

CATEGORY:

BOILER/HEATER < 5 MMBTU

BACT Size: Small Emitter BACT (PTE < 10 lb/day)

BOILER

BACT Determination Number: 218	BACT Determination Date: 7/30/2019
---------------------------------------	---

Equipment Information

Permit Number: N/A -- Generic BACT Determination
Equipment Description: BOILER
Unit Size/Rating/Capacity: >= 75,000 Btu/hr and < 2.0 MMBtu/hr fired on NG
Equipment Location:

BACT Determination Information

ROCs	Standard:	
	Technology Description:	Good combustion practices
	Basis:	Achieved in Practice
NOx	Standard:	20 ppmvd (except pool/spa heaters <0.4 mmbtu/hr)
	Technology Description:	Low-NOx burner
	Basis:	Achieved in Practice
SOx	Standard:	
	Technology Description:	Good combustion practices
	Basis:	Achieved in Practice
PM10	Standard:	
	Technology Description:	Good combustion practices
	Basis:	Achieved in Practice
PM2.5	Standard:	
	Technology Description:	Good combustion practices
	Basis:	Achieved in Practice
CO	Standard:	400 ppmvd
	Technology Description:	
	Basis:	Achieved in Practice
LEAD	Standard:	
	Technology Description:	
	Basis:	

Comments: All ppmvd are at 3% oxygen. The NOx BACT standard for pool/spa heaters < 0.4 MMBTU/hr is 55 ppmvd at 3% oxygen.

District Contact: Joe Carle Phone No.: (916) 874 - 4838 email: jcarle@airquality.org

CATEGORY:

BOILER/HEATER < 5 MMBTU

BACT Size: Small Emitter BACT (PTE < 10 lb/day)

BOILER

BACT Determination Number: 219	BACT Determination Date: 7/30/2019
---------------------------------------	---

Equipment Information

Permit Number: N/A -- Generic BACT Determination
Equipment Description: BOILER
Unit Size/Rating/Capacity: >= 75,000 Btu/hr and < 2.0 MMBTU/hr fired on LPG
Equipment Location:

BACT Determination Information

ROCs	Standard:	
	Technology Description:	Good combustion practices
	Basis:	Achieved in Practice
NOx	Standard:	30 ppmvd (except units < 0.4 MMBTU/hr)
	Technology Description:	Low-NOx burner
	Basis:	Achieved in Practice
SOx	Standard:	
	Technology Description:	Good combustion practices
	Basis:	Achieved in Practice
PM10	Standard:	
	Technology Description:	Good combustion practices
	Basis:	Achieved in Practice
PM2.5	Standard:	
	Technology Description:	Good combustion practices
	Basis:	Achieved in Practice
CO	Standard:	400 ppmvd (except units < 0.4 MMBTU/hr)
	Technology Description:	
	Basis:	Achieved in Practice
LEAD	Standard:	
	Technology Description:	
	Basis:	

Comments: All ppmvd standards are at 3% oxygen. Units < 0.4 MMBTU/hr must meet a BACT standard of 77 ppmvd at 3% oxygen for NOx and must implement good combustion practices for CO.

District Contact: Joe Carle Phone No.: (916) 874 - 4838 email: jcarle@airquality.org



BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

DETERMINATION NOS.: 218 & 219
DATE: July 30, 2019
ENGINEER: J. Carle

Category/General Equip Description: Boiler/Heater – Natural gas or LPG

Equipment Specific Description: #218 – Boiler/heater greater or equal to 75,000 BTU/hr to less than 2.0 MMBTU/hr, fired on natural gas
#219 – Boiler/heater greater or equal to 75,000 BTU/hr to less than 2.0 MMBTU/hr, fired on LPG

Equipment Size/Rating: Small Emitter (PTE < 10 lb/day of VOC, NOx, SOx, PM10, or PM2.5 and less than 550 lbs/day of CO)

Previous BACT Det. No.: 135 & 136

This Best Available Control Technology (BACT) determination will update Determinations #135 & 136 for boilers/heaters greater than or equal to 75,000 BTU/hr and less than 2.0 MMBTU/hr, fired on natural gas or LPG.

