



Proposed Updates to BACT Guidelines

BACT Scientific Review
Committee Meeting #2

July 25, 2023

Meeting Location: South Coast AQMD, Room GB; or join
Zoom Meeting: <https://scaqmd.zoom.us/j/94053989814>
Meeting ID: 940 5398 9814
Call-in number: 1-669-900-6833



1983

40th

2023

BACT Guidelines Anniversary

Agenda



Proposed Updates to Part B - Major Polluting Facilities



Proposed Updates to Part D – Non-Major Polluting Facilities



Proposed Amendments to Overview, Policy & Procedures



Other BACT Updates



Discussion



Next Steps

Part B- LAER/BACT Determination for Major Polluting Facilities

Section I – South Coast AQMD LAER/BACT Determinations

Proposed New Listing

➤ Fugitive Emission Sources at Petroleum Refineries

- Achieved In Practice Case (Permit to Operate issued in May 2013)
 - All components in light liquid Volatile Organic Compounds (VOC) service (greater than 10% VOC by weight) in Naphtha Hydrodesulfurization Unit, except for pumps, compressors, and drains

- Leak Standards:

Emissions	Proposed LAER/BACT	Current LAER/BACT
VOC (ppmv)	200	500

- VOCs are the pollutant of concern emitted from components in petroleum refinery valves and connectors.
- Component is any valve, fitting, pump, compressor, pressure relief device, diaphragm, hatch, sight-glass, and meter in VOC service.



Part B- LAER/BACT Determination for Major Polluting Facilities

Section I – South Coast AQMD LAER/BACT Determinations

Proposed New Listing

➤ Fugitive Emission Sources at Petroleum Refineries (Cont'd)

Key Comments (Letter March 2023)	Responses
Concern that the BACT Guideline as presented, does not reflect the complexity of the requirements that South Coast AQMD is trying to memorialize in the BACT Guidelines	To ensure that the proposed BACT Guidelines align with actual BACT determination and achieved in practice case, more details on the required BACT as well as inspection, monitoring, and testing requirements are included in the BACT/LAER form, Sections (5) and (6). All aspects and requirements of Rule 1173 will remain in effect except that the maintenance requirements will now be triggered at 200 ppm instead of 500 ppm.

- C. DESCRIPTION:
Condition S31.3)
All open-ended lines shall be equipped with cap, blind flange, plug, or a second valve.
All pressure relief valves shall be connected to a closed vent system.
All new light liquid pumps shall utilize double seals.
All compressors shall be equipped with a seal system with a higher-pressure barrier fluid.
All new valves in VOC services shall be bellows seal valves, except those specifically exempted by Rule 1173.

- H. MONITORING AND TESTING REQUIREMENTS: All new components in VOC services as defined in Rule 1173, except valves and flanges shall be inspected quarterly using EPA reference Method 21. All new valves and flanges in VOC services except those specifically exempted by Rule 1173 shall be inspected monthly using EPA Method 21.
- I. DEMONSTRATION OF COMPLIANCE COMMENTS: Condition S31.3) The operator shall keep records of the monthly inspection (quarterly where applicable), subsequent repair, and inspection, in a manner approved by the South Coast AQMD. Records shall be kept and maintained for at least five years and shall be made available to Executive Officer of his authorized representatives upon request.

Part B- LAER/BACT Determination for Major Polluting Facilities

Section I – South Coast AQMD LAER/BACT Determinations

Proposed New Listing

➤ Fugitive Emission Sources at Petroleum Refineries (Cont'd)

Key Comments (Letter March 2023)	Responses
Concern regarding the time allowed to repair fugitive emission leaks from “critical components” including control valves and consider a categorical exemption for such components	This determination is based on an achieved in practice case and there is no exemption listed in the permit for control valves. All existing Rule 1173 repair time periods remain in place and the action trigger level is now set at 200 ppm instead of 500 ppm. Leaks greater than 200 ppm, found by facility operators, are required to be repaired in 7 days, with a potential extended repair period of 7 more days.
Concern about repair of critical components which cannot be immediately shut down and requested to extend the repair period to the next turnaround if the leak has been minimized to less than 500 ppm, but still exceeds 200 ppm.	Extending the repair period is not within the scope of the BACT Guidelines update. All existing Rule 1173 exemptions remain in place including exemptions for components which present a safety hazard for inspection

