[RULE INDEX TO BE ADDED AFTER RULE ADOPTION]

PROPOSED AMENDED RULE 1147 NOx REDUCTIONS FROM MISCELLANEOUS SOURCES

(a) Purpose ~~and Applicability~~

The purpose of this rule is to reduce nitrogen oxide (NOx) emissions while limiting carbon monoxide (CO) emissions from gaseous and liquid fuel fired combustion equipment as defined in this rule.

(b) Applicability

This rule applies to manufacturers, distributors, retailers, installers, owners, and operators of gaseous and/or liquid fuel fired ~~ovens, dryers, dehydrators, heaters, kilns, calciners, furnaces, crematories, incinerators, heated pots, cookers, roasters, fryers, closed and open heated tanks and vaporators, distillation units, afterburners, degassing units, vapor incinerators, catalytic or thermal oxidizers, soil and water remediation units and other~~ combustion equipment with NOx~~nitrogen oxide~~ emissions that require a South Coast AQMD permit and when other South Coast AQMD Regulation XI rules are not applicable to the Unit.~~that require a District permit and are not specifically required to comply with a nitrogen oxide emission limit by other District Regulation XI rules. This rule does not apply to solid fuel-fired combustion equipment, internal combustion engines, turbines, food ovens, charbroilers, boilers, water heaters, thermal fluid heaters, enclosed process heaters and other combustion equipment subject to nitrogen oxide limits of other District Regulation XI rules.~~

(~~b~~c) Definitions

~~(1) ANNUAL CAPACITY FACTOR means the ratio of the ANNUAL HEAT INPUT of a unit in a calendar year to the amount of fuel it could have burned if it had operated at the rated heat input capacity for 100 percent of the time during the calendar year.~~

~~(2) ANNUAL HEAT INPUT means the actual amount of heat released by fuels burned in a unit during a calendar year, based on the fuel's higher heating value.~~

(1) AUTOCLAVE means a device that uses both heat and pressure (over 15 pounds per square inch) to process materials, employing a heating method that includes an internal heat-transfer coil and an external combustion system which fires gaseous or liquid fuels through the coil.

(2) BEEHIVE KILN means gaseous fuel fired equipment which transfers heat from combusted fuel to air contained in a circular brick Unit, with a domed roof and downdraft exhaust, used to heat ceramic materials at process temperatures greater than or equal to 1,200°F.

(3) BTU means British thermal unit or units.

(4) CHILLER means any natural gas fired unit that captures and uses waste heat to provide cold water for air conditioning and other process requirements.

(5) CHARBROILER means a cooking device composed of a grated grill or skewer and a heat source. The heat source is located beneath the food being cooked or may be located above and below the food. Fuels for the heat source include, but are not limited to, electricity, natural gas, liquefied petroleum gas, charcoal, or wood.

(~~4~~6) COMBUSTION SYSTEM MODIFICATION means any modification of burner(s) or heating unit that contains a burner(s), or burner(s) fuel system, combustion air supply, or combustion control system that changes the ~~RATED HEAT INPUT CAPACITY~~Rated Heat Input Capacity of the burner(s) or heating unit.

(~~5~~7) COMBUSTION SYSTEM REPAIR means fixing or refurbishing of a burner(s) or heating unit that contains a burner(s), or burner(s) fuel system, combustion air supply, or combustion control system that does not result in a ~~COMBUSTION SYSTEM MODIFICATION~~Combustion System Modification or ~~COMBUSTION SYSTEM REPLACEMENT~~Combustion System Replacement.

(~~6~~8) COMBUSTION SYSTEM REPLACMENT means the substituting of a burner(s) or a heating unit that includes a burner(s).

(9) CONTINUOUS EMISSIONS MONITORING SYSTEM (CEMS) means the total combined equipment and systems required to continuously determine air contaminants and diluent gas concentrations and/or a mass emission rate of a source effluent (as applicable). The CEMS consists of three major subsystems: sampling interface, analyzer and data acquisition system.

(10) DECOMMISSION means to permanently shut down a Unit by removing the fuel, air, electricity, or other utility source connected to it and to inactivate the Unit's applicable South Coast AQMD permit.

(~~7~~11) FOOD OVEN means an oven, cooker, dryer, roaster, or other fuel-fired unit, excluding fryer, used to heat, cook, dry, roast, or prepare food, food products, or products used for making beverages for human consumption.

(12) FORMER RECLAIM FACILITY means a facility, or any of its successors, that was in the Regional Clean Air Incentives Market program as of January 5, 2018, as established in Regulation XX, that has received a final determination notification, and is no longer in the RECLAIM program.

(~~8~~13) HEATER means any combustion equipment that is fired with gaseous and/or liquid fuels and which transfers heat from combusted fuel to materials or air contained in the unit or in an adjoining cabinet, container or structure. ~~-~~Heater does not include any boiler or ~~PROCESS HEATER~~Process Heater designed to transfer heat to water or process streams that is subject to any NOx emission limits of ~~District~~ South Coast AQMD Rules 1109, 1146, 1146.1 or 1146.2, and does not include any internal combustion engine, ~~or turbine~~ Turbine, Autoclave, or Tunnel Kiln.

(~~9~~14) HEAT INPUT means the chemical heat released due to assumed complete combustion of fuel in a unit, using the higher heating value of the fuel. This does not include the sensible heat of incoming combustion air~~the higher heating value of the fuel to the unit measured as BTU per hour~~.

(~~10~~15) HEAT OUTPUT means the enthalpy of the working fluid output of the unit.

(~~11~~16) INFRARED BURNER means a burner with:

(A) Ceramic, metal fiber, sintered metal, or perforated metal flame-holding surface;

(B) More than 50% of the heat output as infrared radiation and that is operated in a manner where the zone including and above the flame-holding surface is red and does not produce observable blue or yellow flames in excess of ½ inch (13 mm) in length; and

(C) A RATED HEAT INPUT CAPACITY per square foot of flame holding surface of 100,000 BTU per hour or less.

(~~12~~17) IN-USE UNIT means ~~is demonstrated to the Executive Officer that~~ a UNIT that was demonstrated to the Executive Officer to be in operation at the current location prior to ~~*January 1, 2010*~~*[Date of Adoption]*.

(~~13~~18) MAKE-UP AIR HEATER means a ~~UNIT~~ Unit used to heat incoming air in order to maintain the temperature of a spray booth, container, room or other enclosed space and to provide breathable air for a person who may be present during operation.

(19) MINIMUM OPERATING TEMPERATURE means the minimum operating temperature specified by the manufacturer, unless otherwise defined in the South Coast AQMD permit.

(20) NEW UNIT means a Unit that is installed, relocated, or replaced after [*Date of Adoption]*.

(21) NON-RECLAIM FACILITY means a facility, or any of its successors, that was not in the Regional Clean Air Incentives Market (RECLAIM) program as of January 5, 2018, as established in Regulation XX.

(~~14~~22) NOx EMISSIONS means the sum of nitrogen oxide and nitrogen dioxide in the flue gas, collectively expressed as nitrogen dioxide.

(~~15~~23) PROCESS HEATER means any equipment that is fired with gaseous and/or liquid fuels and which transfers heat from combusted fuel to water or process streams. ~~PROCESS HEATER~~ Process Heater does not include any fryer or any furnace, kiln or oven used for melting, heat treating, annealing, drying, curing, baking, cooking, calcining, or vitrifying; any heated tank; or any unfired waste heat recovery heater that is used to recover sensible heat from the exhaust of any combustion equipment.

(~~16~~24) PROTOCOL means a ~~South Coast Air Quality Management District approved~~ test protocol for determining compliance with emission limits for applicable equipment.

(~~17~~25) RATED HEAT INPUT CAPACITY means the ~~gross HEAT INPUT~~Heat Input of the combustion ~~UNIT~~ Unit specified on a permanent rating plate attached by the manufacturer to the device.~~-~~ If the ~~UNIT~~ Unit has been altered or modified, the new Rated ~~gross HEAT INPUT~~Heat Input Capacity as specified in subparagraph (i~~c~~)(~~12~~2)(~~B~~A) shall be considered as the ~~r~~Rated ~~HEAT INPUT~~Heat Input ~~c~~Capacity.

(~~18~~26) RELOCATION means removal of an existing source from one parcel of land in the jurisdiction of the ~~District~~ South Coast AQMD and installation on another ~~non-contiguous~~ parcel of land where the two parcels are not in actual physical contact and are not ~~. RELOCATION does not mean a move from one parcel of~~

~~land to another parcel of land where the two parcels have the same address, are under common ownership, and are~~ separated solely by a public roadway or other public right-of-way.

(27) RECLAIM FACILITY means a facility, or any of its successors, that was in the Regional Clean Air Incentives Market program as of January 5, 2018, as established in Regulation XX.

(~~19~~28) REMEDIATION UNIT means a device used to capture or incinerate air toxics, volatile organic compounds (VOCs) or other combustible vapors extracted from soil or water.

(~~20~~29) RESPONSIBLE OFFICIAL means:

(A) For a corporation:– a president or vice-president of the corporation in charge of a principal business function or a duly authorized person who performs similar policy-making functions for the corporation; or

(B) For a partnership or sole proprietorship: –general partner or proprietor, respectively.

(C) For a government agency: -a duly authorized person

(30) SHUTDOWN is as defined in Rule 429 – Startup and Shutdown Exemption Provisions for Oxides of Nitrogen.

