San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

MAR 14 2014

Ken Gagon
Tessenderlo Kerley, Inc.
2255 N. 44th St., Suite 300
Phoenix, AZ 85008

Re: Notice of Preliminary Decision - Authority to Construct
Facility Number: C-8573
Project Number: C-1132059

Dear Mr. Gagon:

Enclosed for your review and comment is the District's analysis of Tessenderlo Kerley, Inc.'s application for an Authority to Construct for a new potassium thiosulfate manufacturing plant, at 10724 Energy St, Hanford, CA.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. After addressing all comments made during the 30-day public notice period, the District intends to issue the Authority to Construct. Please submit your written comments on this project within the 30-day public comment period, as specified in the enclosed public notice.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Mr. Stanley Tom of Permit Services at (559) 230- 5900.

Sincerely,

David Warner
Director of Permit Services

DW:st

Enclosures

cc: Mike Tollstrup, CARB (w/ enclosure) via email

San Joaquin Valley Air Pollution Control District
Authority to Construct Application Review
Potassium Thiosulfate Manufacturing Plant

Facility Name:	Tessenderlo Kerley, Inc.	Date:	March 13, 2014
Mailing Address:	2255 N. 44th St, Suite 300	Engineer:	Stanley Tom
	Phoenix, AZ 85008	Lead Engineer:	Joven Refuerzo
Contact Person:	Ken Gagon		
Telephone:	(602) 889-8300		
Application #:	C-8573-9-0, '10-0, '11-0		
Project #:	C-1132059		
Deemed Complete:	July 25, 2013		

I. Proposal

Tessenderlo Kerley, Inc. requests Authority to Construct (ATC) permits for a new potassium thiosulfate (KTS) manufacturing plant which manufactures KTS and potassium sulfite/bisulfite solution (KBS also referred to as K-ROW 23) as a co-product. KTS and KBS are both fertilizer products and will be distributed to customers from the fertilizer terminal.

The facility will receive potassium hydroxide (KOH) and elemental sulfur as raw materials for the KTS manufacturing process. The KTS manufacturing plant will consist of the following equipment.

Permit Unit	Process	Equipment
C-8573-9-0	Sulfur Storage	One 22,000 gallon molten sulfur unloading rack (D202)
		One 102,000 gallon molten sulfur storage tank (V203)
		Hydrogen Sulfide (H_2S) scrubber for molten sulfur storage tanks
C-8573-10-0	KTS Production	Sulfur furnace (F400) and igniter (IG400)
		Sulfur thermal reactor (D400)
		Waste heat recovery boiler (B400)
		Two SO_2 absorbers (T401 and T402)
		KTS reaction unit (R410)
		Evaporator (D411)
		High efficiency particulate filters (D403)
		KTS process vent (S401)
C-8573-11-0	Process Water	One 3,000 gallon per minute cooling tower (CT602)
PEER	Process Steam	One 4.5 MMBtu/hr natural gas-fired boiler (B604)
Permit-Exempt	KTS Production	One 20,000 gallon KBS day tank (V408)
Permit-Exempt	KTS Production	One 20,000 gallon KTS day tank (V413)
Permit-Exempt	Process Water	One 11,000 gallon process water tank (V601)
Permit-Exempt	Process Water	One brine tank (V608)

Per Rule 2020 Section 6.1.1, the 4.5 MMBtu/hr natural gas-fired boiler is permit exempt. However, per Rule 2250 and 4307, the unit does require a Permit-Exempt Equipment Registration (PEER) which will be issued in a separate project. Therefore, this unit will not be addressed in this project.

One 20,000 gallon fixed roof potassium sulfite/bisulfite (KBS) tank, one 20,000 gallon fixed roof potassium thiosulfate (KTS) tank, one 11,000 gallon fixed roof process water tank, and one fixed roof brine tank do not contain any VOCs, are not hazardous air pollutants (HAPs), and are not a source of air contaminants as defined in Rule 1020; therefore, these tanks do not require permits. A separate letter will be sent to the facility regarding these tanks not requiring permits.

Tessenderlo Kerley, Inc. has submitted an ATC permit application to install a greenfield fertilizer terminal located at the same site as the potassium thiosulfate manufacturing plant proposed in this project. The greenfield fertilizer terminal was permitted in project C-1131967.

This facility is not a major source for any pollutant.

II. Applicable Rules

Rule 2010	Permits Required (12/17/92)
Rule 2201	New and Modified Stationary Source Review Rule (4/21/11)
Rule 2410	Prevention of Significant Deterioration (6/16/11)
Rule 2520	Federally Mandated Operating Permits (6/21/01)
Rule 2550	Federally Mandated Preconstruction Review for Major Sources of Air Toxics (6/18/98)
Rule 4001	New Source Performance Standards (4/14/99)
Rule 4002	National Emission Standards For Hazardous Air Pollutants (5/20/04)
Rule 4101	Visible Emissions (2/17/05)
Rule 4102	Nuisance (12/17/92)
Rule 4201	Particulate Matter Concentration (12/17/92)
Rule 4202	Particulate Matter – Emission Rate (12/17/92)
Rule 4301	Fuel Burning Equipment (12/19/92)
Rule 4307	Boilers, Steam Generators, And Process Heaters – 2.0 MMBtu/hr to 5.0 MMBtu/hr (5/19/11)
Rule 4309	Dryers, Dehydrators, And Ovens (12/15/05)
Rule 4320	Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (10/16/08)
Rule 4352	Solid Fuel Fired Boilers, Steam Generators And Process Heaters (12/15/11)
Rule 4455	Components At Petroleum Refineries, Gas Liquids Processing Facilities, And Chemical Plants (4/20/05)
Rule 4623	Storage of Organic Liquids (5/19/05)
Rule 4801	Sulfur Compounds (12/17/92)
Rule 7012	Hexavalent Chromium - Cooling Towers (12/17/92)
Rule 8011	General Requirements (8/19/04)
Rule 8021	Construction, Demolition, Excavation, Extraction, And Other Earthmoving Activities (8/19/04)
Rule 8031	Bulk Materials (8/19/04)

Rule 8041 Carryout and Trackout (8/19/04)
Rule 8051 Open Areas (8/19/04)
Rule 8061 Paved and Unpaved Roads (8/19/04)
Rule 8071 Unpaved Vehicle/Equipment Traffic Areas (9/16/04)
CH&SC 41700 Health Risk Assessment
CH&SC 42301.6 School Notice
Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines

III. Project Location

The equipment will be located at 10724 Energy St, Hanford, CA. The District has verified that the equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. Process Description

The KTS Plant receives both KOH and elemental sulfur by truck and rail for use as raw materials in the KTS manufacturing process. The molten sulfur unloading tank serves as an interim storage tank for molten sulfur received via rail that is ultimately stored in the larger molten sulfur storage tank.

The first stage of the KTS production process takes place in the sulfur furnace. The plant uses a process in which molten sulfur is burned with ambient air to create sulfur dioxide ($S + O_2 \rightarrow SO_2$). There are three main pieces of equipment used in the sulfur oxidation process: a sulfur furnace, a thermal reactor, and a waste heat recovery boiler. The sulfur furnace initiates the sulfur oxidation reaction. The thermal reactor allows the sulfur oxidation reaction to near completion. The waste heat recovery boiler cools down the sulfur dioxide while producing steam to support plant operations (sulfur oxidation is an extremely exothermic reaction).

During normal operating conditions, the oxidation of sulfur releases enough heat to maintain continued oxidation without an additional heating source. During startup (SU) conditions, it is necessary to heat up the sulfur furnace to a level at which the oxidation of sulfur can be sustained. As such, a natural gas burner (sulfur igniter) is used as an initial heating source for the sulfur oxidation reaction. During shutdown (SD) conditions, the natural gas sulfur igniter is used to properly cool down the sulfur burning equipment. The capacity of this natural gas burner is 5 MMBtu/hr and is only used during SU/SD periods.

The sulfur igniter is the natural gas-fired burner which is used to initiate the combustion of sulfur. This burner resides inside the furnace at all times and is only fired during SU/SD periods. The entire chamber in which the sulfur combustion takes place is referred to as the furnace. There is also a Stackmatch igniter that is used to ignite the natural gas burner. The Stackmatch igniter is only present in the furnace temporarily to ignite the natural gas burner. Following this, the Stackmatch igniter is removed because it cannot withstand the high temperatures of the furnace.

No molten sulfur is supplied to the sulfur furnace during SU and SD. During SU, no molten sulfur will be oxidized while the burner combusts natural gas. During SD, any residual molten sulfur remaining inside the furnace from normal operation may be oxidized by the natural gas sulfur igniter. Therefore, SD is the only operating scenario when there is a possibility for natural gas to be combusted in the furnace at the same time that molten sulfur is oxidized.

A thermal reactor follows the sulfur furnace in the KTS process. The thermal reactor allows the reaction between sulfur and oxygen to come nearer to completion by increasing contact time. Following the thermal reactor is a waste heat recovery boiler which simply recovers the heat from the hot gaseous SO_2 (normal operation) or hot combustion exhaust gases (SU/SD) to generate steam.

Following the waste heat recovery boiler, the cooled SO_2 vapor stream is sent through two absorbers where gaseous SO_2 is absorbed by liquid KOH and water. The resulting solution is a liquid potassium sulfite/bisulfite solution (KBS). Most of the KBS solution is then routed to the KTS reactor; however, a portion is sent to storage either for use in future KTS production or for future sale/loadout as KBS. Before being vented to the atmosphere, the vapor streams from the absorbers are sent to high efficiency particulate filters which remove particulates, entrained liquid, and much of any remaining sulfur dioxide. Liquid recovered from the process vent particulate filters is recycled back into the KTS manufacturing process to maximize the conversion of raw materials to KTS.

At the KTS reactor, KBS solution reacts with elemental sulfur, KOH, and water to produce liquid KTS. The KTS is then sent through an evaporator to remove the appropriate amount of water before being stored in the KTS day tank or storage tanks at the fertilizer terminal. The vapor vented from the KTS reactor and evaporator is sent through the process vent particulate filters before being emitted to atmosphere.

Additional storage tanks hold raw materials and products, including elemental sulfur, KOH, KTS, and KBS. The KTS and KBS day tanks are used for daily storage of product and are quality checked prior to transfer to bulk storage at the fertilizer terminal. The process water holds utility water used for the KTS manufacturing process and cooling water. The brine tank simply holds a salt and water mixture used as a water softener when necessary.

A cooling tower provides cooling water to the KTS Plant to cool process streams and process water. During normal operation, steam needed for the KTS plant and to heat the molten sulfur tanks is generated from the water heat recovery boiler. During SU/SD events or when the KTS Plant is shutdown completely, a package boiler provides heating for the molten sulfur tanks.

Sulfur Storage Tanks

The facility is installing a 22,000 gallon capacity sulfur unloading tank (D202) and a 167,000 gallon capacity sulfur storage tank (V203) to unload and store elemental liquid sulfur. Potential H_2S emissions are calculated using a mass balance at maximum throughput by conservatively assuming that 100 percent of the H_2S in the stream is released during storage. Since the tanks are in series, a given H_2S molecule may be emitted from either one tank or the other. In practice, some of the H_2S will be emitted from each tank and some will remain in the sulfur as it is fed into the sulfur furnace. In the sulfur furnace, the H_2S will form SO_2, which is the desired intermediate chemical sent to the SO_2 absorbers prior to KTS production.

Sulfur Igniter

The KTS Plant will use a 5 MMBtu/hr natural gas-fired sulfur igniter (IG400) in the sulfur furnace (F400) during SU/SD events. A Stackmatch igniter will be used to ignite the natural gas burner. The Stackmatch igniter is only present in the furnace temporarily as it cannot withstand the high temperatures of the furnace.

KTS Plant Process Vent

All vapor streams from the process units are ultimately routed to the KTS process vent (S401), a common stack carrying all emission from the KTS process to the atmosphere.

Cooling Tower

The facility is installing a cooling tower (CT602) that provides cooling water to the KTS Plant. The cooling tower requires a permit as the unit cools process streams and process water.

Boiler

The facility will install a 4.5 MMBtu/hr natural-gas fired boiler (B604). This boiler provides heat to the molten sulfur tanks when steam is not being generated from the waste heat recovery boiler (B400). This boiler is subject to Rule 2550 Permit-Exempt Equipment Registration (PEER) and Rule 4307 Boilers, Steam Generators, And Process Heaters – 2.0 MMBtu/hr to 5.0 MMBtu/hr. The PEER and discussion of Rule 4307 for this unit will be handled via a separate project. Therefore, this unit will not be addressed in this project.

V. Equipment Listing

Permit Unit	Equipment Description
C-8573-9-0	22,000 GALLON SULFUR UNLOADING TANK (D202) AND 167,000 GALLON SULFUR STORAGE TANK (V203) SERVED BY AN H2S SCRUBBER
C-8573-10-0	POTASSIUM THIOSULFATE PRODUCTION OPERATION INCLUDING A SULFUR FURNACE (F400), 5 MMBTU/HR NATURAL GAS-FIRED SULFUR IGNITER (IG400), SULFUR THERMAL REACTOR (D400), WASTE HEAT RECOVERY BOILER (B400), TWO SO2 ABSORBERS(T401 AND T402), A POTASSIUM THIOSULFATE REACTION UNIT (R410), AN EVAPORATOR (D411), HIGH EFFICIENCY PARTICULATE FILTERS (D403), AND A POTASSIUM THIOSULFATE PROCESS VENT (S401)
C-8573-11-0	3,000 GALLON PER MINUTE COOLING TOWER 3,000 GALLON PER MINUTE COOLING TOWER WITH CELLULAR TYPE DRIFT ELIMINATOR (CT602) (CT602)

VI. Emission Control Technology Evaluation

Sulfur Storage Tanks

The facility will install a scrubber to control H_2S emissions from the molten sulfur. The scrubber will achieve a removal rate of at least 95% for inorganic gases. Thus, a control efficiency of 95% is applied to the uncontrolled H_2S emissions as determined through the mass balance approach.

Sulfur Igniter

Low-NOx burners reduce NOx formation by producing lower flame temperatures (and longer flames) than conventional burners. Conventional burners thoroughly mix all the fuel and air in a single stage just prior to combustion, whereas low-NOx burners delay the mixing of fuel and air by introducing the fuel (or sometimes the air) in multiple stages. Generally, in the first combustion stage, the air-fuel mixture is fuel rich. In a fuel rich environment, all the oxygen will be consumed in reactions with the fuel, leaving no excess oxygen available to react with nitrogen to produce thermal NOx. In the secondary and tertiary stages, the combustion zone is maintained in a fuel-lean environment. The excess air in these stages helps to reduce the flame temperature so that the reaction between the excess oxygen with nitrogen is minimized.

KTS Plant Process Vent

Before being emitted to the atmosphere, the streams pass through the process vent particulate filters, which are high efficiency particulate filters installed inside the process vent. The process vent particulate filters in the stack eliminates 99 percent of particulate matter, remove entrained liquid, and also remove a large amount of remaining SO_2.

VII. General Calculations

A. Assumptions

- Facility will operate 24 hours per day, 365 days per year

Sulfur Storage Tanks

- Sulfur unloading and storage tanks will only emit H_2S (per applicant)
- 100% of the H_2S in the stream is released during storage (per applicant)
- Since the tanks are in series, a given H2S molecule may be emitted from either one tank or the other (per applicant)
- Molten sulfur contains a maximum of 440 ppmw H_2S (0.044 percent by weight) as the maximum solubility of H_2S in molten sulfur at 260 to 300 degrees Fahrenheit is approximately 440 ppmw (per applicant)
- Maximum throughput of sulfur through the sulfur storage tanks = 400 tons/day (per applicant)

KTS Plant Process Vent

- To calculate emissions from the process vent, emissions information (stack testing results and continuous emissions monitoring system (CEMS) data) has been obtained from other similar facilities around the country (per applicant)
- For each pollutant, a safety factor of three is applied to the actual emissions data to obtain the emission factor used to quantify KTS process vent emissions (per applicant)
- SU/SD emissions are estimated by applying a safety factor to the emission factors used for emissions quantification at steady state along with available SU/SD emissions data from a comparable facility (per applicant)
- SU/SD = 324 hours per year (six cycles per year) (per applicant)

Steady State

Process Vent Parameters (Steady State)	
Parameter	**Value**
Stack Air Flow Rate	2,947 scfm
Exhaust % H_2O by Volume	7.38%
Dry Stack Air Flow Rate	2,947 x (1 – 7.38/100) = 2,729 dscfm
Daily Operating Hours	24
Annual Operating Hours	8,760

Startup/Shutdown

Process Vent Parameters (Startup/Shut Down)	
Parameter	**Value**
Stack Air Flow Rate	1,465 scfm
Exhaust % H_2O by Volume	7.38%
Dry Stack Air Flow Rate	1,465 x (1 – 7.38/100) = 1,357 dscfm
Daily Operating Hours	24
Annual Operating Hours	324

Sulfur Igniter

- The sulfur igniter will operate a maximum of 324 hours per year (six SU/SD cycles per year) (per applicant)

Cooling Tower

- Maximum cooling water flow rate = 3,000 gallons per minute (per applicant)
- Density of water = 8.34 lb/gal

B. Emission Factors

Sulfur Storage Tanks

Equipment	H_2S Composition (wt%)	Maximum Temperature (deg F)
Sulfur Unloading Tank	0.044	300
Sulfur Storage Tank		

KTS Plant Process Vent

Process Vent (Steady State)		
Pollutant	Emission Factors	Source
NO_X	15 ppmvd	Applicant Proposal
SO_X	115 ppmvd	Applicant Proposal
PM_{10}	0.00001 lb/dscf	Applicant Proposal
CO	101 ppmvd	Applicant Proposal
CO2e	105,600 ppmvd	Applicant Proposal

Process Vent (Startup/Shutdown)		
Pollutant	Emission Factors	Source
NO_X	45 ppmvd	Applicant Proposal
SO_X	341 ppmvd	Applicant Proposal
PM_{10}	0.000031 lb/dscf	Applicant Proposal
CO	300 ppmvd	Applicant Proposal
CO2e	313,347 ppmvd	Applicant Proposal

Sulfur Igniter

Pollutant	Sulfur Igniter Emission Factors		Source
NO_X	0.06 lb/MMBtu	50 ppmvd (@ 3% O_2)	Applicant Proposal
SO_X	0.00285 lb/MMBtu	-	District Policy APR 1720
PM_{10}	0.0076 lb/MMBtu	-	AP-42 (07/98) Table 1.4-2
CO	0.084 lb/MMBtu	115 ppmvd (@ 3% O_2)	AP-42 (07/98) Table 1.4-1
VOC	0.0055 lb/MMBtu	13 ppmvd (@ 3% O_2)	AP-42 (07/98) Table 1.4-2

Cooling Tower

With the original application, the applicant proposed a drift rate of 0.01%. To satisfy the requirements of BACT that were triggered at the original proposed drift rate, the applicant revised the proposed drift rate to 0.0005%.