Part B- LAER/BACT Determination for Major Polluting Facilities

Section I – South Coast AQMD LAER/BACT Determinations

Proposed New Listing



➤ Heater, Natural Draft Operation, Natural Gas/Process Gas Fired

- Achieved In Practice Case (In operation since Mar. 2021)
 - Ultra Low NOx Process Burners (Multiple burners)
 - Total Max Heat Input Rate: 12.5 MMBTU/HR
 - Heater is located at a terminal and used for the flash distillation process to separate produced gasoline/diesel (transmix) blends to recover individual fractions.
- Emissions:

Emissions *	Proposed LAER Limits**	Source Test Results
NOx (ppmv)	7	6.25
CO (ppmv)	100	<2.00

* @ 3% O₂ on a dry basis

** 15 minutes averaging time

- Source test was performed in 2021 using South Coast AQMD Method 100.1



Part B- LAER/BACT Determination for Major Polluting Facilities

Section I – South Coast AQMD LAER/BACT Determinations

Proposed New Listing



➤ Heater, Natural Draft Operation (Cont'd)

Key Comments	Responses
In order to provide an expectation of continued reliability of the new technology, Scientific Review Committee members suggested to include more than one source test result with similar burner technology.	Staff reviewed the source test results for two additional heaters including 8.3 MMBtu/hr stabilizer/splitter heater and 15 MMBtu/hr heater which have been operating since 2017. The source test results for both heaters meet the proposed listing. Summary of source test results for 15 MMBtu/hr heater is listed in slide 11 (Part B - Section II). The heater is located at SJVAPCD and is equipped with one burner.

Part B- LAER/BACT Determination for Major Polluting Facilities

Section I – South Coast AQMD LAER/BACT Determinations

Proposed New Listing

➤ Linear Generator, Non-Emergency Electrical Generator, Natural Gas Fired

- Achieved In Practice Case (Permit to Operate issued in Apr. 2022)
 - Two 240 kWe linear generators, each consisting of two identical 120 kWe cores
 - Each core is vented to an oxidation catalyst
 - Linear generators use a low-temperature reaction to produce electricity
- Emissions:

Emissions (ppmv)*	Proposed LAER Limits	Source Test Results @ Normal Load					
		2022				2023	
		Core 1	Core 2	Core 3	Core 4	Core 1	Core 2
NOx	2.5	1.66	1.91	1.94	1.13	1.36	2.08
CO	12	1.80	2.17	1.80	1.90	1.90	1.70
VOC	25	4.35	4.03	2.64	4.01	2.91	7.38

* @ 15% O₂ on a dry basis

- Source test was performed using South Coast AQMD Method 100.1 for NOx, O₂, and CO and Method 25.3 for VOC



