand the data it provides, and to avoid creating unnecessary concern in the public at large.

In light of these concerns, we request that the SCAQMD consider modifying the notification portions of the rule by removing requirements to post reported information on the SCAQMD website.

and

We strongly object to the District's plans to make notification information required by Proposed Rule 1148.2 available to the public on the SCAQMD's website. The SCAQMD's "Guidelines for Implementing the California Public Records Act, Section III, Examples of Records available to the Public, section A) states that "All air and other pollution monitoring data, including data compiled from stationary sources" shall be public records. The SCAQMD is planning to disclose data that is clearly not "air and other pollution monitoring data." The SCAQMD should make certain data disclosed to the public is air emissions data and not just ordinary industry activity that the SCAQMD is exploring. The District has also not provided a rationale for singling out these particular activities.

Posting information regarding highly technical and complex activities that will not be easily understood by the general public may contribute to unnecessary and inappropriate opposition to lawful and safe activities that have occurred without significant impact for years.

Response: The SCAQMD staff has received comments from the public, community groups, and environmental groups requesting that the notifications be posted on the SCAQMD website. The information in the notifications includes basic information about the well, contact information, well name, location, nearest sensitive receptor, the type of operation that is being conducted (drilling, well completion, and/or rework), and the start date of the activity. There are potential air quality issues associated with these activities (odors, fugitive dust, hydrocarbons, and possibly toxic emissions), the extent of these will be determined through the rulemaking process as emissions data, chemical use data, and monitoring and sampling occurs. The SCAQMD staff acknowledges these comments and has agreed to work with industry representatives to provide accompanying language on the SCAQMD website explaining how the information is to be interpreted.

107. Comment: Adopt a resolution stating that the SCAQMD will not wait until the reporting requirement sunsets to begin to reduce air emissions from oil and gas well operations. Include a timeline to evaluate emissions data, pollution control technologies and air quality impacts from fracking sites. Make clear that the District will adopt regulations to reduce emissions as soon as there is sufficient information to impose effective regulations.

Response: Proposed Rule 1148.2 will include an accompanying resolution that the Governing Board will direct staff to begin the analysis evaluation process as soon as the information becomes available. The resolution will also require staff to report back to the Governing Board's Stationary Source Committee within six months from the time the first information is submitted.

It is premature to commit to developing rules to control emissions from well completion activities such as hydraulic fracturing at this point. The purpose of PR 1148.2 is to collect information and to base the analysis and evaluation on this information. The purpose of the evaluation process is to determine if there are significant air emissions that need to be controlled. Nevertheless, the SCAQMD staff has committed to return to the Governing Board with a summary of findings and recommendations and to decide if additional requirements are needed, if any.

108. Comment: Modify the rule to better provide information needed to assess air emissions and impacts to local and regional air quality:

- Section (d)(1)(E) – Language referring to "identification of general activities" is too vague to evaluate air quality threats. Require an inventory and description of all proposed activities in pre-drilling notification.
- Sections (d)(2)(D), (e)(5)(D) and (f)(2) – Restrict trade secret information to product formulas. Require disclosure of chemical names and CAS numbers.
- Sections (d)(2)(D), (e)(5)(D) and (f)(2)(B) – Where chemical names and CAS numbers are not reported, include whether the chemical is listed under Proposition 65 as a chemical known as a carcinogen, reproductive or developmental toxicant.

Response: SCAQMD staff believes that the notification requirements in subparagraph (d)(1)(E) are adequate for the proposed rule's purpose of assessing air quality impacts from oil and gas well operations. The notification requirements specify that the owner/operator submit the expected start dates of oil or gas operations and basic information regarding the activities to be conducted. The intent of the notification requirements is to enable SCAQMD staff and the public to have advance notice of oil/gas well activities. This information will allow SCAQMD compliance staff to periodically conduct site visits, and observe oil/gas well operations. Pre-notification of activities will also allow the SCAQMD staff the opportunity to collect air monitoring samples.

Subparagraph (d)(2)(D) no longer exists in the proposed rule. Additionally, there are no requirements related to the disclosure of trade secret information in the notification requirements of subdivision (d). Subdivision (e) of PR 1148.2 contains requirements for operators to

provide the SCAQMD with a comprehensive listing of all chemical compounds contained in drilling and well completion fluids. There are specific provisions for chemicals that chemical suppliers claim are protected as trade secret. The SCAQMD will retain records of all chemical information submitted and will post chemical information, with exceptions for trade secret information, on the SCAQMD website. For trade secret information, only the following will be posted to the SCAQMD website: chemical family or similar descriptor; and identification of whether or not the chemicals are air toxics.

PR 1148.2 relies on a list of toxic air contaminants that is representative of state and federal listings of air toxics. This is the same list of air toxics that is used in the SCAQMD's AB2588 Hot Spots program. The SCAQMD staff agrees that the list of chemicals used for Proposition 65 is more comprehensive, however, some of those chemicals are not air quality related. The focus of Proposed Rule 1148.2 is on air quality issues that can occur from drilling, well completion and rework activities. While staff agrees with the public's right-to-know regarding chemicals used in oil and gas well operations, staff does not believe that the Proposition 65 chemical list appropriately serves the intent of the proposed rule, which is to collect data on potential air quality impacts. For these reasons, staff believes it is appropriate to limit the identification of drilling and completion fluid chemicals as "air toxics", as defined in the California Health and Safety Code.

109. Comment: A major hole in the Proposed Rule is the failure to control methane emissions from oil and gas operations, including fracking. Oil and gas operations are a major cause of climate change due to the large volume of methane emissions. Methane is a potent greenhouse gas with a global warming potential much higher than carbon dioxide.

and

SCAQMD should revise the Proposed Rule to require measurements of methane and to provide controls on methane emissions. If this is impractical, SCAQMD should initiate a separate rulemaking to monitor or control methane. SCAQMD does not presently have controls on methane, but instead controls only some sources of VOC emissions; this is incapable of achieving the level of methane emission reduction the state urgently needs.

