SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report
Proposed Rule 1153.1 – Emissions of Oxides of Nitrogen from Commercial Food Ovens

March 2014

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INTRODUCTION

The purpose of Proposed Rule 1153.1 – Emissions of Oxides of Nitrogen from Commercial Food Ovens (PR 1153.1) is to limit emissions of nitrogen oxides (NOx) and carbon monoxide (CO) from the combustion of gaseous and liquid fuels in food ovens, roasters and smokehouses. This equipment is currently regulated by SCAQMD Rule 1147 – NOx Reductions from Miscellaneous Sources and Regulation XIII – New Source Review (NSR). Rule 1147 limits emissions of NOx from gaseous and liquid fuel fired combustion equipment that are not specifically addressed in other SCAQMD Regulation XI – Source Specific Standards. However, because control technologies have not matured in a timely manner for commercial food ovens, it was decided to regulate these sources separately from the other Rule 1147 sources. In this way the commercial food ovens could be placed on a more suitable compliance schedule with achievable emission limitations.

The equipment addressed by Rule 1147 is used in a variety of industrial and commercial applications. Based on stakeholder input and further evaluation of the technical feasibility of retrofit technologies applicable to older units of this class of equipment, staff has proposed to move food ovens, including roasters and smokehouses, from Rule 1147 and place them in a proposed new rule with different emission limits and compliance dates.

REGULATORY HISTORY

The equipment proposed to be regulated by PR 1153.1 are currently regulated under SCAQMD Rule 1147. Rule 1147 is based on two control measures from the South Coast Air Quality Management District 2007 Air Quality Management Plan (AQMP): Control Measure MCS-01 – Facility Modernization and Control Measure CMB-01 – NOx Reductions from Non-RECLAIM Ovens, Dryers, and Furnaces. Emission reductions from the equipment addressed by Rule 1147 and Control Measure CMB-01 of the 2007 AQMP were proposed to be regulated in earlier AQMPs (e.g., Control Measure 97CMB-092 from the 1997 AQMP).

Control measure MCS-01 was a new control measure developed for the 2007 AQMP that proposes companies upgrade their current technology to best available control technology (BACT) – the cleanest technology available. The facility modernization control measure proposes that equipment operators meet best available control technology (BACT) emission limits at the end of the equipment's useful life. For equipment regulated by Rule 1147, modernization requires burner upgrades, replacement of burner systems or replacement of equipment when the equipment reaches 15 to 20 years of age.

Equipment that is regulated by Rule 1147 and PR 1153.1 must also meet the requirements of SCAQMD Regulation XIII – New Source Review (NSR) and SCAQMD Regulation IV – Prohibitions. Equipment subject to NSR must meet BACT requirements and offset emission increases. The SCAQMD's NSR program includes pre-construction permit review requirements for equipment and processes subject to permit requirements. Permit applications subject to NSR are required to utilize BACT for installation of new equipment, relocation of existing permitted equipment, or modification of existing permitted equipment when the equipment has a potential

to emit more than one pound per day of NOx. BACT is defined as the most stringent emission limitation or control technique that: has been achieved in practice, is contained in any state implementation plan (SIP) approved by EPA, or is any other emission limitation or control technique found by the Executive Officer to be technologically feasible and is cost-effective as compared to adopted rules or measured listed in the AQMP.

Regulation IV limits emissions of particulate matter, carbon monoxide and NOx from combustion sources. However, NOx emission limits required by BACT are significantly more stringent than the emission limits in Regulation IV. For example, Rule 474 – Fuel Burning equipment – Oxides of Nitrogen has emission limits that vary from 125 ppm to 400 ppm (referenced to 3% oxygen) depending upon the fuel and heat input rating of the equipment. NOx emission limits under BACT for combustion equipment subject to Rule 1147 vary from 30 ppm to 60 ppm (referenced to 3% oxygen). Rule 407 in Regulation IV also has a CO limit of 2,000 ppm.

Other SCAQMD regulations affecting equipment addressed by Rule 1147 and PR 1153.1 include Regulation IX – Standards of Performance for New Stationary Sources (NSPS) and Regulation XXX – Title V Permits. Regulation IX is a compilation of federal regulations specifying standards of performance and emission guidelines for new and modified sources. Regulation XXX specifies permit application and issuance procedures and compliance requirements mandated by the federal Operating Permit Program in Title V of the federal Clean Air Act. Equipment regulated by PR 1153.1 are not currently subject to NOx requirements under Regulation IX but some equipment will be included in Regulation XXX facility permits.