(31) STARTUP is as defined in Rule 429 – Startup and Shutdown Exemption Provisions for Oxides of Nitrogen.

(~~21~~32) TENTER FRAME DRYER is a cloth dryer that holds the edges of the material as it is dried in order to control shrinkage.

(33) TUNNEL KILN means any gaseous fired equipment which transfers heat from combusted fuel to air contained in the Unit with exhaust moisture content above 30 percent using a continuous moving conveyor or vehicle.

(34) TURBINE means any turbine that is gaseous and/or liquid fueled with or without power augmentation. This turbine is either attached to a foundation at a facility or is portable equipment that will reside at the same facility for more than 12 consecutive months. Two or more turbines powering one shaft shall be treated as one turbine.

(~~23~~35) UNIT means any combustion equipment with NOx emissions that require a South Coast AQMD permit, and other South Coast AQMD Regulation XI rules

are not applicable to the Unit. Basic equipment with integrated control is considered a single Unit.~~any oven, dryer, dehydrator, heater, kiln, calciner, furnace, crematory, incinerator, heated pot, cooker, roaster, fryer, heated tank and evaporator, distillation unit, afterburner, degassing unit, vapor incinerator, catalytic or thermal oxidizer, soil or water remediation units and other combustion equipment with nitrogen oxide emissions requiring a District permit and not specifically required to comply with a NOx emission limit by other District Regulation XI rules. UNIT does not mean any solid fuel fired combustion equipment, internal combustion engine, turbine, charbroiler, boiler, water heater, thermal fluid heater, enclosed process heater, and other combustion equipment subject to nitrogen oxide limits of other District Regulation XI rules.~~

(~~24~~3 6) VAPOR INCINERATOR means a furnace, afterburner, or other device for burning and destroying air toxics, VOCs or other combustible vapors in gas or aerosol form in gas streams.

(~~c~~d) Requirements

(1) Until an owner or operator is required to meet the NOx and CO emission limits in Table 2 by the applicable schedule in subdivision (e), the owner or operator shall not operate a Unit that exceeds a NOx emission limit:

(A) In Table 1 at a Non-RECLAIM Facility as demonstrated by a source test pursuant to subdivision (h); or

(B) Of 102 ppmv, corrected to 3% oxygen, dry, or existing NOx emission limit, whichever is lower, and as demonstrated by a source test pursuant to subdivision (h), for any Unit at a RECLAIM Facility upon the date of becoming a Former RECLAIM Facility

(~~1~~2) An owner or operator of a Unit without an existing permit condition(s) that limits emission to a level not to exceed the applicable NOx limits in Table 1 shall meet the applicable NOx and CO limits in Table 2, as demonstrated by a source test pursuant to subdivision (h), by the schedule specified in paragraph (e)(1). ~~On or after January 1, 2010 any person owning or operating a unit subject to this rule shall not operate the unit in a manner that exceeds the applicable nitrogen oxide emission limit specified in Table 1:~~

~~(A) at the time a District permit is required~~

~~(i) for operation of a new, relocated or replacement unit, or~~

~~(ii) for a combustion system modification or combustion system replacement, or~~

~~(iii) July 1 of the year a unit becomes 35 years old; or,~~

~~(B) for in-use units, in accordance with the compliance schedule in Table 2.~~

(3) Until an owner or operator is required to comply with the emission limits of Table 2 specified in the implementation schedule in paragraph (e)(2), an owner or operator of a Unit that meets NOx and CO emission limits of Table 1 as of [date of adoption] shall:

(A) Operate the Unit in compliance with the permit if it has an existing permit condition that meets the NOx emission limits in Table 1; or

(B) For a Unit that does not have an existing permit condition that meets the NOx emission limits in Table 1, as of *[date of adoption]*,

(i) Submit a permit application by May 1, 2022 to add a permit condition to the Permit to Operate that requires compliance with the NOx and CO emission limits in Table 1; and

(ii) Demonstrate compliance with the NOx and CO emission limits in Table 1 by a source test conducted pursuant to subdivision (h) in accordance to the schedule in paragraph (h)(13).

(4) In lieu of complying with the emission limits of Table 2 pursuant to paragraphs (d)(2) or (d)(3), an owner or operator of a Unit may elect to Decomission the Unit pursuant to paragraph (e)(4).

(5) An owner or operator of an In-Use Unit shall not operate a Unit that exceeds the applicable NOx and CO emission limits in Table 2 on and after the applicable date specified in subdivision (e).

(6) An owner or operator of a New Unit shall not operate a New Unit that exceeds the applicable NOx and CO emission limits in Table 2.

(7) In lieu of complying with the requirements of paragraphs (d)(1) through (d)(6), an owner or operator of a Unit may elect to comply with the following, whichever is lower:

(A) NOx emissions less than one pound per day averaged over a calendar month pursuant to subdivision (g) and maintain records pursuant to subdivision (j); or

(B) Any new or existing permit limit of less than one pound of NOx per day.

(8) An owner or operator of a Unit electing to comply with paragraph (d)(7) that fails to demonstrate compliance with paragraph (d)(7) shall:

(A) Submit a permit application to meet the emission limits in Table 2 within 180 days of the failure to demonstrate compliance paragraph (d)(7); and

(B) Meet the emission limits in Table 2 no later than:

(i) 12 months after a permit is issued; or

(ii) The expiration date of the permit, if any extension of time has been approved in writing pursuant to Rule 205.

(9) An owner or operator of an in-use distillate fuel-fired Turbine permitted prior to [Date of Adoption] subject to emission limits of Table 1 shall:

(A) Submit a permit application by July 1, 2023 to add a permit condition to the Permit to Operate that requires compliance with an annual fuel throughput of less than or equal to 13,800 gallons/year; and

(B) Not operate the Unit in excess of an annual fuel throughput of less than or equal to 13,800 gallons/year.

Table 1 – NOx and CO ~~Concentration~~ Emission Limits for In-Use Units ~~for Unit Heat Ratings ≥ 325,000 BTU/hour~~

Equipment Categories	**Process Temperature**	**~~Concentration~~ Emission Limits[1] (ppmv corrected to 3% O2, dry unless otherwise specified)**	
		NOx Limit	**CO Limit**
Gaseous Fuel-Fired Equipment[2]			
Afterburner, Degassing Unit, Thermal Oxidizer, Catalytic Oxidizer or Vapor Incinerator	All	60 ppmv or 0.073 lb/MMBtu	1,000 ppmv
Remediation Unit	All	60 ppmv or 0.073 lb/ MMBtu	
Burn-off Furnace, Burnout Oven, Incinerator or Crematory with or without Integrated Afterburner	All	60 ppmv or 0.073 lb/ MMBtu	

Evaporator, Fryer, Heated Process Tank, or Parts Washer	All	60 ppmv or 0.073 lb/ MMBtu	
Oven, Dehydrator, Dryer, Heater, Kiln, Calciner, Cooker, Roaster, Furnace, or Heated Storage Tank	<1,200°F	30 ppmv or 0.036 lb/ MMBtu	
	≥1,200°F	60 ppmv or 0.073 lb/ MMBtu	
Make-Up Air Heater or other Air Heater located outside of building with temperature controlled zone inside building	All	30 ppmv or 0.036 lb/ MMBtu	
Tenter Frame or Fabric or Carpet Dryer	All	30 ppmv or 0.036 lb/ MMBtu	
Other Unit or Process Temperature	<1,200°F	30 ppmv or 0.036 lb/-MMBtu	
	≥1,200°F	60 ppmv or 0.073 lb/-MMBtu	
Liquid Fuel-Fired Equipment			
Turbine <0.3 MW[3] (In-Use distillate fuel <0.3 MW)	All	77 ppmv or 0.285 lb/MMBtu	1,000 ppmv
All liquid fuel-fired Units[3]	<1,200°F	40 ppmv or 0.053 lb/-MMBtu	
	≥1,200°F	60 ppmv or 0.073 lb/-MMBtu	

~~**Equipment Category(ies)**~~	~~**NOx Limit**~~ ~~PPM @ 3% O_2, dry or Pound/mmBtu heat input~~		
	~~**Process Temperature**~~		
~~**Gaseous Fuel-Fired Equipment**~~	~~≤ 800° F~~	~~> 800 ° F and <1200° F~~	~~≥ 1200 ° F~~
~~Asphalt Manufacturing Operation~~	~~40 ppm~~	~~40 ppm~~	
~~Afterburner, Degassing Unit, Remediation Unit, Thermal Oxidizer, Catalytic Oxidizer or Vapor Incinerator [1]~~	~~60 ppm or 0.073 lb/mmBtu~~	~~60 ppm or 0.073 lb/mmBtu~~	~~60 ppm or 0.073 lb/mmBtu~~