The District’s Small Emitter and “Otherwise-Exempt Equipment” BACT Determinations policy states that units which are classified as small emitters (less than 10 lbs/day of VOC, NOx, SOx, PM10, or PM2.5 and less than 550 lbs/day of CO) and are located at non-major stationary sources are only required to meet BACT standards that have been achieved in practice. Therefore, this BACT determination will only be based on what is achieved in practice and will be only applied to small emitters at non-major sources. BACT will be evaluated on a case-by-case basis for units that do not fit this criteria.

BACT/T-BACT ANALYSIS

A. ACHIEVED IN PRACTICE (Rule 202, §205.1a):

The following control technologies are currently employed as BACT for boilers/heaters ≥ 75,000 BTU/hr and < 2.0 MMBTU/hr by the following agencies and air pollution control districts:

US EPA

BACT

Source: [EPA RACT/BACT/LAER Clearinghouse](#) (See Attachment A)

Two determinations were found for units fueled on natural-gas in this size range.

RBLC ID # MI-0426: Through contact with the permitting agency it was found that the 1.0 MMBTU/hr boilers in this determination were part of a larger project for a PSD modification of a natural gas compressing station. The boilers were proposed by the applicant and the standards included in this determination are based on manufacturer data and not through testing. Because the emission standards were not tested and verified in the field, the District does not consider these emission standards achieved in practice.

RBLC ID # SC-0179: Emission standards for VOC and PM are displayed in lb/hr, which are based on the specific input rating of the unit evaluated. These emission rates were not based on any specific control technology but on the use of natural gas as a fuel and good combustion practices. Other agencies list natural gas usage and good combustion practices as BACT for VOC and PM, therefore this determination will be assumed to be equivalent.

No determinations were found for units fueled on LPG for this size range.

RULE REQUIREMENTS: None

California Air Resource Board (CARB)

BACT

Source: [CARB BACT Clearinghouse](#) (See Attachment B)

Natural Gas-Fired Units ≥ 0.075 and < 2.0 MMBTU/hr			
Pollutant	Standard	Control Technology	Source
VOC	N/A - No determinations found in this size range		
NOx	20 ppmvd @ 3% O ₂	Low NOx burner	SMAQMD 9/29/2015
SOx	N/A - No determinations found in this size range		
PM10	N/A - No determinations found in this size range		
PM2.5	N/A - No determinations found in this size range		
CO	400 ppmvd @ 3% O ₂	Fueled by natural gas	SMAQMD 9/29/2015

No determinations were found for units fueled on LPG for this size range.

RULE REQUIREMENTS: None

Sacramento Metropolitan AQMD

BACT

Source: [SMAQMD BACT #135 – Boiler 0.075 to 2 MMBTU per hr LPG \(3/3/2017\)](#)

LPG-Fired Units ≥ 0.075 and < 2.0 MMBTU/hr		
Pollutant	Unit Type	Standard
VOC	All	Good combustion practices
NOx	< 0.4 MMBTU/hr	77 ppmvd @ 3% O ₂
	≥ 0.4 MMBTU/hr	30 ppmvd @ 3% O ₂
SOx	All	Good combustion practices
PM10	All	Good combustion practices
PM2.5	All	Good combustion practices
CO	< 0.4 MMBTU/hr	Good combustion practices
	≥ 0.4 MMBTU/hr	400 ppmvd @ 3% O ₂

Source: [SMAQMD BACT #136 – Boiler 0.075 to 2 MMBTU per hr NG \(3/3/2017\)](#)

Natural Gas-Fired Units ≥ 0.075 and < 2.0 MMBTU/hr		
Pollutant	Unit Type	Standard
VOC	All	Good combustion practices
NOx	Pool/Spa heaters < 0.4 MMBTU/hr	55 ppmvd @ 3% O ₂
	All other units	20 ppmvd @ 3% O ₂
SOx	All	Good combustion practices
PM10	All	Good combustion practices
PM2.5	All	Good combustion practices
CO	All	400 ppmvd @ 3% O ₂

RULE REQUIREMENTS:

[Rule 414 – Water Heaters, Boilers and Process Heaters Rated Less Than 1,000,000 BTU Per Hour \(Amended 10/25/2018\)](#)