Equipment that is regulated under Rule 1147 may also be subject to SCAQMD Regulation X – National Emission Standards for Hazardous Air Pollutants and Regulation XIV – Toxics. Regulation X is a compilation of federal performance standards for handling hazardous materials. Regulation XIV includes 15 SCAQMD Rules that address emissions of toxic air contaminants. Equipment subject to PR 1153.1 are not expected to be subject to Regulations X and XIV.

Equipment subject to NOx emission limits by other rules in SCAQMD Regulation XI – Source Specific Standards are not subject to the requirements of Rule 1147 and PR 1153.1. Changes to NOx emission limits for equipment subject to other Regulation XI rules are addressed through amendment of those source specific rules.

In May 2013 SCAQMD Rules 219 and 222 were amended to exempt specific small equipment from permit requirements including food ovens with low emissions of VOCs. These amendments moved some small ovens from the permit program into the Rule 222 registration program which exempts them from Rule 1147 and PR 1153.1.

Because of information provided by stakeholders at the time of adoption, Rule 1147 provides a later compliance date, until 2014, for food ovens. BACT for ovens and dryers has been 30 ppm NOx since 1998 and the rule 1147 NOx limit is 30 ppm or 60 ppm if the process temperature is above 1,200 °F. However, stakeholders were concerned that achieving an emission concentration of 30 ppm was difficult in older equipment using ribbon burners.

Manufacturers and a research institute had started projects to lower NOx emissions from these types of burners and were expected to achieve the Rule 1147 emission limits by 2014. Because these projects have not been completed and there are many older ovens heated with ribbon burners in the SCAQMD, staff proposed to move food ovens, roasters and smokehouses from Rule 1147 and place them in a new rule specific to these equipment. Staff is recommending a new rule with higher NOx emission limits and delay of the emission limit compliance dates for existing (in-use) permitted food ovens. Staff is also considering a carbon monoxide emission limit in PR 1153.1.

EQUIPMENT AND PROCESSES

Heat Transfer

Heat is transferred from burners and other sources of heat by conduction, convection and radiation. Conductive heat transfer raises the temperature of an item through physical contact with a solid or gas which is hotter than the item. Convective heat transfer involves transfer of energy from a moving fluid (i.e., heated air and combustion gasses) to a solid, liquid, or gaseous material. In convective heat transfer, heat is transported by both diffusion and larger-scale motion of currents in a fluid.

Radiation is the transfer of heat from one location to another through emission of electromagnetic radiation in the infrared range of the spectrum. Burners produce radiant heat from the temperature of the flame and the high temperature of exhaust gases. In an oven this thermal radiation from the flame and exhaust gasses heats up the surfaces of the oven and the product in the oven. The amount of thermal radiation emitted depends upon the temperature of the source.

Process Equipment

PR 1153.1 regulates ovens, roasters, and smokehouses used to prepare food and beverages for human consumption. There are two main types of ovens – batch and conveyor ovens. Roasters and smokehouses are typically batch operations where product is placed in the oven and removed when the process is complete. Conveyor ovens continuously take in food items, cook them and delivery the cooked product to an area where it can cool and then be packaged. Regardless of the type of food oven, they operate in three temperature ranges – less than 500 °F, 500 to 900 °F and greater than 900 °F.

Both batch and conveyor ovens may be manufactured with ribbon burners or one of two types of air heating burners. Air heating burners are used in convection ovens where the burner is not in close proximity to the product being cooked. One type of air heating burner is a line burner made up of one foot sections that can be put together in a variety of shapes but in food ovens are typically put together end to end. The other type of air heating burner has a cylindrical housing projecting into the oven in which the burner flame is contained. Both of these types of burners may fire into a small space and air is moved through that space by blowers to be heated and moved on to the main chamber of the oven.

Many oven burners have historically been long sections of pipe with rows of holes down the length of the pipe. Gas and a small amount of air is introduced into the pipe and that mixture exits through the holes in the pipe where it is lit with a pilot flame. Most of the air for combustion is secondary air which is inside the oven and mixes with the gas as it exits the holes in the pipe.