Response: The intent of Proposed Rule 1148.2 is to collect data regarding oil and gas well drilling, completion, and rework operations. The proposed rule does not contain any provisions to control emissions from these operations. Information collected as a result of the proposed rule will be analyzed by District staff to determine the type(s) and extent, if any, of air contaminant

emissions from oil and gas well drilling, completion, and rework operations. Based on the findings of the analysis, SCAQMD staff will determine the type and extent of any air pollution controls that may be necessary to minimize emissions. The SCAQMD anticipates that if it is determined that pollution controls are needed, that concurrent reductions in methane emissions and other air contaminants will be realized.

110. Comment: The oil and gas sector emits 40 percent of U.S. methane emissions. Generally, for natural gas operations, production operations generate the highest methane emissions. However, emissions occur in all sectors of the natural gas industry. Fracked wells leak an especially large amount of methane. Oil exploration, development and production activities also result in substantial methane emissions. Natural gas leakage also contributes significantly to ozone formation. Methane's effect on ozone concentrations can be substantial. To the extent SCAQMD controls methane by eliminating natural gas emissions, VOC emissions will be reduced. Ground level ozone pollution is associated with serious harms to human health.

Response: PR 1148.2 is a data collection and reporting rule for the oil and gas well industry. There are no controls being proposed in PR 1148.2. PR 1148.2 seeks to determine the magnitude of VOC, NOx, particulate emissions and identify the type and amount of toxic emissions, if any, emitted by oil and gas well drilling, reworks, and completion activities. Issues related to cracked casings and well integrity are being addressed in proposed regulations by DOGGR. Please also refer to the previous response to comment.

111. Comment: The proposed rule lacks a clear protocol for what data is to be gathered and how it will be analyzed and interpreted. The final rule should include an addendum clearly describing what data is to be gathered onsite, how it will be gathered, analyzed, and how the data will be used to determine off-site impacts and the need for additional rulemaking. We recommend creating a plan for how this will be done and allowing appropriate industry review and comment prior to implementing the rule. Without this guidance, operators cannot fully assess the time required to complete reporting or the practicability of the required reporting timeline. Alternatively, industry should have the opportunity to participate in the SCAQMD's process of analyzing and interpreting data resulting from implementation.

and

The rule should focus only on activities with significant emissions potential that are not subject to existing regulations. Protocol and testing plans should be developed with the cooperation of industry before

completion of this rulemaking. The rule should be carefully constructed to gather only the data that is necessary to support specific testing in order for staff to make sound decisions regarding additional rulemaking.

Response: The proposed rule contains a detailed listing of the data that is required to be reported by oil/gas well operators. The type, quantity, and format of data and information required in the rule is very specific, so it is unclear why the commenter states that operators "cannot fully assess the time required to complete reporting or the practicability of the required reporting timeline." The SCAQMD staff will continue to work with key stakeholders during implementation of the proposed rule.

The purpose of PR 1148.2 is to gather air quality-related information on oil and gas well drilling, well completion, and well reworks. Based on research conducted for this rulemaking, SCAQMD staff identified oil/gas well drilling, completion, and rework operations as potential sources of air contaminants. Staff has determined that more information is needed to thoroughly assess the type(s) and extent of air emissions associated with these operations, hence, the proposed rule was developed. Based on the findings from the analysis of information collected as part of the proposed rule, SCAQMD staff will determine the type and extent of any air pollution controls that may be necessary, if any, to minimize emissions from the aforementioned processes.

112. Comment: We suggest the District remove the phrase "typically a" in front of the word "proppant" in the definition of hydraulic fracturing to make it consistent with the DOGGR definition in its "Pre-Rulemaking Discussion Draft" and with common industry usage.

Response: The SCAQMD staff disagrees with the suggestion to remove the words "typically a" in the definition of hydraulic fracturing. These words were added to the definition to ensure that the definition would encompass all types of hydraulic fracturing operations, including hydraulic fracturing operations which may not utilize proppants. For example, one type of hydraulic fracturing method involves the use of an acid solution in conjunction with high pressure injection of fluids into the reservoir to fracture and "etch" the fractured surfaces within the reservoir. This method of hydraulic fracturing does not use a proppant to hold the fractured geologic formation open, but instead the etching action of the acid solution creates open fissures in the formation which allow the flow of hydrocarbons toward the wellbore.

113. Comment: The District has not provided justification for lack of a sunset provision for notification requirements. The District has not determined if activities subject to the proposed rule have significant emissions. Therefore, a

sunset provision for the notification requirements would be prudent and, based on evaluation of the results, determine whether notification should continue for any activities in the second phase.

Response: The notification requirement will be helpful for District staff to compile information regarding the types and frequencies of oil and gas well operations taking place throughout the District. This information will be critical for any future rule development related to oil/gas well operations and will be an ongoing tool to assist District staff in continued research and analysis of these operations, if necessary. However, if at some point in the future, SCAQMD staff determines that the notification information is no longer necessary, the rule may be amended to remove the notification provisions.

114. Comment: District staff believes that not all operators interpret existing rules to necessarily apply to "pre-production" activities (which are not clearly defined). We believe it is inaccurate to say that there is no existing SCAQMD rule for oil and gas facilities that collect and store flowback wastewater in portable tanks or other contaminants that are not part of a wastewater system (January 2013 Draft Staff Report, page 1-7). Rule 203 requires a permit to operate for "any equipment or agricultural permit unit, which may cause the issuance of air contaminants." Thus, unless a portable tank used to collect and store flowback wastewater can be shown to either (a) not cause the issuance of air contaminants or (b) qualify for an exemption in Rule 219 (e.g., (m)(4) or (m)(20)), is required to have a permit. The permit will include appropriate requirements to limit or control emissions.

Response: The SCAQMD staff agrees that wastewater systems, portable storage tanks, or other equipment which "may cause the issuance of air contaminants" may be subject to SCAQMD Rule 203. Staff also agrees that if a permit is required, the permit may contain conditions which may help limit or control emissions from the subject equipment. In many cases, permit conditions/requirements are based on source-specific rule requirements. However, some of the potential emissions sources identified in oil and gas operations do not have existing source-specific rules. Staff contends that since there are no existing source-specific regulations for some emission sources identified in oil and gas operations, applicable under PR 1148.2, these sources should be evaluated to quantify emissions and determine if additional controls are needed. The purpose of the proposed rule is to gather information and evaluate the potential emission sources in oil and gas well operations in order to determine if additional source-specific requirements are warranted. In addition, it is not uncommon for the SCAQMD to conduct an evaluation of permitted sources to determine if there is a need for further controls.