~~Burn-off Furnace, Burnout Oven, Incinerator or Crematory with or without Integrated Afterburner~~	~~60 ppm or 0.073 lb/mmBtu~~	~~60 ppm or 0.073 lb/mmBtu~~	~~60 ppm or 0.073 lb/mmBtu~~
~~Evaporator, Fryer, Heated Process Tank, or Parts Washer~~	~~60 ppm or 0.073 lb/mmBtu~~	~~60 ppm or 0.073 lb/mmBtu~~	
~~Metal Heat Treating, Metal Melting Furnace, Metal Pot, or Tar Pot~~	~~60 ppm or 0.073 lb/mmBtu~~	~~60 ppm or 0.073 lb/mmBtu~~	~~60 ppm or 0.073 lb/mmBtu~~
~~Oven, Dehydrator, Dryer, Heater, Kiln, Calciner, Cooker, Roaster, Furnace, or Heated Storage Tank~~	~~30 ppm or 0.036 lb/mmBtu~~	~~30 ppm or 0.036 lb/mmBtu~~	~~60 ppm or 0.073 lb/mmBtu~~
~~Make-Up Air Heater or other Air Heater located outside of building with temperature controlled zone inside building~~	~~30 ppm or 0.036 lb/mmBtu~~	~~30 ppm or 0.036 lb/mmBtu~~	
~~Tenter Frame or Fabric or Carpet Dryer~~	~~30 ppm or 0.036 lb/mmBtu~~		
~~Other Unit or Process Temperature~~	~~30 ppm or 0.036 lb/mmBtu~~	~~30 ppm or 0.036 lb/mmBtu~~	~~60 ppm or 0.073 lb/mmBtu~~
~~**Liquid Fuel-Fired Equipment**~~	~~≤ 800° F~~	~~> 800 ° F and <1200° F~~	~~≥ 1200 ° F~~
~~All liquid fuel-fired Units~~	~~40 ppm or 0.053 lb/mmBtu~~	~~40 ppm or 0.053 lb/mmBtu~~	~~60 ppm or 0.080 lb/mmBtu~~

1. Emission limit for Tunnel Kiln(s) equipped with certified NOx CEMS is demonstrated pursuant to paragraph (h)(15), emission limit for all other Unit(s) is demonstrated pursuant to paragraph (h)(1).

~~1~~2. Emission limit applies to burners in ~~units~~Unit fueled by 100% natural gas that are used to incinerate air toxics, VOCs, or other vapors; or to heat a ~~unit~~Unit. ~~-~~The emission limit applies solely when burning 100% gaseous fuel and not when the burner is incinerating air toxics, VOCs, or other vapors. ~~-~~The ~~u~~Unit shall be tested or certified to meet the emission limit while fueled with natural gas.

~~2~~3. Emission limits in ppmv for Turbines are corrected to 15% O_2, dry basis.

Table 2 – NOx and CO Emission Limits

Equipment Categories	**Process Temperature**	**Emission Limits[1] (ppmv corrected to 3% O2, dry unless otherwise specified)**	
		NOx Limit	**CO Limit**

Gaseous Fuel-Fired Equipment[2]			
Afterburner, Degassing Unit, Thermal Oxidizer, Catalytic Oxidizer or Vapor Incinerator	All	20 ppmv or 0.024 lb/MMBtu	1,000 ppmv
Remediation Unit	All	60 ppmv or 0.073 lb/ MMBtu	
Burn-off Furnace, Burnout Oven, Incinerator or Crematory with or without Integrated Afterburner	All	30 ppmv or 0.036 lb/ MMBtu	
Evaporator, Fryer, Heated Process Tank, or Parts Washer	All	60 ppmv or 0.073 lb/ MMBtu	
Oven, Dehydrator, Dryer, Heater, Kiln, Calciner, Cooker, Roaster, Furnace, or Heated Storage Tank	≤1,200°F	20 ppmv or 0.024 lb/ MMBtu	
	≥1,200°F	30 ppmv or 0.036 lb/ MMBtu	
Make-Up Air Heater or other Air Heater located outside of building with temperature controlled zone inside building	All	30 ppmv or 0.036 lb/ MMBtu	
Tenter Frame or Fabric or Carpet Dryer	All	20 ppmv or 0.024 lb/MMBtu	
Autoclave	All	30 ppmv or 0.036 lb/ MMBtu	
Tunnel Kiln or Beehive Kiln	≤1,200°F	30 ppmv or 0.036 lb/ MMBtu	
	≥1,200°F	60 ppmv or 0.073 lb/ MMBtu	
Chiller (Absorption or Adsorption)	All	20 ppmv or 0.024 lb/ MMBtu	
Turbine <0.3 MW[3]	All	9 ppmv or 0.033 lb/ MMBtu	
Rotary Dryer	All	30 ppmv or 0.036 lb/ MMBtu	

Other Unit or Process Temperature	≤1,200°F	30 ppmv or 0.036 lb/ MMBtu	
	≥1,200°F	60 ppmv or 0.073 lb/ MMBtu	
Liquid Fuel-Fired Equipment			
All liquid fuel-fired Units[3]	≤1,200°F	40 ppmv or 0.053 lb/ MMBtu	1,000 ppmv
	≥1,200°F	60 ppmv or 0.073 lb/ MMBtu	

1. Emission limit for Tunnel Kiln(s) equipped with certified NOx CEMS is demonstrated pursuant to paragraph (h)(15), emission limit for all other Unit(s) is demonstrated pursuant to paragraph (h)(1).
2. Emission limit applies to burners in Units fueled by 100% natural gas that are used to incinerate air toxics, VOCs, or other vapors; or to heat a Unit. The emission limit applies solely when burning 100% gaseous fuel and not when the burner is incinerating air toxics, VOCs, or other vapors. The Unit shall be tested or certified to meet the emission limit while fueled with natural gas.
3. Emission limits in ppmv for Turbines are corrected to 15% O2, dry basis.

~~Table 2 – Compliance Schedule for Specific In-Use Units and In-Use Units with NOx Emissions of One Pound per Day or More~~

~~Equipment Category(ies)~~	~~Submit Permit Application~~	~~Unit Shall Be in Compliance~~
~~Specific UNIT~~		
~~Remediation UNIT manufactured and installed prior to March 1, 2012~~	~~Seven months prior to a combustion system modification, combustion system replacement or unit replacement or a relocation.~~	~~Upon combustion system modification, combustion system replacement or unit replacement or relocation beginning March 1, 2012~~
~~Evaporator, heated process tank, or parts washer with a District permit issued and operating prior to January 1, 2014~~	~~Seven months prior to combustion system modification, combustion system replacement or unit replacement~~	~~Upon combustion system modification, combustion system replacement or unit replacement~~
~~Tar Pot~~		~~All new permit applications beginning January 1, 2013~~

~~**UNIT with Emissions ≥1 Pound/Day**~~		
~~Afterburner, degassing unit, catalytic oxidizer, thermal oxidizer, vapor incinerator, fryer, or spray booth make-up air heater manufactured prior to 1998~~	~~December 1, 2013~~	~~July 1, 2014~~
~~Other UNIT manufactured prior to 1986~~	~~December 1, 2011~~	~~July 1, 2012~~
~~Other UNIT manufactured prior to 1992~~	~~December 1, 2011~~	~~July 1, 2012~~
~~Other UNIT manufactured prior to 1998~~	~~December 1, 2012~~	~~July 1, 2013~~
~~Any UNIT manufactured after 1997~~	~~December 1 of the year prior to the compliance date~~	~~July 1 of the year the unit is 15 years old~~

~~(2) Unit age shall be based on:~~

~~(A) The original date of manufacture as determined by:~~

~~(i) Original manufacturer's identification or rating plate permanently fixed to the equipment. If not available, then;~~

~~(ii) Invoice from manufacturer for purchase of equipment. If not available, then;~~

~~(iii) Information submitted to the District with prior permit applications for the specific unit. If not available, then;~~

~~(iv) The unit will be deemed by the District to be 20 years old as of July 1, 2012; or~~

~~(B) The date that operations start for a tunnel kiln or crematory rebuilt prior to January 1, 2010 with new burner(s) as determined by:~~

~~(i) Production or fuel usage records after burner installation, and~~

~~(ii) Invoice for burner(s) installation. If not available, then;~~

~~(iii) Invoice for burner(s) purchase, If not available, then;~~

~~(iv) Manufacture date of burner(s) as identified by an attached manufacturers identification or rating plate or date stamp.~~

~~(3) In accordance with the schedule in the permit, an owners or operators of a units shall determine compliance with the emission limit specified in Table 1 using a District approved test protocol. The test protocol shall be submitted to the~~

~~District at least 90 days prior to the scheduled test and approved by the District Source Testing Division.~~

~~(4)~~ ~~Notwithstanding the requirements of paragraph (c)(1), units with combustion system modifications or combustion system replacements completed prior to December 5, 2008 and after January 1, 2000 that resulted in replacement of more than 75% of the rated heat input capacity shall comply with the applicable emission limit specified in Table 1 of paragraph (c)(1) ten years from the date the modification was performed.~~

~~(5)~~ ~~The date a combustion system modification or combustion system replacement, as specified in paragraphs (c)(1) and (c)(4), is performed; shall be determined according to paragraph (c)(2).~~

~~(6)~~ ~~NOx emissions of less than one pound per day shall be demonstrated by compliance with one of the following requirements:~~

~~(A)~~ ~~A rated heat input capacity of less than 325,000 Btu per hour;~~

~~(B)~~ ~~A permit condition that limits NOx emissions to less than 1 pound per day;~~

~~(C)~~ ~~Monthly recordkeeping of unit use documenting average emissions of less than one pound per day calculated based on a unit-specific non-resettable time meter or a non-resettable unit fuel meter with fuel use corrected to standard temperature and pressure. Owners or operators of units with installed calibrated non-resettable totalizing time or fuel meters may elect to comply with the requirements of (c)(6) by demonstrating each calendar month that monthly NOx emissions are less than 22 pounds or less. Monthly emissions with a time meter shall be calculated using the unit's maximum hourly emission rate in pounds multiplied by the hours of operation each calendar month. The maximum hourly emission rate shall be equal to the rated heat input capacity of the unit multiplied by the unit's emissions at the rated heat input capacity in pound per million Btu. Monthly emissions calculated with a fuel meter shall be equal to the unit's emission rate per unit of fuel multiplied by the amount of fuel, corrected to standard temperature and pressure, used that calendar month.~~