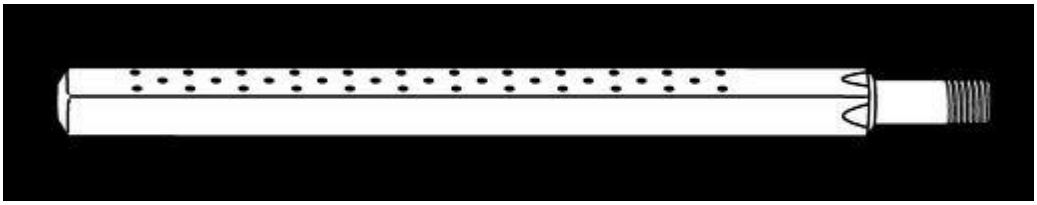

Figure 1 – Pipe Burner

Ribbon burners are similar to this older style of pipe burner but they have an insert along the length of the pipe that allows better control of the flame. They are also designed to provide premixing of air with fuel for more efficient and better control of combustion. The newest types of ribbon burners are made in a variety of ways, but they have better mixing of air with the fuel inside the body of the burner and better control of the distribution of fuel gas in the burner which result in lower NOx emissions and better efficiency. The lower emissions are also achieved because the flame that is produced has lower peak flame temperature which results in less NOx. Some versions of newer ribbon burners also include water cooling which can also help lower emissions. Together with modern control systems, ribbon burners have lower emissions than pipe and older ribbon burners.

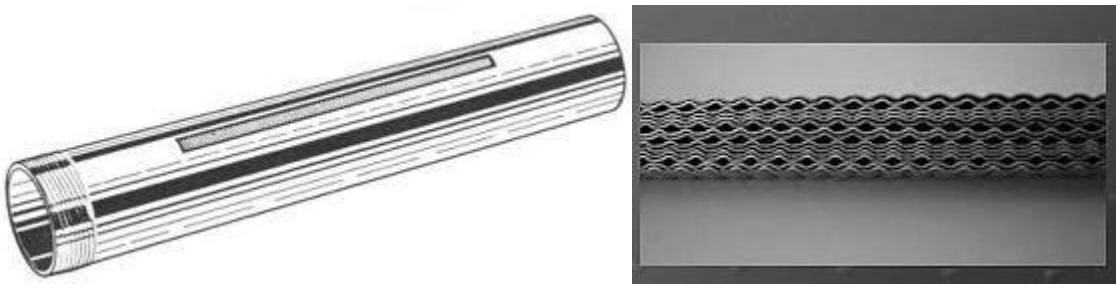

Figure 2 – Ribbon Burner Pipe and Flame Holding Surface

Food ovens can also use radiant systems to provide heat. One type of burner, made with ceramic or metal fiber flame holding surfaces, produces most of their heat as infrared radiation; they produce a red glow, and have very low NOx emissions. These are often called infrared burners and directly heat the product in the oven. Another type of unit has burners which heat the inside of tubes and the tubes then radiate heat to the process. This indirect heating system is called radiant tube heating.

Figure 3 – Infrared Burners

TECHNOLOGY ASSESSMENT

There are several options for reducing NOx emissions from combustion equipment subject to PR 1153.1. Some ovens may be able change their process so heat is generated by electricity. Many ovens use heat generated by electricity. Other ovens may be able to use heat generated by a boiler or thermal fluid heater. Heat transfer from steam or thermal fluids can be an efficient and cost effective way to heat a process. However, heat transfer from a boiler or thermal fluid heater requires the use of a heat exchange system to warm air and the process chamber that heats the product. For the majority of processes however, the preferred option to reduce NOx emissions will be tuning or replacing the burner system. `

Emission Reduction Technology

Low NOx burners in some applications can achieve less than 10 ppm NOx. There are many types of burners with emission in the range of 20 to 60 ppm NOx. The manufacturers of these burners use a variety of techniques to achieve lower emissions. The principal technique is better premixing of fuel and air before combustion takes place. This results in more efficient combustion of fuel and a more uniform flame temperature. A more uniform flame temperature results in fewer hot spots and reduced formation of NOx.

Many premix burners require the aid of a blower to mix the fuel with air before combustion takes place (primary air). However, residential tank type water heaters, some small boilers and other equipment are now made with atmospheric premix burners that achieve NOx emissions in the range of 15 to 60 ppm. Atmospheric burners do not use a blower to mix fuel and air. The burners in these units combine premixing with specially designed burner heads that reduce flame temperature and NOx emissions by spreading the flame over a larger area. Premixing of fuel and air is accomplished using a jet of fuel gas exiting a specially designed nozzle. The velocity of the fuel leaving the nozzle draws air into a mixing zone and mixing is completed before the fuel and air mixture leaves the burner.