115. Comment: Page 1-12 of the January 2013 Draft Staff Report states:

> "Proposed requirements for reporting the chemicals used during well drilling, completion, and reworks may affect the suppliers of chemicals used during these processes."

Paragraph (e)(2) of the proposed rule states:

> "… a supplier that provides chemicals to the owner or operator of an oil or gas well for drilling, well completion, or rework shall provide the owner or operator . . ."

Because the rule states "shall", there is no question that the rule affects chemical suppliers. Thus, the word "may" should be replaced with the word "will" in the above statement in the Staff Report.

Response: The SCAQMD staff agrees that paragraph (e)(2) of the rule affects chemical suppliers and has made the requested change to the Staff Report.

116. Comment: The Pennsylvania Department of Environmental Protection (DEP) recently released its first annual report on air emissions data associated with unconventional natural gas development. The data represents 2011 emissions from wells and compressor stations and separates data by source categories which include completions, drilling rigs, tanks, and fugitive emissions. Emissions data on particulate matter and VOCs among others were calculated. Some of the compiled data could be useful in informing the District's efforts, especially due to the focus on completions and drilling rig emissions. We recommend reaching out to Pennsylvania DEP for more information on its emissions inventory and the methods used to generate the data.

Response: The SCAQMD staff thanks the commenter for the information and suggestion to collaborate with the Pennsylvania DEP to gather more information on their emissions inventory. Based on a cursory review of the referenced information and as stated in the comment, the DEP data represents air emissions associated with unconventional natural gas development. While staff agrees that this information may be helpful in the analysis of unconventional gas development operations in the South Coast Basin, it is our understanding that the majority of oilfield development in Southern California targets crude oil, rather than natural gas. SCAQMD staff has found very limited information in existing studies or research which focus on air emissions from oil well drilling, completion, or reworks. As discussed in Response to Comments #13 and 23, SCAQMD staff has evaluated several studies air quality related to oil and gas well operations. The SCAQMD staff concludes that the studies evaluated showed significant gaps in the emissions provided. For instance, no studies evaluated PM emissions from the dry material mixing operations conducted for drilling, reworks, and well completion operations.

117. Comment: The proposed trade secret exemptions to disclosure are unnecessary and overbroad. If SCAQMD elects to adopt a trade secret exemption, trade secrets should be defined in accordance with California's Uniform Trade Secrets Act, Cal Civil Code §3426 *et seq.*, rather than by reference to California Government Code §6254.7(d). The former requires a party claiming trade secrecy to demonstrate that they are generally engaged in efforts to maintain the secrecy. If any trade secret exemptions are adopted SCAQMD must retain the proposed requirements that all information be reported to SCAQMD regardless of trade secret status, and that the public be informed of the chemical family and use of toxics.

Response: Exempting trade secret information from PR 1148.2's public disclosure requirements is necessary to protect trade secrets from misappropriation under California Uniform Trade Secrets Act. Under the District's Guidelines for Implementing the California Public Records Act, which sets out the District's procedures for accessing trade secret claims and protecting trade secret information, trade secrets are defined in accordance with the California Public Records Act. *See* Gov. Code Section 6254.7(d). Although efforts to maintain secrecy are not included in the definition of trade secret in section 6254.7(d) of the Government Code, the Guidelines require that any justification claiming trade secret status include a sworn declaration that addresses "the extent of measures taken by the person to guard the secrecy of the information." While trade secret information will not be disclosed publicly, the proposed rule requires that a supplier and/or operator nonetheless provide all chemical information, including trade secret information, to the District so that it can assess potential air quality and public health impacts. For the trade secret chemical ingredients, the District will post on its website the chemical family or a similar descriptor and identification of whether the chemical is an air toxic.

118. Comment: The proposed rule is inconsistent with the State's Uniform Trade Secrets Act (UTSA). Under PR 1148.2 the District recognizes that chemical information released by suppliers may contain trade secrets that must be protected and allows suppliers to submit trade secret information directly to the District instead of to owners/operators. The District will then refrain from posing the information on its website and will only post the chemical family name. However, the PR 1148.2 fails to establish how:

1. The District will determine whether the claim of trade secret protection is valid;
2. The District will protect the confidentiality of information claimed as trade secret;
3. A supplier can seek judicial review of the District's actions that threaten disclosure, and thus misappropriation, of information it claims as trade secret; and

4. The District will control the dissemination of claimed trade secret information to other state or federal agencies to which the District may choose to disclose the claimed trade secret information.

By failing to establish procedures, the District will put at risk the confidentiality of trade secret information submitted under the proposed rule. Simply submitting claimed trade secret information to the District may destroy a supplier's trade secret, because under the UTSA, a supplier must first make "efforts that are reasonable under the circumstances to maintain [the trade secret information's] secrecy." The proposed rule's treatment of trade secret information is so insufficient, therefore, that it is inconsistent with the UTSA and in violation of the Health and Safety Code

Response: Consistent with the State's Uniform Trade Secrets Act, the proposed rule protects trade secret information from misappropriation. As both PR 1148.2 and the Staff Report explains, the District will determine whether a claim of trade secret protection is valid pursuant to the District's Guidelines for Implementing the California Public Records Act, which were adopted by the Governing Board on May 6, 2005. Pursuant to the District's Guidelines, the District will mail a notice, by certified mail, to the facility or entity claiming exempt or trade secret status. In addition, staff proposes to send notice by email to any person claiming trade secret who provides an email address. The notice will include a request for a detailed and complete justification of the bases for exempt or trade secret status. The facility or entity must make an appointment with Public Records Staff, within 15 calendar days of the date of the letter, to come in and review the records and highlight the portion exempt or containing trade secret. If no justification is timely received, the subject records shall be released as specified herein. Any justification claiming trade secret status must include a sworn declaration that should address the following six factors (Restatement of Torts Sec. 757.): (1) the extent to which the information is known outside of the person's business; (2) the extent to which it is known by employees and others involved in the person's business; (3) the extent of measures taken by the person to guard the secrecy of the information; (4) the value of the information to the person's business and to the person's competitors; (5) the amount of effort or money expended by the person in developing the information; and (6) the ease or difficulty with which the information could be properly acquired or duplicated by others.