Parameter	Value
Total Dissolved Solids (TDS) Content	2,000 ppm
Drift Rate	0.0005 percent

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Since these are new emission units, PE1 = 0 for all criteria pollutants.

2. Post-Project Potential to Emit (PE2)

Sulfur Storage Tanks

Daily Emissions (lb/day) = H_2S Content (wt%) x Daily Throughput (ton/day) x 2000 lb/ton x (1 – Control Efficiency)

Annual Emissions (lb/year) = H_2S Content (wt%) x Annual Throughput (ton/year) x 2000 lb/ton x (1 – Control Efficiency)

Daily Potential to Emit – Sulfur Storage Tanks				
Equipment	H2S Content (wt%)	Daily Throughput (tons/day)	Control Efficiency (%)	Daily Emissions (lb/day)
Sulfur Unloading Tank	0.044	400	95	17.6
Sulfur Storage Tank				

Annual Potential to Emit – Sulfur Storage Tanks				
Equipment	H2S Content (wt%)	Annual Throughput (tons/year)	Control Efficiency (%)	Annual Emissions (lb/year)
Sulfur Unloading Tank	0.044	146,000	95	6,424
Sulfur Storage Tank				

Sulfur Igniter

Daily Emissions = Emission Factor (lb/MMBtu) x Heat Input (MMBtu/hr) x 24 hr/day

Annual Emissions = Emission Factor (lb/MMBtu) x Heat Input (MMBtu/hr) x 324 hr/year

Daily Potential to Emit – Sulfur Igniter			
Pollutant	Emission Factor (lb/MMBtu)	Heat Input (MMBtu/hr)	Daily Emissions (lb/day)
NO_X	0.06	5	7.2
SO_X	0.00285	5	0.3
PM_{10}	0.0076	5	0.9
CO	0.084	5	10.1
VOC	0.0055	5	0.7

Annual Potential to Emit – Sulfur Igniter			
Pollutant	**Emission Factor (lb/MMBtu)**	**Heat Input (MMBtu/hr)**	**Annual Emissions (lb/year)**
NO_X	0.06	5	97
SO_X	0.00285	5	5
PM_{10}	0.0076	5	12
CO	0.084	5	136
VOC	0.0055	5	9

KTS Plant Process Vent

Daily Emissions

Daily Emissions (lb/day) = Emission Factor (ppmvd) x Dry Stack Exhaust Air Flow Rate (dscfm) x lb-mol/379.5 scf x Molecular Weight (lb/lb-mol) x 1440 min/day

PM_{10} Daily Emissions (lb/day) = Emission Factor (lb/dscf) x Dry Stack Exhaust Air Flow Rate (dscfm) x 1440 min/day

Daily Potential to Emit – Process Vent (Steady State)				
Pollutant	**Emission Factor**	**Dry Stack Exhaust Air Flow Rate (dscfm)**	**Molecular Weight (lb/lb-mol)**	**Daily Emissions (lb/day)**
NO_X	15 ppmvd	2,729	46	7.1
SO_X	115 ppmvd	2,729	64	76.2
PM_{10}	0.00001 lb/dscf	2,729	-	39.3
CO	101 ppmvd	2,729	28	29.3
VOC*				0.7
CO2e	105,600 ppmvd	2,729	46	48,131.6

* VOC emissions are directly a result of the combustion of natural gas in the sulfur igniter. Therefore, the VOC emissions at the process vent will be assumed to be equal to the VOC emissions generated by the sulfur igniter.

Daily Potential to Emit – Process Vent (Startup/Shutdown)				
Pollutant	**Emission Factor**	**Dry Stack Exhaust Air Flow Rate (dscfm)**	**Molecular Weight (lb/lb-mol)**	**Daily Emissions (lb/day)**
NO_X	45 ppmvd	1,357	46	10.7
SO_X	341 ppmvd	1,357	64	112.4
PM_{10}	0.000031 lb/dscf	1,357	-	60.6
CO	300 ppmvd	1,357	28	43.3
CO2e	313,347 ppmvd	1,357	46	74,218.8

The sulfur igniter only operates during periods of startup and shutdown. No molten sulfur is supplied to the sulfur furnace during startup or shutdown. Only one of the steady state emissions or startup/shutdown emissions will be emitted from the process vent at any given time. Therefore, the worst case emission rate will be used to determine the potential to emit from the process vent.

Daily Potential to Emit – Process Vent (Total)			
Pollutant	**Steady State (lb/day)**	**Startup/Shutdown (lb/day)**	**Daily Emissions (lb/day)**
NO_X	7.1	10.7	10.7
SO_X	76.2	112.4	112.4
PM_{10}	39.3	60.6	60.6
CO	29.3	43.3	43.3
VOC	0.7	-	0.7
CO2e	48,131.6	74,218.8	74,218.8

<u>Annual Emissions</u>

Steady State

Annual Emissions (lb/year) = Emission Factor (ppmvd) x Dry Stack Exhaust Air Flow Rate (dscfm) x lb-mol/379.5 scf x Molecular Weight (lb/lb-mol) x 60 min/hr x 8760 hr/year

PM_{10} Annual Emissions (lb/year) = Emission Factor (lb/dscf) x Dry Stack Exhaust Air Flow Rate (dscfm) x 1440 min/day x 365 days/year

Annual Potential to Emit – Process Vent (Steady State)				
Pollutant	**Emission Factor**	**Dry Stack Exhaust Air Flow Rate (dscfm)**	**Molecular Weight (lb/lb-mol)**	**Annual Emissions (lb/year)**
NO_X	15 ppmvd	2,729	46	2,608
SO_X	115 ppmvd	2,729	64	27,818
PM_{10}	0.00001 lb/dscf	2,729	-	14,344
CO	101 ppmvd	2,729	28	10,689
VOC				9
CO2e	105,600 ppmvd	2,729	46	18,359,839

Startup/Shutdown

Annual Emissions (lb/year) = Emission Factor (ppmvd) x Dry Stack Exhaust Air Flow Rate (dscfm) x lb-mol/379.5 scf x Molecular Weight (lb/lb-mol) x 60 min/hr x 324 hr/year

PM_{10} Annual Emissions (lb/year) = Emission Factor (lb/dscf) x Dry Stack Exhaust Air Flow Rate (dscfm) x 60 min/hr x 324 hr/year

Annual Potential to Emit – Process Vent (Startup/Shutdown)				
Pollutant	Emission Factor	Dry Stack Exhaust Air Flow Rate (dscfm)	Molecular Weight (lb/lb-mol)	Annual Emissions (lb/year)
NO_X	45 ppmvd	1,357	46	144
SO_X	341 ppmvd	1,357	64	1,517
PM_{10}	0.000031 lb/dscf	1,357	-	818
CO	300 ppmvd	1,357	28	584
CO2e	313,347 ppmvd	1,357	46	1,001,954

As explained above, the sulfur igniter only operates during periods of startup and shutdown. No molten sulfur is supplied to the sulfur furnace during startup or shutdown. Only one of the steady state emissions or startup/shutdown emissions will be emitted from the process vent at any given time. Therefore, the worst case emission rate from either steady state operation or startup/shutdown operation will be used to determine the potential to emit from the process vent.

Annual Potential to Emit – Process Vent (Total)			
Pollutant	Steady State (lb/year)	Startup/Shutdown (lb/year)	Annual Emissions (lb/year)
NO_X	2,608	144	2,608
SO_X	27,818	1,517	27,818
PM_{10}	14,344	818	14,344
CO	10,689	584	10,689
VOC	9	-	9
CO2e	18,359,839	1,001,954	18,359,839

Cooling Tower

Daily Emissions = H_2O circulation rate (gal/min) x drift rate (%) x TDS concentration (ppm by weight) x Density of water (lb/gal) x 1440 min/day

Annual Emissions = H_2O circulation rate (gal/min) x drift rate (%) x TDS concentration (ppm by weight) x Density of water (lb/gal) x 60 min/hr x 8,760 hr/year

Daily Potential to Emit – Cooling Tower					
Pollutant	H_2O Circulation Rate (gal/min)	Drift Rate (%)	TDS Concentration (ppm by weight)	Density of Water (lb/gal)	Daily Emissions (lb/day)
PM_{10}	3,000	0.0005	2,000	8.34	0.4

Annual Potential to Emit – Cooling Tower					
Pollutant	H_2O Circulation Rate (gal/min)	Drift Rate (%)	TDS Concentration (ppm by weight)	Density of Water (lb/gal)	Annual Emissions (lb/year)
PM_{10}	3,000	0.0005	2,000	8.34	132

Daily Potential to Emit Summary			
Permit Unit	**Emission Unit**	**Pollutant**	**Daily Emissions (lb/day)**
C-8573-9-0	Sulfur Unloading Tank Sulfur Storage Tank	H_2S	17.6
C-8573-10-0	Process Vent	NO_X	10.7
		SO_X	112.4
		PM_{10}	60.6
		CO	43.3
		VOC	0.7
C-8573-11-0	Cooling Tower	PM_{10}	0.4

Annual Potential to Emit Summary			
Permit Unit	**Emission Unit**	**Pollutant**	**Annual Emissions (lb/year)**
C-8573-9-0	Sulfur Unloading Tank Sulfur Storage Tank	H_2S	6,424
C-8573-10-0	Process Vent	NO_X	2,608
		SO_X	27,818
		PM_{10}	14,344
		CO	10,689
		VOC	9
C-8573-11-0	Cooling Tower	PM_{10}	132

3. Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to District Rule 2201, the Pre-Project Stationary Source Potential to Emit (SSPE1) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

Pre-Project Stationary Source Potential to Emit [SSPE1] (lb/year)						
Permit Unit	NO_X	SO_X	PM_{10}	CO	VOC	NH_3
C-8573-1-0	0	0	0	0	0	1
C-8573-2-0	0	0	0	0	0	1
C-8573-3-0	0	0	0	0	0	0
C-8573-4-0	0	0	0	0	0	0
C-8573-5-0	0	0	0	0	1	0
C-8573-6-0	0	0	0	0	0	0
C-8573-7-0	0	0	0	0	0	0
C-8573-8-0	0	0	0	0	361	183
Fugitive Emissions	0	0	0	0	48	8
Pre-Project SSPE (SSPE1)	0	0	0	0	410	193

4. Post-Project Stationary Source Potential to Emit (SSPE2)

Pursuant to District Rule 2201, the Post-Project Stationary Source Potential to Emit (SSPE2) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

Post-Project Stationary Source Potential to Emit [SSPE2] (lb/year)							
Permit Unit	NO_X	SO_X	PM_{10}	CO	VOC	NH_3	H_2S
C-8573-1-0	0	0	0	0	0	1	0
C-8573-2-0	0	0	0	0	0	1	0
C-8573-3-0	0	0	0	0	0	0	0
C-8573-4-0	0	0	0	0	0	0	0
C-8573-5-0	0	0	0	0	1	0	0
C-8573-6-0	0	0	0	0	0	0	0
C-8573-7-0	0	0	0	0	0	0	0
C-8573-8-0	0	0	0	0	361	183	0
C-8573-9-0	0	0	0	0	0	0	6,424
C-8573-10-0	2,608	27,818	14,344	10,689	9	0	0
C-8573-11-0	0	0	132	0	0	0	0
Fugitive Emissions	0	0	0	0	48	8	0
Post-Project SSPE (SSPE2)	2,608	27,818	14,476	10,689	419	193	6,424

5. Major Source Determination

Rule 2201 Major Source Determination

Pursuant to District Rule 2201, a Major Source is a stationary source with a SSPE2 equal to or exceeding one or more of the following threshold values. For the purposes of determining major source status the following shall not be included:

- any ERCs associated with the stationary source
- Emissions from non-road IC engines (i.e. IC engines at a particular site at the facility for less than 12 months)
- Fugitive emissions, except for the specific source categories specified in 40 CFR 51.165

This facility manufacturers potassium thiosulfate and qualifies as a chemical processing plant. Therefore, this facility is a specific source category specified in 40 CFR 51.165 and the fugitive emissions shall be included in the Rule 2201 Major Source determination.

Rule 2201 Major Source Determination (lb/year)					
	NO_X	SO_X	PM_{10}	CO	VOC
Pre-Project SSPE (SSPE1)	0	0	0	0	410
Post Project SSPE (SSPE2)	2,608	27,818	14,476	10,689	419
Major Source Threshold	20,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No

As seen in the table above, the facility is not an existing Major Source and also is not becoming a Major Source as a result of this project.

Rule 2410 Major Source Determination

The facility or the equipment evaluated under this project is listed as one of the categories specified in 40 CFR 52.21 (b)(1)(i). Therefore the following PSD Major Source thresholds are applicable.

PSD Major Source Determination (tons/year)							
	NO2	VOC	SO2	CO	PM	PM10	CO2e
Estimated Facility PE before Project Increase	0	0.2	0	0	0	0	0
PSD Major Source Thresholds	100	100	100	100	100	100	100,000
PSD Major Source?	No	No	No	No	No	No	No

As shown above, the facility is not an existing major source for PSD for at least one pollutant. Therefore, the facility is not an existing major source for PSD.

6. Baseline Emissions (BE)

BE = Pre-Project Potential to Emit for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to Rule 2201

As shown in Section VII.C.5 above, the facility is not a Major Source for any criteria pollutant.

Therefore Baseline Emissions (BE) are equal to the Pre-Project Potential to Emit (PE1).

Since these are new emission units, BE = PE1 = 0 for all criteria pollutants.

7. SB 288 Major Modification

SB 288 Major Modification is defined in 40 CFR Part 51.165 as "any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act."

Since this facility is not a major source for any of the pollutants addressed in this project, this project does not constitute an SB 288 Major Modification.

8. Federal Major Modification

District Rule 2201 states that a Federal Major Modification is the same as a "Major Modification" as defined in 40 CFR 51.165 and part D of Title I of the CAA.

Since this facility is not a Major Source for any pollutants, this project does not constitute a Federal Major Modification. Additionally, since the facility is not a major source for PM_{10} (140,000 lb/year), it is not a major source for PM2.5 (200,000 lb/year).

9. Rule 2410 – Prevention of Significant Deterioration (PSD) Applicability Determination

Rule 2410 applies to pollutants for which the District is in attainment or for unclasssified, pollutants. The pollutants addressed in the PSD applicability determination are listed as follows:

- NO2 (as a primary pollutant)
- SO2 (as a primary pollutant)
- CO
- PM
- PM_{10}
- Greenhouse gases (GHG): CO2, N2O, CH4, HFCs, PFCs, and SF6

The first step of this PSD evaluation consists of determining whether the facility is an existing PSD Major Source or not (See Section VII.C.5 of this document).

In the case the facility is an existing PSD Major Source, the second step of the PSD evaluation is to determine if the project results in a PSD significant increase.

In the case the facility is NOT an existing PSD Major Source but is an existing source, the second step of the PSD evaluation is to determine if the project, by itself, would be a PSD major source.

In the case the facility is new source, the second step of the PSD evaluation is to determine if this new facility will become a new PSD major Source as a result of the project and if so, to determine which pollutant will result in a PSD significant increase.

I. Potential to Emit for New or <u>Modified</u> Emission Units vs PSD Major Source Thresholds

As a screening tool, the project potential to emit from all new and modified units is compared to the PSD major source threshold, and if total project potential to emit from all new and modified units is below this threshold, no futher analysis will be needed.