A variety of burners are designed to spread flames over a larger area to reduce hot spots and lower NOx emissions. One type, radiant premix burners, has been available for several decades. Radiant premix burners are made with ceramic, sintered metal, metal screen or metal fiber heads that spread the flame over a larger surface. These burners can be run in either radiant or blue flame modes. When a burner runs in radiant mode, the flame surface is red instead of blue and it produces more radiant heat. These burners come in a variety of shapes including flat and cylindrical.

To further reduce NOx emissions, some premix burners also use staged combustion. This technique produces two combustion zones with differing air-fuel mixtures. The burner produces a fuel rich zone to start combustion and stabilize the flame and a fuel lean zone to complete combustion and reduce the peak flame temperature. In combination, these two zones reduce the formation of NOx. This technique incorporates premixing and can be used in combination with other techniques.

Current Burner Technology for Food Ovens

Rule 1147 emission limits are based on BACT. BACT determinations by the SCAQMD and other air districts since 1998 have resulted in emission limits of 30 to 60 ppm for equipment ranging from low temperature ovens to very high temperature metal melting and heat treating furnaces. The BACT NOx limit since 1998 for most ovens and dryers, including food ovens, has been 30 ppm.

Rule 1147 requires equipment to meet NOx emission limits in the range of 30 ppm to 60 ppm (referenced to 3% oxygen) depending upon the process and process temperature. The emission limits are based on SCAQMD and other air district's determinations for BACT, availability of burners that can achieve these emission levels and recent emission limits decisions for SCAQMD permits. Currently, the typical emission for low NOx burners applicable to equipment subject to Rule 1147 varies from less than 20 ppm to 60 ppm depending upon the burner, process temperature and nature of the process.

PR 1153.1 has NOx emission limits of 40 to 60 ppm based on process temperature. These proposed NOx emission limits are based on comments from equipment and burner manufacturers and local businesses. For existing technology, local businesses and a major customer of the burner manufacturers proposed NOx emission limits in the range of 35 to 60 ppm depending upon process temperature. Burner manufacturers have suggested future temperature based NOx emission limits as low as 30 ppm for lower process temperatures below about 500 °F and 60 ppm for higher process temperatures above 900 °F. For process temperatures between about 500 and 900 °F an emission limit of 45 ppm was suggested. Based on these comments, PR 1153.1 has NOx emission limits for existing in-use equipment of 40 and 60 ppm for processes below and above 500 °F.

The Gas Company and the Gas Technology Institute have a project to reduce emissions from ribbon burners. The design goal is to achieve NOx emissions of 30 ppm across a wide range of temperatures. The project is currently moving from testing of burners to installation of the modified burners into test ovens. The project is expected to be completed in 2016. Individual burner manufacturers also have developed new burners to achieve NOx emissions of 30 ppm across a wide range of process temperatures.

To meet PR 1153.1 emission limits, some ovens with ribbon burners will only require tuning and regular maintenance. In other cases, compliance with the emission limits will require replacement with newer design lower emitting burners and/or upgrades to burner control systems.

Air heating and infrared burners used in food ovens can easily achieve the emission limits of PR 1153.1 and are the basis for the BACT NOx limit of 30 ppm for most ovens and dryers. These burners are readily available. These burners and some older design air heating burners will achieve the emission limits in PR 1153.1.

Radiant tube heating systems can also achieve the emission limits of PR 1153.1 but will require replacement with larger diameter tubes in order to use burners that will meet the proposed NOx limits. However, PR 1153.1 provides up to 20 years of use before an oven has to meet the emission limit. Because firing tubes eventually need to be replaced (boiler fire tubes are typically replaced every 8 to 12 years), the proposed rule provides sufficient time for the original heating system to be upgraded.

There are many suppliers of ribbon burners for food ovens and many manufactures of air heating and radiant burners used in food ovens and roasters. Currently suppliers of ribbon burners for food ovens have products that will achieve the proposed NOx limits for the equipment regulated by PR 1153.1. The suppliers of other types of burners which are typically found in food ovens also produce burners that meet the NOx limits in Rule 1147 and PR 1153.1.

