SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

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

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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.

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 existing SCAQMD rules 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 reworks activity 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 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 three emission source categories that the proposed rule requires reporting: (1) 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. 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 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 reduction 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 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 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 and completion 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 activity. Lastly, the proposed rule will include requirements for owners or operators of onshore oil and gas wells 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 activity.

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 on December 12, 2012, January 15, 2013, and January 24, 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 where public testimony and further comments from several Governing Board members were heard. Additionally, a Public Workshop has been scheduled for January 30, 2013 to present the proposed rule and receive public comment.

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.

Initial Comments

The public has expressed several concerns. To date, 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 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 falsification is subject to civil penalties under Health and Safety code 42402.4.

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 existing SCAQMD rules either did not cover these operations or an existing rule could cover the operations, even though it was not the intent of that rule.

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 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. 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.

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 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.

OIL AND GAS DEVELOPMENT PROCESSES AND SCAQMD RULES

Staff has evaluated the following 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 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.

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. Although 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, set 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 sources.

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 represents 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 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.

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 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); trade secret chemical information; 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.

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 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. 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 and Orange County regions.

Proposed requirements for reporting the chemicals used during well drilling, completion, and reworks 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 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 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 activity 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 District that is conducting drilling, well completion activities, and well reworks. In addition, the proposed rule applies to suppliers that are selling or distributing 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.

- Chemical family
- Drilling
- Drilling fluid
- Flowback fluid
- Hazardous air pollutant
- High rate gravel pack
- Hydraulic fracturing
- Hydraulic fracturing fluid
- Onshore oil or gas well
- Proppant
- Rework
- Sensitive Receptor
- Supplier
- Toxic Air Contaminant
- Well
- Well Completion
- Well Completion Fluid

- Well Production Stimulation 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 days from date of rule adoption.

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

- Owner or operator of the subject well;
- API well number;
- Geographical coordinates of the subject well;
- Nearest sensitive receptor within 1,500 of the subject well; specifying the:
    - Sensitive receptor type (e.g., residence, school, hospital)
    - Name of facility, if applicable;
    - Location address; and
    - Distance from the outer boundary of the sensitive receptor to the subject well;
- 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.

Reporting Requirements

Proposed Rule 1148.2, subdivision (e) includes two reporting requirements for: (1) emission sources and (2) chemical reporting. Both reporting requirements begin 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 submitted no later than 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.

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 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 and Flowback Fluids – Under subparagraph (e)(1)(E), the owner or operator is required to report information regarding drilling 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, 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.

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. 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 the name of each chemical compound and the 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, and whether the chemical is a hazardous air pollutant or a toxic air contaminant. If the supplier claims 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 chemical family or similar descriptor and whether or not chemical is a 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 to the owner or operator.

If the supplier claims trade secret, the supplier must provide the information claimed as trade secret to the Executive Officer. 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.

Chemical Use Reporting

Under this provision, there are requirements for the owner and operator of a well for chemicals that are used during drilling, well completion, and rework activities. Under paragraph (e)(5), 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 the name of each chemical compound, 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, whether or not the chemical is claimed as trade secret and if so the chemical family or similar descriptor, and whether the chemical is a hazardous air pollutant under the Clean Air Act or a toxic air contaminant under state law. The proposed rule 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 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 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 Public Records Act Guidelines and the California Public Records Act. If the District determines that the justification for claiming trade secret is inadequate, the District 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, the proposed rule requires the following information be posted on the SCAQMD's website and made available to the public:

- Name of chemical compound;
- Chemical abstract service (CAS) number;
- Volume or mass of chemical used; and
- Identification of the chemical(s) that are a 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:

- Chemical family or similar descriptor; and
- Identification of the chemical(s) that are a 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

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 working, 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 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

The proposed rule would affect 241 oil and gas wells operation facilities. Out of 241 facilities, 206 are located in Los Angeles County, and the remaining 35 are located in Orange County. Eighty 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, the proposed rule would affect a number of chemical suppliers, most of which are located outside of California. 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 AQMD 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 AQMD'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 241 oil or gas well operations in the District, information on employees and sales for 169 facilities is available, based on the 2013 Dun and Bradstreet data. Under the AQMD definition of small business, 64 facilities are considered small. Based on the SBA and CAAA definition of small businesses, there are 105 and 103 small businesses, respectively.

Compliance Cost

Under the proposed requirements, well owners/operators are required to notify the District 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 wells drilling and well reworks. These estimates represent a higher-end estimate because they include injection notifications 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 half an hour to two hours 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.

Reporting requirements for chemical suppliers would apply only if they choose not to report such information 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 contained in the drilling fluids, well completion fluids, and rework operations.

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-

[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.

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

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 AQMD 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 AQMD 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 AQMD rules. In addition, there is insufficient information available to know the air emission potential of these processes. 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 AQMD 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 AQMD 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 AQMD 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.

Non-Duplication

The AQMD 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 before the specific activity is conducted. However, these notification provisions are a necessary undertaking since it is the mission of the AQMD 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.

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. The reporting requirements of federal NESHAPS focus on compliance with the "green completion" provisions of the regulation but do not requiring 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) and Federal Clean Air Act Section 112 (Hazardous Air Pollutants).

REFERENCES

REFERENCES

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

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