The facility or the equipment evaluated under this project is listed as one of the categories specified in 40 CFR 52.21 (b)(1)(i). Therefore the following PSD Major Source thresholds are applicable.

PSD Major Source Determination: Potential to Emit (tons/year)							
	NO2	VOC	SO2	CO	PM	PM10	CO2e
Total PE from New and Modified Units	1.3	0.005	13.9	5.3	7.2	7.2	8,784
PSD Major Source threshold	100	100	100	100	100	100	100,000
New PSD Major Source?	N	N	N	N	N	N	N

As shown in the table above, the project potential to emit, by itself, does not exceed any of the PSD major source thresholds. Therefore Rule 2410 is not applicable and no further discussion is required.

10. Quarterly Net Emissions Change (QNEC)

The Quarterly Net Emissions Change is used to complete the emission profile screen for the District's PAS database. The QNEC shall be calculated as follows:

QNEC = PE2 - PE1, where:

QNEC = Quarterly Net Emissions Change for each emissions unit, lb/qtr.
PE2 = Post Project Potential to Emit for each emissions unit, lb/qtr.
PE1 = Pre-Project Potential to Emit for each emissions unit, lb/qtr.

Using the values in Sections VII.C.2 and VII.C.6 in the evaluation above, quarterly PE2 and quarterly PE1 can be calculated as follows:

$PE2_{quarterly} = PE2_{annual} \div 4$ quarters/year
$PE1_{quarterly} = PE1_{annual} \div 4$ quarters/year

Quarterly NEC [QNEC]				
Permit	Pollutant	PE2 (lb/qtr)	PE1 (lb/qtr)	QNEC (lb/qtr)
C-8573-9-0	H_2S	1,606	0	1,606
C-8573-10-0	NOx	652	0	652
	SOx	6,955	0	6,955
	PM_{10}	3,586	0	3,586
	CO	2,672	0	2,672
	VOC	2	0	2
C-8573-11-0	PM_{10}	33	0	33

VIII. Compliance

Rule 2010 Permits Required

The purpose of this rule is to require any person constructing, altering, replacing or operating any source operation which emits, may emit, or may reduce emissions to obtain an Authority to Construct or a Permit to Operate.

The provisions of this rule shall apply to any person who plans to or does operate, construct, alter, or replace any source operation which may emit air contaminants or may reduce the emission of air contaminants.

Rule 1020 defines air contaminants as any discharge, release, or other propagation into the atmosphere directly or indirectly, caused by man and includes, but is not limited to, smoke, charred paper, dust, soot, grime, carbon, noxious acids, fumes, gases, odors, or particulate matter, or any combination thereof.

The facility is proposing to install one 20,000 gallon fixed roof potassium sulfite/bisulfite (KBS) tank, one 20,000 gallon fixed roof potassium thiosulfate (KTS) tank, one 11,000 gallon fixed roof process water tank, and one fixed roof brine tank. Potassium thiosulfate (KTS), potassium sulfite/bisulfite (KBS), potassium hydroxide (KOH), process water, and brine are not considered VOCs, are not hazardous air pollutants (HAPs), and are not air contaminants as defined in Rule 1020. Therefore, these tanks do not require permits.

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis for the following*:

a. Any new emissions unit with a potential to emit exceeding two pounds per day,
b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,

c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day, and/or
d. Any new or modified emissions unit, in a stationary source project, which results in a Major Modification.

*Except for CO emissions from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

a. New emissions units – PE > 2 lb/day

As shown in Section VII.C of this evaluation, the H2S emissions from each of the sulfur storage tanks and the NOx, SOx, PM_{10}, CO emissions from the KTS process vent are greater than 2 lb/day. BACT is triggered for H2S emissions from each of the sulfur storage tanks and for NOx, SOx, PM_{10} emissions from the KTS process vent since the PEs are greater than 2 lbs/day. The source of the NOx emissions at the process vent is from the sulfur igniter. Therefore, BACT is triggered for NOx emissions from the sulfur igniter. However, BACT is not triggered for CO since the SSPE2 for CO is not greater than 200,000 lbs/year, as demonstrated in Section VII.C.5 above.

Daily Post-Project Potential to Emit				
Permit Unit	Emission Unit	Pollutant	Daily PE2 (lb/day)	BACT Triggered?
C-8573-9-0	Sulfur Unloading Tank and Sulfur Storage Tank	H_2S	17.6	Yes
C-8573-10-0	Process Vent	NOx	10.7	Yes
		SOx	112.4	Yes
		PM_{10}	60.6	Yes
		CO	43.3	No
		VOC	0.7	No
	Sulfur Igniter	NOx	7.2	Yes
		SOx	0.3	No
		PM_{10}	0.9	No
		CO	10.1	No
		VOC	0.7	No
C-8573-11-0	Cooling Tower	PM_{10}	0.4	No

b. Relocation of emissions units – PE > 2 lb/day

As discussed in Section I above, there are no emissions units being relocated from one stationary source to another; therefore BACT is not triggered.

c. Modification of emissions units – AIPE > 2 lb/day

As discussed in Section I above, there are no modified emissions units associated with this project; therefore BACT is not triggered.

d. SB 288 and/or Federal Major Modification

As discussed in Section VII.C.7 and VII.C.8 above, this project does not constitute a SB 288 or Federal Major Modification; therefore BACT is not triggered.

2. BACT Guideline

C-8573-9-0

A current BACT Guideline for sulfur storage tanks does not exist. Therefore, a new BACT determination will be performed (see Attachment A).

BACT Guideline 7.3.XX applies to the sulfur storage tanks. [Liquid Sulfur Storage Tank] (see Attachment A).

C-8573-10-0

Sulfur Igniter

BACT Guideline 1.9.2 applies to the sulfur igniter. [Sulfuric Acid Plant Start-up Heater - < 15 MMBtu/hr] (See Attachment A)

BACT Guideline 1.9.2 applies to the sulfur igniter as the unit is a type of start-up heater.

Process Vent

A current BACT Guideline for a KTS process vent does not exist. Therefore, a new BACT determination will be performed (see Attachment A).

BACT Guideline 4.12.X applies to the KTS process vent. [Chemical Plant – Potassium Thiosulfate Process Vent] (see Attachment A).

3. Top-Down BACT Analysis

Per Permit Services Policies and Procedures for BACT, a Top-Down BACT analysis shall be performed as a part of the application review for each application subject to the BACT requirements pursuant to the District's NSR Rule.

Pursuant to the attached Top-Down BACT Analysis (see Attachment A), BACT has been satisfied with the following:

C-8573-9-0

Sulfur Unloading Tank and Sulfur Storage Tank

H_2S: 0.044 lb-H_2S/gal and H_2S Scrubber

C-8573-10-0

Sulfur Igniter

NO_X: Natural gas fuel with LPG backup

Process Vent

SOx: Dual Absorption/Particulate Filters
PM_{10}: Dual Absorption/Particulate Filters

B. Offsets

1. Offset Applicability

Pursuant to Rule 2201, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the Post-Project Stationary Source Potential to Emit (SSPE2) equals to or exceeds the offset threshold levels in Table 4-1 of District Rule 2201.

The following table compares the post-project facility-wide annual emissions in order to determine if offsets will be required for this project.

Offset Determination (lb/year)					
	NO_X	SO_X	PM_{10}	CO	VOC
Post-Project SSPE (SSPE2)	2,608	27,818	14,476	10,689	419
Offset Threshold	20,000	54,750	29,200	200,000	20,000
Offsets triggered?	No	No	No	No	No

2. Quantity of Offsets Required

As seen above, the SSPE2 is not greater than the offset thresholds for all the pollutants; therefore offset calculations are not necessary and offsets will not be required for this project.

C. Public Notification

1. Applicability

Public noticing is required for:

a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications,
b. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
c. Any project which results in the offset thresholds being surpassed, and/or
d. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications

New Major Sources are new facilities, which are also Major Sources. As shown in Section VII.C.5 above, the SSPE2 is not greater than the Major Source threshold for any pollutant. Therefore, public noticing is not required for this project for new Major Source purposes.

As demonstrated in VII.C.7 and VII.C.8, this project does not constitute an SB 288 or Federal Major Modification; therefore, public noticing for SB 288 or Federal Major Modification purposes is not required.

b. PE > 100 lb/day

Applications which include a new emissions unit with a PE greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. As seen in Section VII.C.2 above, this project does not include a new emissions unit which has daily emissions greater than 100 lb/day for any pollutant, therefore public noticing for PE > 100 lb/day purposes is not required.

c. Offset Threshold

The following table compares the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project.

Offset Threshold				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO_X	0	2,608	20,000 lb/year	No
SO_X	0	27,818	54,750 lb/year	No
PM_{10}	0	14,476	29,200 lb/year	No
CO	0	10,689	200,000 lb/year	No
VOC	410	419	20,000 lb/year	No

As detailed above, there were no thresholds surpassed with this project; therefore public noticing is not required for offset purposes.

d. SSIPE > 20,000 lb/year

Public notification is required for any permitting action that results in a SSIPE of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE = SSPE2 – SSPE1. The SSIPE is compared to the SSIPE Public Notice thresholds in the following table.

Stationary Source Increase in Permitted Emissions [SSIPE] – Public Notice					
Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	SSIPE Public Notice Threshold	Public Notice Required?
NO_x	2,608	0	2,608	20,000 lb/year	No
SO_x	27,818	0	27,818	20,000 lb/year	Yes
PM_{10}	14,476	0	14,476	20,000 lb/year	No
CO	10,689	0	10,689	20,000 lb/year	No
VOC	419	410	9	20,000 lb/year	No
H_2S	6,424	0	6,424	20,000 lb/year	No

As demonstrated above, the SSIPE for SOx is greater than 20,000 lb/year; therefore public noticing for SSIPE purposes is required.

2. Public Notice Action

As discussed above, public noticing is required for this project for SSIPE greater than 20,000 lb/year for SOx emissions. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATC permits for this equipment.

D. Daily Emission Limitations (DELs)

DELs and other enforceable conditions are required by Rule 2201 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. The DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT.

Proposed Rule 2201 (DEL) Conditions

C-8573-9-0

- Throughput for each tank shall not exceed either of the following limits: 400 tons/day or 146,000 tons/year. [District Rule 2201]
- Combined controlled H2S emission rate from the sulfur unloading tank and sulfur storage tank shall not exceed 0.044 lb/gal solution. [District Rule 2201]

C-8573-10-0

- Except during startup and shutdown, emission rates from the process vent shall not exceed any of the following: NOx (as NO2): 15 ppmvd, SOx (as SO2): 115 ppmvd, PM10: 0.00001 lb/dscf, CO: 101 ppmvd, or VOC: 0.0055 lb/MMBtu. [District Rule 2201]
- During startup and shutdown, emission rates from the process vent shall not exceed any of the following: NOx (as NO2): 45 ppmvd, SOx (as SO2): 341 ppmvd, PM10: 0.000031 lb/dscf, CO: 300 ppmvd, or VOC: 0.0055 lb/MMBtu. [District Rule 2201]
- Emission rates from the sulfur igniter shall not exceed any of the following: NOx (as NO2): 0.06 lb/MMBtu, SOx (as SO2): 0.00285 lb/MMBtu, PM10: 0.0076 lb/MMBtu, CO: 0.084 lb/MMBtu, or VOC: 0.0055 lb/MMBtu. [District Rule 2201]
- The sulfur igniter shall not operate more than 324 hours per year. [District Rule 2201]
- During steady state operation, the process vent exhaust flow rate shall not exceed 2,729 dscfm. [District Rule 2201]
- During startup and shutdown, the process vent exhaust flow rate shall not exceed 1,357 dscfm. [District Rule 2201]

C-8573-11-0

- Drift eliminator drift rate shall not exceed 0.0005%. [District Rule 2201]
- Total dissolved solids (TDS) in circulating water shall not exceed 2,000 ppm by weight. [District Rule 2201]
- Cooling tower circulation water flow rate shall not exceed 3,000 gallons per minute. [District Rule 2201]
- PM10 emission rate from the cooling tower shall not exceed 0.4 lb/day. [District Rule 2201]
- Compliance with the PM10 daily emission limit shall be demonstrated as follows: PM10 lb/day = circulating water recirculation rate (gal/day) x total dissolved solids concentration in the circulating water (ppm by weight) x manufacturer's design drift rate (%). [District Rule 2201]

E. Compliance Assurance

1. Source Testing

C-8573-9-0

Pursuant to District Policy APR 1705, annual source testing for SOx for small sources shall not be required if the uncontrolled emissions from the unit are less than 30 lb/day. The uncontrolled SOx emissions from this unit are greater than 30 lb/day; therefore, initial and annual source testing will be required. The following conditions will be listed on the permit to ensure compliance:

- Source testing to determine the emission rate of the scrubber shall be conducted at least once every twelve (12) months. [District Rule 2201]
- The pH of the scrubbing liquid shall be maintained at a level recommended by the scrubber manufacturer. A continuous monitoring device shall be installed and maintained to measure the pH of the scrubbing liquid. [District Rule 2201]

- The pH range of the scrubbing liquid shall be established during the initial source test of the scrubber. [District Rule 2201]
- The scrubber liquid operating flow rate shall not be less than the scrubber manufacturer's minimum recommended rate. A flow meter shall be installed and maintained to measure the scrubbing liquid flow rate at the inlet of the scrubber. [District Rule 2201]
- The flow rate range of the scrubbing liquid shall be established during the initial source test of the scrubber. [District Rule 2201]
- Source testing to measure the H2S emission rate from the outlet of the scrubber shall be conducted using ARB Method 15 or using an alternative method approved by the APCO. [District Rules 1081 and 2201]
- Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]
- The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]
- For emissions source testing, the arithmetic average of three test runs shall apply each with a duration of at least 30 consecutive minutes. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rule 1081]

C-8573-10-0

For the sulfur igniter, the SOx, PM_{10}, CO, and VOC emission factors are based upon AP-42 generally accepted emission factors and therefore, will not require source test validation. NOx emissions will be source tested at the process vent as explained below.

Pursuant to District Policy APR 1705, annual source testing for small sources shall not be required if the uncontrolled emissions from the unit are less than 30 lb/day. NOx, CO, and VOC emissions at the process vent are uncontrolled and are less than 30 lb/day. To validate the proposed emission rates, initial source testing will be required. The controlled SOx and PM_{10} emissions from the process vent is greater than 30 lb/day; therefore, initial and annual source testing will be required.

The following conditions will be listed on the permit to ensure compliance:

- Source testing to determine initial compliance with the NOx, SOx, PM10, CO, and VOC emission rates from the process vent for normal operation shall be conducted within 60 days of startup. [District Rule 2201]
- Source testing to determine the SOx and PM10 emission rates from the process vent during normal operation shall be conducted at least once every twelve (12) months. [District Rule 2201]
- The following source test methods shall be used: NOx (ppmv) - EPA Method 7E or ARB Method 100, CO (ppmv) - EPA Method 10 or ARB Method 100, VOC (lb/MMBtu) - EPA Method 18. Alternative methods may be utilized provided they are previously approved by the District, in writing. [District Rule 2201]

- SOx and PM10 source testing shall be performed using ARB Methods 1-6 or EPA Methods 5 or 201A, 6, 6B, 8, or ARB 100 or EPA Method 19. Alternative methods may be utilized provided they are previously approved by the District, in writing. [District Rule 2201]
- All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 1081]
- Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]
- For emissions source testing, the arithmetic average of three test runs shall apply each with a duration of at least 30 consecutive minutes. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rule 1081]
- The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]

C-8573-11-0

Pursuant to District Policy APR 1705, source testing is not required for cooling towers to demonstrate compliance with Rule 2201.

2. Monitoring

C-8573-9-0

- The pH of the scrubbing liquid shall be maintained at a level recommended by the scrubber manufacturer. A continuous monitoring device shall be installed and maintained to measure the pH of the scrubbing liquid. [District Rule 2201]
- The scrubber liquid operating flow rate shall not be less than the scrubber manufacturer's minimum recommended rate. A flow meter shall be installed and maintained to measure the scrubbing liquid flow rate at the inlet of the scrubber. [District Rule 2201]

C-8573-10-0

No monitoring is required to demonstrate compliance with Rule 2201.

C-8573-11-0

District Rule 7012 requires hexavalent chromium concentration testing to be conducted at least once every six (6) months for non-wooden cooling towers subject to Section 5.2.3 of the rule. Since the cooling tower has never had hexavalent chromium containing compounds added to the circulating water, this unit is exempt from the monitoring requirements of the rule. Therefore, no monitoring will be required for this permit unit.

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the offset, public notification and daily emission limit requirements of Rule 2201. All records shall be maintained for five years and made available for District inspection upon request. Therefore, the following conditions will be listed on the permits to ensure compliance:

S-8573-9-0

- The permittee shall maintain daily and annual records, in tons, of the quantity of liquid processed through each storage tank. [District Rules 1070 and 2201]
- During each day of operation, the permittee shall record the scrubber liquid pH and flow rate (in gallons per minute), and compare the reading with the established ranges listed in this permit. [District Rule 2201]
- All records shall be maintained and retained on-site for a period of at least five (5) years and shall be made available for District inspection upon request. [District Rule 1070]

S-8573-10-0

- The permittee shall maintain annual records of the hours of operation of the sulfur igniter. [District Rules 1070 and 2201]
- All records shall be maintained and retained on-site for a period of at least five (5) years and shall be made available for District inspection upon request. [District Rule 1070]

C-8573-11-0

- Daily records of the cooling tower circulating water flow rate and quarterly records of the cooling tower water TDS shall be kept at the facility and made readily available for District inspection upon request for five (5) years. [District Rule 1070]

4. Reporting

C-8573-9-0 and '10-0

No reporting is required to demonstrate compliance with Rule 2201.

