

SMAQMD BACT CLEARINGHOUSE

ACTIVE

CATEGORY Type: **PROCESS HEATER**

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

BACT Determination Number:	397	BACT Determination Date:	08/20/2025
----------------------------	-----	--------------------------	------------

Equipment Information

Permit Number: N/A - Generic BACT Determination
Equipment Description: VAPORIZERS - LPG FIRED
Unit Size/Rating/Capacity: ≥ 0.075 MMBtu/hr to < 0.4 MMBtu/hr
Equipment Location: N/A - Generic BACT Determination

BACT Determination Information

District Contact: Felix Trujillo, Jr. **Phone No.:** (279) 207-1154 **Email:** ftrujillo@airquality.org

ROCs	Standard:	
	Technology Description:	
	Basis:	
NOx	Standard:	77 ppmvd @ 3% O2
	Technology Description:	
	Basis:	Achieved in Practice
SOx	Standard:	
	Technology Description:	
	Basis:	
PM10	Standard:	
	Technology Description:	
	Basis:	
PM2.5	Standard:	
	Technology Description:	
	Basis:	
CO	Standard:	
	Technology Description:	

	Basis:	
LEAD	Standard:	
	Technology Description:	
	Basis:	
Comments:	Vaporizer falls under the definition of process heater. This BACT is being processed for LPG fired vaporizers used at an asphalt plant under A/C 28005.	

Printed:

08/26/2025



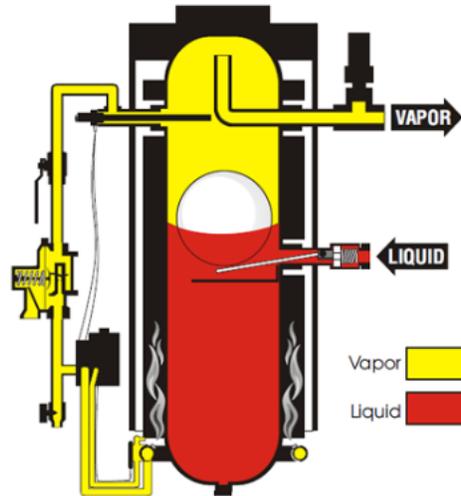
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

DETERMINATION NOS.: 397
DATE: 8/20/25
ENGINEER: Felix Trujillo, Jr.

Category/General Equip Description: Vaporizers - LPG Fired
Equipment Specific Description: Direct-fired vaporizer greater than or equal to 75,000 BTU/hr to less than 0.4 MMBTU/hr, fired on LPG
Equipment Size/Rating: Small Emitter BACT
Previous BACT Det. No.: N/A

This Best Available Control Technology (BACT) determination will cover the direct fired liquid petroleum gas (LPG) fired vaporizers proposed under the project for A/C 28011. This BACT determination is for vaporizers greater than or equal to 75,000 BTU/hr and less than 0.4 MMBTU/hr, fired on LPG. These types of vaporizers fall under the definition of process heaters under air district’s prohibitory regulations. For purposes of this determination a process heater is any unit fired with LPG which transfers heat from combustion gases to water or process streams. Process heater does not include any dryer in which the material being dried is in direct contact with the products of combustion, cement or lime kilns, glass melting furnaces, or smelters. The definition of process heaters can cover a variety of industries and the process streams applicable to those types of industries, such as refineries and chemical industries. Therefore, this BACT will be determined more specifically for vaporizers that are used to heat LPG from pressurized storage tanks to ensure that there is always plenty of LPG gas to be used at a facility. The LPG gas used at this facility will be used to fuel combustion sources at this facility. In general, these vaporizers will only be used at sites where natural gas is unavailable.