The District shall evaluate the justification and any other information at its disposal and shall determine if the justification supports the claim that the material is in fact exempt or is a trade secret under Gov. Code Sec. 6254 and Sec. 6254.7, or otherwise privileged. If the District determines that the claim of trade secret is not meritorious or is inadequately supported by the evidence, the District shall promptly notify, by certified mail, the entity who claimed exempt or trade secret status that the justification is

inadequate, and that the information will be released after 15 calendar days from the date of such notice. Again, notice will also be provided by email.

The District has strategies in place for protecting the confidentiality of information claimed as trade secret. SCAQMD has been handling confidential and trade secret information for many years without incident. Our computer systems are protected from outside attackers, and access by internal staff is controlled and audited. A security assessment was recently conducted which found no vulnerabilities from outside attackers. Internally, disclosure is limited to employees who require such information to perform their duties. Moreover, the amount and nature of trade secret information revealed to an employee depends solely upon their need to know. Controls for internal access include strong passwords, domain account authentication, limiting access to authorized users with proper roles, antivirus software with updates, security software updates, and physical security.

The District's Guidelines for Implementing the California Public Records Act explain how a supplier can seek judicial review of the District's determination of a supplier's trade secret claim. When the District determines that the claim of trade secret is not meritorious or is inadequately supported by the evidence, and notifies the entity who claimed trade secret status that the justification is inadequate, the entity shall also be advised of its right to bring appropriate legal action to prevent disclosure, and of its right to further respond.

As explained in the District's Guidelines for Implementing the California Public Records Act, the District will control the dissemination of claimed trade secret information to other state or federal agencies. The District will disclose trade secret information to other governmental agencies who request such information for purposes of carrying out their official responsibilities if such agencies agree to treat the disclosed material as confidential pursuant to a written confidentiality agreement with the District. The confidentiality agreement shall designate those persons authorized by the requesting governmental agency to obtain the information.

119. Comment: We are not aware of any other recently proposed regulations that require the disclosure of product ingredient information in the same way the District has proposed. For example DTSC's proposed Green Chemistry regulations and the hydraulic fracturing regulations proposed by DOGGR contain detailed protections for trade secret information.

Response: The Department of Toxic Substance's Control's proposed Green Chemistry regulations' evaluation and protection of trade secrets are similar to the District's Guidelines for Implementing the California Public Records Act. Like the District's Guidelines, the proposed regulations provide a process whereby a person who asserts a claim of trade secret will receive a written request from the Department to furnish the Department with information supporting the trade secret claim. *See* Art. 9, section 69509 (available at:http://www.dtsc.ca.gov/LawsRegsPolicies/Regs/upload/SCP-Revised-Text.pdf)(last visited March 27, 2013).

Once the substantiating information is provided, the proposed regulations set up the review process the Department undertakes. *See* Art. 10, section 69510.1. Similar to the District's Guidelines, the proposed regulations set up a procedure whereby the Department notifies the entity if their justification does not satisfy the criteria for trade secret information and informs the entity of its right to seek judicial review to prevent the Department from releasing such information.

With respect to the commenter's second point, DOGGR's Pre-Rulemaking Discussion Draft Regulations differ from Proposed Rule 1148.2 in that DOGGR's proposed regulations require the disclosure of trade secret information in two limited situations. In the first situation, the draft regulations require the disclosure of trade secret information to DOGGR or to a public agency with lawful jurisdiction for either enforcement action or emergency response if the information is necessary to investigate or respond to evidence of a spill or release of hydraulic fracturing fluid or material or evidence that hydraulic fracturing fluid or material has escaped the intended zone or zones of the hydraulic fracturing operations. *See* section 1788.2(a) of DOGGR's draft regulations. In the second situation, DOGGR's draft regulations require the disclosure of trade secret information to a public health professional who, in the scope of her professional duties, requests the information and executes a confidentiality agreement. *See* section 1788.2(c) of DOGGR's draft regulations (last visited March 27, 2013). In those limited, ad hoc situations, DOGGR's proposed regulations provide for the trade secret holder and the public agency or health professional to enter into an agreement to prevent the disclosure of trade secret information.

In contrast, the District's proposed rules requires suppliers and/or operators to provide the District with the trade secret information of chemicals used in drilling, well completions or well reworks so that the District can evaluate the potential health impacts and air quality effects. As explained in response to comment #118 above, the District's Guidelines for Implementing the California Public Records Act contain

routine, systematic and detailed procedures for evaluating and protecting for trade secret information.

However, DOGGR's proposed regulation and proposed Rule 1148.2 are similar in that neither regulatory scheme require a supplier or operator to make trade secrets available to the public. *See* section 1788.1 of DOGGR's draft regulations.

120. Comment: The belief that the proposed rule can remain silent on handling trade secret information because it is handled under the District's Public Records Act Guidelines is an erroneous belief because the Guidelines are legally flawed and, if followed, may lead to trade secret misappropriation. Flaws include:

1. The Guidelines state that even if a facility claims records are trade secret, they may still be "immediately released [in response to a Public Records Act Request if] the District determines they are clearly public records." The District may summarily decide that the information is "clearly" a public record and release it immediately without allowing the submitter to seek a judicial remedy preventing disclosure, therefore no person can reasonably assume that information submitted to the District will be kept a trade secret, meaning the Guidelines and the proposed rule are inconsistent with the UTSA and are likely to lead to the misappropriation of trade secret information.
2. The procedure allowing a claimant to protect its claimed trade secret information is so truncated it provides little protection. Under the Guidelines, if the District decides to release information claimed as trade secret, it will mail a notice to the claimant allowing 15 calendar days from the date of mailing to obtain a court order preventing disclosure. If the letter does not get to the claimant, the information will be released anyway. At best, a claimant would have only a few days to obtain a temporary restraining order and at worst, the information could be disclosed even before the claimant knows about the District's plans to release it.
3. The Guidelines, like the proposed rule, are silent on how the District will protect the confidentiality of information claimed as trade secret from physical or electronic disclosure. Failure to adequately protect claimed trade secret information is likely to lead to disclosure and misappropriation of trade secret information in violation of the UTSA. Therefore, the District must revise the Guidelines or augment its procedures within PR 1148.2 itself.

