ACTIVE SMAQMD BACT CLEARINGHOUSE

CATEGORY: **SULFUR BURNER & ABSORPTION TRA**

BACT Size: Minor Source BACT **SULFUR PROCESS UNIT**

BACT Determination Number: 222	**BACT Determination Date:** 8/15/2019

Equipment Information

Permit Number: 25277
Equipment Description: SULFUR PROCESS UNIT
Unit Size/Rating/Capacity: Minor Source BACT
Equipment Location: THATCHER COMPANY OF CALIFORNIA
8625 UNSWORTH AVE
SACRAMENTO, CA

BACT Determination Information

ROCs	**Standard:**	
	Technology Description:	No Standard
	Basis:	
NOx	**Standard:**	15 ppmvd @ 3% O2
	Technology Description:	15 ppmvd @ 3% O2 (excluding start up and shutdown)
	Basis:	Achieved in Practice
SOx	**Standard:**	18 ppm SOx as SO2 @ 3% O2
	Technology Description:	Scrubber (using soda ash) with demister – 18 ppm SOx as SO2 @ 3% O2
	Basis:	Achieved in Practice
PM10	**Standard:**	20 grams/dscm @ 12% CO2
	Technology Description:	Scrubber (using soda ash) with demister – 0.20 grams/dscm @ 12% carbon dioxide at standard conditions (0.0874 grains/dscf)
	Basis:	Achieved in Practice
PM2.5	**Standard:**	20 grams/dscm @ 12% CO2
	Technology Description:	Scrubber (using soda ash) with demister – 0.20 grams/dscm @ 12% carbon dioxide at standard conditions (0.0874 grains/dscf)
	Basis:	Achieved in Practice
CO	**Standard:**	
	Technology Description:	No Standard
	Basis:	
LEAD	**Standard:**	
	Technology Description:	No Standard
	Basis:	

Comments: T-BACT is Scrubber (using soda ash) with demister

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Printed: 8/15/2019

777 12th Street, Third Floor

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Sacramento, CA 95814

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

DETERMINATION NO.: 222

DATE: August 15, 2019

ENGINEER: Jeffrey Quok

Category/General Equip Description: Sulfur Process Unit

Equipment Specific Description: Sulfur Process Unit

Equipment Size/Rating: Minor Source BACT

Previous BACT Det. No.: N/A

This BACT determination was determined under the project A/C 25277 (Thatcher Company of California) for Sulfur Process Unit. The Sulfur Process Unit is an absorption train system that processes sulfur dioxide through packed bed towers to produce aqueous product solutions of ammonium thiosulfate, potassium thiosulfate, and sodium thiosulfate.

BACT/T-BACT ANALYSIS

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

The following control technologies are currently employed as BACT/T-BACT for sulfur process unit by the following air pollution control districts:

US EPA

BACT
Source: EPA RACT/BACT/LAER Clearinghouse
There are no BACT standards published in the clearinghouse for this category.

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
40 CFR Part 60 – New Source Performance Standards (NSPS):
There are currently no 40 CFR, Part 60 NSPS sections that apply to this source category.

40 CFR Part 61 – National Emission Standards for Hazardous Air Pollutants (NESHAPS):
There are currently no 40 CFR, Part 61 NESHAPs that apply to this source category.

40 CFR Part 63 – NESHAPS for Source Categories (MACT Standards):

40 CFR Part 63 Subpart VVVVVV – National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources.

This NESHAP regulates chemical manufacturing process units that use feed stocks or generates products or byproducts of the target HAPs at an area source of HAPs where either the HAPs are present in the feed stocks or are generated or produced in the process and are present in process fluid at concentrations greater than 0.1% for carcinogens or greater than 1.0% for noncarcinogens. The target HAPs are 1,3-butadiene, 1,3-dichloropropene, acetaldehyde, chloroform, ethylene dichloride, hexachlorobenzene, methylene chloride, quinoline, arsenic compounds, cadmium compounds, chromium compounds, lead compounds, manganese compounds, nickel compounds, and hydrazine. The process is not subject to this regulation because it doesn't involve any of the target HAPs.

Air Resources Board (ARB)

BACT
Source: CARB BACT Clearinghouse
There are no BACT standards published in the clearinghouse for this category.

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
ARB Airborne Toxic Control Measures (ATCM):
There are currently no ATCMs that apply to this source category.

Sacramento Metropolitan AQMD

BACT
Source: SMAQMD BACT Clearinghouse
There are no BACT standards published in the clearinghouse for this category.