In order to economically store and transfer propane, it is converted to liquid (LPG) by storing it under pressure in storage tanks and cylinders. An LPG vaporizer converts the liquid propane, stored in the pressurized storage vessel, into a gaseous state for use in various applications. The vaporizer applies heat to the liquid propane in order to raise its temperature to the point where it transitions from a liquid to a gaseous state. There are various forms of vaporizers, such as waterbath, steam and direct fired. This BACT will be specific to direct fired units, since this is what is proposed under this project and this type of unit has been tested to show compliance with the NOx standards. Direct fired vaporizers directly heat the pressure vessel of the vaporizer containing the LPG by an LPG gas fired burner. The burner consumes a small portion of vapor from the vessel to develop the heat required for vaporization.



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, 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.

BACT/T-BACT ANALYSIS

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

The following control technologies are currently employed as BACT for LPG fired vaporizers $\geq 75,000$ BTU/hr and < 0.4 MMBTU/hr by the following agencies and air pollution control districts:

US EPA

BACT

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

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

RULE REQUIREMENTS: None

California Air Resource Board (CARB)

BACT

Source: [CARB BACT Clearinghouse](#)
[CARB BACT Guidelines Search](#)

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

RULE REQUIREMENTS: None

Sacramento Metropolitan AQMD

BACT

Source: [SMAQMD BACT Clearinghouse](#)

BACT

SMAQMD BACT Guidelines do not contain a determination for vaporizers rated 1 MMBTU/hr or less, because these units are not required to obtain a written permit, pursuant to SMAQMD Rule 201, except if the ratings of all combustion equipment used in the same process have a cumulative rating of greater than 1 MMBtu/hr. However, BACT would only be evaluated on an emissions unit basis.

[SMAQMD Rule 201 – Equipment Not Requiring a Written Permit Pursuant to Regulation II \(Amended 4/7/2023\)](#)

Section 112.2: Any combustion equipment that has a maximum heat input of less than 1,000,000 Btu per hour (gross) and is equipped to be fired exclusively with purchased quality natural gas, liquefied petroleum gas or any combination thereof. The ratings of all combustion equipment used in the same process will be accumulated to determine whether this exemption applies.

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 any 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	40 (55)	No Limit
All others	14 (20)	No Limit

- * 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.

South Coast AQMD

BACT

SCAQMD BACT Guidelines do not contain a determination for process 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 \(Amended 4/7/2023\)](#)

Section (d)(2)(C): 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 222 may be applicable for boilers, steam generators, or process heaters with rated heat input capacities from 1,000,000 up to and including 2,000,000 Btu per hour. This exemption does not apply to:

- (i) Internal combustion engines;
- (ii) Turbines; or
- (iii) Boilers process heaters, or any combustion equipment whenever there are emissions other than products of fuel combustion, except for food ovens with a rated maximum heat input capacity of 2,000,000 Btu/hour or less, that are fired exclusively on natural gas and where the process VOC emissions are less than one pound per day. Rule 222 may be applicable.

[Rule 222 – Filing Requirements for Specific Emission Sources not Requiring a Written Permit Pursuant to Regulation II \(Amended 4/7/23\)](#)

The purpose of this rule is to provide an alternative to written permits. This rule requires owners or operators of specified emission sources to submit information regarding the source, including, but not limited to:

- (1) A description of the source;
- (2) Data necessary to estimate emissions from the source; and
- (3) Information to determine whether the emission source is operating in compliance with applicable South Coast AQMD, state and federal rules and regulations.

RULE REQUIREMENTS:

[Reg XI, Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters \(Amended 6/7/2024\)](#)

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. **This rule is not applicable to LPG fired units.**

RULE REQUIREMENTS:

[Reg XI, Rule 1147 – NOx Reductions from Miscellaneous Sources \(Amended 5/6/2022\)](#)

This rule is applicable to gaseous and/or liquid fired combustion equipment with NOx emissions that require SCAQMD permit and when other SMAQMD Regulation XI rules are not applicable to the unit. This size of units is not subject to SCAQMD permit requirements

or subject to other SCAQMD Regulation XI rules when fired on LPG. Therefore, this rule is not applicable to this category of units.