Response: As with all other trade secret information the District receives, any information the District receives pursuant to PR 1148.2 that is claimed as trade secret will be handled in accordance with the District's Guidelines for Implementing the California Public Records Act.

As the commenter notes, the Guidelines allow the District to immediately release information claimed to be trade secret only if the District determines that the information is clearly a public record. Under this provision of the Guidelines, information that the District would determine is clearly a public record would be information that is already available to the public and therefore does not meet the definition of trade secret. For instance, emissions data that is reported to the District and made available on the District's website would be considered information that is clearly a public record. In all other instances, records that are claimed as trade secret will not be released until the District has determined that the trade secret claim is not meritorious or is inadequately supported by the evidence in accordance with the procedures set forth in the District's Guidelines. Because the Guidelines only allow the District to immediately release information that is clearly public record, implementation of the Guidelines will not lead to misappropriation of trade secret information and the Guidelines are not inconsistent with the Uniform Trade Secret Act.

The commenter argues that an entity might only have a few days to obtain a temporary restraining order to prevent the District from disclosing trade secret information under the District's Guidelines. The District believes that 15 days is a sufficient amount of time for an entity to bring appropriate legal action to prevent disclosure. As noted in response to comment #118 above, in addition to notifying a claimant by certified mail, the District will send notice by email, negating the likelihood that a claimant would have only a few days to obtain a temporary restraining order or that the information would be disclosed before the claimant even knew about the District's plans to release the information.

In response to the commenter's final point, the District's computer systems are protected from outside attackers and access by internal staff is controlled and audited. See response to comment #118 above for a more detailed explanation of the safeguards in place to protect the confidentiality of information claimed as trade secret from physical or electronic disclosure.

121. Comment: The proposed rule exceeds the District's rule-making authority and is not consistent with existing statutes. PR 1148.2 requires disclosure of *all* ingredients of a hydraulic fracturing fluid product regardless of the ingredient's physical characteristics or effect on air quality. Requiring disclosure of all hydraulic fracturing fluid products without reference to concentration or physical properties is overboard and, at *de minimis* concentrations, infeasible. This would require disclosure of trade secret information for ingredients that have no effect on air quality creating unnecessary risk of misappropriation of trade secrets.

Under the Health and Safety Code, the District may only adopt regulations within its rule-making authority, meaning only regulations to control air pollution. Therefore, the District only has authority to require disclosure of chemicals that have the potential to affect air quality. Most chemicals in hydraulic fracturing fluids are not VOCs, Toxic Air Contaminants, or Hazardous Air Pollutants, and so do not have the potential to affect air quality. Furthermore, the broad disclosure of hydraulic fracturing constituents is inconsistent with the purpose of the proposed rule which is to "assess if there are potential volatile organic compounds, toxic air contaminants, or hazardous air pollutants that may be a concern for air quality of public health." These shortcomings can be remedied by revising the regulation to include robust protections for trade secret information and by narrowing the disclosure obligation to constituents that are VOCs, TACs, or HAPs and are present at relevant concentrations. Failure to do so will harm the regulated community and violate the Health and Safety Code.

Response: Under the Health & Safety Code, the District may adopt rules to control air pollution and protect the public health. *See* Health and Safety Code Sections 39002, 40000, 40701, 40702, 40725 through 40728, 41508, 41511, 41700. PR 1148.2 requires the disclosure of all ingredients of a hydraulic fracturing fluid product because the District does not know what chemicals are contained in the product. Without knowing what chemicals are in the product, the District cannot make a determination that the chemicals in the product will not have a negative effect on public health or air quality. The alternative suggested by the commenter – that the District only ask the supplier to provide information for chemicals that the supplier believes will have an effect on air quality – would put the supplier in the position of the regulating entity by allowing them to determine what chemicals might have an effect on air quality or public health. For the District to fully assess the potential impacts on air quality and public health from the chemicals used in drilling, well completions and well reworks, it is necessary for the District to know what chemicals are being used.

Even though a chemical may not be a VOC or a toxic air contaminant, it may cause an air quality impact. One example is particulate. Use of dry materials can create particulate matter, and depending on the particle size and the type of material can cause an air quality and potentially health impact. Full disclosure of chemical use will complement emissions monitoring and sampling efforts and will be used to help identify and quantify emissions.

See response to comment #118 above about the protections for trade secret information contained in the District's Guidelines for Implementing the California Public Records Act.

122. Comment: The District has the opportunity to rely upon the adoption of more extensive chemical disclosure regulations by DOGGR. It makes sense to leave adoption of disclosure regulations to DOGGR because:
DOGGR has the authority to require disclosure of all constituents of hydraulic fracturing fluids rather than only those affecting air quality;
DOGGR regulation would have state-wide applicability rather than just part of the state;

The Legislature has expressed the preference for DOGGR to be the state agency regulating hydraulic fracturing activities; and if both the District and DOGGR adopt similar but different disclosure regulations, the burden on the regulated community, and risk of trade secret misappropriation, will increase. Health and Safety Code Section 40727 is intended to prevent such duplication.

Response: As explained above in response to comment #119, DOGGR's draft regulations do not contain extensive chemical disclosure requirements. Rather, DOGGR's draft regulations only require disclosure of trade secret information if (1) the information is necessary to investigate or respond to evidence of a spill or release of hydraulic fracturing fluid or material or evidence that hydraulic fracturing fluid or material has escaped the intended zone or zones of the hydraulic fracturing operations or (2) the information is needed for the purpose of diagnosis or treatment of an individual by a medical professional. *See* section 1788.2(a),(c) of DOGGR's draft regulations. Therefore, the District cannot rely on DOGGR's regulations as a means of allowing the District to obtain the information it needs to determine if the chemicals used in drilling, well completions and well reworks will have an impact on air quality or public health.