Part B- LAER/BACT Determination for Major Polluting Facilities

Section I – South Coast AQMD LAER/BACT Determinations

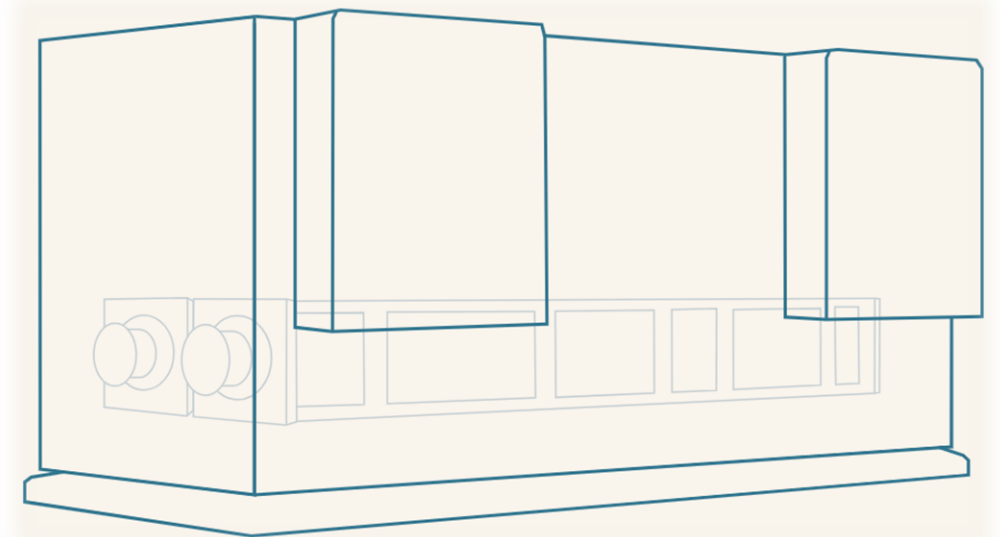
Proposed New Listing

➤ Linear Generator, Non-Emergency Electrical Generator, Natural Gas Fired (cont'd)

- Proposed Rule 1110.3 is in progress and proposes a lower VOC limit
- Permits to Construct for 6 linear generator systems issued in June 2023 (Pending Construction)
 - Six 240 kWe linear generators, each consisting of two identical 120 kWe cores
 - Each core is vented to an oxidation catalyst
- Emissions:

Emissions (ppmv)*	Permit Limits
NOx	2.5
CO	12
VOC	10

* @ 15% O₂ on a dry basis



Part B- LAER/BACT Determination for Major Polluting Facilities

Section I – South Coast AQMD LAER/BACT Determinations

Proposed New Listing

➤ Sulfur Recovery Unit

- Achieved In Practice Case (Permit to Operate issued in May 2017)
 - Claus Unit and Tail Gas Treatment Unit (TGTU) followed by a Tail Gas Incinerator and Caustic Scrubber
 - Sulfur production capacity is 235 long tons per day
- Emissions:

Emissions	Proposed Limits	Source Test Results
NOx (lb/MMBTU natural gas)*	0.05	0.04
CO (lb/MMBTU natural gas)*	0.03	0.00
SOx (ppmv)**	12	0.22
H ₂ S (ppmv)*	2.5	0.13

* On 24-hr averaging time basis

** @ 0% O₂ on a dry basis, 72-hr averaging time

- Source test was performed in 2015 using South Coast AQMD Method 6.1 for SO₂, Method 307-91 for H₂S, and Method 100.1 for NOx and CO



Part B- LAER/BACT Determination for Major Polluting Facilities

Section I – South Coast AQMD LAER/BACT Determinations

Proposed New Listing



➤ Sulfur Recovery (Claus) Unit

Key Comments (March 2023)	Responses
Clarification on the configuration of the sulfur recovery unit (SRU)	The acid gas feeds to SRU to recover elemental sulfur. Sulfur not recovered in the Claus unit (front portion of SRU) will be processed in an amine-based Tail Gas Treatment Unit (TGTU, rear portion of SRU). The TGTU is vented to a tail gas incinerator followed by a caustic scrubber for removal of remaining H ₂ S and SO _x , respectively.
Concern that the SO _x limit should only be applied while incinerator is fired on natural gas and that there would be increased emissions from acid gas	The tail gas incinerator utilizes natural gas as the primary fuel to combust the tail gas from the TGTU to reduce the tail gas H ₂ S concentration below 2.5 ppmvd (averaged over 24 hours, 0% O ₂)

Part B- LAER/BACT Determination for Major Polluting Facilities

Section I – South Coast AQMD LAER/BACT Determinations

Proposed New Listing

➤ Tank Truck Loading Racks

- Achieved In Practice Case (Permit to Operate Issued in Sep. 2015)
 - Vapor recovery collection and disposal system (VCDS) controls vapors generated from storage tank and loading rack operations
 - VOC laden vapors vented to the thermal oxidizer
 - Max Heat Input Rate: 78 MMBTU/HR
- Emissions:

Emissions *	Proposed LAER Limit	Source Test Result
VOC (lb/1000 gals)	0.02	0.01

* Overall control efficiency is 99% for the vapor recovery/disposal system

- Source test was performed in 2010 using South Coast AQMD Method 25.1/25.3



Part B- LAER/BACT Determination for Major Polluting Facilities

Section II - Other LAER/BACT Determinations

Proposed New Listing

➤ Boiler, Natural Gas or Propane Fired > 20 MMBTU/HR

- Achieved In Practice Case (Permit Issued in Sep. 2018); SJVAPCD
 - Natural gas fire-tube boiler with Low-NOx burner and Selective Catalytic Reduction (SCR) System, rated at 29.47 MMBTU/HR
 - Boiler provides steam for corrugated container manufacturing