This rule applies to a person who manufactures, distributes, offers for sale, sells, or installs any type of water heater, boiler or process heater with a rated heat input capacity less than 1.0 MMBTU/hr, fired with gaseous or nongaseous fuels. Units must be certified to meet the emission limits by the SMAQMD or SCAQMD. **LPG-fired units are exempt from this rule.**

No person shall distribute, offer for sale, sell, or install any unit that does not meet the following standards:

Heat Input Range and Type	NOx Limit Nanograms per Joule of Heat Output (ppmv @ 3% O ₂)*	CO Limit (ppmv @ 3% O ₂)
<u>75,000 to < 400,000 Btu/hr</u> Pool/Spa All others	40 (55) 14 (20)	No Limit No Limit
<u>400,000 to 1 million Btu/hr</u> All Types	14 (20)	400

* Where limits are shown in units of both nanograms per joule of heat output and ppmv at 3% oxygen, compliance can be demonstrated using either limit.

[Rule 411 – NOx from Boilers, Process Heaters and Steam Generators \(Amended 8/23/2007\)](#)

This rule applies to units fired on gaseous or nongaseous fuels with a rated heat input capacity of 1 million Btu per hour or greater.

No unit shall exceed the following limits:

Unit Size/Description mmBtu/hr Input	NOx Limit ppmvd @ 3% O ₂	CO Limit ppmvd @ 3% O ₂
Greater than or equal to 1 and less than 5	30	400

South Coast AQMD

BACT

SCAQMD BACT Guidelines do not contain a determination for boilers/heaters rated 2 MMBTU/hr or less, because these units are not required to obtain a written permit, pursuant to SCAQMD Rule 219.

[SCAQMD Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II \(Amended 4/6/2018\)](#)

Section (b)(2): Written permits are not required for boilers, process heaters, or any combustion equipment that has a rated maximum heat input capacity of 2,000,000 Btu per hour (gross) or less and are equipped to be heated exclusively with natural gas, methanol, liquefied petroleum gas, or any combination thereof.

RULE REQUIREMENTS:

[Reg XI, Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters \(Amended 12/7/2018\)](#)

This rule is applicable to all natural gas-fired units that have a rated heat input capacity less than or equal to 2,000,000 Btu per hour. Units must be certified to meet the emission limits by the SCAQMD.

New units must meet the following standards:

Category	NOx Limit	CO Limit
Units ≤ 0.4 MMBTU/hr (except pool heaters)	14 nanograms per joule of heat output (20 ppmvd @ 3% O ₂)	No standard
Pool heaters ≤ 0.4 MMBTU/hr	40 nanograms per joule of heat output (55 ppmvd @ 3% O ₂)	No standard
Units > 0.4 and ≤ 2.0 MMBTU/hr	14 nanograms per joule of heat output (20 ppmvd @ 3% O ₂)	400 ppmvd @ 3% O ₂

San Joaquin Valley Unified APCD

BACT

SJVUAPCD BACT Guidelines do not contain a determination for boilers rated 5 MMBTU/hr or less, because these units are not required to obtain a written permit, pursuant to SJUVAPCD Rule 2020.

[SJVUAPCD Rule 2020 – Exemptions \(Amended December 18, 2014\)](#)

Section 6.1.1: No Authority to Construct or Permit to Operate shall be required for steam generators, steam superheaters, water boilers, steam cleaners, and closed indirect heat transfer systems that have a maximum input heat rating of 5,000,000 Btu per hour (gross) or less and is equipped to be fired exclusively with natural gas, liquefied petroleum gas, or any combination of the two.

RULE REQUIREMENTS:

[SJVUAPCD Rule 4308 – Boilers, Steam Generators, and Process Heaters – 0.075 MMBtu/hr to less than 2.0 MMBtu/hr \(Amended 11/14/2013\)](#)

This rule applies to any person who supplies, sells, offers for sale, installs, or solicits the installation of any boiler, steam generator, process heater or water heater with a rated heat input capacity of greater than or equal to 75,000 British thermal units per hour and less than 2,000,000 British thermal units per hour.

A person shall not supply, sell, offer for sale, install, or solicit the installation of any boiler, process heater or water heater unless it has been certified pursuant to the standards in the table below.