While DOGGR is the state agency responsible for the safe exploration and development of energy resources, the District is the agency responsible for regulating air pollution and protecting the public health from such pollution. As noted above, the District and DOGGR are proposing to adopt very different disclosure regulations. Accordingly, the District's proposed regulation does not impose the same requirements as an existing state regulation. *See* Health and Safety Code 40727. However, to the extent feasible, the District has made efforts to streamline the requirements.

Throughout the rulemaking process, the SCAQMD staff has been in communication with DOGGR staff. As previously discussed, Proposed Rule 1148.2 is an information gathering rule. The purpose is to gather air quality-related information. The proposed rule requires pre-notification of

drilling, well completion, and rework activities. In addition, the proposed rule focuses on three emission sources: exhaust emissions from combustion sources, particulate emissions from mixing operations, and VOCs and potentially toxic emissions from flowback fluids. The proposed rule does not specify any pollution control requirements and is administrative in nature.

The proposed DOGGR regulations focus on well construction and integrity. The proposed DOGGR regulation does include notification for hydraulic fracturing only. Proposed Rule 1148.2 is focused on activities with potential air quality impacts and includes drilling, well completions, and rework activities. The proposed DOGGR regulation does include chemical disclosure requirements, however, the proposed DOGGR regulation does not include requirements to identify air toxics and all information that is claimed trade secret, including chemical family names or similar descriptors that maintain confidentiality of trade secret information yet inform the public about the general chemical family that is being used.

APPENDIX B: SUMMARY OF SCAQMD EVALUATED STUDIES

SCAQMD Staff's Review of TSDs for NSPS and Sixteen Additional Studies

As part of the development for Proposed Rule 1148.2, the SCAQMD reviewed a number of studies including those referenced in the Technical Support Document (TSD) in the federal New Source Performance Standards for the newly adopted New Source Performance Standards covering the crude oil and natural gas production source category. Below are the studies evaluated and a summary of findings by SCAQMD staff.

Document or Study Title	Summary
Oil and Natural Gas Sector: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution, Background Technical Support Document for Proposed Standards	Emissions were estimated for completions and recompletions. Both oil and gas wells were evaluated. However, only gas wells were evaluated with and without hydraulic fracturing. PM and NOx were not evaluated. Basic emissions methodology to estimate emissions used an approximate gas composition ratio of VOCs and HAPs in natural gas. These approximations were based on an EPA memo documenting previously obtained sources of gas composition data. According to the memo, gas composition from gas production basins throughout the U.S. was the basis for the data (presumably by sampling). It is not clear which if any oil well fields were used as a basis for the VOC/HAP composition ratios for oil well completions and recompletions. Specific natural gas basins included in the data sources did not specifically identify the South Coast region as being a source of data. For the most part, HAPs included BTEX only. Overall methane emissions were determined from EPA's GHG inventory, EPA's Inventory of Greenhouse Gas Emissions and Sinks: 1990-2008 (Inventory). Natural gas completions and recompletions without hydraulic fracturing are assumed to be uncontrolled at baseline. Fifteen percent of natural gas well completions with hydraulic fracturing are assumed as controlled at baseline. Oil well completions and recompletions are assumed to be uncontrolled at baseline. Fifteen percent of natural gas well recompletions with hydraulic fracturing are assumed to be controlled at baseline Based on the results, the VOC and HAP emissions from oil completions and recompletions are very low.
Federal Register Notice for Final NSPS and NESHAPS	It should be noted that in response to a comment, EPA stated that their agency did not have sufficient data on VOC emissions during well completion or recompletion operations involving hydraulically fractured oil wells to set standards for these operations.
Oil and Natural Gas Sector: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution. Background Supplemental Technical Support Document for the Final New Source Performance Standards	The paper is a supplemental TSD to the above background TSD on NSPS for the Oil and Gas Production sector published in July 2011 (EPA-453/R-11-002). The paper provides an evaluation of the emission factor for hydraulically fractured gas well completions and recompletions. The recent (2010) emission factor based on four data sets. The 2010 factor was developed using four data sources representing over 1000 well completions from 2004 – 2007. Significant quantities of gas are produced during completion process during flowback period. However, no breakdown is given in the document of gas produced during various stages of completion. The paper also provides a description of Reduced Emission Completions (REC). No evaluation of other well completions, reworks, or well drilling is provided. The paper also evaluates changes to the NSPS for storage vessels. The NSPS covers

Document or Study Title	Summary
	new storage vessels in crude oil and natural gas production with throughputs greater than 1 barrel per day (BPD) of condensate and 20 BPD of crude oil. The analysis looks at baseline emissions and cost of controls, though not specific to hydraulic fracturing operations.
EDF Study from WSPA	This article is focusing on the natural gas production and distribution network. There is no information on well drilling, well reworks, or well completions, In this article, the authors propose the use of technology warming potentials (TWPs) rather than global warming potential (GWP) as a means to compare the cumulative radiative forcing created by alternative technologies fueled by natural gas and oil or coal by using the best available estimates of greenhouse gas emissions from each fuel cycle (i.e., production, transportation, and use). The authors conclude that there is a need for the natural gas industry and science community to help obtain better emissions data and for increased efforts to reduce methane leakage in order to minimize the climate footprint of natural gas. The article briefly mentions how horizontal drilling and hydraulic fracturing technologies have expanded the country's extractable natural gas resources by accessing gas in deep shale formations. The article also discusses methane emissions through the natural gas supply network, but does not go into detail about the specific sources of natural gas leaks. The article cites a study that indicated that methane emissions from upstream leakage (leaks and venting in the natural gas network between production wells and the local distribution network) account for 3.6-7.9% of methane produced over the lifecycle of a well for shale gas, versus 1.7-6.0% for conventional gas. The article also discusses findings of methane leak rates at 250 well sites in Fort Worth, Texas to range from 0-5%, however, the article indicates that the leakage rates "…do not include such occasional events as well completions and blowdowns. Only 203 of the 254 sites had data for gas production."
EDF - Emissions from Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements	The objective of this study was to develop an emissions inventory of air pollutants from oil and gas production in the Barnett Shale area, and to identify cost-effective emissions control options. Study only examined natural gas well development and production. Emission sources from the oil and gas sector in the Barnett Shale area were divided into point sources, which included compressor engine exhausts and oil/condensate tanks, as well as fugitive and intermittent sources, which included production equipment fugitives, well drilling and fracking engines, well completions, gas processing, and transmission fugitives. The air pollutants considered in this inventory were smog-forming compounds (NOx and VOC), greenhouse gases, and air toxic chemicals. The report refers to four previous studies which examined emissions of natural gas during well completions and found typical well completions could vent between 1,000 to 24,000 Mcf of natural gas. For emission estimation purposes, the report uses 5,000 Mcf of natural gas/well as representative of typical gas producers in the Barnett Shale, employing "green completion" techniques to reduce emissions during well completion. Estimated emissions of VOC, HAPs, methane, and CO2 from well completion operations were calculated using unprocessed natural gas as the surrogate and an assumed natural gas composition of 74% methane, 8.2% VOC, 1.4% CO2, and 0.20% HAPs, on a mass % basis (according to the study, natural gas composition was "based on data from gas producers" but does not provide a reference). Note that EPA in their TSD, used 14.6% for VOC and 1.1% for HAPs. The study indicates that HAPs in