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:

Rule 406 – Specific Contaminants (Amended 12/6/1978)
This rule limits the emission of sulfur compounds and combustion contaminants.

A person shall not discharge into the atmosphere from any single source of emission equipment whatsoever:
1. Sulfur compounds in any state or combination thereof exceeding in concentration at the point of discharge: sulfur compounds, calculated as sulfur dioxide: 0.2% volume.
2. Combustion contaminants in any state or combination thereof exceeding in concentration at

the point of discharge: 0.23 grams per dry standard cubic meter (0.1 grains per dry standard cubic foot) of gas calculated to 12% carbon dioxide at standard conditions.

South Coast AQMD

BACT
Source: SCAQMD BACT Guidelines for Non-Major Polluting Facilities, page 5.
(Last Revised 2/1/2019)

Ammonium Bisulfate and Thiosulfate Production	
VOC	No Standard
NOx	No Standard
SOx	No Standard
PM10	Packed column scrubber with heat exchanger and mist eliminator
PM2.5	No standard
CO	No Standard
Inorganic	Packed column scrubber for NH3

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:

Reg IV, Rule 407 – Liquid and Gaseous Air contaminants (Last amended 4/2/1982)
A person shall not discharge into the atmosphere from any equipment:
1. Carbon Monoxide (CO) exceeding 2,000 ppm by volume measured on a dry basis, averaged over 15 consecutive minutes
2. Sulfur compounds which would exist as liquid or gas at standard conditions exceeding 500 ppm, calculated as sulfur dioxide (SO2) and averaged over 15 consecutive minutes

San Diego County APCD

BACT
Source: NSR Requirements for BACT (June 2011)
There are no BACT standards published in the clearinghouse for this category

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:

Regulation 4, Rule 53 – Specific Air Contaminants – (1/22/1997)

A shall not discharge into the atmosphere from any single source of emission equipment whatsoever:

1. Sulfur compounds calculated as sulfur dioxide: 0.05 percent, by volume, on a dry basis.
2. Combustion particulates: 0.1 grains per dry standard cubic foot of gas which is standardized to 12% of carbon dioxide by volume (0.23 grans dscm).

Bay Area AQMD

BACT
Source: BAAQMD BACT Guideline (5/22/2015)
There are no BACT standards published in the clearinghouse for this category.

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
Reg 6, Rule 1 – General Requirements
No person shall emit total suspended particulate (TSP) from any source in excess of 343 mg per dscm (0.15 gr per dscf) of exhaust gas volume.

Regulation 9, Rule 1 – Sulfur Dioxide
This rule establishes emission limits for sulfur dioxide from all sources.

General emission limitation: A person shall not emit from any source, other than a ship, a gas stream containing sulfur dioxide in excess of 300 ppm (dry).

San Joaquin Valley Unified APCD

BACT
Source: SJVAPCD BACT Clearinghouse

There are no BACT standards published in the clearinghouse for this category.

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
Rule 4201 – Particulate Matter Concentration (Amended December 12, 1992)
A person shall not release or discharge into the atmosphere from any single source operation, dust, fumes, or total suspended particulate matter emissions in excess of 0.1 grain per cubic foot of gas at dry standard conditions (0.23 grams per dry standard cubic meter).

Rule 4801 – Sulfur Compounds (Amended 12/17/1992)
A person shall not discharge into the atmosphere sulfur compounds, which would exist as a liquid or gas at standard conditions, exceeding in the concentration at the point of discharge: two-tenths (0.2) percent by volume calculated as sulfur dioxide, on a dry basis averaged over 15 consecutive minutes.

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

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES	
VOC	No Standard – [EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD]
NOx	No Standard – [EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD]
SOx	1. 300 ppmvd [BAAQMD] 2. 500 ppmvd [SCAQMD] 3. 0.2% by volume (2000 ppmvd) [SMAQMD, BAAQMD] 4. 0.5% by volume (5000 ppmvd) [SDAPCD] 5. No Standard [EPA, ARB, SDCAPCD, BAAQMD, SJVAPCD]
PM10	1. Packed column scrubber with heat exchanger and mist eliminator [SCAQMD] 2. 0.1 grains per dry standard cubic foot at 12% carbon dioxide by volume [SMAQMD, SDAPCD, SJVAPCD] 3. 0.15 grains per dscf [BAAQMD] 4. No Standard [EPA, ARB]
PM2.5	No Standard – [EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD]
CO	No Standard – [EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD]
Inorganic HAP/VHAP (T-BACT)	1. Packed column scrubber for NH3 [SCAQMD] 2. No Standard – [EPA, ARB, SMAQMD, SDCAPCD, BAAQMD, SJVAPCD]