~~(D) Daily recordkeeping of unit operation and the following specified rated heat input capacities operating less than or equal to the specified number of hours per day in Table 3:~~

~~Table 3 – Small and Low Use Unit Daily Operating Limits~~

~~Unit Rating (Btu/hour)~~	~~Daily Hour Limit~~
~~325,000 to 400,000~~	~~16~~
~~400,001 to 500,000~~	~~14~~
~~500,001 to 800,000~~	~~8~~
~~800,001 to 1,000,000~~	~~6~~
~~1,000,001 to 1,200,000~~	~~5~~

~~(E) Daily recordkeeping of unit operation and the following specified rated heat input capacities operating less than or equal to the specified number of hours per calendar month in Table 4:~~

~~Table 4 – Small and Low Use Unit Monthly Operating Limits~~

~~Unit Rating (Btu/hour)~~	~~Monthly Hour Limit~~
~~325,000 to 400,000~~	~~352~~
~~400,001 to 500,000~~	~~308~~
~~500,001 to 800,000~~	~~176~~
~~800,001 to 1,000,000~~	~~132~~
~~1,000,001 to 1,200,000~~	~~110~~

~~(F) Unit natural gas use less than or equal to 7,692 cubic feet per day at standard temperature and pressure, documented by daily recordkeeping of gas consumption with a non-resettable fuel meter; or~~

~~(G) Daily recordkeeping of unit operation using process specific parameters that demonstrate the unit does not emit one pound per day or more of NOx emissions, does not exceed the daily and weekly hours of operation submitted for the District permit application, and complies with all unit permit conditions.~~

~~Owners or operators of units complying under this paragraph that fail to continuously demonstrate compliance with the applicable heat input rating, permit condition, or daily or monthly requirements of this paragraph shall comply with the applicable emission limit in Table 1 by the applicable compliance date in Table 2 or within 210 days from the date the unit first fails to continuously comply with heat input rating, permit condition, or the daily or~~

~~monthly limit requirement whichever is later. A unit that must demonstrate compliance with an emission limit for failure to demonstrate emissions less than one pound per day pursuant to this provision shall comply with the applicable emission limit for the life of the unit.~~

~~(7) On or after January 1, 2010, any person owning or operating a unit subject to this rule shall perform combustion system maintenance in accordance with the manufacturer's schedule and specifications as identified in the manual and other written materials supplied by the manufacturer or distributor. The owner or operator shall maintain on site at the facility where the unit is being operated a copy of the manufacturer's, distributor's, installer's or maintenance company's written maintenance schedule and instructions and retain a record of the maintenance activity for a period of not less than three years. The owner or operator shall maintain on site at the facility where the unit is being operated a copy of the District certification or District approved source test reports, conducted by an independent third party, demonstrating the specific unit complies with the emission limit. The source test report(s) must identify that the source test was conducted pursuant to a District approved protocol. The model and serial numbers of the specified unit shall clearly be indicated on the source test report(s). The owner or operator shall maintain on the unit in an accessible location a permanent rating plate. The maintenance instructions, maintenance records and the source test report(s) or District certification shall be made available to the Executive Officer upon request.~~

(10) An owner or operator of a Unit shall perform combustion system maintenance pursuant to subdivision (l) and maintain records pursuant to subdivision (j).

~~(8) Any person owner~~ing ~~or operator~~ing of ~~a unit subject to this rule complying with Table 1 using pounds per million BTU, shall~~:

~~(A) i~~Install and maintain in service non-resettable, totalizing, fuel meters for each unit's fuel(s) prior to the compliance determination specified in paragraph (c)(3).; ~~and~~

~~(B) Owners or operators of a unit with a combustion system that operates at only one firing rate that comply with an emission limit using pounds per million BTU shall install a non-resettable, totalizing, time or fuel meter for each fuel.~~

~~(9) Meters that require electric power to operate shall be provided a permanent supply of electric power that cannot be unplugged, switched off, or reset except by the main power supply circuit for the building and associated equipment or the unit's safety shut-off switch. Any person operating a unit subject to this rule shall not shut off electric power to a unit meter unless the unit is not operating and is shut down for maintenance or safety.~~

~~(10) On or before the compliance date, the owner or operator of a unit shall demonstrate compliance with the applicable emission limit in Table 1 pursuant to the provisions of subdivisions (d) or (e).~~

(11) Compliance by Certification

For a ~~u~~Unit~~s~~ that do~~es~~ not allow adjustment of the fuel and combustion air for the combustion system ~~by the owner or operator~~, and upon approval by the Executive Officer at the time of permit issuance, an owner or operator may demonstrate compliance with the emission limit of subdivision (d) and demonstration requirement of ~~this~~ subdivision (h) by: ~~certification granted to the manufacturer for any model of equipment sold for use in the District. Any unit certified pursuant to subdivision (e) shall be deemed in compliance with the emission limit in Table 1 and demonstration requirement of this subdivision, unless a District source test shows non-compliance.~~

(A) Certification granted to the manufacturer pursuant to subdivision (k) for any model of equipment sold for use in the South Coast AQMD; and

(B) Any Unit certified pursuant to subdivision (k) shall be deemed in compliance with the applicable emission limit in Table 1 or Table 2 and demonstration requirement of ~~this~~ subdivision (h), unless a South Coast AQMD approved source test shows non-compliance.

~~(12) Identification of Units~~

~~(A) New Manufactured Units~~

~~The manufacturer shall display the model number and the rated heat input capacity of the unit complying with subdivision (c) on a permanent rating plate. The manufacturer shall also display the District certification status on the unit when applicable.~~

~~(B) Modified Units~~

~~The owner or operator of a unit with a modified combustion system (new or modified burners) shall display the new rated heat input capacity on a~~

~~new permanent supplemental rating plate installed in an accessible location on the unit or burner. The gross heat input shall be based on the maximum fuel input corrected for fuel heat content, temperature and pressure. Gross heat input shall be demonstrated by a calculation based on fuel consumption recorded by an in-line fuel meter by the manufacturer or installer.~~

~~(13)~~ ~~The owner or operator shall maintain on site a copy of all documents identifying the unit's rated heat input capacity for as long as the unit is retained on-site. The rated heat input capacity shall be identified by a manufacturer's or distributor's manual or invoice and a permanent rating plate attached to the unit. If a unit is modified, the rated heat input capacity shall be calculated pursuant to subparagraph (c)(12)(B). The documentation of rated heat input capacity for modified units shall include the name of the company and person modifying the unit, a description of all modifications, the dates the unit was modified and calculation of rated heat input capacity. The documentation for modified units shall be signed by the highest ranking person modifying the unit.~~

~~(14)~~ ~~Alternate Compliance Plans~~

~~(A)~~ ~~Owners or operators of facilities with three or more in-use units required to demonstrate compliance with the emission limit within two consecutive calendar years may submit an alternate compliance plan to phase-in compliance of all units. The compliance plan shall be submitted at least 270 days prior to the date the first unit is required to demonstrate compliance. The alternate compliance plan shall identify the units included in the plan and a schedule identifying when each unit will comply with the emission limit and the compliance determination for each unit will be completed. At least one unit shall demonstrate compliance with the applicable emission limit of this rule by the first compliance date for any unit included in the plan. Each year thereafter, a minimum of 20 percent of additional units and no less than one unit shall demonstrate compliance with the applicable emission limit. All units with NOx emissions greater than or equal to 1 pound per day identified in Table 2 of paragraph (c)(1) must demonstrate compliance with the applicable emission limit of this rule before January 1, 2015.~~

~~(15) Any unit with NOx emissions less than one pound per day that becomes 35 years old on or before July 1, 2018 shall demonstrate compliance with the applicable emission limit specified in paragraph (c)(1) on or before July 1, 2020.~~

~~(16) Notwithstanding the requirements of paragraphs (c)(1) and (c)(10), an owner or operator of any in-use unit 35 years of age or older may continue operating that unit provided~~

~~(A) NOx emissions are less than 1 pound per day as demonstrated through a biennial emissions test conducted pursuant to paragraphs (d)(1) through (d)(10) and recordkeeping with a calibrated non-resettable fuel or time meter as specified in the unit's SCAQMD Permit to Operate; and~~

~~(B) The biennial emissions test is conducted no later than 180 days before the in-use unit becomes 35 years of age for the first demonstration and no later than 18 months after completion of the previous biennial emissions test for any subsequent demonstrations.~~

~~(17) An owner or operator of a unit that fails to continuously demonstrate emissions less than one pound per day pursuant to paragraph (c)(16) shall demonstrate compliance with the applicable NOx emission limit in Table 1 through compliance with the requirements of paragraphs (d)(1) through (d)(10) no later than 1 year from the date the owner or operator fails to demonstrate unit emissions are less than one pound per day.~~

(e) Compliance Schedule

(1) An owner or operator of a Unit that is required to meet the NOx and CO emission limits in Table 2 pursuant to paragraph (d)(2) shall:

(A) Submit a permit application for each Unit to limit the NOx and CO emissions to a level not to exceed the emission limits in Table 2:

(i) On or before July 1, 2023 for any Unit where the burner age is 12 years or older, as determined pursuant to subdivision (f), as of January 1, 2023; or

(ii) On or before July 1 of the year when a Unit's burner age reaches 12 years, as determined pursuant to subdivision (f), by January 1 of that calendar year; and

(B) Not operate a Unit that exceeds the NOx and CO emission limits in Table 2 no later than:

(i) 12 months after a permit is issued; or

(ii) The expiration date of the permit, if any extension of time has been approved in writing pursuant to Rule 205.