C-8573-11-0

District Rule 7012 requires the facility submit a compliance plan to the APCO at least 90 days before the newly constructed cooling tower is operated. Such reporting will be required.

- Permittee shall submit cooling tower design details including the cooling tower type, drift eliminator design details, and materials of construction to the District at least 90 days before the tower is operated. [District Rule 7012]

F. Ambient Air Quality Analysis (AAQA)

An AAQA shall be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an air quality standard. The District's Technical Services Division conducted the required analysis. Refer to Attachment B of this document for the AAQA summary sheet.

The proposed location is in an attainment area for NO_X, CO, and SO_X. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for NO_X, CO, or SO_X.

The proposed location is in a non-attainment area for the state's PM_{10} as well as federal and state $PM_{2.5}$ thresholds. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for PM_{10} and $PM_{2.5}$.

Rule 2410 Prevention of Significant Deterioration

The prevention of significant deterioration (PSD) program is a construction permitting program for new major stationary sources and major modifications to existing major stationary sources located in areas classified as attainment or in areas that are unclassifiable for any criteria air pollutant.

As demonstrated above, this project is not subject to the requirements of Rule 2410 due to a significant emission increase and no further discussion is required.

Rule 2520 Federally Mandated Operating Permits

Since this facility's potential emissions do not exceed any major source thresholds of Rule 2201, this facility is not a major source, and Rule 2520 does not apply.

Rule 2550 Federally Mandated Preconstruction Review for Major Sources of Air Toxics

Section 2.0 states, "*The provisions of this rule shall only apply to applications to construct or reconstruct a major air toxics source with Authority to Construct issued on or after June 28, 1998.*"

Noncriteria pollutants are compounds that have been identified as pollutants that pose a significant health hazard. Nine of these pollutants are regulated under the Federal New Source Review program: lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds.

In addition to these nine compounds, the federal Clean Air Act lists 189 substances as potential hazardous air pollutants (Clean Air Act Sec. 112(b)(1)). Any pollutant that may be emitted from the project and is on the federal New Source Review List and the federal Clean Air Act list has been evaluated.

The following are the hazardous air pollutant (HAP) emission calculations for the equipment at the facility.

Hazardous Air Pollutant (HAP) Emissions
Natural Gas Combustion Units

Hazardous Air Pollutant	AP-42 Table 1.4-3 and 1.4-4 (7/98) Emission Factor (lb/MMcf)	Maximum Annual Emissions (ton/yr)
		Sulfur Igniter(2)
2-Methylnaphthalene	2.40E-05	1.91E-08
3-Methylcholanthrene	1.80E-06	1.43E-09
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.27E-08
Acenaphthene	1.80E-06	1.43E-09
Acenaphthylene	1.80E-06	1.43E-09
Anthracene	2.40E-06	1.91E-09
Benz(a)anthracene	1.80E-06	1.43E-09
Benzene	2.10E-03	1.67E-06
Benzo(a)pyrene	1.20E-06	9.53E-10
Benazo(b)fluoranthene	1.80E-06	1.43E-09
Benzo(g,h,i)perylene	1.20E-06	9.53E-10
Benzo(k)fluoranthene	1.80E-06	1.43E-09
Chysene	1.80E-06	1.43E-09
Dibenzo(a,h)anthracene	1.20E-06	9.53E-10
Dichlorobenzene	1.20E-03	9.53E-07
Fluoranthene	3.00E-06	2.38E-09
Fluorene	2.80E-06	2.22E-09
Formaldehyde	7.50E-02	5.96E-05
Hexane	1.80E+00	1.43E-03
Indeno(1,2,3-cd)pyrene	1.80E-06	1.43E-09
Naphthalene	6.10E-04	4.84E-07
Phenanathrene	1.70E-05	1.35E-08
Pyrene	5.00E-06	3.97E-09
Toluene	3.40E-03	2.70E-06
Arsenic	2.00E-04	1.59E-07
Beryliium	1.20E-05	9.53E-09
Cadmium	1.10E-03	8.74E-07
Chromium	1.40E-03	1.11E-06
Cobalt	8.40E-05	6.67E-08
Lead Compounds(1)	5.00E-04	3.97E-07
Manganese	3.80E-04	3.02E-07
Mercury	2.60E-04	2.06E-07
Nickel	2.10E-03	1.67E-06
Selenium	2.40E-05	1.91E-08
Total		**0.00**

(1) AP-42 Table 1.4-2 (7/98)
(2) Maximum Heat Input (MMBtu/hr) x scf/1020 Btu x EF (lb/MMscf) x 324 hr/year x ton/2000 lb

As emissions of each individual HAP are below 10 tons per year and total HAP emissions are below 25 tons per year, this facility will not be a major air toxics source and the provisions of this rule do not apply.

Rule 4001 New Source Performance Standards (NSPS)

<u>40 CFR Part 60 – Subpart Dc: Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units</u>

This subpart applies to each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and has a maximum design heat input capacity of 29 megawatts (MW) (100 million Btu per hour (Btu/hr)) or less, but greater than or equal to 2.9 MW (10 million Btu/hr). Since the sulfur igniter is rated at 5 MMBtu/hr and the package boiler is rated at 4.5 MMBtu/hr, the provisions of this subpart do not apply to this project.

<u>40 CFR Part 60 – Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984</u>

Section 60.110b(a) states except as provided in paragraph (b) of this section, the affected facility to which this subpart applies is each storage vessel with a capacity greater than or equal to 75 cubic meters (m^3) (equivalent to 19,813 gal) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984.

Section 60.111b defines volatile organic liquid as any organic liquid which can emit volatile organic compounds (as defined in 40 CFR 51.100) into the atmosphere. Liquid sulfur, ammonium sulfite/bisulfite, and ammonium thiosulfate are not considered volatile organic liquids as they are not an organic liquid which can emit volatile organic compounds. Therefore, provisions of this subpart do not apply to this project.

<u>40 CFR Part 60 – Subpart VVa: Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006</u>

Section 60.480(a)(1) states the provisions of this subpart apply to affected facilities in the synthetic organic chemicals manufacturing industry.

Section 60.489 provides a list of chemicals produced by affected facilities. Section 60.489 states the following chemicals are produced, as intermediates or final products, by process units covered under this subpart. The applicability date for process units producing one or more of these chemicals is January 5, 1981.

Potassium thiosulfate or potassium sulfite/bisulfite are not listed in Section 60.489 as a chemical produced by an affected facility. Therefore, the provisions of this subpart do not apply to this project.

40 CFR Part 60 – Subpart III: Standards of Performance for Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes

Section 60.610(a) states the provisions of this subpart apply to each affected facility designated in paragraph (b) of this section that produces any of the chemicals listed in Section 60.617 as a product, co-product, by-product, or intermediate, except as provided in paragraph (c) of this section.

Potassium thiosulfate or potassium sulfite/bisulfite are not listed in Section 60.617. Therefore, the provisions of this subpart do not apply to this project.

40 CFR Part 60 – Subpart NNN: Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations

Section 60.660(a) states the provisions of this subpart apply to each affected facility designated in paragraph (b) of this section that is part of a process unit that produces any of the chemicals listed in Section 60.667 as a product, co-product, by-product, or intermediate, except as provided in paragraph (c).

Potassium thiosulfate or potassium sulfite/bisulfite are not listed in Section 60.667. Therefore, the provisions of this subpart do not apply to this project.

40 CFR Part 60 – Subpart RRR: Standards of Performance for Volatile Organic Compound Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes

Section 60.700(a) states the provisions of this subpart apply to each affected facility designated in paragraph (b) of this section that is part of a process unit that produces any of the chemicals listed in Section 60.707 as a product, co-product, by-product, or intermediate, except as provided in paragraph (c) of this section.

Potassium thiosulfate or potassium sulfite/bisulfite are not listed in Section 60.707. Therefore, the provisions of this subpart do not apply to this project.

Rule 4002 National Emission Standards for Hazardous Air Pollutants (NESHAPS)

40 CFR Part 63 – Subpart F: National Emission Standards for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry

Section 63.100(a) states this subpart provides applicability provisions, definitions, and other general provisions that are applicable to subparts G and H of this part.

Section 63.100(b) states except as provided in paragraphs (b)(4) and (c) of this section, the provisions of subparts F, G, and H of this part apply to chemical manufacturing process units that meet all the criteria specified in paragraphs (b)(1), (b)(2), and (b)(3) of this section:

Section 63.100(b)(1), (b)(2), and (b)(3) states the following:

(1) Manufacture as a primary product one or more of the chemicals listed in paragraphs (b)(1)(i) or (b)(1)(ii) of this section.
(i) One or more of the chemicals listed in table 1 of this subpart; or
(ii) One or more of the chemicals listed in paragraphs (b)(1)(ii)(A) or (b)(1)(ii)(B) of this section:
(A) Tetrahydrobenzaldehyde (CAS Number 100-50-5); or
(B) Crotonaldehyde (CAS Number 123-73-9).
(2) Use as a reactant or manufacture as a product, or co-product, one or more of the organic hazardous air pollutants listed in table 2 of this subpart;
(3) Are located at a plant site that is a major source as defined in section 112(a) of the Act.

As shown in the Rule 2550 section discussion, this facility is not a major source of HAP emissions. Therefore, the provisions of this subpart are not applicable to this project.

<u>40 CFR Part 63 – Subpart G: National Emission Standards for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater</u>

Section 63.110(a) states this subpart applies to all process vents, storage vessels, transfer racks, wastewater streams, and in-process equipment subject to Section 63.149 within a source subject to subpart F of this part.

As explained in the 40 CFR Part 63 Subpart F section discussion, this facility is not a major source of HAP emissions and the provisions of 40 CFR Part 63 Subpart F are not applicable to this project. Therefore, the provisions of 40 CFR Part 63 Subpart G are not applicable to this project.

<u>40 CFR Part 63 – Subpart H: National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks</u>

Section 63.160(a) states the provisions of this subpart apply to pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, instrumentation systems, and control devices or closed vent systems required by this subpart that are intended to operate in organic hazardous air pollutant service 300 hours or more during the calendar year within a source subject to the provisions of a specific subpart in 40 CFR part 63 that references this subpart.

This source is not subject to provisions of a specific subpart in 40 CFR Part 63 that references Subpart H. Therefore, the provisions of this subpart are not applicable to this project.

40 CFR Part 63 – Subpart Q: National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers

Section 63.400(a) states the provisions of this subpart apply to all new and existing industrial process cooling towers that are operated with chromium-based water treatment chemicals and are either major sources or are integral parts of facilities that are major sources as defined in Section 63.401.

Section 63.401 defines major source as any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants.

As shown in the Rule 2550 section discussion, this facility is not a major source of HAP emissions. Therefore, this facility is not a major source or an integral part of a facility that is a major source as defined in Section 63.401 and the provisions of this subpart are not applicable to this project.

40 CFR Part 63 – Subpart BB: National Emission Standards for Hazardous Air Pollutants From Phosphate Fertilizers Production Plants

Section 63.620(a) states except as provided in paragraphs (c), (d), and (e) of this section, the requirements of this subpart apply to the owner or operator of each phosphate fertilizers production plant.

Section 63.620(c) states the requirements of this subpart do not apply to the owner or operator of a new or existing phosphate fertilizers production plant that is not a major source as defined in Section 63.2.

Section 63.2 defines major source as any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants, unless the Administrator establishes a lesser quantity, or in the case of radionuclides, different criteria from those specified in this sentence.

As shown in the Rule 2550 section discussion, this facility is not a major source of HAP emissions. Therefore, this facility is not a major source as defined in Section 63.2 and the provisions of this subpart are not applicable to this project.

40 CFR Part 63 – Subpart EEEE: National Emission Standards for Hazardous Air Pollutants: Organic Liquids Distribution (Non-Gasoline)

Section 63.2330(a) states This subpart establishes national emission limitations, operating limits, and work practice standards for organic hazardous air pollutants (HAP) emitted from organic liquids distribution (OLD) (non-gasoline) operations at major sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations, operating limits, and work practice standards.

Section 63.2334(a) states except as provided for in paragraphs (b) and (c) of this section, you are subject to this subpart if you own or operate an OLD operation that is located at, or is part of, a major source of HAP emissions. An OLD operation may occupy an entire plant site or be collocated with other industrial (e.g., manufacturing) operations at the same plant site.

As shown in the Rule 2550 section discussion, this facility is not a major source of HAP emissions. Therefore, the provisions of this subpart are not applicable to this project.

<u>40 CFR Part 63 – Subpart FFFF: National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing</u>

Section 63.2430(a) states this subpart establishes national emission standards for hazardous air pollutants (NESHAP) for miscellaneous organic chemical manufacturing. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limits, operating limits, and work practice standards.

Section 63.2435(a) states you are subject to the requirements in this subpart if you own or operate miscellaneous organic chemical manufacturing process units (MCPU) that are located at, or are part of, a major source of hazardous air pollutants (HAP) emissions as defined in section 112(a) of the Clean Air Act (CAA).

Section 63.2 defines major source as any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants, unless the Administrator establishes a lesser quantity, or in the case of radionuclides, different criteria from those specified in this sentence.

As shown in the Rule 2550 section discussion, this facility is not a major source of HAP emissions. Therefore, this facility is not a major source as defined in section 112(a) of the Clean Air Act (CAA) and the provisions of this subpart are not applicable to this project.

<u>40 CFR Part 63 – Subpart DDDDD: National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters</u>

Section 63.7480 states this subpart establishes national emission limitations and work practice standards for hazardous air pollutants (HAP) emitted from industrial, commercial, and institutional boilers and process heaters located at major sources of HAP. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and work practice standards.

Section 63.7485 states you are subject to this subpart if you own or operate an industrial, commercial, or institutional boiler or process heater as defined in Section 63.7575 that is located at, or is part of, a major source of HAP, except as specified in Section 63.7491. For purposes of this subpart, a major source of HAP is as defined in Section 63.2, except that for oil and natural gas production facilities, a major source of HAP is as defined in Section 63.7575.

Section 63.7491 lists types of boilers and process heaters which are not subject to this subpart.

Section 63.2 defines major source as any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants, unless the Administrator establishes a lesser quantity, or in the case of radionuclides, different criteria from those specified in this sentence.

As shown in the Rule 2550 section discussion, this facility is not a major source of HAP emissions. Therefore, this facility is not a major source as defined in Section 63.2 and the provisions of this subpart are not applicable to this project.

<u>40 CFR Part 63 – Subpart JJJJJJ: National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources</u>

Section 63.11193 states you are subject to this subpart if you own or operate an industrial, commercial, or institutional boiler as defined in Section 63.11237 that is located at, or is part of, an area source of hazardous air pollutants (HAP), as defined in Section 63.2, except as specified in Section 63.11195.

Section 63.11195 lists types of boilers which are not subject to this subpart.

Section 63.11237 defines boiler as an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam or hot water. Controlled flame combustion refers to a steady-state, or near steady-state, process wherein fuel and/or oxidizer feed rates are controlled. Waste heat boilers are excluded from this definition.

Section 63.11237 defines waste heat boilers as a device that recovers normally unused energy and converts it to usable heat. Waste heat boilers are also referred to as heat recovery steam generators.

The sulfur igniter does not use controlled flame combustion in which water is heated to recover thermal energy in the form of steam or hot water. The waste heat recovery boiler in this project recovers normally unused energy and converts it to usable heat and meets the definition of waste heat boiler in this subpart. Therefore, the waste heat recovery boiler is excluded from the definition of boiler as defined in this subpart.

Therefore, the permitted units in this project are not boilers as defined in this subpart and the provisions of this subpart are not applicable to this project.

Rule 4101 Visible Emissions

Rule 4101 states that no air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity.

The following condition will be listed on the permits to ensure compliance:

- No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

Therefore, compliance with the requirements of this rule is expected.

Rule 4102 Nuisance

Section 4.0 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of this operation, provided the equipment is well maintained.

The following condition will be listed on the permits to ensure compliance:

- No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

California Health & Safety Code 41700 - Health Risk Analysis

District Policy APR 1905 – Risk Management Policy for Permitting New and Modified Sources specifies that for an increase in emissions associated with a proposed new source or modification, the District perform an analysis to determine the possible impact to the nearest resident or worksite.

An HRA is not required for a project with a total facility prioritization score of less than or equal to one. According to the Technical Services Memo for this project (Attachment B), the total facility prioritization score including this project was less than or equal to one. Therefore, no future analysis is required to determine the impact from this project and compliance with the District's Risk Management Policy is expected.