The following control technologies have been identified as the most stringent, achieved in practice control technologies:

BEST CONTROL TECHNOLOGIES ACHIEVED		
Pollutant	**Standard**	**Source**
VOC	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD
NOx	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD
SOx	300 ppmvd	BAAQMD
PM10	Packed column scrubber with heat exchanger and mist eliminator	SCAQMD
PM2.5	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD
CO	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD

BEST CONTROL TECHNOLOGIES ACHIEVED		
Pollutant	**Standard**	**Source**
Inorganic HAP/VHAP (T-BACT)	Packed column scrubber for NH3	SCAQMD

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

Technologically Feasible Alternatives:

Any alternative basic equipment, fuel, process, emission control device or technique, singly or in combination, determined to be technologically feasible by the Air Pollution Control Officer.

The table below shows the technologically feasible alternatives identified as capable of reducing emissions beyond the levels determined to be "Achieved in Practice" as per Rule 202, §205.1.a.

Pollutant	Technologically Feasible Alternatives
VOC	No other technologically feasible option identified
NOx	15 ppmvd @ 3% O2 (excluding start up and shutdown)
SOx	Scrubber (using soda ash) with demister – 18 ppmvd SOx as SO2 @ 3% O2
PM10	Scrubber (using soda ash) with demister – 0.20 grams/dscm @ 12% carbon dioxide at standard conditions (0.0874 grains/dscf)
PM2.5	Scrubber (using soda ash) with demister – 0.20 grams/dscm @ 12% carbon dioxide at standard conditions (0.0874 grains/dscf)
CO	No other technologically feasible option identified
Inorganic HAP/VHAP (T-BACT)	Scrubber (using soda ash) with demister

Thatcher Company of California is proposing to install an exhaust emission control system consisting of wet scrubbers (using soda ash to absorb SO2) and demisters. Thatcher Company of California is proposing limits of 15 ppmvd for NOx @ 3% O2 (excluding startup and shutdown), 18 ppmvd for SOx @ 3% O2 (based on a standard imposed on a similar Thatcher facility in Utah), and 0.20 grams/dscm @ 12% carbon dioxide at standard conditions for PM (0.0874 grains/dscf) during normal operation (excluding startup/shutdown). Therefore, a scrubber (using soda ash) with demister will be considered technologically feasible for SOx, PM10, PM2.5, and inorganic HAP/VHAP.

Cost Effective Determination:

Thatcher Company of California is proposing to install the technological feasible controls of a scrubber (using soda ash) with a demister. Since the highest rank option is being selected, no cost effectiveness evaluation is necessary.

C. SELECTION OF BACT/T-BACT:

Based on the review of EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, and SJVAPCD BACT Clearinghouses and cost effectiveness determinations for Technologically Feasible Controls, BACT for VOC, NOx, SOx, PM10, and PM2.5 will be the following:

BACT For Sulfur Process Unit		
Pollutant	**Standard**	**Source**
VOC	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD
NOx	15 ppmvd @ 3% O2 (excluding start up and shutdown)	Technologically feasible
SOx	Scrubber (using soda ash) with demister – 18 ppm SOx as SO2 @ 3% O2	Technologically feasible
PM10	Scrubber (using soda ash) with demister – 0.20 grams/dscm @ 12% carbon dioxide at standard conditions (0.0874 grains/dscf)	Technologically feasible
PM2.5	Scrubber (using soda ash) with demister – 0.20 grams/dscm @ 12% carbon dioxide at standard conditions (0.0874 grains/dscf)	Technologically feasible
CO	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD

T-BACT For Sulfur Process Unit		
Pollutant	**Standard**	**Source**
Inorganic HAP/VHAP (T-BACT)	Scrubber (using soda ash) with demister	Technologically feasible

APPROVED BY: Brian F Hunt **DATE:** 8-13-19

Attachment A

BACT Determination Published by SCAQMD

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guidelines for Non-Major Polluting Facilities*

10-20-2000 Rev. 0

Equipment or Process: Ammonium Bisulfate and Thiosulfate Production

	Criteria Pollutants					
Rating/Size	**VOC**	**NOx**	**SOx**	**CO**	**PM_{10}**	**Inorganic**
All					Packed Column Scrubber with Heat Exchanger and Mist Eliminator (1990)	Packed Column Scrubber for NH3 (1990)

* Means those facilities that are minor facilities as defined by Rule 1302 - Definitions