(2) An owner or operator of a Unit that meets the emission limits in Table 1 and is required to meet the NOx and CO emission limits in Table 2 pursuant to paragraph (d)(3) shall:

(A) Submit a permit application for each Unit to limit the NOx and CO emissions to a level not to exceed the emission limits in Table 2:

(i) On or before July 1, 2023 for any Unit where the burner age is 32 years or older, as determined pursuant to subdivision (f), as of January 1, 2023; or

(ii) On or before July 1 of the year when a Unit's burner age reaches 32 years, as determined pursuant to subdivision (f), by January 1 of that calendar year; and

(B) Not operate the Unit that exceeds the NOx and CO emission limits in Table 2, no later than:

(i) 12 months after a permit is issued; or

(ii) The expiration date of the permit, if any extension of time has been approved in writing pursuant to Rule 205.

(3) In lieu of meeting the schedule requirements in paragraphs (e)(1) and (e)(2), an owner or operator of a Unit identified in Table 3 may elect to comply with the NOx and CO emission limits specified in Table 2 pursuant to the compliance schedule in Table 3.

Table 3 – Alternative Compliance Schedule

Equipment Category(ies)	**Permit Application Submittal Deadline**	**Compliance Deadline**
Specific Unit		
Remediation Unit manufactured and installed prior to March 1, 2012 with an active South Coast AQMD permit	At least 210 days prior to a Combustion System Modification, Combustion System Replacement or Unit	Upon Combustion System Modification, Combustion System Replacement or Unit Replacement or a Relocation

	Replacement or a Relocation	
Evaporator, heated process tank, or parts washer operating prior to January 1, 2014 with an active South Coast AQMD permit	At least 210 days prior to a Combustion System Modification, Combustion System Replacement or Unit Replacement	Upon Combustion System Modification, Combustion System Replacement or Unit Replacement

(4) An owner or operator that elects to Decommission a Unit, in lieu of meeting the requirements of paragraphs (d)(1) through (d)(6), shall Decommission the Unit no later than 30 months after the applicable permit application submittal date pursuant to subdivision (e) and, by that date, inactivate the Unit's applicable South Coast AQMD permit.

(5) Implementation Schedule for Facilities with Five or More Units

An owner or operator of a facility with five or more Units subject to the same compliance date pursuant to paragraphs (d)(2) or (d)(3) electing to comply with the multiple Unit implementation schedule pursuant to Table 4, in lieu of the schedule in clause (e)(1)(A)(i) or (e)(2)(A)(i), shall:

(A) Submit permit application(s) by the permit application submittal deadline specified in Table 4 to comply with the applicable NOx and CO emission limits in Table 2 or Decommission the Unit pursuant to paragraph (d)(4); where;

(i) The total Rated Heat Input Capacity is calculated as the sum of the Rated Heat Input Capacity of all Units at a facility that are subject to paragraph (e)(1) or (e)(2) as of July 1, 2023; and

(ii) The minimum percentages listed in Table 4 are calculated using the Rated Heat Input Capacity of the Units for which a permit application is submitted divided by the total Rated Heat Input Capacity calculated pursuant to clause (e)(5)(A)(i) rounded up to the nearest whole number; and

(B) Demonstrate compliance with the NOx and CO emission limits in Table- 2, for each applicable Unit, by a source test pursuant to subdivision (h), no later than:

(i) 12 months after a permit is issued; or

(ii) The expiration date of the permit, if any extension of time has been approved in writing pursuant to Rule 205.

Table 4 – Multiple Unit Implementation Schedule

Permit Application Submittal Deadline	5 to 9 Units (Minimum % of Total Heat Input)	10 to 19 Units (Minimum % of Total Heat Input)	20+ Units (Minimum % of Total Heat Input)
July 1, 2023	50%	Not Applicable	Not Applicable
July 1, 2024	100%	50%	33%
July 1, 2025	Not Applicable	Not Applicable	Not Applicable
July 1, 2026		100%	67%
July 1, 2027		Not Applicable	Not Applicable
July 1, 2028			100%

(6) An owner or operator of a Unit that fails to meet the requirements of paragraphs (d)(2) through (d)(8) shall not operate a Unit unless the Unit meets the applicable emission limits in Table 2 by the following dates, whichever is sooner:

(A) 12 months after a permit is issued or the expiration date of the permit, if any extension of time has been approved in writing pursuant to Rule 205; or

(B) No later than 30 months following the permit application submittal date in the implementation schedule of paragraphs (e)(1), (e)(2), (e)(3) or (e)(5).

(f) Burner Age

(1) Burner age for a Unit equipped with burners of varying ages shall be based on the oldest burner age.

(2) Burner age shall be based on the original date of installation determined by:

(A) Invoice from burner manufacturer for purchase of burner equipment;

(B) Information submitted to the South Coast AQMD with applications for permit prior to [*Date of Adoption*] for the specific burner;

(C) Original Unit manufacturer's identification or rating plate permanently affixed to the Unit; or

(D) Any other method of determining burner age that can be substantiated through sufficient written information as approved by the Executive Officer.

(3) The burner shall be deemed to be 32 years old as of January 1, 2023 for any Unit where the burner age cannot be determined pursuant to paragraph (f)(2).

(g) Demonstration of Less than One Pound of NOx per Day Averaged Over a Calendar Month

(1) Effective upon *[six months after Date of Adoption]*, an owner or operator of a Unit electing to comply with paragraph (d)(7) by demonstrating that NOx emissions are less than one pound per day averaged over a calendar month shall:

(A) Install and maintain in service a non-resettable totalizing time meter on the Unit and operate the Unit no more than the specified time per calendar month in Table 5 or as calculated using Equation 1; or

Monthly Operating Hours = D ÷[R x (EF ÷HHV)] (Eq. 1)

Where,

D = Number of Days in Calendar Month

R = Rated Heat Input (MMBtu/hr)

EF = Emission Factor for the Unit (lbs NOx/MMScf natural gas)

HHV = Higher Heating Value of Natural Gas (1,050 MMBtu/MMScf)

Table 5 – Less than One Pound per Day Daily Operating Limits

Unit Rated Heat Input (Btu/hr)	**Monthly Operating Limit (Hours)**
< 1,000,000	240
≥ 1,000,000 to < 1,500,000	160
≥ 1,500,000 to ≤ 2,000,000	120

(B) Install and maintain in service a non-resettable totalizing fuel meter corrected to standard conditions on the Unit and consume no more than the Therms of fuel per month calculated using Equation 2.

Monthly Therms of Fuel = (D÷EF) x HHV x 10 (Eq. 2)

Where,

D = Number of Days in Calendar Month

EF = Emission Factor for the Unit (lbs NOx/MMScf natural gas)

HHV = Higher Heating Value of Natural Gas (1,050 MMBtu/MMScf)

10 = Conversion to from MMBtu to Therms

(~~d~~h) ~~Compliance Determination~~Monitoring and Source Testing

(1) All compliance determinations pursuant to paragraph (~~c~~d)(~~6~~1), (d)(2), (d)(3), ~~or~~ (d)(4), or South Coast AQMD permit emission limits shall be calculated:

(A) Using a ~~District~~ South Coast AQMD approved source test protocol averaged over a period of at least 15 minutes of combustion system operation and no more than 60 consecutive minutes, or alternative time period approved by the Executive Officer;

(B) After ~~u~~Unit ~~s~~Start-up; and

(C) In the ~~u~~Unit's ~~as-found operating condition~~firing rate under normal operating conditions.

(2) For each unit, a compliance determination shall be made in the maximum heat input range at which the ~~u~~Unit normally operates.

(3) An additional compliance determination shall be made for any of the following types of ~~units~~Unit(s): ~~-~~Make-Up Air Heater, other Air Heater located outside of process building, Oven, Dehydrator, Dryer, Tenter-Frame Dryer, Fabric Dryer, Carpet Dryer, Heater, Cooker, Roaster, non-metallurgical Furnace, or Heated Storage Tank. ~~-~~The additional compliance determination for the specified ~~units~~ Unit(s) in this paragraph shall be made:

(A) Using a heat input of less than 35% of the rated heat input capacity; or

(B) For at least 30 consecutive minutes after ~~u~~Unit ~~s~~Start-up using the ~~lowest~~ Minimum ~~o~~Operating ~~t~~Temperature that may be used during normal operation of the ~~u~~Unit.

(4) An owner or operator of a Unit shall submit a source test protocol to the Executive Officer for approval no later than 90 days prior to the scheduled source test and conduct the source test within the 90-day period, or within 30- days following the source test protocol approval, whichever is later.

(~~4~~5) For compliance determinations after the initial approved test pursuant to paragraph (h)(4), the operator is not required to resubmit a protocol for approval if: there is a previously approved protocol and the ~~u~~Unit has not been ~~altered~~ modified in a manner that requires a permit ~~alteration~~modification; and rule or permit emission limits have not become more stringent since the previous test.