Type and Size of Unit, in MMBtu/hr	NOx Limit lb/MMBtu of heat input (ppmvd @ 3% O ₂)	
	PUC Natural Gas*	Non-PUC Natural Gas or Liquid
Units ≥ 0.075 and ≤ 0.4 , except as below	0.024 (20)	0.093 (77)
Units > 0.4 and < 2.0 , except as below	0.024 (20)	0.036 (30)
Instantaneous water heaters ≥ 0.075 and ≤ 0.4	0.024 (20)	0.093 (77)
Instantaneous water heaters > 0.4 and < 2.0	0.024 (20)	0.093 (77)
Pool heaters ≥ 0.075 and ≤ 0.4	0.068 (55)	0.093 (77)
Pool heaters > 0.4 and < 2.0	0.024 (20)	0.036 (30)

* PUC Natural Gas stands for California Public Utility Commission Quality Natural Gas

Units with a rating of ≥ 0.4 MMBtu/hr and < 2.0 MMBtu/hr must meet a standard of 400 ppmvd @ 3% O₂ for CO.

San Diego County APCD

BACT

SDCAPCD BACT Guidelines do not contain a determination for boilers/heaters rated 5 MMBtu/hr or less, because these units are not required to obtain a written permit, pursuant to SDCAPCD Rule 11.

[SDCAPCD Rule 11 – Exemptions from Rule 10 Permit Requirements \(Amended 5/11/2016\)](#)

Section (d)(2)(iv): Any boiler, process heater, or steam generator with a manufacturer’s maximum gross heat input rating of less than 5 million BTU per hour fired exclusively with natural gas and/or liquefied petroleum gas.

RULE REQUIREMENTS:

[Regulation 4, Rule 69.2.1 – Small Boilers, Process Heaters, and Steam Generators \(Adopted 3/25/2009\)](#)

This rule applies to any person who manufactures, sells, offers for sale or distributes for use within San Diego County, or installs within San Diego County a new unit (boiler, process heater, or steam generator) with a heat input rating from 600,000 Btu per hour to 2 million Btu per hour.

No person shall manufacture, distribute, sell, offer for sale, or install within San Diego County any new unit that exceeds the following emission levels:

Unit Type and Size in MMBTU/hr	NOx Limit ppmvd @ 3% O ₂	CO Limit ppmvd @ 3% O ₂
Units ≥ 0.6 and ≤ 2.0 fired on gaseous fuel	30	400
Units ≥ 0.6 and ≤ 2.0 fired on liquid fuel	40	400

SDCAPCD has no rule or regulation for units that are rated $< 600,000$ MMBtu/hr.

Bay Area AQMD

BACT

BAAQMD BACT Guidelines do not contain a determination for boilers/heaters rated 5.0 MMBTU/hr or less fired exclusively on natural gas or LPG, because units rated less than 10 MMBTU/hr fired exclusively on natural gas or LPG are not required to obtain a permit, pursuant to BAAQMD Rule 2-1.

[BAAQMD Regulation 2, Rule 1 – General Requirements \(Amended 12/6/2017\)](#)

Section 2-1-114: Boilers, heaters, steam generators, duct burners, and similar combustion equipment with less than 10 million BTU per hour rated heat input if fired exclusively with natural gas (including compressed natural gas), liquefied petroleum gas (e.g. propane, butane, isobutene, propylene, butylene, and their mixtures), or any combination thereof are exempt from being required to obtain an Authority to Construct or Permit to Operate.

RULE REQUIREMENTS:

[BAAQMD Regulation 9, Rule 6 – Nitrogen Oxides Emissions from Natural Gas-Fired Water Heaters \(Amended 11/7/2007\)](#)

This rule applies to natural gas-fired boilers and water heaters with a rated heat input capacity less than or equal to 2,000,000 BTU/hr. Units must be certified to meet the emission limits by the BAAQMD or SCAQMD.

Rated Heat Input Capacity Btu/hr	Type of Unit	NOx Limit nanograms per joule of heat output (ppm @ 3% O ₂)
$\leq 75,000$	Mobile Home Water Heaters	40
	Other Storage Tank Water Heaters	10
75,001 to 400,000	Mobile Home Water Heaters	40
	Pool/Spa Heaters	Exempt
	All Other	14
400,001 to 2,000,000	Mobile Home Water Heaters	40
	Pool/Spa Heaters	14 (20)
	All Other	14 (20)

Summary of Achieved in Practice Control Technologies

The following control technologies have been identified and are ranked based on stringency:

UNIT CONVERSION FOR NO_x & CO

Depending on the agency, NO_x and CO emission standards were listed in either ppmvd @ 3% O₂ or in nanograms per joule of heat output. For purposes of comparison all nanograms per joule of heat output standards have been converted to ppmvd @ 3% O₂.