The following conditions will be listed on the permit to ensure compliance:

C-8573-10-0

- The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
- Stack height shall be at least 150 feet. [District Rule 4102]

C-8573-11-0

- No biocide containing hexavalent chromium will be used in the cooling tower. [District Rule 4102]

Rule 4201 Particulate Matter Concentration

District Rule 4201 prohibits discharge of dust, fumes, or total particulate matter into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot.

C-8573-10-0

The applicant has proposed a process vent PM_{10} emission rate of 0.00001 lb/dscf.

$$GL = \frac{0.00001\, lb - PM}{dscf} \times \frac{7{,}000\, grain}{lb} = \frac{0.07\, grain - PM}{dscf}$$

$$GL = 0.07\ grain/dscf < 0.1\, grain/dscf$$

C-8573-11-0

$$\text{PM Conc. (gr/scf)} = \frac{\text{(PM emission rate) x (7,000 gr/lb)}}{\text{(Exhaust gas flow rate) x (60 min/hr) x (24 hr/day)}}$$

PM_{10} emission rate = 0.4 lb/day. Assuming 100% of PM is PM_{10}
Exhaust Gas Flow = 2,729 scfm

PM Conc. (gr/scf) = [(0.4 lb/day) x (7,000 gr/lb)] ÷ [(2,729 ft^3/min) x (60 min/hr) x (24 hr/day)]
PM Conc. = 0.00007 gr/scf

The following condition will be listed on the permits to ensure compliance:

- Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

Therefore, compliance with District Rule 4201 requirements is expected.

Rule 4202 Particulate Matter Emission Rate

Rule 4202 establishes PM emission limits as a function of process weight rate in tons/hr. Gas and liquid fuels are excluded from the definition of process weight.

C-8573-11-0

Process weight rate = 3,000 gal/min x 60 min/hr x 8.34 lb/gal ÷ 2,000 lb/ton
= 750.6 ton/hr

Rule 4202 emission limit = 17.31 x $P^{0.16}$ (where P greater than 30 tons/hr)
= 17.31 x $(750.6)^{0.16}$
= 49.93 lb/hr

The cooling tower has a PM_{10} emission rate of 0.02 lb/hr (0.4 lb/day ÷ 24 hr/day). Assuming all cooling tower PM emissions are PM_{10}, the cooling tower PM emissions will be less than allowed by Rule 4202.

Therefore, compliance with the requirements of this rule is expected.

Rule 4301 Fuel Burning Equipment

This rule specifies maximum emission rates in lb/hr for SO_2, NO_2, and combustion contaminants (defined as total PM in Rule 1020). This rule also limits combustion contaminants to ≤ 0.1 gr/scf. According to AP 42 (Table 1.4-2, footnote c), all PM emissions from natural gas combustion are less than 1 μm in diameter. As shown below, each unit's maximum hourly emission rates are below the Rule 4301 limits.

District Rule 4301 Limits			
Permit Unit	**NO_2**	**Total PM**	**SO_2**
C-8573-10-0	0.45	2.53	4.68
Rule 4301 Limit	**140 lb/hr**	**10 lb/hr**	**200 lb/hr**

As shown above, compliance with the requirements of this rule is expected.

Rule 4307 Boilers, Steam Generators, and Process Heaters – 2.0 MMBtu/hr to 5.0 MMBtu/hr

The purpose of this rule is to limit emissions of NOx, CO, SOx, and PM_{10} from boilers, steam generators, and process heaters.

Rule 4307 applies to any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input of 2.0 MMBtu/hr up to and including 5.0 MMBtu/hr.

Section 3.5 defines boiler or steam generator as any external combustion equipment, fired with any fuel used to produce hot water or steam.

Section 3.18 defines process heater as any combustion equipment fired with liquid and/or gaseous fuel and which transfers heat from combustion gases to water or process streams. This definition excludes: kilns or ovens used for drying, baking, cooking, calcining, or vitrifying; and unfired waste heat recovery heaters used to recover sensible heat from the exhaust of combustion equipment.

The sulfur igniter in this project is not used to produce hot water or steam. Therefore, the sulfur igniter does not meet the definition of boiler or steam generator as defined in this rule.

The sulfur igniter only operates during periods of startup and shutdown. No molten sulfur is supplied to the sulfur furnace during startup or shutdown. The purpose of the sulfur igniter during startup is to heat up the sulfur furnace to a level at which the oxidation of sulfur can be sustained. The purpose of the sulfur igniter during shutdown is to properly cool down the sulfur burning equipment. The definition of process heater states a unit that "transfers heat from combustion gases to water or process streams". Although the rule does not define "process stream", the operation of the sulfur igniter does not directly heat any product that is part of the process stream. In addition, the molten sulfur at this stage of the process is not being processed to generate the final product of the manufacturing process (i.e. KTS). Therefore, the sulfur igniter does not transfer heat from combustion gases to water or process streams and does not meet the definition of a process heater as defined in this rule.

Therefore, the requirements of this rule are not applicable to this project.

Rule 4309 Dryers, Dehydrators, and Ovens

The purpose of this rule is to limit emissions of oxides of nitrogen (NO_X) and carbon monoxide (CO) from dryers, dehydrators, and ovens. This rule applies to any dryer, dehydrator, or oven that is fired on gaseous fuel, liquid fuel, or is fired on gaseous and liquid fuel sequentially, and the total rated heat input for the unit is 5.0 million British thermal units per hour (5.0 MMBtu/hr) or greater.

Section 3.9 defines dehydrator as a device that drives free water from products like fruits, vegetables, and nuts, at an accelerated rate without damage to the product.

Section 3.10 defines dryer as a device in which material is dried or cured in direct contact with the products of combustion.

Section 3.19 defines oven as a chamber in which material is dried or cured in direct contact with the products of combustion.

The sulfur furnace in this project will not drive free water from any material. The sulfur furnace will not dry or cure any material. Therefore, the sulfur furnace does not meet the definition of dehydrator, dryer, or oven as defined in this rule and the requirements of this rule are not applicable to this project.

Rule 4320 Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr

The purpose of this rule is to limit emissions of oxides of nitrogen (NOx), carbon monoxide (CO), oxides of sulfur (SO_2), and particulate matter 10 microns or less (PM_{10}) from boilers, steam generators, and process heaters.

This rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input greater than 5 million Btu per hour.

As the sulfur igniter in this project does not have a total rated heat input greater than 5 MMBtu/hr, the requirements of this rule are not applicable to the sulfur igniter in this project.

Rule 4352 Solid Fuel Fired Boilers, Steam Generators And Process Heaters

The purpose of this rule is to limit emissions of oxides of nitrogen (NOx) and carbon monoxide (CO) from solid fuel fired boilers, steam generators and process heaters.

This rule applies to any boiler, steam generator or process heater fired on solid fuel. Heat may be supplied by liquid or gaseous fuels for startups, shutdowns, and during other flame stabilization periods, as deemed necessary by the owner/operator.

The sulfur igniter in this project is not fired on solid fuel.

Therefore, the requirements of this rule are not applicable to this project.

Rule 4455 Components at Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants

The purpose of District Rule 4455 is to limit VOC emissions from leaking components at petroleum refineries, gas liquids processing facilities, and chemical plants.

Pursuant Section 3.4, a chemical plant is an establishment that produces organic chemicals and/or manufactures products by organic chemical processes. This facility does not produce organic chemicals and/or manufacture products by organic chemical processes. The facility does manufacture potassium thiosulfate but potassium thiosulfate is not an organic chemical and is not manufactured by organic chemical processes.

Therefore, the facility is not a chemical plant and the requirements of this rule are not applicable to this project.

Rule 4623 Storage of Organic Liquids

The purpose of this rule is to limit volatile organic compound (VOC) emissions from the storage of organic liquids.

Pursuant to Section 2.0, this rule applies to any tank with a capacity of 1,100 gallons or greater in which any organic liquid is placed, held, or stored.

Section 3.22 defines organic liquid as any liquid which contains volatile organic compounds (VOCs) including, but not limited to, crude oils and petroleum distillates.

Rule 1020 Section 3.53 defines volatile organic compound as any compound containing at least one (1) atom of carbon, except for a list of exempt compounds.

The equipment in this project handle KTS, KBS, KOH, process water, and/or brine. These solutions do not meet the definition of organic liquid as the compounds do not contain at least one atom of carbon. Therefore, the equipment in this project does not place, hold, or store organic liquids and the requirements of this rule are not applicable to this project.

Rule 4801 Sulfur Compounds

A person shall not discharge into the atmosphere sulfur compounds, which would exist as a liquid or gas at standard conditions, exceeding in concentration at the point of discharge: 0.2 % by volume calculated as SO_2, on a dry basis averaged over 15 consecutive minutes.

C-8573-9-0

Molten sulfur H_2S concentration = 440 ppmw H2S

Converting ppmw to ppmv,

$$\frac{m_{H2S} / MW_{H2S}}{m_{exhaust} / MW_{exhaust}} = \frac{n_{H2S}}{n_{exhaust}} = \frac{V_{H2S}}{V_{exhaust}}$$

Assuming exhaust is 100% air,

$$\frac{V_{H2S}}{V_{air}} = \frac{m_{H2S}}{m_{air}} x \frac{MW_{air}}{MW_{H2S}}$$ = 440E-6 x (29/34) = 375 ppmv H2S = 375 ppmv SOx (as SO2)

C-8573-10-0

The applicant has proposed a process vent SOx emission rate of 115 ppmv.

Therefore, compliance with District Rule 4801 requirements is expected.

Rule 7012 Hexavalent Chromium – Cooling Towers

The purpose of this rule is to limit emissions of hexavalent chromium from circulating water in cooling towers and to prohibit the use or sale of products containing these compounds for treating cooling tower water.

The requirements of this rule apply to any person who owns or operates or who plans to build, own, or operate a cooling tower in which the circulating water is exposed to the atmosphere.

C-8573-11-0

Section 4.1 provides an exemption for cooling tower circulating water that has never had hexavalent chromium containing compounds added.

Since the proposed cooling tower will not and has never had hexavalent chromium containing compounds added, the cooling tower will be exempt from the provision of this rule except for the Sections 5.2.1, 6.1, and 7.1.

Section 5.2.1 requires that no hexavalent chromium compounds be added after 9/16/91 (intended to apply to cooling towers that previously used hexavalent chromium). The following condition will be listed on the permit to ensure compliance:

- No hexavalent chromium containing compounds shall be added to cooling tower circulating water. [District Rule 7012]

Section 6.1 requires that the owner/operator of a new cooling tower submit a compliance plan at least 90 days before it is operated containing business information, location of cooling tower, type and materials of construction, and a statement regarding the use or non-use of hexavalent chromium. The following condition will be listed on the permit to ensure compliance:

- Permittee shall submit cooling tower design details including the cooling tower type, drift eliminator design details, and materials of construction to the District at least 90 days before the tower is operated. [District Rule 7012]

Section 7.1 requires that the permittee pay filing fees associated with the cooling tower as specified in Rule 3010 (Permit Fee). The applicant has already paid such fees with the submittal of this project's applications.

Therefore, compliance with the requirements of this rule is expected.

Rule 8011 General Requirements

The definitions, exemptions, requirements, administrative requirements, recordkeeping requirements, and test methods set forth in this rule are applicable to all rules under Regulation VIII (Fugitive PM_{10} Prohibitions) of the Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District.

Rule 8021 Construction, Demolition, Excavation, Extraction, And Other Earthmoving Activities

The purpose of this rule is to limit fugitive dust emissions from construction, demolition, excavation, and other earthmoving activities. It requires the use of control measures to maintain visible dust emissions (VDE) under the 20% opacity requirement.

The applicant will commit to the use of dust control measures (e.g., water, approved chemical stabilizers, etc.) during construction to maintain opacity to a level below 20% per Rule 8021 requirements. The following conditions will be listed on the permits to ensure compliance with the requirements of this rule.

- Disturbances of soil related to any construction, demolition, excavation, extraction, or other earthmoving activities shall comply with the requirements for fugitive dust control in

District Rule 8021 unless specifically exempted under Section 4.0 of Rule 8021 or Rule 8011. [District Rules 8011 and 8021]

- An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. [District Rules 8011 and 8021]

Rule 8031 Bulk Materials

This rule is applicable to the outdoor handling and storage of any bulk material, which emits visible dust when stored or handled. The following condition will be listed on the permits to ensure compliance with the requirements of this rule.

- {3443} All bulk material transport vehicles shall limit Visible Dust Emissions to 20% opacity by either limiting vehicular speed, maintaining sufficient freeboard on the load, applying water to the top of the load, or covering the load with a tarp or other suitable cover. [District Rules 8011 and 8031]
- {3444} When storing bulk materials outside an enclosed structure or building, water or chemical/organic stabilizers/suppressants shall be applied as required to limit Visible Dust Emissions to a maximum of 20% opacity. When necessary to achieve this opacity limitation, all bulk material piles shall also be either maintained with a stabilized surface as defined in Section 3.58 of District Rule 8011, or shall be protected with suitable covers or barriers as prescribed in Table 8031-1, Section B, of District Rule 8031. [District Rules 8011 and 8031]
- {3445} When transporting bulk materials outside an enclosed structure or building, all bulk material transport vehicles shall limit Visible Dust Emissions to 20% opacity by either limiting vehicular speed, maintaining sufficient freeboard on the load, applying water to the top of the load, or covering the load with a tarp or other suitable cover. [District Rules 8011 and 8031]

Rule 8041 Carryout and Trackout

This rule is applicable to all sites that are subject to Rule 8021 (Construction, Demolition, Excavation, Extraction, and other Earthmoving Activities), Rule 8031 (Bulk Materials), and Rule 8071 (Unpaved Vehicle and Equipment Traffic Areas) where carryout or trackout has occurred or may occur. The following condition will be listed on the permits to ensure compliance with the requirements of the rule:

- {3447} An owner/operator shall prevent or cleanup any carryout or trackout in accordance with the requirements of District Rule 8041 Section 5.0, unless specifically exempted under Section 4.0 of Rule 8041 or Rule 8011. [District Rules 8011 and 8041]

Rule 8051 Open Areas

This rule is applicable to any open area having 3.0 acres or more of disturbed surface area, that has remained undeveloped, unoccupied, unused or vacant for more than seven days.

The following condition will be listed on the permits to ensure compliance with the requirements of the rule.

- Whenever open areas are disturbed, or vehicles are used in open areas, the facility shall comply with the requirements of Section 5.0 of District Rule 8051, unless specifically exempted under Section 4.0 of Rule 8051 or Rule 8011. [District Rules 8011 and 8051]

Rule 8061 Paved and Unpaved Roads

This rule applies to any paved, or unpaved public or private road, street, highway, freeway, alley, way, access drive, access easement, or driveway constructed or modified after December 10, 1993. The following condition will be listed on the permits to ensure compliance with the requirements of this rule.

- {3437} Any paved road or unpaved road shall comply with the requirements of District Rule 8061 unless specifically exempted under Section 4.0 of Rule 8061 or Rule 8011. [District Rules 8011 and 8061]

Rule 8071 Unpaved Vehicle/Equipment Traffic Areas

This rule applies to any unpaved vehicle/equipment traffic area of 1.0 acre or larger. The following conditions will be listed on the permits to ensure compliance with the requirements of the rule.

- {3438} Water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure shall be applied to unpaved vehicle travel areas as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071]
- {3448} Where dusting materials are allowed to accumulate on paved surfaces, the accumulation shall be removed daily or water and/or chemical/organic dust stabilizers/suppressants shall be applied to the paved surface as required to maintain continuous compliance with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011 and limit Visible Dust Emissions (VDE) to 20% opacity. [District Rule 8011 and 8071]
- {3449} On each day that 50 or more Vehicle Daily Trips or 25 or more Vehicle Daily Trips with 3 axles or more will occur on an unpaved vehicle/equipment traffic area, permittee shall apply water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071]
- {3450} Whenever any portion of the site becomes inactive, permittee shall restrict access and periodically stabilize any disturbed surface to comply with the conditions for a stabilized surface as defined in Section 3.58 of District Rule 8011. [District Rules 8011 and 8071]

- {3451} Records and other supporting documentation shall be maintained as required to demonstrate compliance with the requirements of the rules under Regulation VIII only for those days that a control measure was implemented. Such records shall include the type of control measure(s) used, the location and extent of coverage, and the date, amount, and frequency of application of dust suppressant, manufacturer's dust suppressant product information sheet that identifies the name of the dust suppressant and application instructions. Records shall be kept for one year following project completion that results in the termination of all dust generating activities. [District Rules 8011, 8031, and 8071]

California Health & Safety Code 42301.6 – School Notice

This site is not located within 1000 feet of a K-12 school. Therefore, pursuant to California Health & Safety Code 42301.6, a school notice is not required.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The San Joaquin Valley Unified Air Pollution Control District (District) adopted its *Environmental Review Guidelines* (ERG) in 2001. The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities.
- Identify the ways that environmental damage can be avoided or significantly reduced.
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

Greenhouse Gas (GHG) Significance Determination

It is determined that another agency has prepared an environmental review document for the project. The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381). As a Responsible Agency, the District is limited to mitigating or avoiding impacts for which it has statutory authority. The District does not have statutory authority for regulating greenhouse gas emissions. The District has determined that the applicant is responsible for implementing greenhouse gas mitigation measures, if any, imposed by the Lead Agency.