Document or Study Title	Summary
	unprocessed natural gas can include low levels of n-hexane, benzene, or other compounds. The study included emission factors and an equation for calculating the mass emission rate of each pollutant. The study indicates that emissions from well completions can vary based on numerous site-specific factors, including the pressure of the fluids brought to the surface, the effectiveness of on-site gas capturing equipment, the control efficiency of any flaring that is done, the chemical composition of the gas and hydrocarbon liquids at the drill site, and the duration of drilling and completion work before the start of regular production. The study also mentions an EPA study which found that green completions were estimated to capture 70% of formerly released gases, and another report by Williams Corporation which found that 61% to 98% of gases formerly released during well completions were captured with green completions. The report does not provide a detailed breakdown of emissions from individual steps in the drilling or well completion processes. The sources they used as the basis for their emission estimates from these processes were diesel engines used to operate drilling rigs and hydraulic fracturing pumps, and natural gas releases during the well completion process. Aside from engine emissions, the study's discussion regarding emissions focuses on the flowback process during hydraulic fracturing. The study states, "After the wellbore is formed and the shale fractured, an initial mixture of gas, hydrocarbon liquids, water, sand, or other materials comes to the surface. The standard hardware typically used at a gas well, including the piping, separator, and tanks, are not designed to handle this initial mixture of wet and abrasive fluid that comes to the surface. Standard practice has been to vent or flare the natural gas during this "well completion" process, and direct the sand, water, and other liquids into ponds or tanks…. During well completions, the venting/flaring of the gas coming to the surface results in a loss of potential revenue and also in substantial methane and VOC emissions to the atmosphere."
2011 Oil and Gas Emission Inventory Enhancement Project for CenSARA States (seven states).	Source emission inventories were prepared for each oil and gas producing State within the CenSARA region (middle part of U.S.). Both oil and gas wells were estimated. These inventories are highly detailed and include emissions at basin, state and county levels. Inventories include 16 pollutants in 19 source categories. These include emissions from drilling equipment (no mixing operations or return mud), hydraulic fracturing pumps (no flowback), fugitive emissions, and well completion venting. A number of production activities were also included. There are a number of appendices (basically spreadsheet calculator tools) referenced in the report that are not publically available.
Oil and Gas Emission Inventories for the Western States	The report presents an emissions inventory of well completion sources, with the focus on larger sources of NOx emissions. These consisted of drilling and gas compressor engines. NOx and VOC emissions from minor wellhead process for which emission factors are available were also estimated. Most of the emissions estimated were for production activities, although some well completion estimates are provided. All estimates for California came from CARB's general emission inventory for oil and gas production. CARB's provides this information through the California Emission Inventory Development and Reporting System (CEIDARS). There are several categories listed in the CEIDARS report, but they are focused on the production, treatment, storage, and transmission sources of the activities. The support study reports emissions annually. The baseline year for the report is 2002.

Document or Study Title	Summary
	The introduction states "As this was the first effort to develop a regionally consistent emissions inventory for oil and gas area sources and resources were limited, this inventory is neither comprehensive nor as accurate as it might be. . . ." In addition, it states, "This inventory and the methodology used should be considered as a first step . . . and the basis for further work to improve the estimates." Projections out to 2018 were also provided. Emission release points are not discussed or evaluated. No PM emissions are addressed from mixing operations. The report gives the following estimates for well completions: • Flaring and venting emissions estimated from well completions ▪ No mention of whether hydraulic fracturing emissions were included in well completions • Default emission factors from the Wyoming DEQ were used for all states except Colorado to estimate emissions from well completions: ▪ 86.0 tons VOC/well completion ▪ 1.75 tons NOx/well completion • An alternative emission factor was provided by Colorado Dept of Public Health and Environment (CDPHE) ▪ 16.664 tons VOC/well completion ▪ 0.85 tons NOx/well completion
Emissions from Oil and Gas Well Production Facilities	The purpose of this study was to compile a comprehensive emissions inventory for onshore and offshore oil and gas exploration and production facilities in Texas for the base year 2005. The inventory was compiled for criteria pollutant emissions. In addition to emission estimates from production sources, the report included estimates for drilling rigs (diesel engines, degassing of drilling muds in open pits or storage tanks), gas well completions (flaring, venting), and oil well completions (flaring, venting). While emission estimates are provided for the above source categories, the estimated emissions use general surrogate emission factors with no sampling to back up the factors. The drilling emissions are also based on daily activity, so they are not based on volume or mass of materials. In addition, the estimates do not provide detail on the specific emission points. Particulate matter emissions are based on diesel support equipment only. Dry material mixing is not covered. There is also a missing appendix that is unavailable for review which would shed light on the methodology for how the venting and flaring emissions were calculated. The report does not evaluate hydraulic fracturing. This would be included in the well completion category, but there was not mention of this process. In addition, no mention of emission controls was included in study. In fact the authors report that this was a major drawback of the report…"Essentially no useful information in regards to controls could be identified."
Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program	The document analyzes potential environmental impacts from high-volume hydraulic fracturing on natural gas shale deposits, including impacts to: water resources, ecosystems and wildlife, air resources, greenhouse gas emissions, visual, noise and community character, transportation, naturally occurring radioactive materials (NORM), and seismicity. The report categorizes emissions sources into three types: 1- combustion from