LPG-FIRED UNITS RATED $\geq 75,000$ and $< 400,000$ BTU/hr – NO_x

Achieved in Practice Standards for NO_x for LPG-Fired Units Rated $\geq 75,000$ and $< 400,000$ BTU/hr				
Rank	NO _x Standard (ppmvd @ 3% O ₂)	Technology Description	Source	Year
1	77	None Listed	SMAQMD BACT	2017
1	77	None Listed	SJVUAPCD Rule	2013
2	No standard	N/A	SCAQMD / SDCAPCD / BAAQMD	N/A
2	No determinations found for this category	N/A	EPA BACT Clearinghouse / CARB BACT Clearinghouse	N/A

LPG-FIRED UNITS RATED $\geq 400,000$ and $< 2,000,000$ BTU/hr – NO_x

Achieved in Practice Standards for NO_x for LPG-Fired Units Rated $\geq 400,000$ and $< 2,000,000$ BTU/hr				
Rank	NO _x Standard (ppmvd @ 3% O ₂)	Technology Description	Source	Year
1	30	None Listed	SMAQMD BACT	2017
2	Rated at 0.4 MMBTU/hr: 77 Rated > 0.4 MMBTU/hr: 30	None Listed	SJVUAPCD Rule	2013
3	Rated < 0.6 MMBTU: No standard Rated ≥ 0.6 MMBTU/hr: 40	None Listed	SDCAPCD Rule	2016
4	No standard	N/A	SCAQMD / BAAQMD	N/A

Achieved in Practice Standards for NOx for LPG-Fired Units Rated $\geq 400,000$ and $< 2,000,000$ BTU/hr				
Rank	NOx Standard (ppmvd @ 3% O ₂)	Technology Description	Source	Year
4	No determinations found for this category	N/A	EPA BACT Clearinghouse / CARB BACT Clearinghouse	N/A

NATURAL GAS-FIRED POOL/SPA HEATERS RATED $\geq 75,000$ and $< 400,000$ BTU/hr - NOx

Achieved in Practice Standards for NOx for Natural Gas-Fired Pool/Spa Heaters Rated $\geq 75,000$ and $< 400,000$ BTU/hr				
Rank	NOx Standard (ppmvd @ 3% O ₂)	Technology Description	Source	Year
1	55	None Listed	SMAQMD BACT	2017
1	55	None Listed	SCAQMD Rule	2006
2	Fired on PUC Gas: 55 Fired on Non-PUC Gas: 77	None Listed	SJVUAPCD Rule	2003
3	No standard	N/A	SDCAPCD / BAAQMD	N/A
3	No standards found for this category	N/A	EPA BACT Clearinghouse / CARB BACT Clearinghouse	N/A

NATURAL GAS-FIRED UNITS RATED $\geq 75,000$ and $< 2,000,000$ BTU/hr (Excluding Pool/Spa Heaters Rated $< 400,000$ BTU/hr) - NOx

Achieved in Practice Standards for NOx for Natural Gas-Fired Units Rated $\geq 75,000$ and $< 2,000,000$ BTU/hr (Excluding Pool/Spa Heaters Rated $< 400,000$ BTU/hr)				
Rank	NOx Standard (ppmvd @ 3% O ₂)	Technology Description	Source	Year
1	20	None Listed	SMAQMD BACT	2017
1	20	None Listed	SCAQMD Rule	2006

Achieved in Practice Standards for NOx for Natural Gas-Fired Units Rated $\geq 75,000$ and $< 2,000,000$ BTU/hr (Excluding Pool/Spa Heaters Rated $< 400,000$ BTU/hr)				
Rank	NOx Standard (ppmvd @ 3% O ₂)	Technology Description	Source	Year
1	20	Low NOx Burner	CARB BACT Clearinghouse	2015
2	Mobile Home Water Heaters: 55 All Other Units at 0.075 MMBTU/hr: 15 All Other Units: 20	None Listed	BAAQMD Rule	2007
3	PUC Natural Gas* Fired: 20 Non-PUC Natural Gas Fired Instantaneous Water Heaters: 77 All Other Units ≤ 0.4 MMBTU/hr: 77 All Other Units > 0.4 MMBTU/hr: 30	None Listed	SJVUAPCD Rule	2013
4	Units < 0.6 MMBTU/hr: No Standard Units ≥ 0.6 MMBTU/hr: 30	None Listed	SDCAPCD Rule	2009