~~(5) All parts per million emission limits specified in subdivision (c) are referenced at 3 percent volume stack gas oxygen on a dry basis.~~

(6) Compliance with the NO_X emission limits of subdivision (~~c~~d) and determination of stack-gas oxygen and carbon dioxide concentrations for this rule shall be determined according to the following procedures:

(A) ~~District~~ South Coast AQMD Source Test Method 100.1 – Instrumental Analyzer Procedures for Continuous Gaseous Emission Sampling (March 1989); or

~~(B) ASTM Method D6522-00 – Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers; or~~

~~(C) United States Environmental Protection Agency Conditional Test Method CTM-030 – Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Emissions from Natural Gas-Fired Engines, Boilers and Process Heaters Using Portable Analyzers; or~~

~~(D) District Source Test Method 7.1 – Determination of Nitrogen Oxide Emissions from Stationary Sources (March 1989); and~~

(~~E~~B) ~~District~~ South Coast AQMD Source Test Method 10.1 – Carbon Monoxide and Carbon Dioxide by Gas Chromatograph/Non-Dispersive Infrared Detector (GC/NDIR) – Oxygen by Gas Chromatograph-Thermal Conductivity (GC/TCD) (March 1989); or

(~~F~~C) Any alternative test method determined approved before the test in writing by the Executive Officers of the ~~District~~South Coast AQMD, the California Air Resources Board and the United States Environmental Protection Agency.

(7) For any operator who chooses to comply using pound per million Btu, NO_X emissions in pounds per million Btu of heat input shall be calculated using procedures in 40 CFR Part 60, Appendix A, Method 19, Sections 2 and 3.

(8) Records of source tests shall be maintained for ~~ten~~ five years and made available to ~~District~~ South Coast AQMD personnel upon request.~~-~~ Emissions determined to exceed any limits established by this rule through the use of any of the test methods specified in subparagraphs (~~d~~h)(~~3~~6)(A) through (~~d~~h)(~~3~~6)(~~F~~C) shall constitute a violation of this rule.

(9) All compliance determinations shall be made using an independent contractor to conduct testing, which is approved by the Executive Officer under the Laboratory Approval Program for the applicable test methods.

(10) For equipment with two or more ~~u~~Units in series or multiple ~~u~~Units with a common exhaust, the owner or operator may demonstrate compliance with the emission limits in Table 1 and Table 2 by one of the following:

(A) Test each ~~u~~Unit separately and demonstrate each ~~u~~Unit's compliance with the applicable limit, or

(B) Test only after the last ~~u~~Unit in the series and at the end of a common exhaust for multiple ~~u~~Units, when all ~~u~~Units are operating, and demonstrate that the series of ~~u~~Units either meet:

(i) The lowest emission limit ~~in Table 1~~ applicable to any of the ~~u~~Units in series, or

(ii) A heat input weighted average of all the applicable emission limits in Tables 1 or 2 ~~in Table 1~~ using the following calculation.

$$\textbf{Weighted Limit} = \frac{\Sigma\,[\,(EL_X)*(Q_X)\,]}{\Sigma\,[\,Q_X\,]}$$

Where:

EL_X = emission limit for ~~u~~Unit X

Q_X = total heat input for ~~u~~Unit X during test

(11) An owner or operator of any ~~u~~Unit with a ~~Unit~~Rated Heat Input ~~Rating~~Capacity of 2 million Btu per hour or less may elect to demonstrate compliance with the applicable emission limit through a burner manufacturer's emission certification in lieu of a compliance demonstration pursuant to subparagraphs (~~d~~e)(~~1~~1), (e)(2) ~~through (d)(10)~~ or subdivision (~~e~~k) of this rule provided the following information ~~required in subparagraphs (d)(11)(A) through (d)(11)(C)~~ is provided when a permit application is submitted ~~for a unit~~:

(A) The manufacturer or manufacturer authorized distributor of the burner(s) submits emission certifications that are signed by the burner manufacturer's responsible official pursuant to ~~sub~~paragraph (~~b~~c)(~~20~~29)~~(A) of this rule,~~ that guarantees the burner(s), fuel and combustion air system, and combustion control system identified in the application for the ~~District~~ South Coast AQMD ~~P~~ppermit that complies with the applicable NOx emission limit in Table 1 or Table 2 ~~of paragraph (c)(1)~~ when used for specified processes, operating conditions, and within specified temperature ranges.~~ The signed emission certifications shall be submitted separately, and addressed to the:~~

(B) The manufacturer or manufacturer authorized distributor of the burner(s) separately submits the signed emissions certifications, addressing them to the:

(i) O~~o~~wner or operator of the ~~u~~Unit; and

(ii) Executive Officer or designee.

(~~B~~C) The burner manufacturer, manufacturer authorized distributor submits to the Executive Officer or designee, supporting documentation including emission test reports of at least five ~~District~~ South Coast AQMD approved emission tests using ~~District~~ South Coast AQMD approved test protocol and methods of five different ~~u~~Units ~~using~~ operating the same ~~burner, fuel and combustion air system, and combustion control system that demonstrate compliance with the applicable emission limit for the same type of process operating in the same temperature range as the unit in the permit application. The five emission test results submitted for the manufacturer's emission certification must have been approved by the District prior to submittal of an application for permit.~~:

(i) Process;

(ii) Burner;

(iii) Fuel and combustion air system;

(iv) Combustion control system; and

(v) Temperature range.

(D) The emission test results specified in subparagraph (h)(11)(C) shall be approved by the South Coast AQMD prior to submittal of an application for permit.

(~~C~~E) A contract or purchase order, signed by the responsible official of the ~~u~~Unit's owner or operator pursuant to paragraph (~~b~~c)(~~20~~29), for purchase of the burner(s), fuel and combustion air system, and combustion control system to be installed in the ~~u~~Unit as identified in the permit application and the signed letter or bid from the burner manufacturer to the owner or operator of the ~~u~~Unit as specified in subparagraph (~~d~~h)(11)(A) of this rule.

(~~D~~F) The owner or operator of any ~~u~~Unit where the requirements specified in subparagraphs (~~d~~h)(11)(A) through (~~d~~h)(11)(~~C~~E) are not met or submits any manufacturer's emission certification, contract, or purchase order that is not identical to the combustion system specified in the application for the ~~u~~Unit's permit and installed in the ~~u~~Unit, shall demonstrate ~~u~~Unit compliance: ~~with the applicable emission limit in Table 1 through emission testing pursuant to the requirements of paragraphs (d)(1) through (d)(10) of this rule.~~

(i) With the applicable emission limit in Table 1 or Table 2 through emission testing pursuant to the requirements of subdivision (e);

(ii) ~~The owner or operator specified above shall demonstrate unit compliance~~ T~~t~~hrough emission testing within 12 months following issuance of a permit~~210 calendar days from the date a permit is approved by the District~~; and~~. A unit that must demonstrate compliance with an emission limit of this paragraph and shall comply with the applicable emission limit for the life of the unit.~~

(iii) For the life of the Unit.

(~~E~~G) The owner or operator of any ~~u~~Unit that fails to operate the ~~u~~Unit as specified in the manufacturer's emission certification in subparagraphs (~~d~~h)(11)(A) through (~~d~~h)(11)(~~C~~E), including specified processes, operating conditions, and temperatures, shall demonstrate compliance with the applicable emission limit in Table 1 or Table 2 through emission

testing pursuant to the requirements of paragraphs (~~d~~h)(1) through (~~d~~h)(10)~~ of this rule~~.

(12) An owner or operator of a Unit subject to this rule with emissions of greater than or equal to one pound of NOx per day as determined by subdivision (g) shall conduct source tests pursuant to paragraphs (h)(1) through (h)(10), –to demonstrate compliance with the applicable NOx and CO emission limit requirements in Table 1, Table 2, or South Coast AQMD permit emission limits:

(A) For a Unit with a Rated Heat Input Capacity lower than 10 million Btu per hour, conduct source testing every five calendar years, but no earlier than 48 calendar months after the previous source test;

(B) For a Unit with a Rated Heat Input Capacity greater than or equal to 10 million Btu per hour and less than 40 million Btu per hour, conduct source testing every three calendar years, but no earlier than 24 calendar months after the previous source test; or

(C) For a Unit with a Rated Heat Input Capacity greater than or equal to 40 million Btu per hour:

(i) Conduct source testing every calendar year, but no earlier than six calendar months after the previous source test; or

(ii) If the Unit has not operated for at least six consecutive calendar months, conduct a source test no later than 90 days after the date of resumed operation and maintain monthly fuel usage using a non-resettable fuel meter to demonstrate that the Unit has not been operated for at least six consecutive calendar months.

(13) An owner or operator of an In-Use Unit shall:

(A) Conduct an initial source test no later than 24 months after [Date of Adoption] or, for a Unit located at a RECLAIM Facility, no later than 24 months after the facility becomes a Former RECLAIM Facility, whichever is later, and establish the date of this source test as the basis for subsequent source testing frequency; or

(B) Use the results of a South Coast AQMD-approved source test with South Coast AQMD approved source test protocol conducted between the applicable frequency required in paragraph (h)(12) and *[Date of Adoption]* and establish the date of this source test as the basis for subsequent source testing frequency. The source test and protocol must

still be representative of the current operation of the equipment, or a new source test protocol will be required to be submitted pursuant to (h)(1).

(14) Provided the emissions test set forth in this paragraph is conducted within the same schedule as the compliance determination required in paragraph (h)(12), an owner or operator of a Unit may use the following emissions test to comply with paragraph (h)(12):

(A) Periodic monitoring or testing of a Unit as required in a Title V permit pursuant to Regulation XXX, or

(B) Relative accuracy testing for continuous emissions monitoring verification pursuant to Rule 218.2 and Rule 218.3.