Document or Study Title	Summary
	engines, compressors, line heaters, and flares; 2- short term venting of gas constituents which are not flared; 3- emissions from truck activities near the well pad. The report summarizes "Estimated wellsite emissions" (see page 6-106 of the dSGEIS) from flowback gas flaring and venting for dry gas (little or no VOC content) and wet gas (contains heavier hydrocarbons such as benzene) wells, but does not provide a detailed discussion of how the emissions estimates were derived, other than stating that the estimates are based on industry's response to the DEC's information requests (referred to as the Industry Information Report). The report identifies flowback venting (where "wet" gas is encountered) as the venting source with the most dominant emissions of toxics. The report refers to the Industry Information Report, which indicated that flowback venting has about two orders of magnitude higher emissions of benzene, hexane, toluene, xylene, and H2S, than the other two sources of venting emissions, the mud-gas separator and the dehydrator. The report notes that venting is limited to a few hours before the flare is used, which reduces emissions by over 90%. The report indicates that engine manufacturer emissions data is the preferred method for calculating emissions from engine exhaust, where available. The report provides a few examples of common EPA AP42 emission factors for engines in order to characterize emissions from engines used in the drilling, hydraulic fracturing, and production processes. The report does not provide a detailed inventory of engines used in these processes, but does provide examples of engine sizes for a drilling rig engine (5400 hp), a hydraulic fracturing pump engine (2333 hp), and a natural gas compressor engine (2500 hp). The report also provides total Potential To Emit for each of the example engines, based on engine data specification sheet information and assuming continuous year-round engine operation. The report discusses emissions from flowback during hydraulic fracturing, stating that "a small amount of gas is vented for a period of time. Once the flow rate of gas is sufficient to sustain combustion in a flare, the gas is flared for a short period of time for testing purposes. Recovering the gas to a sales line is called a reduced emissions completion." The report goes on to state that normally, flowback gas is flared when there is insufficient pressure to enter a sales line or if a sales line is not available. The report discusses emissions during drilling when gaseous zones are encountered such that some gas is returned with the drilling fluid, which is referred to as a gas "kick." For safety reasons the drilling fluid is circulated through a mud-gas separator as the gas kick is circulated out of the wellbore. The separator diverts the gas away from the rig personnel and is vented to the main vent line or a separate line normally run adjacent to the main vent line. The report does not quantify the gas emissions during a "kick", but states that drilling in a shale formation does not result in significant gas adsorption into the drilling fluid as the shale has not yet been fractured. Also, the report states that experience in the Marcellus shale has shown few if any encounters with gas kicks during drilling. The report concludes that an air monitoring program should be undertaken in order to "fully address potential for adverse air quality impacts beyond those analyzed in the SGEIS related to associated activities which are either not fully known at this time or verifiable by the assessments to date." The report further states, " For example, the consequences of increased regional VOC and NOx emissions on the resultant levels of ozone and PM2.5 cannot be fully addressed by only modeling at this stage due to the lack of detail on the distribution of wells and compressor stations. In addition, any

Document or Study Title	Summary
	potential emissions of certain VOCs at the well sites due to fugitive emissions, including possible endogenous level, and from the drilling and gas processing equipment at the compressor station (e.g. glycol dehydrators) are not fully quantifiable. The report contains detailed listings of chemical compositional information on many of the additives used in fracturing fluids. The tables contain alphabetical listings of products for which complete product composition information and MSDSs were provided, as well as a listing of products for which only partial chemical composition information was provided to the DEC. The information was collected directly from 15 chemical suppliers and 6 service companies and in some cases, represents "complete product composition disclosure", which includes the chemical names and associated CAS Numbers of every constituent within a product, as well as the percent by weight information associated with each constituent of a product. Compositional information for 235 products was collected, with complete product composition disclosures and MSDSs for 167 of those products. Within these products, there are 322 unique chemicals whose CAS numbers were disclosed and at least 21 compounds whose CAS numbers were not disclosed due to the fact that they are mixtures. Typically no more than 12 products consisting of far fewer chemicals than listed would be present at one time at any given site. The report includes a detailed discussion of fracturing fluid additives, including: chemical composition of fracturing fluids, properties of fracturing fluids, classes of additives, chemical categories and health effects. However, total amounts per frack job are not specified. The study discusses results of laboratory analyses of flowback fluids provided by the URS Corporation and the Marcellus Shale Coalition (MSC). The report contains detailed summaries of the parameters analyzed in the flowback fluid and the laboratory results. In summary, most samples were analyzed for conventional parameters, metals, VOCs, semi-volatile compounds, organochloride pesticides, PCBs, organophosphorous pesticide, alcohols, glycols, and acids. The study also discussed the changes in flowback composition over time during the course of the flowback process.
Greenhouse Gas Mandatory Reporting Rule and Technical Supporting Documents	This study focused on GHG only. No criteria pollutants or HAPs/TACs evaluated.
Inventory of Greenhouse Gas Emissions and Sinks: 1990-2008	This study focused on GHG only. No criteria pollutants or HAPs/TACs evaluated.
Methane Emissions from the Natural Gas Industry	This study focused on GHG only. No criteria pollutants or HAPs/TACs evaluated.
Methane Emissions from the US Petroleum Industry (Draft	This study focused on GHG only. No criteria pollutants or HAPs/TACs evaluated.
Methane Emissions	This study focused on GHG only. No criteria pollutants or HAPs/TACs evaluated.

Document or Study Title	Summary
from the US Petroleum Industry	
Oil and Gas Producing Industry in Your State	This study had no emission information/data
Availability, Economics and Production of North American Unconventional Natural Gas Supplies	This study focused on the production side of natural gas supplies
Petroleum and Natural Gas Statistical Data	This study focused on the production side of natural gas supplies
Preferred and Alternative Methods for Estimating Air Emissions from Oil and Gas Field Production and Processing Operations	This study focused on post production operations.
Natural Gas STAR Program	This study focuses on GHG only. No criteria pollutants or HAPs/TACs evaluated.