AFFECTED INDUSTRIES

Proposed Rule 1153.1 affects manufacturers of ovens, roasters and smokehouses (NAICS 333) and manufacturers of food and beverage products (NAICS 311 and 312) .

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PUBLIC PROCESS

The rule development effort for PR1153.1 is part of an ongoing process to evaluate low NOx technologies for combustion equipment subject to SCAQMD Rule 1147. To date, SCAQMD staff has held three PR 1153.1 Task Force meetings to discuss burner technology, implementation issues, compliance schedules and other topics with representatives from affected manufacturers, trade organizations and other interested parties. At these meetings low NOx technology, emission limits, emission testing and compliance dates were discussed. In addition, a Public Workshop for PR 1153.1 will be held on April 2, 2014 and PR 1153.1 was discussed at the Stationary Source Committee on March 21, 2014.

CHAPTER 2: SUMMARY OF PROPOSED RULE 1153.1

AQMP CONTROL MEASURE

PROPOSED AMENDED RULE REQUIREMENTS

AQMP CONTROL MEASURE

Control measure CMB-01 – NOx Reductions from Non-RECLAIM Ovens, Dryers, and Furnaces and control measure MCS-01 – Facility Modernization provide a framework for Rule 1147 and PR 1153.1. Control measure MCS-01 proposes that equipment operators meet best available control technology (BACT) emission limits at the end of the equipment's useful life. Control measure CMB-01 proposes emission NOx limits in the range of 20 ppm to 60 ppm (referenced to 3% oxygen) for ovens, dryers, kilns, furnaces and other miscellaneous combustion equipment. based on BACT limits. Unlike Rule 1147, PR 1153.1 is based on best available retrofit control technology (BARCT) and has less stringent NOx emission limit. To meet PR 1153.1 emission limits, equipment will require tuning and regular maintenance and in some cases, replacement with lower emitting burners or upgrades to burner control systems.

PROPOSED RULE REQUIREMENTS

Purpose and Applicability

The purpose of PR 1153.1 is to limit nitrogen oxide emissions from gaseous and liquid fuel fired combustion equipment as defined in this rule. This rule applies to in-use ovens, dryers, smokers and roasters with nitrogen oxide emissions from fuel combustion that require a District permit and are used to prepare food or beverages for human consumption. This rule does not apply to solid fuel-fired combustion equipment, fryers, char broilers, or boilers, water heaters, thermal fluid heaters and process heaters subject to District Rules 1146, 1146.1, or 1146.2. .

Requirements

PR 1153.1 is based on SCAQMD Rule 1147 but with higher NOx emission limits of 40 to 60 ppm and a CO limit of 800 ppm. A CO emission limit will ensure that burners are operated consistent with manufacturers operating guidelines. However, the 800 ppm CO emission limit will also provide operators flexibility for equipment that processes more than one type of product. The proposed rule also includes an emission testing requirement but delays compliance dates for at least 2 additional years beyond the dates for Rule 1147. PR 1153.1 phases in compliance based on a 20 year equipment life instead of the 15 years used in Rule 1147. Figure 4 compares the compliance schedules of Rule 1147 and PR 1153.1.

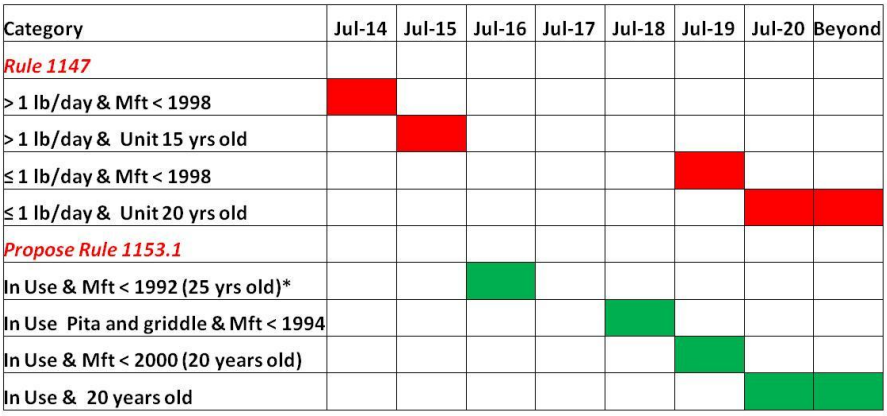

Figure 4 – Proposed Rule 1153.1 Compliance Schedule

PR 1153.1 also includes options for alternate compliance plans, equipment certification and a mitigation fee option to delay compliance. The alternate compliance option allows facilities to phase in compliance over three to five years for equipment with manufacture dates in two consecutive years. The mitigation fee option provides facilities and option to delay compliance by up to three years.