(15) An owner or operator of an existing Tunnel Kiln with continuous in-stack emissions monitor or equivalent verification system located at a former RECLAIM facility prior to *[Date of Adoption]* shall:

(A) Operate the CEMS and comply with the requirements specified in Rules 218.2 and 218.3;

(B) Demonstrate compliance with the NOx emission limits specified in paragraph (d)(2) or (d)(3) based on a 24-hour rolling average corrected to 3% oxygen, on a dry basis at standard conditions; and

(C) Averaging time pursuant to (h)(15)(B) shall exclude all periods during startup and shutdown pursuant to Rule 429 and all periods that the Unit is not operating.

(16) An owner or operator of a Unit subject to this rule complying with Table 1 or Table 2 using pounds per million BTU, shall:

(A) Install and maintain in service non-resettable, totalizing, fuel meters for each Unit's fuel(s) prior to the compliance determination specified in subdivision (d); and

(B) Owners or operators of a Unit with a combustion system that operates at only one firing rate that comply with a emission limit using pounds per million BTU shall install a non-resettable, totalizing, time or fuel meter for each fuel.

(17) An owner or operator of a Unit required to install a meter pursuant to paragraph (h)(16) shall:

(A) Provide a permanent supply of electric power that cannot be unplugged, switched off, or reset except by the main power supply circuit for the building and associated equipment or the Unit's safety shut-off switch; and

(B) Maintain electric power to a Unit meter unless the Unit is not operating and is shutdown for maintenance, safety, recalibration or meter repair.

(i) Labeling Requirements

(1) An owner or operator of a Unit shall display and maintain the model number and Rated Heat Input Capacity of the Unit burner on a permanent rating plate.

(2) The owner or operator of a Unit that is modified shall:

(A) Display the new Rated Heat Input Capacity on a new permanent supplemental rating plate installed in an accessible location on the Unit or burner; and

(B) Determine the date of Unit Modification pursuant to the burner age determination requirements of subdivision (f).

(j) Reporting, and Recordkeeping

(1) An owner or operator shall maintain for at least five years and make available to the Executive Officer upon request, source test reports, maintenance records, and, if applicable, monthly records demonstrating compliance with the less than one pound NOx per day demonstration requirements of subdivision (g).

(2) An owner or operator of a Unit shall maintain records identifying the Rated Heat Input for any Unit subject to this rule and make such records available to the Executive Officer upon request.

(3) An owner or operator of a Unit that is modified and subject to this rule shall maintain records to include the name of the company and person modifying the Unit, a description of all modifications, the date(s) the Unit was modified, and a calculation of the Rated Heat Input and make such records available to the Executive Officer upon request.

(4) An owner or operator of a Unit equipped with a CEMS shall maintain records in compliance with any applicable South Coast AQMD Rule for CEMS certification, operation, monitoring, reporting, and notification or any applicable permit condition, for at least five years and make records available to the Executive Officer upon request.

(5) RECLAIM facilities must continue to comply with reporting requirements pursuant to Regulation XX until such time as the facility becomes a Former RECLAIM facility.

(6) An owner or operator of a Unit shall maintain, for at least five years and make available to the Executive Officer upon request, a copy of the manufacturer's, distributor's, installer's or maintenance company's written maintenance schedule and instructions.

(~~e~~k) Certification

(1) Unit Certification

For a ~~u~~Unit~~s~~ that does not allow adjustment of the fuel and combustion air for the combustion system by the owner or operator, any manufacturer or distributor that distributes for sale or sells a ~~u~~Unit~~s~~ or burner system~~s~~ for use in the ~~District~~ South Coast AQMD may elect to ~~apply to the Executive Officer to~~ certify such ~~u~~Unit~~s~~ or burner system~~s~~ as compliant with subdivision (~~e~~d) by submitting the following to the Executive Officer:~~.~~

(A) A statement that the model is in compliance with subdivision (d). The statement shall be signed and dated by the manufacturer's responsible official and shall attest to the accuracy of all statements;

(B) General Information

(i) Name and address of manufacturer,

(ii) Brand name, if applicable,

(iii) Model number, as it appears on the Unit rating plate; and

(iv) Rated Heat Input Capacity, gross output of burner(s) and number of burners;

(C) A description of each model being certified; and

(D) A South Coast AQMD approved source test report pursuant to subdivision (h) conducted within 90 days of certification submittal and within 120 days of proposed sale or installation, whichever is sooner.

~~(2) Manufacturer Confirmation of Emissions~~

~~Any manufacturer's application to the Executive Officer to certify a model of equipment as compliant with the emission limit and demonstration requirement of subdivision (c) shall obtain confirmation from an independent contractor that is approved by the Executive Officer under the Laboratory Approval Program~~

~~for the necessary test methods prior to applying for certification that each unit model complies with the applicable requirements of subdivision (c). This confirmation shall be based upon District approved emission tests of standard model units and a District approved protocol shall be adhered to during the confirmation testing of all units subject to this rule. Emission testing shall comply with the requirements of paragraphs (d)(1) through (d)(5) except emission determinations shall be made at 100% rated heat input capacity and an additional emission determination shall be made using a heat input of less than 35% of the rated heat input capacity for any Afterburner, Degassing Unit, Remediation Unit, Thermal Oxidizer, Catalytic Oxidizer, Vapor Incinerator, Make-Up Air Heater, other Air Heater located outside of process building, Oven, Dehydrator, Dryer, Tenter-Frame Dryer, Fabric Dryer, Carpet Dryer, Heater, Kiln, Crematory, Incinerator, Calciner, Cooker, Roaster, non-metallurgical Furnace, or Heated Storage Tank.~~

~~(3) When applying for unit(s) certification, the manufacturer shall submit to the Executive Officer the following:~~

~~(A) A statement that the model is in compliance with subdivision (c). The statement shall be signed and dated by the manufacturer's responsible official and shall attest to the accuracy of all statements;~~

~~(B) General Information~~

~~(i) Name and address of manufacturer,~~

~~(ii) Brand name, if applicable,~~

~~(iii) Model number, as it appears on the unit rating plate; and~~

~~(iv) Rated Heat Input Capacity, gross output of burner(s) and number of burners;~~

~~(C) A description of each model being certified; and~~

~~(D) A source test report verifying compliance with the applicable emission limit in subdivision (c) for each model to be certified. The source test report shall be prepared by the confirming independent contractor and shall contain all of the elements identified in the District approved Protocol for each unit tested. The source test shall have been conducted no more than ninety (90) days prior to the date of submittal to the Executive Officer.~~

~~(4) When applying for unit certification, the manufacturer shall submit the information identified in paragraph (e)(3) no more than ninety (90) days after the date of the source test identified in subparagraph (e)(3)(D) and at least 120 days prior to the date of the proposed sale and installation of any District certified unit.~~

(~~5~~2) The Executive Officer shall certify a unit model which complies with the provisions of subdivision (~~c~~d) and ~~of~~ paragraph~~s~~ (k)(1)~~(e)(2), (e)(3), and (e)(4)~~.

(~~6~~3) Certification status shall be valid for five years from the date of approval by the Executive Officer. ~~-~~After the fifth year, recertification shall be required by the Executive Officer according to the requirements of paragraph~~s~~ (e~~k~~)(~~2~~1)~~, (e)(3), and (e)(4)~~.

(l) Maintenance

(1) An owner or operator of a Unit subject to subdivision (d) shall perform combustion system maintenance in accordance with the manufacturer's schedule and specifications as identified in the manual and other written materials supplied by the manufacturer or distributor.

(2) An owner or operator shall maintain maintenance records pursuant to subdivision (j).

~~(f) Enforcement~~

~~(1) The Executive Officer may inspect certification records and unit installation, operation, maintenance, repair, combustion system modification, combustion system repair, combustion system replacement, unit replacement, relocation and test records of owners, operators, manufacturers, distributors, retailers, and installers of units located in the District, and conduct such tests as are deemed necessary to ensure compliance with this rule. Tests shall include emission determinations, as specified in paragraph (d)(1) to (d)(10), of a random sample of any category of units subject to this rule.~~

~~(2) An emission determination specified under paragraph (f)(1) that finds NOx emissions in excess of those allowed by this rule or permit conditions shall constitute a violation of this rule.~~

(~~g~~m) Exemptions

(1) The provisions of this rule shall not apply to a ~~units~~Unit~~:~~ with heat input rating below 325,000 Btu/hr.

~~(A)~~ ~~subject to the nitrogen oxide limits of other District~~ South Coast AQMD ~~Regulation XI rules; or~~

~~(B)~~ ~~located at RECLAIM facilities.~~

(2) The provisions of this rule shall not apply to charbroilers or food ovens.