* PUC Natural Gas stands for California Public Utility Commission Quality Natural Gas

LPG-FIRED UNITS RATED $\geq 75,000$ and $< 2,000,000$ BTU/hr - CO

Achieved in Practice Standards for CO for LPG-Fired Units Rated $\geq 75,000$ and $< 2,000,000$ BTU/hr			
Rank	CO Standard	Source	Year
1	Units < 0.4 MMBTU/hr: Good Combustion Practices Units ≥ 0.4 MMBTU/hr: 400 ppmvd @ 3% O ₂	SMAQMD BACT	2017
2	Units < 0.4 MMBTU/hr: No Standard Units ≥ 0.4 MMBTU/hr: 400 ppmvd @ 3% O ₂	SJVUAPCD Rule	2013
3	Units < 0.6 MMBTU/hr: No Standard Units ≥ 0.6 MMBTU/hr: 400 ppmvd @ 3%O ₂	SDCAPCD Rule	2009
4	No standard	SCAQMD / BAAQMD	N/A
4	No standards found for this category	EPA BACT Clearinghouse / CARB BACT Clearinghouse	N/A

NATURAL GAS-FIRED UNITS RATED $\geq 75,000$ and $< 2,000,000$ BTU/hr - CO

Achieved in Practice Standards for CO for Natural Gas-Fired Units Rated $\geq 75,000$ and $< 2,000,000$ BTU/hr			
Rank	CO Standard	Source	Year
1	400 ppmvd @ 3%O ₂	SMAQMD BACT	2017
1	400 ppmvd @ 3%O ₂	CARB BACT Clearinghouse	2015
2	Units < 0.4 MMBTU/hr: No Standard Units ≥ 0.4 MMBTU/hr: 400 ppmvd @ 3%O ₂	SJVUAPCD Rule	2013
3	Units ≤ 0.4 MMBTU/hr: No Standard Units > 0.4 MMBTU/hr: 400 ppmvd @ 3%O ₂	SCAQMD Rule	2006
4	Units < 0.6 MMBTU/hr: No Standard Units ≥ 0.6 MMBTU/hr: 400 ppmvd @ 3%O ₂	SDCAPCD Rule	2009
5	No standard	BAAQMD	N/A
5	No standards found for this category	EPA BACT Clearinghouse	N/A

VOC, SO_x, PM₁₀ & PM_{2.5}

The only standard set for any of these pollutants for this category of equipment is the use of good combustion practices by last SMAQMD BACT Determination and the EPA BACT Clearinghouse.

B. TECHNOLOGICALLY FEASIBLE AND COST EFFECTIVE (Rule 202, §205.1.b.):

The District's Small Emitter and "Otherwise-Exempt Equipment" BACT Determinations policy (dated 5/16/2019) states that units which are classified as small emitters (less than 10 lbs/day of VOC, NO_x, SO_x, PM₁₀, or PM_{2.5} and less than 550 lbs/day of CO) and are located at non-major stationary sources are only required to meet BACT standards that have been achieved in practice. Therefore, this BACT determination will only be based on what is achieved in practice and will only be applied to small emitters at non-major sources. BACT will be evaluated on a case-by-case basis for units that do not fit these criteria.

C. SELECTION OF BACT:

Based on the above analysis, BACT for VOC, NO_x, SO_x, PM₁₀, PM_{2.5} and CO will be the most stringent standards of what is currently achieved in practice.