The following two tables indicate the NOx emission limits and compliance dates for PR 1153.1.

Table 1 – NO_x Emission Limit

Equipment Category(ies)	NOx Emission Limit PPM @ 3% O_2, dry or Pound/mmBTU heat input		
	Process Temperature		
	≤ 500° F	*> 500° F and < 900° F*	*≥ 900° F*
In-use units with only radiant tube heating	60 ppm or 0.073 lb/mmBTU	60 ppm or 0.073 lb/mmBTU	60 ppm or 0.073 lb/mmBTU
Other in-use units	40 ppm or 0.042 lb/mmBTU	60 ppm or 0.073 lb/mmBTU	60 ppm or 0.073 lb/mmBTU

Table 2 – Compliance Schedule for In-Use Units

Equipment Category(ies)	Submit Permit Application	Unit Shall Be in Compliance
Griddle ovens and ovens used solely for making pita bread and manufactured prior to 1994	October 1, 2017	July 1, 2018
Other UNIT manufactured prior to 1992	October 1, 2015	July 1, 2016
Other UNIT manufactured prior to 2000	October 1, 2018	July 1, 2019
Any UNIT manufactured after 2000	October 1 of the year prior to the compliance date	July 1 of the year the unit is 20 years old

Exemptions

. PR 1153.1 includes an exemption from the emission limit and testing for small and low-use units with NOx emissions of one pound per day or less. In addition, the proposed rule includes a testing exemption for infrared burners that have significantly lower NOx emission than the limits in PR 1153.1.

CHAPTER 3: IMPACT ASSESSMENT

IMPACT ANALYSIS

COST EFFECTIVENESS

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

SOCIOECONOMIC ASSESSMENT

INCREMENTAL COST-EFFECTIVENESS

COMPARATIVE ANALYSIS

IMPACT ANALYSIS

PR 1153.1 impacts over 200 ovens, roasters and smokehouses at approximately 100 facilities. The proposed rule will exempt two thirds of the ovens from emission limit requirements (small and low use units). The owners and operators of these units are still subject to the combustion system maintenance and recordkeeping requirements that are carried over from Rule 1147. The maintenance requirements will help limit NOx, CO, VOC and PM emissions from these units. An estimated 75 units would still be required to meet PR 1153.1 emission limits and demonstrate compliance through source testing. It is expected that most of the larger ovens will be able to comply with the proposed emission limits without changing burner systems.

Emissions of CO, VOC and PM are not expected to change compared with Rules 1147. However, NOx emission reductions for PR 1153.1 are delayed compared with Rule 1147 and will result in about 120 pounds per day of NOx emissions forgone by 2023. PR 1153.1 is not anticipated to have any additional environmental impacts.

COST EFFECTIVENESS

Staff has reviewed and reaffirmed the applicability of the cost and cost effectiveness estimates for Rule 1147 which are used for PR 1153.1. The cost for ovens to comply with PR 1153.1 emission limits will vary depending upon the type of burners used in the oven. A few ovens with air heating burners may need to replace burners in order to meet PR 1153.1 emission limits. For those ovens the cost and cost effectiveness estimated for Rule 1147 is applicable. However, for higher temperature ovens and many other ovens, the cost will be less than for Rule 1147 because their current burners can meet the PR 1153.1 NOx emission limits of 40 and 60 ppm. The following table lists Rule 1147 average cost for air heating burners in the size range used by food ovens.

Average Burner Cost for Rule 1147

Burner Size (mmBtu/hr)	30 ppm	60 ppm
Less than 0.5	$6,800	$2,500
1	$3,500	$2,000
2.5	$5,500	$3.500
5	$5,000	$5,000

Rule 1147 cost effectiveness is based on replacement of burners and other related costs. The cost effectiveness for burner replacement for Rule 1147 was up to $20,000 per ton. This is an average cost effectiveness based on the wide range of burners and equipment subject to Rule 1147 emission limits. However, staff does not anticipate that most of the ovens using air heating burners will need to replace their burners. Newer ovens in the SCAQMD with air heating burners have permits limits of 30 ppm NOx (the current SCAQMD NOx BACT limit for ovens and dryers).