■ Emissions:

Emissions *	Proposed LAER Limits	Source Test Results
NOx (ppmv)	2.5	1.4
CO (ppmv)	50	<0.1

* @ 3% O₂ on a dry basis

- Source test was performed in 2020
- NH₃ limit is 10 ppm and tested at 2.8 ppm



Emissions *	SJVAPCD BACT	Rule 4320
NOx (ppmv)	2.5	2.5
CO (ppmv)	50	400

* @ 3% O₂ on a dry basis

Part B- LAER/BACT Determination for Major Polluting Facilities

Section II - Other LAER/BACT Determinations

Proposed New Listing

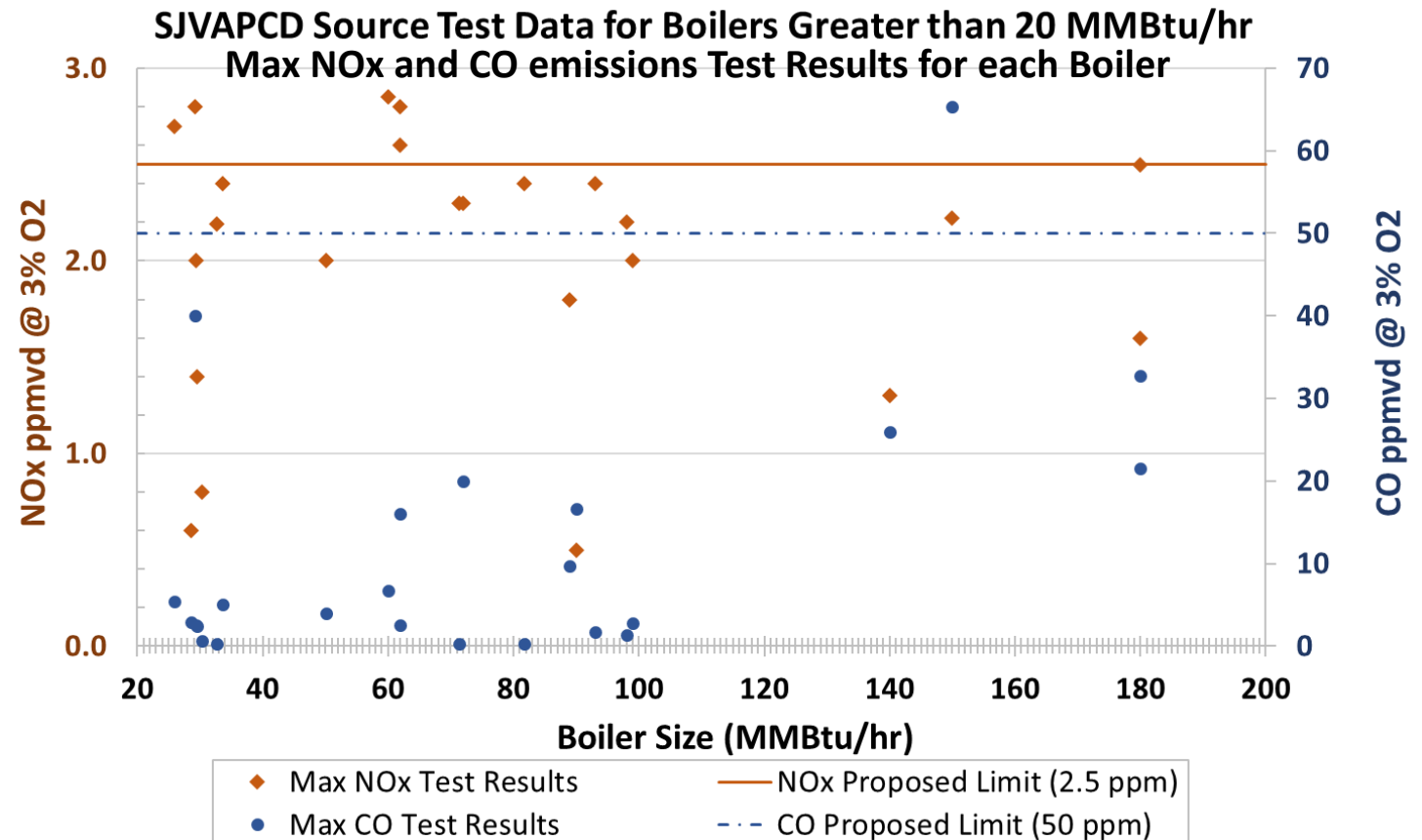
➤ Boiler, Natural Gas or Propane Fired > 20 MMBTU/HR (Cont'd)