District CEQA Findings

The City of Hanford (City) is the public agency having principal responsibility for approving the project. As such, the City served as the Lead Agency (CCR §15367). In approving the project, the Lead Agency prepared and adopted a Mitigated Negative Declaration. The Lead agency filed a Notice of Determination, stating that the environmental document was adopted pursuant to the provisions of CEQA and concluding that the project would not have a significant effect on the environment.

The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CCR §15381). As a Responsible Agency the District complies with CEQA by considering the environmental document prepared by the Lead Agency, and by reaching its own conclusion on whether and how to approve the project (CCR §15096).

The District has considered the Lead Agency's environmental document. Furthermore, the District has conducted an engineering evaluation of the project, this document, which demonstrates that Stationary Source emissions from the project would be below the District's thresholds of significance for criteria pollutants. Thus, the District finds that through a combination of project design elements, compliance with applicable District rules and regulations, and compliance with District air permit conditions, project specific stationary source emissions will have a less than significant impact on air quality. The District does not have authority over any of the other project impacts and has, therefore, determined that no additional findings are required (CEQA Guidelines §15096(h)).

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Issue Authority to Construct permits C-8573-9-0, '10-0, and '11-0 subject to the permit conditions on the attached draft Authority to Construct permits in Attachment C.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
C-8573-9-0	3020-05-E	167,000 gallons	$246
C-8573-10-0	3020-02-G	5 MMBtu/hr	$815
C-8573-11-0	3020-01-C	50 hp	$197

Attachments

A: BACT Guidelines, New BACT Determination, BACT Revisions, and Top Down BACT Analyses
B: Health Risk Assessment Analysis and Ambient Air Quality Analysis
C: Draft Authority to Construct Permits

Attachment A

BACT Guidelines, New BACT Determination, BACT Revisions, and Top Down BACT Analyses

New BACT Determination 7.3.XX: Liquid Sulfur Storage Tanks

Facility Name:	Tessenderlo Kerley, Inc.	Date:	August 18, 2013
Mailing Address:	2255 N. 44th St, Suite 300 Phoenix, AZ 85008	Engineer:	Stanley Tom
		Lead Engineer:	Joven Refuerzo
Contact Person:	Ken Gagon		
Telephone:	(602) 889-8300		
Application #:	C-8573-9-0		
Project #:	C-1132059		
Location:	10724 Energy St, Hanford, CA		
Complete:	July 25, 2013		

I. PROPOSAL

Tessenderlo Kerley, Inc. requests Authority to Construct (ATC) permits for a new potassium thiosulfate (KTS) manufacturing plant which manufactures KTS and potassium sulfite/bisulfite solution (KBS also referred to as K-ROW 23) as a co-product. KTS and KBS are both fertilizer products and will be distributed to customers from the fertilizer terminal.

The facility will receive potassium hydroxide (KOH) and elemental sulfur as raw materials for the KTS manufacturing process. The facility is installing a 22,000 gallon capacity sulfur unloading tank (D202) and a 167,000 gallon capacity sulfur storage tank (V203) to unload and store elemental liquid sulfur. Potential H_2S emissions are calculated using a mass balance at maximum throughput by conservatively assuming that 100 percent of the H_2S in the stream is released during storage. Since the tanks are in series, a given H_2S molecule may be emitted from either one tank or the other. In practice, some of the H_2S will be emitted from each tank and some will remain in the sulfur as it is fed into the sulfur furnace. In the sulfur furnace, the H_2S will form SO_2, which is the desired intermediate chemical sent to the SO_2 absorbers prior to KTS production.

II. PROJECT LOCATION

The facility is located at 10724 Energy St, Hanford, CA.

III. EQUIPMENT LISTING

Permit Unit	Equipment Description
C-8573-9-0	22,000 GALLON SULFUR UNLOADING TANK (D202) AND 167,000 GALLON SULFUR STORAGE TANK (V203) SERVED BY A H2S SCRUBBER

IV. PROCESS DESCRIPTION

The KTS Plant receives both KOH and elemental sulfur by truck and rail for use as raw materials in the KTS manufacturing process. The molten sulfur unloading tank serves as an interim storage tank for molten sulfur received via rail that is ultimately stored in the larger molten sulfur storage tank.

The first stage of the KTS production process takes place in the sulfur furnace. The plant uses a process in which molten sulfur is burned with ambient air to create sulfur dioxide ($S + O_2 \rightarrow SO_2$). There are three main pieces of equipment used in the sulfur oxidation process: a sulfur furnace, a thermal reactor, and a waste heat recovery boiler. The sulfur furnace initiates the sulfur oxidation reaction. The thermal reactor allows the sulfur oxidation reaction to near completion. The waste heat recovery boiler cools down the sulfur dioxide while producing steam to support plant operations (sulfur oxidation is an extremely exothermic reaction).

During normal operating conditions, the oxidation of sulfur releases enough heat to maintain continued oxidation without an additional heating source. During startup (SU) conditions, it is necessary to heat up the sulfur furnace to a level at which the oxidation of sulfur can be sustained. As such, a natural gas burner (sulfur igniter) is used as an initial heating source for the sulfur oxidation reaction. During shutdown (SD) conditions, the natural gas sulfur igniter is used to properly cool down the sulfur burning equipment. The capacity of this natural gas burner is 5 MMBtu/hr and is only used during SU/SD periods.

No molten sulfur is supplied to the sulfur furnace during SU and SD. During SU, no molten sulfur will be oxidized while the burner combusts natural gas. During SD, any residual molten sulfur remaining inside the furnace from normal operation may be oxidized by the natural gas sulfur igniter. Therefore, SD is the only operating scenario when there is a possibility for natural gas to be combusted in the furnace at the same time that molten sulfur is oxidized.

A thermal reactor follows the sulfur furnace in the KTS process. The thermal reactor allows the reaction between sulfur and oxygen to come nearer to completion by increasing contact time. Following the thermal reactor is a waste heater recovery boiler which simply recovers the heat from the hot gaseous SO_2 (normal operation) or hot combustion exhaust gases (SU/SD) to generate steam.

Following the waste heat recovery boiler, the cooled SO_2 vapor stream is sent through two absorbers where gaseous SO_2 is absorbed by liquid KOH and water. The resulting solution is a liquid potassium sulfite/bisulfite solution (KBS). Most of the KBS solution is then routed to the KTS reactor; however, a portion is sent to storage either for use in future KTS production or for future sale/loadout as KBS. Before being vented to the atmosphere, the vapor streams from the absorbers are sent to high efficiency particulate filters which remove particulates, entrained liquid, and much of any remaining sulfur dioxide. Liquid recovered from the process vent particulate filters is recycled back into the KTS manufacturing process to maximize the conversion of raw materials to KTS.

At the KTS reactor, KBS solution reacts with elemental sulfur, KOH, and water to produce liquid KTS. The KTS is then sent through an evaporator to remove the appropriate amount of water before being stored in the KTS day tank or storage tanks at the fertilizer terminal. The vapor vented from the KTS reactor and evaporator is sent through the process vent particulate filters before being emitted to atmosphere.

Additional storage tanks hold raw materials and products, including elemental sulfur, KOH, KTS, and KBS. The KTS and KBS day tanks are used for daily storage of product and are quality checked prior to transfer to bulk storage at the fertilizer terminal. The process water holds utility water used for the KTS manufacturing process and cooling water. The brine tank simply holds a salt and water mixture used as a water softener when necessary.

A cooling tower provides cooling water to the KTS Plant to cool process streams as necessary. During normal operation, steam needed for the KTS plant and to heat the molten sulfur tanks is generated from the water heat recovery boiler. During SU/SD events or when the KTS Plant is shutdown completely, a package boiler provides heating for the molten sulfur tanks.

<u>KTS Plant Process Vent</u>

All vapor streams from the process units are ultimately routed to the KTS process vent (S401), a common stack carrying all emission from the KTS process to the atmosphere.

IV. CONTROL EQUIPMENT EVALUATION

<u>Sulfur Storage Tanks</u>

The facility will install a scrubber to control H_2S emissions from the molten sulfur. The scrubber will achieve a removal rate of at least 95% for inorganic gases. Thus, a control efficiency of 95% is applied to the uncontrolled H_2S emissions as determined through the mass balance approach.

A. Best Available Control Technology (BACT) for Permit Unit C-8573-9-0

Applicability

District Rule 2201 states that BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis for the following:

a) Any new emissions unit with a potential to emit exceeding two pounds per day,
b) The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day, and/or
c) Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day.
d) When a Major Modification is triggered for a modification project at a facility that is a Major Source.

As shown below, BACT is triggered for SOx emissions for the liquid sulfur storage tanks.

Post-Project Potential to Emit				
Permit Unit	Process	Pollutant	Daily PE (lb/day)	Annual PE (lb/year)
C-8573-9-0	Sulfur Storage Tanks	H_2S	17.6	6,424

B. BACT Policy

Per District Policy APR 1305, Section IX, "A top-down BACT analysis shall be performed as a part of the Application Review for each application subject to the BACT requirements pursuant to the District's NSR Rule for source categories or classes covered in the BACT Clearinghouse, relevant information under each of the following steps may be simply cited from the Clearinghouse without further analysis".

The District's 4th quarter 2013 BACT Clearinghouse was surveyed to determine if an existing BACT guideline was applicable for this class and category of operation. No BACT guidelines were found that cover sulfur storage tanks. Pursuant to the District's BACT policy, a Top-Down BACT analysis will be performed for inclusion of a new determination in the District's BACT Clearinghouse.

C. BACT Determination for Sulfur Storage Tanks

The Environmental Protection Agency (EPA), California Air Resources Board (CARB), San Diego County Air Pollution Control District (SDCAPCD), South Coast Air Quality Management District (SCAQMD), Bay Area Air Quality Management District (BAAQMD) and the San Joaquin Valley Air Pollution Control District (SJVAPCD) BACT clearinghouses were reviewed to determine potential control technologies for this class and category of operation.

Although the proposed project is for a sulfur storage tank, the following BACT analysis will be based upon control technologies found on BACT Guideline 7.3.2 for petroleum and petrochemical production fixed roof organic liquid storage or processing tank. Both operations are types of liquid storage operations and the possible control technologies employed would be applicable to both types of operations.

Top Down BACT Analysis for Sulfur Storage Tanks H_2S Emissions for Permit Unit C-8573-9-0

Step 1 - Identify All Possible Control Technologies

The controls listed in BACT Guideline 7.3.2 are applicable to the sulfur storage tanks as the same control technology is feasible and sulfur storage tanks and chemical and petrochemical tanks operate in a similar manner. Both store liquids and emit pollutants via working and standing losses.

The following control technologies have been identified for sulfur storage tanks:

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
H2S		0.044 lb-H2S/gal solution or 95% control (sulfur removal by scrubber or equal)	

Step 2 - Eliminate Technologically Infeasible Options

None of the above listed technologies are technologically infeasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Rank by Control Effectiveness		
Rank	Control	Overall Capture and Control Efficiency
1	0.044 lb-H2S/gal solution or 95% control (sulfur removal by scrubber or equal)	95%

Step 4 - Cost Effectiveness Analysis

Pursuant to Section IX.D of District Policy APR 1305 – BACT Policy, a cost effectiveness analysis is required for the options that have not been determined to be achieved in practice.

As the applicant has proposed the most effective control technology applicable, a cost effectiveness analysis is not required.

Step 5 - Select BACT

The facility has proposed a H_2S scrubber serving the sulfur storage tanks achieving 0.044 lb-H_2S/gal solution. Therefore, the BACT requirements for H_2S are satisfied.

Proposed Pages For the BACT Clearinghouse

San Joaquin Valley Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 7.3.XX

Emission Unit: Liquid Sulfur Storage Tank **Industry Type:** All

Equipment Rating: None **Last Update:** August 18, 2013

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
H_2S		0.044 lb-H_2S/gal solution or 95% control (sulfur removal by scrubber or equal)	

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

***This is a Summary Page for this Class of Source - Permit Specific BACT Determinations on Next Page(s)**

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 7.3.XX A

Emission Unit: Liquid Sulfur Storage Tank

Equipment Rating: None

Facility: Tessenderlo Kerley, Inc.

References: ATC #: C-8573-9-0
Project #: 1132059

Location: 10724 Energy St., Hanford, CA

Date of Determination: August 18, 2013

Pollutant	BACT Requirements
H2S	0.044 lb-H2S/gal solution or 95% control (sulfur removal by scrubber or equal)

BACT Status:

_ Achieved in practice _ Small Emitter _ T-BACT
X Technologically feasible BACT
_ At the time of this determination achieved in practice BACT was equivalent to technologically feasible BACT
_ Contained in EPA approved SIP
_ The following technologically feasible options were not cost effective:
_ Alternate Basic Equipment
_ The following alternate basic equipment was not cost effective:

BACT CLEARINGHOUSE
--Submission Form--

Category

Source Category	Industrial Inorganic Chemicals	
SIC Code	2819	View SIC Code List
NAICS Code		View NAICS Code List

Emission Unit Information

Manufacturer	N/A
Type	N/A
Model	N/A
Equipment Description	22,000 GALLON SULFUR UNLOADING TANK (D202) AND 167,000 GALLON SULFUR STORAGE TANK (V203) SERVED BY AN H2S SCRUBBER
Capacity/Dimensions	N/A
Fuel Type	N/A
Multiple Fuel Types	
Operating Schedule	Continuous 24 hrs/day, 8,760 hrs/yr
Function of Equipment	The proposed equipment will store elemental liquid sulfur.

Facility/District Information

Facility Name	Tessenderlo Kerley, Inc.
Facility County	Kings County
Facility Zip Code	93230
District Contact	David Warner, San Joaquin Valley Air Pollution District
District Contact Phone	(559) 230-6000
District Contact E-mail	carlos.garcia@valleyair.org

Project/Permit Information

Application or Permit Number	C-8573-9-0
New Construction/Modification	New Construction
ATC Date (mm-dd-yyyy)	TBD
PTO Date (mm-dd-yyyy)	TBD
Startup Date (mm-dd-yyyy)	TBD
Technology Status	None

Source Test Available No

Source Test Results TBD

BACT Information

Pollutant Limit(s) and Control Method(s) – Please include proper units

NOx	Limit: Control Method Type: Control Method Description:	Units:	Averaging Time:
CO	Limit: Control Method Type: Control Method Description:	Units:	Averaging Time:
VOC	Limit: Control Method Type: Control Method Description:	Units:	Averaging Time:
PM	Limit: Control Method Type: Control Method Description:	Units:	Averaging Time:
PM 2.5	Limit: Control Method Type: Control Method Description:	Units:	Averaging Time:
PM 10	Limit: Control Method Type: Control Method Description:	Units:	Averaging Time:
SOx	Limit: Control Method Type: Control Method Description:	Units:	Averaging Time:
H2S	Limit: 0.044 Control Method Type: Scrubber Control Method Description: Sulfur reducing scrubber	Units: lb/gal	Averaging Time:

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 1.9.2*

Last Update 7/2/1996

Sulfuric Acid Plant Start-up Heater - < 15 MMBtu/hr

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
NOx		1. Selective catalytic reduction 2. Natural gas fuel with LPG backup, Low-NOx burner 3. Natural gas fuel with LPG backup	

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in s a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

***This is a Summary Page for this Class of Source**

BACT Guideline 1.9.2 Revision: Sulfuric Acid Plant Start-up Heater - < 15 MMBtu/hr

Top Down BACT Analysis for Sulfur Igniter NOx Emissions for Permit Unit C-8573-10-0

BACT Guidance

Current District BACT Guideline 1.9.2 applies to sulfuric acid plant startup heaters < 15 MMBtu/hr.

BACT Guideline 1.9.2 also applies to the sulfur igniter in this project as the sulfur igniter is a type of startup heater. The sulfur igniter combusts fuel to heat a chamber and provide heat to initiate a chemical reaction similar to a sulfuric acid plant startup heater.

The sulfuric acid plant startup heater operated by J R Simplot Company and listed on permit N-767-9 is currently in service and utilizes natural gas fuel. Therefore, the current technologically feasible option of natural gas fuel with LPG backup will be listed as an Achieved in Practice control option. The proposed sulfur igniter in this project also utilizes natural gas fuel.

Since this project is for a potassium thiosulfate startup heater, the title of the BACT Guideline will be revised to include potassium thiosulfate manufacturing chemical plants.

Step 1 - Identify All Possible Control Technologies

The SJVUAPCD BACT Clearinghouse guideline 1.9.2, 4th quarter 2013, identifies BACT for Sulfuric Acid/Potassium Thiosulfate Plant Start-up Heater - < 15 MMBtu/hr.

Tessenderlo Kerley, Inc. has indicated the control technology of non-selective catalytic reduction is feasible for this class and category source operation. Therefore, this control technology will be added as a technologically feasible option.

Current BACT Guideline 1.9.2 will be revised in this project as follows to identify possible NOx control technologies:

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
NOx	Natural gas fuel with LPG backup	1. Non-Selective catalytic reduction 2. Selective catalytic reduction	

Step 2 - Eliminate Technologically Infeasible Options

Natural gas fuel with LPG backup, Low-NOx burner (Technologically Feasible)

As explained in the Process Description section of this evaluation, the natural gas-fired burner increases the temperature of the furnace to a level which can sustain sulfur combustion. The Stackmatch igniter is used to ignite the natural gas-fired burner and then the Stackmatch igniter is removed from the furnace. The elevated furnace temperature would melt the Stackmatch igniter.