Food ovens using ribbon burners require regular replacement of burners on a frequency that varies from every year to every 10 years depending upon use and type of burner. The cost

effectiveness of installing new burners with lower NOx emissions is the price difference between a new type of burner and the older style burners. The typical cost of individual ribbon burners for ovens cooking cookies, crackers and bread is in the range of $250 to $800. If ribbon burners are replaced with infrared/radiant pipe burners designed as a direct replacement for ribbon burners, the cost per burner would be $315 to $1000. The cost difference between ribbon burners and the infrared burners for an oven rated at 2 million Btu per your would be in the range of $12,000 to $17,000. With a NOx emission reduction of 4 tons or more over 20 years, the cost effectiveness is around $3,000 to $4,000 per ton NOx reduced.

In some cases an owner may choose to use a new updated control system with ribbon burners in order to meet the emission limit. Depending upon the size of the oven and number of burners, a modern burner control system can cost $25,000 to $75,000 dollars. However, with an emission reduction of at least 4 tons of NOx over 20 years for a conveyor oven and an average cost of $50,000 for a new control system on a large oven, the average cost effectiveness of the control system is about $12,500/ton NOx reduced. This control systems cost and cost difference is in the range for other Rule 1147 equipment.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

Pursuant to the California Environmental Quality Act (CEQA) and SCAQMD's Certified Regulatory Program (Rule 110), the SCAQMD is preparing a Notice of Preparation/Initial Study (NOP/IS) for Proposed Rule 1153.1. The NOP/IS serves two purposes: 1) to solicit information on the scope of the environmental analysis for the proposed project, and 2) to notify the public that the SCAQMD will prepare a Draft Environmental Assessment (EA) to further assess potential environmental impacts that may result from implementing the proposed project. The proposed project may have statewide, regional or area-wide significance; therefore, a CEQA scoping meeting is required (pursuant to Public Resources Code §21083.9(a)(2)). The public workshop scheduled for April 2, 2014 will also serve as a CEQA scoping meeting for the proposed actions.

Comments received at the public workshop/CEQA scoping meeting on the environmental analysis will be considered when preparing the EA. When released, the NOP/IS will be available for public comment and review for 30 days. Upon completion of the public review and comment period for the NOP/IS, responses to comments received relative to the NOP/IS will be prepared and incorporated into the Draft EA that will be subsequently prepared and circulated for a 45-day public review and comment period.

SOCIOECONOMIC ASSESSMENT

Based on stakeholder input and evaluation of the technical feasibility of technologies applicable to older food ovens, staff has proposed to move existing in-use food ovens, including roasters and smokehouses, from Rule 1147 and place them in a proposed new rule with less stringent emission limits and later compliance dates. As such, staff does not anticipate any additional costs beyond those determined in the socioeconomic analysis for the original adoption of Rule 1147 in 2008.

PR 1153.1 will impose lower costs than Rule 1147 because the proposed rule has less stringent emission limits which are based on the technology currently used in older food ovens. The

reduced equipment replacement cost (savings) for small and low use ovens exempt from the PR 1153.1 emission limits will be on the order of $2,500 to $7,500 per burner. The proposed rules' maintenance, recordkeeping and testing requirements, which apply to all food ovens, are the same as in Rule 1147 and will result the same cost. Similar to Rule 1147, PR 1153.1 has a testing requirement. Testing cost will vary from $2,000 to $5,000 depending upon the type of equipment. Most of the food ovens are small or low use, they will not be required to do emissions testing, and will therefore see this cost savings. PR 1153.1 also has later compliance dates compared with Rule 1147 which delays the costs from testing for larger units.

Most large food ovens with air heating burners will be able to meet PR 1153.1 emission limits with their current burners. This will result in a cost saving of $2,500 to $7,500 per burner.

Operators of large ovens with ribbon burners may choose to replace older design ribbon burners with new design burners or upgrade to a new control systems. As discussed in the previous section on cost effectiveness in this staff report, these costs are similar to the costs estimated for Rule 1147. The cost difference for lower emission burners for a 2 million Btu per hour oven is estimated to be less than $20,000 and the cost of a new control system averages about $50,000. Which option an owner/operator chooses will depend on the variety of products made in the oven and other operational factors.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH & SAFETY CODE SECTION 40727

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. In order to determine compliance with Sections 40727, 40727.2 require a written analysis comparing the proposed amended rule with existing regulations.