Key Comments (March 2023)

Concern regarding fuel type and upper bound of heat input rating for the proposed limits

Responses

This determination includes boilers that are fired **solely** on natural gas or propane with a heat input capacity over 20 MMBTU/HR. Size equivalent to Group I Units combined with Group II Units (Rule 1146).

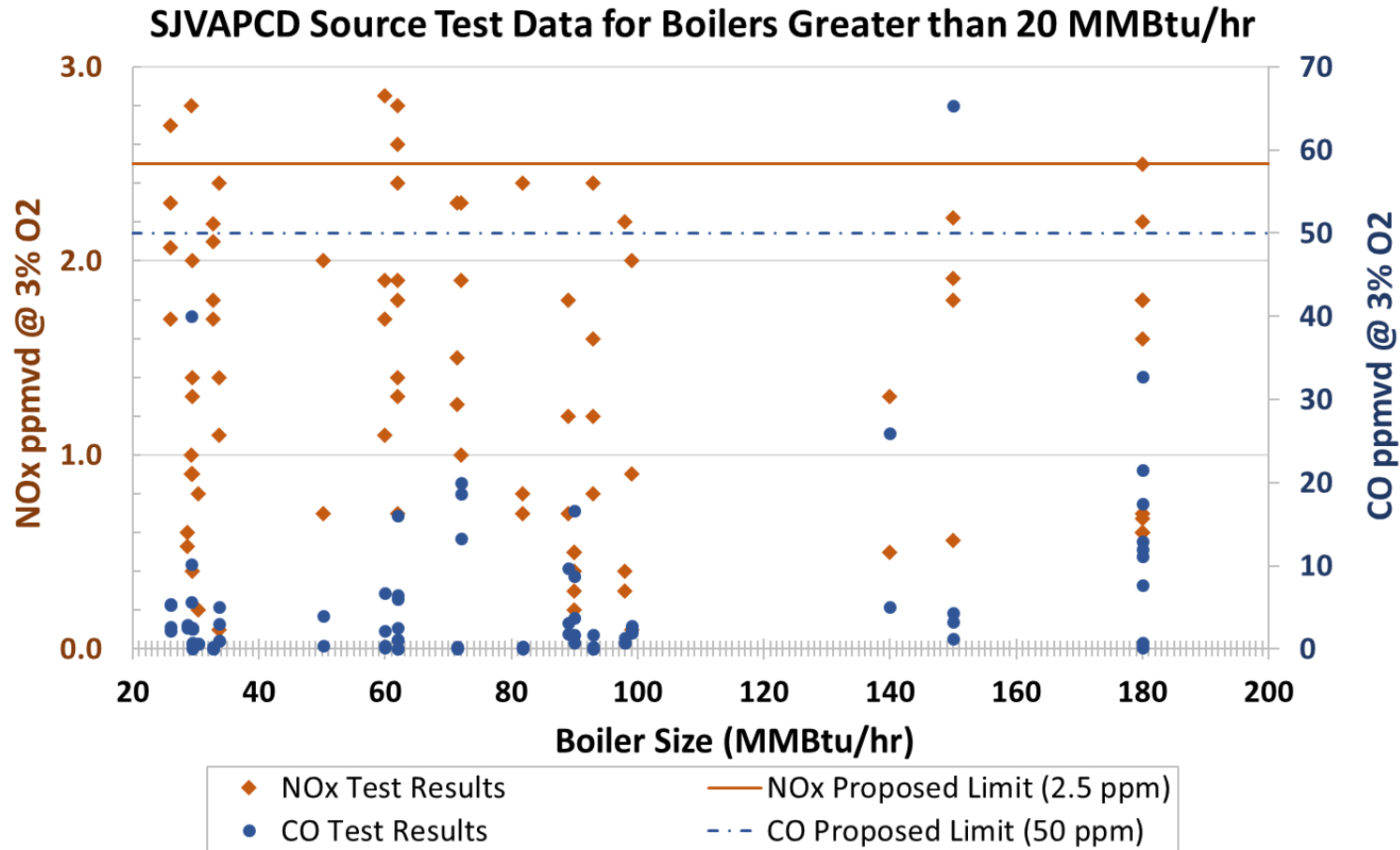


Part B- LAER/BACT Determination for Major Polluting Facilities

Section II - Other LAER/BACT Determinations

Proposed New Listing

➤ Boiler, Natural Gas or Propane Fired > 20 MMBTU/HR (Cont'd)



- 93% of tests meet proposed NOx BACT/LAER limit of 2.5 ppm
- 99% of tests meet proposed CO BACT/LAER limit of 50 ppm
- 91% of tests meet both proposed CO and NOx BACT/LAER limits in the same test

Note: 81 source tests have been conducted on total of 24 boilers

Part B- LAER/BACT Determination for Major Polluting Facilities

Section II - Other LAER/BACT Determinations

Proposed New Listing

➤ Gas Turbine - Simple Cycle, Natural Gas

- Achieved In Practice Case (Permit to Operate issued in Nov. 2015); BAAQMD
 - 760 MW simple cycle power plant
 - Four Dry Low NO_x (DLN) natural gas fired combustion turbine generators (190 MW each), equipped with SCR and Oxidation Catalyst, to generate electrical power
- Emissions:

Emissions *	Proposed LAER Limit	Current LAER Limit	Source Test Results	
			Unit A	Unit B
CO (ppmv)	2	4	0.2	0.34

* @ 15% O₂ on a dry basis

- NO_x limit for these gas turbines is 2.5 ppm
- Source test was performed in 2019 (Unit A) and 2021 (Unit B) using EPA Method 7E for NO_x, EPA Method 3A for O₂ and EPA Method 10 for CO
- NH₃ limit is 10 ppm and tested at 1.6 (Unit A) and 1.0 ppm (Unit B)