San Joaquin Valley APCD

BACT

SJVAPCD BACT Guidelines do not contain a determination for vaporizers 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

The SJVAPCD provided test results for a 0.2297 MMBtu/hr direct fired vaporizer, showing it met the NOx standard for this size of units.

San Diego County APCD

BACT

SDCAPCD BACT Guidelines do not contain a determination for process heaters rated 2 MMBtu/hr or less fired exclusively with natural gas or liquefied petroleum gas, 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 \(Amended 10/13/2022\)](#)

Section (d)(2)(iv): Any boiler, process heater, steam generator, or water heater with a manufacturer’s maximum gross heat input rating of:

- (A) less than 1 million BTU per hour fired with any fuel, or
- (B) 2 million BTU per hour or less 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 \(Adopted 7/8/2020\)](#)

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 75,000 Btu per hour to 2 million Btu per hour.

Effective 7/1/2021 no person shall manufacture, distribute, sell, offer for sale, or install within San Diego County any new unit that exceeds the following emission levels:

Fuel	Unit Type & Heat Input Rating BTU/hr	NOx Limit ppmvd @ 3% O₂	CO Limit ppmvd @ 3% O₂
Natural Gas	75,000 to 400,000 Pool Heaters	55	N/A
Natural Gas	75,000 to 400,000 All Other Units	20	N/A
Natural Gas	> 400,000 to 2,000,000 All Units	20	400
Non PUC Gas or Liquid Fuel	75,000 to 400,000 All Units	77	N/A
Non PUC Gas or Liquid Fuel	> 400,000 to 2,000,000 All Units	30	400

Bay Area AQMD

BACT

BAAQMD BACT Guidelines do not contain a determination for process heaters rated 10 MMBTU/hr or less fired exclusively on 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 7 – Nitrogen Oxides and Carbon Monoxide from Industrial and Commercial Boilers, Steam Generators and Process Heaters \(Amended 5/4/2011\)](#)

Section 110.1 of this rule exempts boilers, steam generators and process heaters with a rated heat input of 2 MMBtu/hr or less, if fired exclusively with natural gas, liquefied petroleum gas (LPG), or any combination thereof. Therefore, this rule is not applicable to this size of units.

Summary of Achieved in Practice Control Technologies

The following control technologies have been identified as achieved in practice and are ranked based on stringency:

NOx AND CO LPG-FIRED UNITS RATED $\geq 75,000$ and $< 400,000$ BTU/HR

Achieved in Practice Standards for NOx & CO for LPG-Fired Units Rated $\geq 75,000$ and $< 400,000$ BTU/hr			
Rank	Standard/Control		Source
	NOx (ppmvd @ 3% O ₂)	CO (ppmvd @ 3% O ₂)	
1	77	No standard	SJVAPCD Rule 4308 (2013) & SDCAPCD Rule 69.2.1 (2020)

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, 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 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 #397 – VAPORIZER RATED GREATER THAN OR EQUAL TO 75,000 BTU/HR TO LESS THAN 0.4 MMBTU/HR, FIRED ON LPG – SMALL EMITTER CATEGORY		
Pollutant	Standard	Source
VOC	No standard	
NO _x	Units rated ≥ 0.075 MMBtu/hr to < 0.4 MMBtu/hr: 77 ppmvd @ 3% O ₂	SJVAPCD, SDAPCD
SO _x	No standard	
PM ₁₀	No standard	
PM _{2.5}	No standard	
CO	No standard	

D. SELECTION OF T-BACT:

Toxics are in the form of VOCs and particulate matter. Since toxic emissions from LPG-fired vaporizers in the 75,000 Btu/hr to less than 0.4 MMBtu/hr range are so small and the cancer risk is expected to be well below 1 in a million cases, T-BACT was not evaluated for this determination.

APPROVED BY: Brian F Krebs DATE: 08-20-2025