When the facility received price quotes for a natural gas-fired burner in the proposed furnace, the vendors did not quote a price for a low NOx burner achieving an emission rate of 30 ppmv @ 3% O2 (0.036 lb/MMBtu). Based on the proposed operating conditions of the burner, the vendors stated the lowest achievable NOx emission rate was 0.06 lb/MMBtu. In project N-960206, the burner for the furnace analyzed in the BACT analysis for the sulfuric acid plant was analyzed with a technologically feasible option of achieving a NOx emission rate of 30 ppmv @ 3% O2. However, as the vendors would not provide price quotes for a low NOx burner for the size burner proposed in this project, the emission control option of a low NOx burner will be considered technologically infeasible for this project and will be removed from consideration in the BACT analysis.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Rank by Control Effectiveness		
Rank	Control	Control Efficiency
1	Non-Selective Catalytic Reduction	90%
2	Selective Catalytic Reduction	80%
3	Natural gas fuel (0.06 lb/MMBtu) with LPG backup	Baseline

Step 4 - Cost Effectiveness Analysis

Pursuant to Section IX.D of District Policy APR 1305 – BACT Policy, a cost effectiveness analysis is required for the options that have not been determined to be achieved in practice.

Option 1: Non-Selective Catalytic Reduction (Technologically Feasible)

Assumptions

- Hours of Operation for Sulfur Igniter = 324 hours/year (per applicant)
- Exhaust % H_2O by Volume = 7.38%
- Natural gas F-Factor = 8,578 dscf/MMBtu (corrected to 60 °F)
- Natural gas Higher Heating Value = 1,000 Btu/scf (District Practice)
- Molar Specific Volume = 379.5 scf/lb-mol (corrected to 60 °F)
- Molecular Weight Air = 28.84 lb/lb-mol

- Heat Capacity Air @ 450 °F = 0.246 Btu/lb °F
- Uncontrolled project NOx emissions = 2,608 lb/year

Before Heating

- NSCR inlet temperature = 105 °F = 564.67 °R (per applicant engineering design documents)
- NSCR inlet airflow at temperature of KTS process vent = 3,107 cfm (per applicant engineering design documents)

After Heating

- NSCR inlet temperature = 800 °F = 1259.67 °R (minimum temperature to achieve effective NOx control using NSCR)
- NSCR inlet airflow = 3,107 cfm x (1259.67 °R ÷ 564.67 °R) = 6,931 cfm

Annual Costs

Fuel Costs

Mass Flow Rate = SCR inlet airflow (before heating) x Standard Temperature ÷ SCR inlet temperature (before heating) x Molecular weight dry air x 1/Molar specific volume x (1 – Moisture Content)

Mass Flow Rate = 3,107 cfm x (519.67 °R ÷ 564.67 °R) x 28.84 lb/lb-mol x lb-mol/379.5 scf x (1 – 7.38%) x 60 min/hour

Mass Flow Rate = 12,076 lb/hr

Additional Heating Required = (SCR inlet temperature (after heating) – SCR inlet temperature (before heating)) x Heat capacity of air x Mass flow rate

Additional Heating Required = (800 °F – 105 °F) x 0.246 Btu/lb °F x 12,076 lb/hr x 8,760 hr/year
= 18,086 MMBtu/year

The cost for natural gas shall be based upon the average price of natural gas sold to "Commercial Consumers" in California for the years 2011 and 2012.[1]

2012	= \$8.28/thousand ft^3 total monthly average
2011	= \$7.13/thousand ft^3 total monthly average
Average for two years	= \$7.705/thousand ft^3 total monthly average

Fuel Cost = 18,086 MMBtu/year x scf/1000 Btu x \$7.705/1000 ft^3
= \$139,351/year

1 Energy Information Administration/Natural Gas; Average Price of Natural Gas Sold to Commercial Consumers by State, 2011 - 2012

Emission Reductions

Annual Emission Reduction = 2,608 lb-NOx/year x 0.90
= 2,347.2 lb-NOx/year
= 1.17 ton-NOx/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $139,351/year ÷ 1.17 tons-NOx/year
= $119,103/ton-NOx

The analysis demonstrates that the annual fuel cost alone results in a cost effectiveness which exceeds the District's Guideline of $24,500/ton-NOx. Therefore this option is not cost-effective and will not be considered for this project.

Option 2: Selective Catalytic Reduction (Technologically Feasible)

Assumptions

- Hours of Operation for Sulfur Igniter = 324 hours/year (per applicant)
- Exhaust % H_2O by Volume = 7.38%
- Natural gas F-Factor = 8,578 dscf/MMBtu (corrected to 60 °F)
- Natural gas Higher Heating Value = 1,000 Btu/scf (District Practice)
- Molar Specific Volume = 379.5 scf/lb-mol (corrected to 60 °F)
- Molecular Weight Air = 28.84 lb/lb-mol
- Heat Capacity Air @ 350 °F = 0.244 Btu/lb °F
- Uncontrolled NOx emission factor = 0.10 lb/MMBtu (AP-42, Table 1.4-1 (7/98))
- SCR controlled NOx emission factor = 0.011 lb/MMBtu (per project N-960206)

Before Heating

- SCR inlet temperature = 105 °F = 564.67 °R (per applicant engineering design documents)
- SCR inlet airflow at temperature of KTS process vent = 3,107 cfm (per applicant engineering design documents)

After Heating

- SCR inlet temperature = 600 °F = 1059.67 °R (minimum temperature to achieve effective NOx control using SCR)
- SCR inlet airflow = 3,107 cfm x (1059.67 °F ÷ 564.67 °F) = 5,831 cfm

Annual Costs

Fuel Costs

Mass Flow Rate = SCR inlet airflow (before heating) x Standard Temperature ÷ SCR inlet temperature (before heating) x Molecular weight dry air x 1/Molar specific volume x (1 – Moisture Content)

Mass Flow Rate = 3,107 cfm x (519.67 °R ÷ 564.67 °R) x 28.84 lb/lb-mol x lb-mol/379.5 scf x (1 – 7.38%) x 60 min/hour

Mass Flow Rate = 12,076 lb/hr

Additional Heating Required = (SCR inlet temperature (after heating) – SCR inlet temperature (before heating)) x Heat capacity of air x Mass flow rate

Additional Heating Required = (600 °F – 105 °F) x 0.244 Btu/lb °F x 12,076 lb/hr x 8,760 hr/year
= 12,776.8 MMBtu/year

The cost for natural gas shall be based upon the average price of natural gas sold to "Commercial Consumers" in California for the years 2011 and 2012.

2012	= \$8.28/thousand ft^3 total monthly average
2011	= \$7.13/thousand ft^3 total monthly average
Average for two years	= \$7.705/thousand ft^3 total monthly average

Fuel Cost = 12,776.8 MMBtu/year x scf/1000 Btu x \$7.705/1000 ft^3
= \$98,445/year

Emission Reductions

Annual Emission Reduction = 2,608 lb-NOx/year x 0.80
= 2,086.4 lb-NOx/year
= 1.04 ton-NOx/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = \$98,445/year ÷ 1.04 tons-NOx/year
= \$94,659/ton-NOx

The analysis demonstrates that the annual fuel cost alone results in a cost effectiveness which exceeds the District's Guideline of \$24,500/ton-NOx. Therefore this option is not cost-effective and will not be considered for this project.

Option 3: Natural gas fuel with LPG backup (Achieved in Practice)

The option listed above has been identified as achieved in practice for NOx emissions. Therefore, a cost analysis is not necessary.

Step 5 - Select BACT

All identified feasible options with control efficiencies higher than the option proposed by the facility have been shown to not be cost effective.

Pursuant to the above Top-Down BACT Analysis, BACT for the sulfur igniter must be satisfied with the following:

NOx: Natural gas fuel (0.06 lb/MMBtu) with LPG backup (Achieved in Practice)

The facility has proposed Option 3, natural gas fuel (0.06 lb/MMBtu) with LPG backup. These BACT requirements will be listed on the permits as enforceable conditions. Therefore, the requirements of BACT have been satisfied.

Proposed Pages For the BACT Clearinghouse

San Joaquin Valley Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 1.9.2

Emission Unit: Sulfuric Acid or Potassium Thiosulfate Manufacturing Plant Start-up Heater

Industry Type: All

Last Update: August 18, 2013

Equipment Rating: None

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
NOx	Natural gas fuel (0.06 lb/MMBtu) with LPG backup	1. Non-Selective catalytic reduction 2. Selective catalytic reduction 3. Natural gas fuel with LPG backup, Low-NOx burner (30 ppmv @ 3% O2)	

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

***This is a Summary Page for this Class of Source - Permit Specific BACT Determinations on Next Page(s)**

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 1.9.2 B

Emission Unit: Potassium Thiosulfuate Manufacturing Chemical Plant Sulfur Igniter

Equipment Rating: 5 MMBtu/hr

References: ATC #: C-8573-10-0
Project #: 1132059

Facility: Tessenderlo Kerley, Inc.

Date of Determination: August 18, 2013

Location: 10724 Energy St., Hanford, CA

Pollutant	BACT Requirements
NOx	Natural gas fuel (0.06 lb/MMBtu) with LPG backup

BACT Status:

X Achieved in practice _ Small Emitter _ T-BACT
_ Technologically feasible BACT
_ At the time of this determination achieved in practice BACT was equivalent to technologically feasible BACT
_ Contained in EPA approved SIP
X The following technologically feasible options were not cost effective:

1) Non-selective catalytic reduction
2) Selective catalytic reduction
3) Natural gas fuel with LPG backup, Low-NOx burner (30 ppmv @ 3% O2)

_ Alternate Basic Equipment
_ The following alternate basic equipment was not cost effective:

BACT CLEARINGHOUSE
--Submission Form--

Category

Source Category	Industrial Inorganic Chemicals	
SIC Code	2819	View SIC Code List
NAICS Code		View NAICS Code List

Emission Unit Information

Manufacturer	N/A
Type	N/A
Model	N/A
Equipment Description	POTASSIUM THIOSULFATE PRODUCTION OPERATION INCLUDING A SULFUR FURNACE (F400), 5 MMBTU/HR NATURAL GAS-FIRED SULFUR IGNITER (IG400), SULFUR THERMAL REACTOR (D400), WASTE HEAT RECOVERY BOILER (B400), TWO SO2 ABSORBERS(T401 AND T402), A POTASSIUM THIOSULFATE REACTION UNIT (R410), AN EVAPORATOR (D411), HIGH EFFICIENCY PARTICULATE FILTERS (D403), AND A POTASSIUM THIOSULFATE PROCESS VENT (S401)
Capacity/Dimensions	5 MMBTU/HR
Fuel Type	Natural Gas
Multiple Fuel Types	
Operating Schedule	Intermittent 24 hrs/day, 324 hrs/yr
Function of Equipment	The proposed equipment will be used to heat the sulfur furnace chamber.

Facility/District Information

Facility Name	Tessenderlo Kerley, Inc.
Facility County	Kings County
Facility Zip Code	93230
District Contact	David Warner, San Joaquin Valley Air Pollution District
District Contact Phone	(559) 230-6000
District Contact E-mail	carlos.garcia@valleyair.org

Project/Permit Information

Application or Permit Number	C-8573-10-0

New Construction/Modification	New Construction
ATC Date (mm-dd-yyyy)	TBD
PTO Date (mm-dd-yyyy)	TBD
Startup Date (mm-dd-yyyy)	TBD
Technology Status	None
Source Test Available	No
Source Test Results	TBD

BACT Information

Pollutant Limit(s) and Control Method(s) – Please include proper units

NOx	Limit: 0.06 Units: lb/MMBtu Averaging Time: Control Method Type: None Control Method Description: None
CO	Limit: Units: Averaging Time: Control Method Type: Control Method Description:
VOC	Limit: Units: Averaging Time: Control Method Type: Control Method Description:
PM	Limit: Units: Averaging Time: Control Method Type: Control Method Description:
PM 2.5	Limit: Units: Averaging Time: Control Method Type: Control Method Description:
PM 10	Limit: Units: Averaging Time: Control Method Type: Control Method Description:
SOx	Limit: Units: Averaging Time: Control Method Type: Control Method Description:

New BACT Determination 4.12.X: Chemical Plant – Potassium Thiosulfate Manufacturing Process Vent

Facility Name:	Tessenderlo Kerley, Inc.	Date:	August 18, 2013
Mailing Address:	2255 N. 44th St, Suite 300 Phoenix, AZ 85008	Engineer:	Stanley Tom
		Lead Engineer:	Joven Refuerzo
Contact Person:	Ken Gagon		
Telephone:	(602) 889-8300		
Application #:	C-8573-10-0		
Project #:	C-1132059		
Location:	10724 Energy St, Hanford, CA		
Complete:	July 25, 2013		

I. PROPOSAL

Tessenderlo Kerley, Inc. requests Authority to Construct (ATC) permits for a new potassium thiosulfate (KTS) manufacturing plant which manufactures KTS and potassium sulfite/bisulfite solution (KBS also referred to as K-ROW 23) as a co-product. KTS and KBS are both fertilizer products and will be distributed to customers from the fertilizer terminal.

The facility will receive potassium hydroxide (KOH) and elemental sulfur as raw materials for the KTS manufacturing process. The KTS manufacturing plant will consist of the following equipment.

Permit Unit	Process	Equipment
C-8573-10-0	KTS Production	Sulfur furnace (F400) and igniter (IG400)
		Sulfur thermal reactor (D400)
		Waste heat recovery boiler (B400)
		Two SO_2 absorbers (T401 and T402)
		KTS reaction unit (R410)
		Evaporator (D411)
		High efficiency particulate filters (D403)
		KTS process vent (S401)

Tessenderlo Kerley, Inc. has submitted an ATC permit application to install a greenfield fertilizer terminal located at the same site as the potassium thiosulfate manufacturing plant proposed in this project. The greenfield fertilizer terminal will be permitted in project C-1131967.

This facility is not a major source for any pollutant.

II. PROJECT LOCATION

The facility is located at 10724 Energy St, Hanford, CA.

III. EQUIPMENT LISTING

Permit Unit	Equipment Description
C-8573-10-0	POTASSIUM THIOSULFATE PRODUCTION OPERATION INCLUDING A SULFUR FURNACE (F400), 5 MMBTU/HR NATURAL GAS-FIRED SULFUR IGNITER (IG400), SULFUR THERMAL REACTOR (D400), WASTE HEAT RECOVERY BOILER (B400), TWO SO2 ABSORBERS(T401 AND T402), A POTASSIUM THIOSULFATE REACTION UNIT (R410), AN EVAPORATOR (D411), HIGH EFFICIENCY PARTICULATE FILTERS (D403), AND A POTASSIUM THIOSULFATE PROCESS VENT (S401)

V. PROCESS DESCRIPTION

The KTS Plant receives both KOH and elemental sulfur by truck and rail for use as raw materials in the KTS manufacturing process. The molten sulfur unloading tank serves as an interim storage tank for molten sulfur received via rail that is ultimately stored in the larger molten sulfur storage tank.

The first stage of the KTS production process takes place in the sulfur furnace. The plant uses a process in which molten sulfur is burned with ambient air to create sulfur dioxide ($S + O_2 \rightarrow SO_2$). There are three main pieces of equipment used in the sulfur oxidation process: a sulfur furnace, a thermal reactor, and a waste heat recovery boiler. The sulfur furnace initiates the sulfur oxidation reaction. The thermal reactor allows the sulfur oxidation reaction to near completion. The waste heat recovery boiler cools down the sulfur dioxide while producing steam to support plant operations (sulfur oxidation is an extremely exothermic reaction).

During normal operating conditions, the oxidation of sulfur releases enough heat to maintain continued oxidation without an additional heating source. During startup (SU) conditions, it is necessary to heat up the sulfur furnace to a level at which the oxidation of sulfur can be sustained. As such, a natural gas burner (sulfur igniter) is used as an initial heating source for the sulfur oxidation reaction. During shutdown (SD) conditions, the natural gas sulfur igniter is used to properly cool down the sulfur burning equipment. The capacity of this natural gas burner is 5 MMBtu/hr and is only used during SU/SD periods.

No molten sulfur is supplied to the sulfur furnace during SU and SD. During SU, no molten sulfur will be oxidized while the burner combusts natural gas. During SD, any residual molten sulfur remaining inside the furnace from normal operation may be oxidized by the natural gas sulfur igniter. Therefore, SD is the only operating scenario when there is a possibility for natural gas to be combusted in the furnace at the same time that molten sulfur is oxidized.

A thermal reactor follows the sulfur furnace in the KTS process. The thermal reactor allows the reaction between sulfur and oxygen to come nearer to completion by increasing contact time. Following the thermal reactor is a waste heater recovery boiler which simply recovers the heat from the hot gaseous SO_2 (normal operation) or hot combustion exhaust gases (SU/SD) to generate steam.