The following provides the draft findings.

Necessity: A need exists to adopt PR 1153.1 to address technical infeasibility and the need for additional time to retrofit food ovens, roasters and smokehouses to meet the new less stringent proposed NOx emission limits.

Authority: The SCAQMD obtains its authority to adopt, amend, or repeal rules and regulations from California Health and Safety Code Sections 39002, 40000, 40001, 40440, 40440.1, 40702, 40725 through 40728, 41508, and 41700.

Clarity: PR 1153.1 has been written or displayed so that its meaning can be easily understood by the persons affected by the rule.

Consistency: PR 1153.1 is in harmony with, and not in conflict with or contradictory to, existing federal or state statutes, court decisions or federal regulations.

Non-Duplication: PR 1153.1 does not impose the same requirement as any existing state or federal regulation, and is necessary and proper to execute the powers and duties granted to, and imposed upon the SCAQMD.

Reference: In amending this rule, the following statues which the SCAQMD hereby implements, interprets or makes specific are referenced: Health and Safety Code sections 39002, 40001, 40702, 40440(a), and 40725 through 40728.5.

INCREMENTAL COST-EFFECTIVENESS

Health and Safety Code Section 40920.6 requires an incremental cost-effectiveness analysis for Best Available Retrofit Control Technology (BARCT) rules or emission reduction strategies when there is more than one control option that would achieve the emission reduction objective of the proposed amendments, relative to ozone, CO, SOx, NOx, and their precursors.

The proposal to adopt PR 1153.1 does not require additional emission controls or emission reduction strategies beyond those required under SCAQMD Rule 1147. However, PR 1153.1 does require a less stringent emission limit and later compliance dates compared with Rule 1147 which currently applies to this equipment. Therefore, the incremental cost-effectiveness analysis requirement does not apply.

The only other options for reducing NOx emission from equipment affected by PR 1153.1 is replacement of burners with other sources of heat. Some ovens do use electricity to provide heat and other units provide heat through a heat exchanger with heated water of other fluid from a small boiler or process heater. However, this equipment is either not regulated for NOx emissions by the SCAQMD (electric ovens) or is regulated by other SCAQMD rules (Rules 1146, 1146.1 and 1146.2).

Staff has evaluated the incremental cost effectiveness as compared to a less stringent emission limit. The same technology used to achieve the proposed NOx limit can also be used to achieve less stringent limits. For these less stringent limits the cost of the technology is the same but because emission reductions are less, the cost effectiveness increases. In other words, a less stringent option is less cost-effective.

COMPARATIVE ANALYSIS

Under Health and Safety Code Section 40727.2, the SCAQMD is required to perform a comparative written analysis when adopting, amending, or repealing a rule or regulation. The comparative analysis is relative to existing federal requirements, existing or proposed SCAQMD rules and air pollution control requirements and guidelines which are applicable to industrial, institutional, and commercial water heaters, boilers, steam generators, and process heaters.

The SCAQMD staff is not aware of any state or federal requirements regulating air pollution that are applicable to PR 1153.1 type units. PR 1153.1 does not make an existing limit or standard more stringent, or impose more stringent monitoring, reporting or recordkeeping requirements. However, PR 1153.1 does include a less stringent emission limit and later compliance dates compared with Rule 1147 which currently applies to this equipment. Since PR 1153.1 is only applicable to existing in-use ovens, roasters and smokehouses it does not conflict with Best

Available Control Technology requirements under the SCAQMD's New Source Review Program.

REFERENCES

REFERENCES

EPA, 2002. *EPA Air Pollution Control Cost Manual, Sixth Edition (EPA-452-02-001),* United Stated Environmental Protection Agency, January 2002

SCAQMD, 2008. *Staff Repot: Proposed Rule 1147* - NOx Reductions from Miscellaneous Sources. South Coast Air Quality Management District, December 2008.

SCAQMD, 2007. *Air Quality Management Plan, Final 2007 AQMP Appendix IV-A, District's Stationary and Mobile Source Control Measures,* South Coast Air Quality Management District, June 2007.

SCAQMD, 1996. *1997 Air Quality Management Plan, Appendix IV-A, Stationary and Mobile Source Control Measures,* South Coast Air Quality Management District, November 1996.