Part B- LAER/BACT Determination for Major Polluting Facilities

Section II - Other LAER/BACT Determinations

Proposed New Listing



➤ Heater, Natural Draft Operation, Natural Gas Fired

- Achieved In Practice Case (In operation since 2017); SJVAPCD
 - Ultra Low NOx Process Burner
 - Total Max Heat Input Rate: 15 MMBTU/HR (Single burner)
 - Heater is located at a lube oil finishing plant
- Emissions:

Emissions *	Proposed LAER Limits	Source Test Results 9/15/2017	Source Test Results 9/1/2020
NOx (ppmv)	6	5.34	5.61
CO (ppmv)	50	37.5	39.9

* @ 3% O₂ on a dry basis

** 30 minutes averaging time

- Initial and subsequent source tests were performed using CARB Method 100

Part D- BACT Determination for Non-Major Polluting Facilities

South Coast AQMD BACT Determinations

Proposed New Listing



➤ Crumb Rubber/Asphalt Oil Blending System

- Achieved In Practice Case (In operation since 2018)
 - The mixing tanks and storage tank are vented to air pollution control, consisting of condenser and steel wool for each tank, ESP for the mixing tanks, and carbon adsorber (two canisters in series)
- Emissions:
 - Source test was performed in 2021 using South Coast AQMD Method 25.1/25.3

Emissions	Proposed BACT Limit	Source Test Result
VOC (Control Eff.)	90%	97.6%



Part D- BACT Determination for Non-Major Polluting Facilities

South Coast AQMD BACT Determinations

Proposed New Listing



➤ Crumb Rubber/Asphalt Oil Blending System (cont'd)

- Cost-effectiveness Evaluation and Assumptions:
 - Total capital investment and total annual cost was provided by consultants.
-
- Operating Schedule: 10 hours/day; 5 days/week; 52 weeks/year
 - Equipment life for carbon adsorbers Life: 20 years
 - Control Efficiency: 90%