BACT DETERMINATION #218 – BOILERS/HEATERS RATED GREATER THAN OR EQUAL TO 75,000 BTU/HR TO LESS THAN 2.0 MMBTU/HR, FIRED ON NATURAL GAS – SMALL EMITTER CATEGORY		
Pollutant	Standard	Source
VOC	Good combustion practices	SMAQMD
NO _x	Pool/spa heaters $< 400,000$ Btu/hr: 55 ppmvd @ 3% O ₂ All other boilers/heaters: 20 ppmvd @ 3% O ₂	SMAQMD / SCAQMD
SO _x	Good combustion practices	SMAQMD
PM ₁₀	Good combustion practices	SMAQMD
PM _{2.5}	Good combustion practices	SMAQMD
CO	400 ppmvd @ 3% O ₂	SMAQMD

BACT DETERMINATION #219 – BOILERS/HEATERS RATED GREATER THAN OR EQUAL TO 75,000 BTU/HR TO LESS THAN 2.0 MMBTU/HR, FIRED ON LPG – SMALL EMITTER CATEGORY		
Pollutant	Standard	Source
VOC	Good combustion practices	SMAQMD
NO _x	Units $< 400,000$ Btu/hr: 77 ppmvd @ 3% O ₂ Units $\geq 400,000$ Btu/hr: 30 ppmvd @ 3% O ₂	SMAQMD / SCAQMD
SO _x	Good combustion practices	SMAQMD
PM ₁₀	Good combustion practices	SMAQMD
PM _{2.5}	Good combustion practices	SMAQMD
CO	Units < 0.4 MMBTU/hr: Good Combustion Practices Units ≥ 0.4 MMBTU/hr: 400 ppmvd @ 3% O ₂	SMAQMD

D. SELECTION OF T-BACT:

Toxics are in the form of VOCs and particulate matter. Since toxic emissions from natural gas and LPG-fired boilers in the 75,000 Btu/hr to less than 2.0 MMBtu/hr range are so small and the cancer risk is not expected to be anywhere close to 1 in a million cases, T-BACT was not evaluated for this determination.

APPROVED BY: Ben F. Voul DATE: 7-30-19


Attachment A

Review of BACT Determinations published by EPA

List of BACT determinations published in EPA's RACT/BACT/LAER Clearinghouse (RBLC) for Commercial/Institutional-Sized Boilers/Furnaces < 100 Million BTU/H - Natural Gas (includes propane & liquefied petroleum gas) (Process Code 13.310):

Boilers/Heaters < 2.0 MMBTU/hr							
RBLC#	Permit Date^(A)	Rating	Fuel	Pollutant	Standard	Control Technology	Case-By-Case Basis
MI-0426	3/24/2017	1 MMBTU/hr	Natural gas	NOx	9 ppmvd @ 3% O ₂	Ultra-low NOx burner and good combustion practices	BACT-PSD
MI-0426	3/24/2017	1 MMBTU/hr	Natural gas	CO	84 lb/MMSCF	Good combustion practices and clean burn fuel (pipeline quality NG)	BACT-PSD
MI-0426	3/24/2017	1 MMBTU/hr	Natural gas	PM10/PM2.5	0.52 lb/MMSCF	Good combustion practices and clean burn fuel (pipeline quality NG)	BACT-PSD
SC-0179	3/18/2015	1.83 MMBTU/hr	Natural gas	PM10	0.01 lb/hr	Use of natural gas and good combustion practices	BACT-PSD
SC-0179	3/18/2015	1.83 MMBTU/hr	Natural gas	PM2.5	0.003 lb/hr	Use of natural gas and good combustion practices	BACT-PSD
SC-0179	3/18/2015	1.83 MMBTU/hr	Natural gas	VOC	0.01 lb/hr	Use of natural gas and good combustion practices	BACT-PSD

(A) Due to the large number of entries only determinations made (based on Permit Date) entered since 01/01/2009 are included in the above table.

 = Selected as the most stringent BACT determination achieved in practice.

Attachment B

Review of BACT Determinations published by ARB

List of BACT determinations published in ARB's BACT Clearinghouse for Boiler: < 5 MMBTU/hr:

Boilers < 2 MMBTU/hr						
Source	A/C Date	Rating	Fuel	Pollutant	Standard	Control Technology
SMAQMD	9/29/2015	1.99 MMBTU/hr	Natural Gas	NOx	20 ppmvd @ 3% O ₂	Low NOx burner
				CO	400 ppmvd @ 3% O ₂	Use of natural gas

 = Selected as the most stringent (or most recent if standards are equivalent) BACT determination achieved in practice.