(3) The provisions of this rule shall not apply to:

(A) Flares subject to ~~District~~ Rule 1118 or Rule 1118.1;

(B) Flares, afterburners, degassing ~~u~~Units, thermal or catalytic oxidizers or vapor incinerators in which a fuel, including but not limited to natural gas, propane, butane or liquefied petroleum gas, is used only to maintain a pilot for vapor ignition or is used for five minutes or less to bring a ~~u~~Unit up to Minimum ~~o~~Operating ~~t~~Temperature;

(C) Municipal solid waste incinerators with a ~~District~~ South Coast AQMD permit operating before December 5, 2008;

(D) An afterburner or vapor incinerator with a ~~District~~ South Coast AQMD permit operating before December 5, 2008 that has an integrated thermal fluid heat exchanger that captures heat from the afterburner or vapor incinerator and an oven or furnace exhaust in order to reduce fuel consumption by an oven or the afterburner or vapor incinerator; or

(E) A flare, afterburner, degassing U~~u~~nit, ~~r~~Remediation ~~u~~Unit, thermal oxidizer, catalytic oxidizer or vapor incinerator process in which particulate matter, air toxics, VOCs, landfill gas, digester gas or other combustible vapors are mixed in the U~~u~~nit's burner with combustion air or fuel, including but not limited to natural gas, propane, butane or liquefied petroleum gas, prior to or at incineration in the U~~u~~nit, in order to maintain vapor concentration above the upper explosion limit or above a manufacturer specified limit in order to maintain combustion or temperature in the ~~u~~Unit. This exemption is subject to the following conditions: ~~This exemption does not apply to a regenerative thermal or catalytic oxidizer unit with a burner used to heat up or maintain temperature of the unit or a unit that incinerates particulate matter, air toxics, VOCs or other combustible vapors in a gas stream moving past the burner flame.~~

(i) This exemption shall not apply to a regenerative thermal or catalytic oxidizer Unit with a burner used to heat up or maintain

temperature of the Unit or a Unit that incinerates particulate matter, air toxics, VOCs or other combustible vapors in a gas stream moving past the burner flame; and

(ii) This exemption shall apply to the combustion process prior to or at incineration in the Unit, in order to maintain vapor concentration above the upper explosion limit or above a manufacturer specified limit in order to maintain combustion or temperature in the Unit.

(F) Solid fuel-fired combustion equipment.

~~(4) Afterburners, degassing units, thermal oxidizers, catalytic oxidizers, vapor incinerators, and spray booth make-up air heaters installed and operating before March 1, 2012 and with emissions less than one pound per day, are exempt from the emission limit in Table 1 until the unit is 35 years old or undergoes a combustion system modification, combustion system replacement, or relocation or the unit is replaced. Afterburners, degassing units, thermal oxidizers, catalytic oxidizers, vapor incinerators, and spray booth make-up air heaters installed for use at a specific facility after December 5, 2008 and before March 1, 2012 and with emissions of one pound per day or more, shall comply with the emission limit in Table 1 on and after July 1 of the year the unit is 15 years old.~~

(4~~5~~) Remediation U~~u~~nits installed after December 5, 2008 and before March 1, 2012, are exempt from the emission limit in Table 1 and Table 2 until replacement with a ~~n~~New ~~u~~Unit, a combustion system modification, combustion system replacement, or relocation on or after January 1, 2012.

(5~~6~~) ~~Fryers installed and operating before January 1, 2014 and with emissions less than one pound per day, are exempt from the emission limit in Table 1 until the unit is 35 years old, a combustion system modification, combustion system replacement, relocation, or the unit is replaced.~~ Fryers installed after December 5, 2008 and operating before January 1, 2014 and with emissions of one pound per day or more, are exempt from the emission limit in Table 1 and Table 2 until July 1 of the year the ~~u~~Unit is 15 years old.

(6~~7~~) Remediation ~~u~~Units are exempt from the applicable emission limit in Table 1 and Table 2 while fueled with propane, butane or liquefied petroleum gas in a location where natural gas is not available.~~-~~ Remediation ~~u~~Units must comply

with the emission limit when natural gas is available and while fueled with natural gas.

(7~~8~~) The provisions of ~~paragraphs (c)(1) and (c)(3)~~subdivision (d) ~~of this rule~~ shall not apply to any evaporator, heated process tank, or parts washer with a ~~District~~ South Coast AQMD permit issued and operating prior to January 1, 2014 until a combustion system modification, combustion system replacement, relocation, or the ~~u~~Unit is replaced.

(8~~9~~) The provisions of ~~paragraph (c)(3)~~ subdivision (d)~~of this rule~~ shall not apply to ~~u~~Units heated solely with infrared burners.

(9~~10~~) On and after ~~(date of adoption)~~December 5, 2008, the provisions of ~~paragraphs (c)(1) and (c)(3)~~ subdivision (d)~~of this rule~~ shall not apply to any ~~u~~Unit that becomes subject to this rule subsequent to a revision of ~~District~~ Rule 219, on or after May 5, 2017, until the ~~u~~Unit is replaced~~.~~, a combustion system modification, combustion system replacement, ~~u~~Unit relocation, or until the applicable compliance date in Table ~~2~~ 3~~of paragraph (c)(1),. or, for units with NOx emissions less than one pound per day, the unit becomes 35 years old.~~

(10~~1~~) The requirement to demonstrate compliance with an emission limit in Table 1 and Table 2 shall not apply to any I~~i~~n-~~u~~Use ~~u~~Unit with NOx emissions less than one pound per day NOx pursuant to paragraph (d)(7) in the circumstance where the ~~u~~Unit is: ~~relocated with the facility to the new facility location and the facility and unit is owned and operated by the same company and owner(s) for 36 calendar months prior to and 36 calendar months after the unit relocation. This exemption from demonstrating compliance with an emission limit at the time of a unit and facility relocation does not apply if the relocated unit is replaced, undergoes a combustion system modification or combustion system replacement, subject to a compliance date in Table 2 of paragraph (c)(1), or, for units with NOx emissions less than one pound per day and not subject to paragraph (g)(8), the unit becomes 35 years old.~~

(A) Relocated to the new facility location; and

(B) The facility and Unit are owned and operated by the same company and owner(s) for 36 calendar months prior to and 36 calendar months after the Unit Relocation.

(11) Emission limits of Table 1 and Table 2 shall not apply to owners or operators of Tunnel Kilns subject to paragraph (h)(14) during periods of Startup or Shutdown pursuant to Rule 429.

~~(A) Startup or shutdown period does not exceed 180 minutes;~~

~~(B) Frequency of startup and shutdown events does not exceed four times during one calendar month; and~~

~~(C) Records of startup or shutdown period shall be maintained and kept on site for five years and contain the following information:~~

~~(i) Unit permit or application number;~~

~~(ii) Date startup or shutdown event occurred; and~~

~~(iii) Cause for startup or shutdown.~~

(12) Heating equipment associated with fuel cells, which produce electricity in an electro-chemical reaction and use phosphoric acid, molten carbonate, proton exchange membrane, or solid oxide technologies,~~;~~ provided the heating equipment:

(A) Does not use a combustion source; or

(B) Is fueled exclusively with natural gas, methanol, liquefied petroleum gas, or any combination thereof, including heaters that have a rated maximum heat input capacity of greater than 2,000,000 Btu per hour, provided that the supplemental heat used is 90,000 therms per year or less.

(13) Requirements of subdivision (d) shall not apply to a burner that is permitted to be fired by a gaseous fuel other than natural gas and/or liquid fuel during normal operations.

(14) Units used in equipment that endothermically decompose solid waste in an environment with little to no oxygen.

~~(h) Technology Assessment~~

~~(1) On or before December 7, 2015, the Executive Officer shall conduct a technology assessment and shall report to the Governing Board on the availability of burner systems and units for processes with NOx emissions of one pound per day or less.~~

~~(i) Mitigation Fee Compliance Option~~

~~(1) An owner or operator of a unit with emissions of 1 pound per day or more may elect to delay the applicable compliance date in Table 2 of paragraph (c)(1) or~~

~~(c)(4) three years by submitting an alternate compliance plan and paying an emissions mitigation fee to the District in lieu of meeting the applicable NOx emission limit in Table 1.~~

~~(2) Compliance Demonstration~~

~~An owner or operator of a unit electing to comply with the mitigation fee compliance option shall:~~

~~(A) Submit an alternate compliance plan and pay the mitigation fee to the Executive Officer at least 150 days prior to the applicable compliance date in Table 2 of paragraph (c)(1) or (c)(4), and~~

~~(B) Maintain on-site a copy of verification of mitigation fee payment and District approval of the alternate compliance plan that shall be made available upon request to District staff.~~

~~(3) Plan Submittal~~

~~The alternate compliance plan submitted pursuant to paragraphs (i)(1) and (i)(2) shall include:~~

~~(A) A completed District Form 400A with company name, District Facility ID, identification that application is for a compliance plan (section 7 of form), and identification that request is for the Rule 1147 mitigation fee compliance option (section 9 of form);~~

~~(B) Attached documentation of unit fuel use for previous 5 years, description of weekly operating schedule, unit permit ID, unit heat rating (Btu/hour), and fee calculation;~~

~~(C) Filing fee payment; and~~

~~(D) Mitigation fee payment as calculated by Equation 1.~~

~~**Equation 1:**~~

~~$MF = R \times (3 \text{ years}) \times (L_1 - L_0) \times (AF) \times (k)$~~

~~**Where:**~~

~~MF = Mitigation fee, $~~

~~R = Fee Rate = $12.50 per pound ($6.25 per pound for a small business with 10 or fewer employees and gross annual receipts of $500,000 or less)~~

~~L_1 = Default NOx emission factor, 0.136 lbs of NOx/mmBtu for natural gas and LPG, and 0.160 lb/mmBtu for fuel oils~~

~~L_0 = Applicable NOx emission limit specified in Table 1 in lbs/mmBtu~~

~~AF = Annual average fuel usage of unit for previous 5 years, mmscf/yr for natural gas or gallons for liquid fuel~~

~~k = unit conversion for cubic feet of natural gas to Btu = 1,050 Btu/scf, 95,500 Btu/gallon for LPG, and 138,700 Btu/gallon for fuel oil~~