 - Interest Rate: 4%
 - Capital Cost: \$126,644
 - Annual Cost: \$44,038

 - Cost per ton of VOC reduced: \$31,861 → **COST EFFECTIVE**
 - MSBACT max. cost effectiveness VOC (\$/ton): 102,682 INCREMENTAL 2ndQ 2021
 - MSBACT max. cost effectiveness VOC (\$/ton): 34,227 AVERAGE 2ndQ 2021

Other BACT Updates

Overview, Policy and Procedures

➤ Overview

■ MAJOR POLLUTING FACILITY EMISSION THRESHOLDS

Table 1
Actual or Potential Emission Threshold Levels (Tons per Year)
for Major Polluting Facilities

Pollutant	South Coast Air Basin	Riverside County Portion of Salton Sea Air Basin	Riverside County Portion of Mojave Desert Air Basin
VOC	10	2510	100
NOx	10	2510	100



■ CALCULATION PROCEDURES FOR EMISSION INCREASES

- Add a link to footnote 7 in order to include Policies & Procedures to determine pre-modification Potential To Emit (PTE)

■ BACT SCIENTIFIC REVIEW COMMITTEE (BACT SRC)

- Change Engineering and Compliance to Engineering and Permitting

Other BACT Updates (Cont'd)

Overview, Policy and Procedures

- **Part C - Policy and Procedures for Non-Major Polluting Facilities**
 - Update Maximum Cost Effectiveness values based on Marshall & Swift Cost Indexes

Table 5: Maximum Cost Effectiveness Criteria (2nd Quarter 2023)

Pollutant	Average (Maximum \$ per Ton)	Incremental (Maximum \$ per Ton)
ROG	40,936	122,807
NOx	38,706	115,917
SOx	20,468	61,403
PM ₁₀	9,119	27,155
CO	811	2,330

➤ Emergency, Stationary I.C. Engine Testing Guidance

- In September 2022, the South Coast AQMD established Tier 4 Final emission standards as BACT/LAER for Stationary Emergency I.C. Engine-Compression Ignition ≥ 1000 BHP located at Major Polluting Facilities
- Compliance with South Coast AQMD's BACT/LAER can be achieved through multiple options:

**Installing
Tier 4 Final
Certified I.C. Engines**

**Installing
Tier 4 Final
Compliant I.C. Engines**

**Retrofitting
U.S. EPA Certified I.C.
Engines, Non-Tier 4F,
to meet Tier 4 Final
emission limits**

Other BACT Updates (Cont'd)

➤ Emergency, Stationary I.C. Engine Testing Guidance (Cont'd)

- Update on the status of the Draft Permitting Source Testing Guidance
- Guidance will only apply to Title V major source facilities
 - BACT and permitting requirements for minor sources remains the same



- Source tests can ensure proper operation of air pollution control systems



- Guidance document developed to streamline source testing



- Beneficial to minimize diesel emissions for source testing purposes

Other BACT Updates (Cont'd)

➤ Emergency, Stationary I.C. Engine Testing Guidance (Cont'd)

- Source Testing is required for pollutants that are subject to the Tier 4F requirements, i.e., PM, NO_x, CO and NMHC.
- Ammonia testing requirements are under consideration.

	Tier 4 Final Certified I.C. Engine	Tier 4 Final Compliant I.C. Engines	Retrofitting U.S. EPA Certified I.C. Engines
Definition	New Tier 4F engine, certified by the U.S. EPA (include inducement features)	New Tier 4F engine, not certified as Tier 4F by the U.S. EPA	New or existing certified engine, non-Tier 4F, retrofitted with aftertreatment equipment
Initial Source Test	Not required	Required	Required
Subsequent Testing	Not required	Every 5 years	Every 5 years
Test Loads	N/A	~ 50% and 75%	~ 50% and 75%

- Emissions testing will not be required for PM provided that the engine is equipped with current (valid) CARB-verified Level 3 DPF.

Next Steps

Please Provide Your Written Comments No Later than
August 24, 2023, to BACTTeam@aqmd.gov



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