Following the waste heat recovery boiler, the cooled SO_2 vapor stream is sent through two absorbers where gaseous SO_2 is absorbed by liquid KOH and water. The resulting solution is a liquid potassium sulfite/bisulfite solution (KBS). Most of the KBS solution is then routed to the KTS reactor; however, a portion is sent to storage either for use in future KTS production or for future sale/loadout as KBS. Before being vented to the atmosphere, the vapor streams from the absorbers are sent to high efficiency particulate filters which remove particulates, entrained liquid, and much of any remaining sulfur dioxide. Liquid recovered from the process vent particulate filters is recycled back into the KTS manufacturing process to maximize the conversion of raw materials to KTS.

At the KTS reactor, KBS solution reacts with elemental sulfur, KOH, and water to produce liquid KTS. The KTS is then sent through an evaporator to remove the appropriate amount of water before being stored in the KTS day tank or storage tanks at the fertilizer terminal. The vapor vented from the KTS reactor and evaporator is sent through the process vent particulate filters before being emitted to atmosphere.

Additional storage tanks hold raw materials and products, including elemental sulfur, KOH, KTS, and KBS. The KTS and KBS day tanks are used for daily storage of product and are quality checked prior to transfer to bulk storage at the fertilizer terminal. The process water holds utility water used for the KTS manufacturing process and cooling water. The brine tank simply holds a salt and water mixture used as a water softener when necessary.

A cooling tower provides cooling water to the KTS Plant to cool process streams as necessary. During normal operation, steam needed for the KTS plant and to heat the molten sulfur tanks is generated from the water heat recovery boiler. During SU/SD events or when the KTS Plant is shutdown completely, a package boiler provides heating for the molten sulfur tanks.

KTS Plant Process Vent

All vapor streams from the process units are ultimately routed to the KTS process vent (S401), a common stack carrying all emission from the KTS process to the atmosphere.

IV. CONTROL EQUIPMENT EVALUATION

KTS Plant Process Vent

Before being emitted to the atmosphere, the streams pass through the process vent particulate filters, which are high efficiency particulate filters installed inside the process vent. The process vent particulate filters in the stack eliminate 99 percent of particulate matter, remove entrained liquid, and also remove a large amount of remaining SO_2.

A. Best Available Control Technology (BACT) for Permit Unit S-8153-10-0

Applicability

District Rule 2201 states that BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis for the following:

a) Any new emissions unit with a potential to emit exceeding two pounds per day,
b) The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day, and/or
c) Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day.
d) When a Major Modification is triggered for a modification project at a facility that is a Major Source.

As shown below, BACT is triggered for NOx, SOx, and PM10 emissions for the process vent.

Process Vent		
Pollutant	**Daily PE2**	**BACT Triggered?**
NO_x	10.7 lb/day	Yes
SO_x	112.4 lb/day	Yes
PM_{10}	60.6 lb/day	Yes
CO	43.3 lb/day	No*
VOC	0.7 lb/day	No

* BACT is not triggered for CO since the SSPE2 for CO is not greater than 200,000 lbs/year

B. BACT Policy

Per District Policy APR 1305, Section IX, "A top-down BACT analysis shall be performed as a part of the Application Review for each application subject to the BACT requirements pursuant to the District's NSR Rule for source categories or classes covered in the BACT Clearinghouse, relevant information under each of the following steps may be simply cited from the Clearinghouse without further analysis".

The District's 4th quarter 2013 BACT Clearinghouse was surveyed to determine if an existing BACT guideline was applicable for this class and category of operation. No BACT guidelines were found that cover process vents from potassium thiosulfate manufacturing chemical plants. Pursuant to the District's BACT policy, a Top-Down BACT analysis will be performed for inclusion of a new determination in the District's BACT Clearinghouse.

C. BACT Determination for Process Vents from Potassium Thiosulfate Chemical Plants

The Environmental Protection Agency (EPA), California Air Resources Board (CARB), San Diego County Air Pollution Control District (SDCAPCD), South Coast Air Quality Management District (SCAQMD), Bay Area Air Quality Management District (BAAQMD) and the San Joaquin

Valley Air Pollution Control District (SJVAPCD) BACT clearinghouses were reviewed to determine potential control technologies for this class and category of operation.

Although the proposed project is a Potassium Thiosulfate and Potassium Sulfite/Bisulfite manufacturing plant, the following BACT analysis will be based upon control technologies found at sulfuric acid plants. Both operations are types of chemical plants and the possible control technologies employed would be applicable to both types of operations. Sulfuric acid manufacturing is a wide spread industry whereas Potassium Thiosulfate and Potassium Sulfite/Bisulfite manufacturing is a much smaller market with sparse literature available. However, there were no BACT Guidelines found for either sulfuric acid manufacturing or potassium thiosulfate/potassium sulfite/bisulfite manufacturing.

1. NOx Top-Down BACT Analysis for Permit Unit C-8573-10-0

The source of NOx emissions at the process vent is from the sulfur igniter and from the potassium thiosulfate manufacturing process. The source of nitrogen oxides is from potassium thiosulfate manufacturing raw material feed containing nitrogen compounds. Therefore, a NOx top down BACT analysis will be performed for both the sulfur igniter unit and the process vent.

Step 1 - Identify All Possible Control Technologies

As shown in the sulfur igniter top down BACT analysis, the following control technologies are possible.

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
NOx		1. Non-Selective catalytic reduction 2. Selective catalytic reduction	

Step 2 - Eliminate Technologically Infeasible Options

There are no technologically infeasible options.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Rank by Control Effectiveness		
Rank	Control	Control Efficiency
1	Non-Selective Catalytic Reduction	90%
2	Selective Catalytic Reduction	80%

Step 4 - Cost Effectiveness Analysis

Pursuant to Section IX.D of District Policy APR 1305 – BACT Policy, a cost effectiveness analysis is required for the options that have not been determined to be achieved in practice.

Option 1: Non-Selective Catalytic Reduction (Technologically Feasible)

Assumptions

- Exhaust % H_2O by Volume = 7.38%
- Natural gas F-Factor = 8,578 dscf/MMBtu (corrected to 60 °F)
- Natural gas Higher Heating Value = 1,000 Btu/scf (District Practice)
- Molar Specific Volume = 379.5 scf/lb-mol (corrected to 60 °F)
- Molecular Weight Air = 28.84 lb/lb-mol
- Heat Capacity Air @ 450 °F = 0.246 Btu/lb °F
- Uncontrolled project NOx emissions = 2,608 lb/year

Before Heating

- NSCR inlet temperature = 105 °F = 564.67 °R (per applicant engineering design documents)
- NSCR inlet airflow at temperature of KTS process vent = 3,107 cfm (per applicant engineering design documents)

After Heating

- NSCR inlet temperature = 800 °F = 1259.67 °R (minimum temperature to achieve effective NOx control using NSCR)
- NSCR inlet airflow = 3,107 cfm x (1259.67 °R ÷ 564.67 °R) = 6,931 cfm

Annual Costs

Fuel Costs

Mass Flow Rate = SCR inlet airflow (before heating) x Standard Temperature ÷ SCR inlet temperature (before heating) x Molecular weight dry air x 1/Molar specific volume x (1 – Moisture Content)

Mass Flow Rate = 3,107 cfm x (519.67 °R ÷ 564.67 °R) x 28.84 lb/lb-mol x lb-mol/379.5 scf x (1 – 7.38%) x 60 min/hour

Mass Flow Rate = 12,076 lb/hr

Additional Heating Required = (SCR inlet temperature (after heating) – SCR inlet temperature (before heating)) x Heat capacity of air x Mass flow rate

Additional Heating Required = (800 °F – 105 °F) x 0.246 Btu/lb °F x 12,076 lb/hr x 8,760 hr/year
= 18,086 MMBtu/year

The cost for natural gas shall be based upon the average price of natural gas sold to "Commercial Consumers" in California for the years 2011 and 2012.[2]

2012	= \$8.28/thousand ft^3 total monthly average
2011	= \$7.13/thousand ft^3 total monthly average
Average for two years	= \$7.705/thousand ft^3 total monthly average

Fuel Cost = 18,086 MMBtu/year x scf/1000 Btu x \$7.705/1000 ft^3
= \$139,351/year

Emission Reductions

Annual Emission Reduction = 2,608 lb-NOx/year x 0.90
= 2,347.2 lb-NOx/year
= 1.17 ton-NOx/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = \$139,351/year ÷ 1.17 tons-NOx/year
= \$119,103/ton-NOx

The analysis demonstrates that the annual fuel cost alone results in a cost effectiveness which exceeds the District's Guideline of \$24,500/ton-NOx. Therefore this option is not cost-effective and will not be considered for this project.

Option 2: Selective Catalytic Reduction (Technologically Feasible)

Assumptions

- Exhaust % H_2O by Volume = 7.38%
- Natural gas F-Factor = 8,578 dscf/MMBtu (corrected to 60 °F)
- Natural gas Higher Heating Value = 1,000 Btu/scf (District Practice)
- Molar Specific Volume = 379.5 scf/lb-mol (corrected to 60 °F)
- Molecular Weight Air = 28.84 lb/lb-mol
- Heat Capacity Air @ 350 °F = 0.244 Btu/lb °F

Before Heating

- SCR inlet temperature = 105 °F = 564.67 °R (per applicant engineering design documents)
- SCR inlet airflow at temperature of KTS process vent = 3,107 cfm (per applicant engineering design documents)

2 Energy Information Administration/Natural Gas; Average Price of Natural Gas Sold to Commercial Consumers by State, 2011 - 2012

After Heating

- SCR inlet temperature = 600 °F = 1059.67 °R (minimum temperature to achieve effective NOx control using SCR)
- SCR inlet airflow = 3,107 cfm x (1059.67 °F ÷ 564.67 °F) = 5,831 cfm

Annual Costs

Fuel Costs

Mass Flow Rate = SCR inlet airflow (before heating) x Standard Temperature ÷ SCR inlet temperature (before heating) x Molecular weight dry air x 1/Molar specific volume x (1 – Moisture Content)

Mass Flow Rate = 3,107 cfm x (519.67 °R ÷ 564.67 °R) x 28.84 lb/lb-mol x lb-mol/379.5 scf x (1 – 7.38%) x 60 min/hour

Mass Flow Rate = 12,076 lb/hr

Additional Heating Required = (SCR inlet temperature (after heating) – SCR inlet temperature (before heating)) x Heat capacity of air x Mass flow rate

Additional Heating Required = (600 °F – 105 °F) x 0.244 Btu/lb °F x 12,076 lb/hr x 8,760 hr/year
= 12,776.8 MMBtu/year

The cost for natural gas shall be based upon the average price of natural gas sold to "Commercial Consumers" in California for the years 2011 and 2012.

2012	= $8.28/thousand ft^3 total monthly average
2011	= $7.13/thousand ft^3 total monthly average
Average for two years	= $7.705/thousand ft^3 total monthly average

Fuel Cost = 12,776.8 MMBtu/year x scf/1000 Btu x $7.705/1000 ft^3
= $98,445/year

Emission Reductions

Annual Emission Reduction = 2,608 lb-NOx/year x 0.80
= 2,086.4 lb-NOx/year
= 1.04 ton-NOx/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $98,445/year ÷ 1.04 tons-NOx/year
= $94,659/ton-NOx

The analysis demonstrates that the annual fuel cost alone results in a cost effectiveness which exceeds the District's Guideline of $24,500/ton-NOx. Therefore this option is not cost-effective and will not be considered for this project.

Step 5 - Select BACT

All identified feasible options with control efficiencies higher than the option proposed by the facility have been shown to not be cost effective.

Pursuant to the above Top-Down BACT Analysis, BACT for the process vent must be satisfied with the following:

NOx: No control

The facility does not operate any NOx controls at the process vent. Therefore, the requirements of BACT have been satisfied.

2. SOx Top-Down BACT Analysis for Permit Unit C-8573-10-0

EPA AP-42 Section 8.10

AP-42 Section 8.10 discusses emissions and controls for sulfuric acid manufacturing plants.

Sulfuric acid plants typically employ either a single or dual absorption process. In the dual absorption process, the SO_3 gas formed in the primary converter stages is sent to an interpass absorber where most of the SO_3 is removed to form H_2SO_4. The remaining unconverted sulfur dioxide is forwarded to the final stages in the converter to remove much of the remaining SO_2 by oxidation to SO_3, whence it is sent to the final absorber for removal of the remaining sulfur trioxide. The single absorption process uses only one absorber.

Dual absorption, as discussed above, has generally been accepted as the best available control technology for meeting NSPS emission limits. There are no byproducts or waste scrubbing materials created. Conversion efficiencies of 99.7 percent and higher are achievable, whereas most single absorption plants have SO_2 conversion efficiencies ranging only from 95 to 98 percent. Furthermore, dual absorption permits higher converter inlet sulfur dioxide concentrations than are used in single absorption plants, because the final conversion stages effectively remove any residual sulfur dioxide from the interpass absorber.

40 CFR Part 63 Subpart G – National Emission Standards for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater

Section 63.113 lists provisions for process vent control technologies.

The subpart provides various options for reducing emissions including combustion devices such as flares, boilers, and process heaters, and the use of scrubbers. Section 63.113(a)(2) states emissions of total organic hazardous air pollutants shall be reduced by 98 weight-percent or to a concentration of 20 parts per million by volume, whichever is less stringent.

Tail gas scrubbing

SO_2 abatement by scrubbing consists in a chemical reaction between SO_2 and a basic liquid solution. This operation is achieved generally in a Gas/Liquid contact packed tower or a scrubber. A liquid circulation loop is operated from the bottom to the top of the tower, where the liquid is distributed above the packing. The gases enter the bottom part of the tower, contact and react with the basic liquid solution on the packing. SO_2 content in the outlet gases is achieved by controlling the pH of the solution, by adding more or less basic concentrated solution into the liquid circulation loop. Depending on the inlet and outlet SO_2 content and the basic product, one or two reaction steps can be needed. The resulting by-products (sulfates and sulfites) can be sold or have to be disposed of.

J R Simplot Company (Permit N-767-9)

J R Simplot Company operates a sulfuric acid production plant under permit N-767-9. This plant is a dual absorption operation.

Chemtrade

Chemtrade operates single absorption sulfuric acid production plants in locations such as Shreveport, LA and Tulsa, OK. The company entered a Consent Decree in 2009 to install scrubbers achieving a 95% control efficiency to reduce SO_2 emissions.

Tessenderlo Kerley, Inc. Ammonium Thiosulfate (ATS) and Potassium Thiosulfate (KTS) Manufacturing Plants

The applicant currently operates an ATS plant in Eufaula, AL which has been in operation since the late 1990s.

The ATS plant in Eufaula, AL is very similar in design to the KTS plant proposed in this project. The process flow diagram for the Eufaula, AL plant indicates all process units are identical and the ATS and ammonia streams are interchangeable with KTS and KOH. However, in practice the Eufaula, AL plant has never produced any KTS and is strictly an ATS manufacturing plant.

The applicant has four additional ATS plants in Ponca City, OK, Billings, MT, Wynnewood, OK, and Coffeyville, KS and one potassium thiosulfate (KTS) plant in Coffeyville, KS. These plants have been in operation varying in length from the early 1990s to December 2012. However, these plants are tail gas plants for sulfur recovery from refineries. These plants process H_2S gas instead of burning sulfur so the setup is different than for a sulfur burning plant.

The applicant has received a construction permit for an ATS plant in Burley, ID in 2012 but construction on this facility has not commenced.

The applicant stated there are no other KTS manufacturing plants the company is aware of and the District was unable to locate any other KTS manufacturing plants.

Step 1 – Identify all control technologies

Although both control technologies of dual absorption/particulate filters and use of a scrubber are achieved in practice (as discussed above), both control technologies are site and operation specific and none are currently in operation for a KTS plant.

For sulfuric acid plants, dual absorption is typically utilized in post 1970 plants and is achievable only when the SO_2 stream is greater than 6%. Single absorption is typically utilized in pre-1970 plants and when achievable on a technical basis, transformation from a single absorption process to a dual absorption process can be considered.

Tail gas scrubbers are typically used to control SO_2 emissions from single absorption processes.

Since the control technologies of dual absorption and scrubber are site and operation specific and none are currently in operation for a KTS plant, both control technologies will be listed as technologically feasible options.

The following control technologies have been identified for process vents from KTS manufacturing chemical plants.

1) Dual Absorption/Particulate Filters (Technologically Feasible)
2) Scrubber (Technologically Feasible)

Step 2 - Eliminate Technologically Infeasible Options

None of the above listed technologies are technologically infeasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Rank by Control Effectiveness		
Rank	Control	Achieved in Practice
1	Dual Absorption/Particulate Filters	N
2	Scrubber	N

Step 4 - Cost Effectiveness Analysis

Pursuant to Section IX.D of District Policy APR 1305 – BACT Policy, a cost effectiveness analysis is required for the options that have not been determined to be achieved in practice.

As the applicant has proposed the most effective control technology applicable, a cost effectiveness analysis is not required.

Step 5 - Select BACT

Pursuant to the above Top-Down BACT Analysis, BACT for the chemical plant process vent must be satisfied with the following:

SO_X: Dual Absorption/Particulate Filters (Technologically Feasible)

The applicant has proposed a KTS manufacturing chemical plant with a dual absorption process configuration and particulate filters at the process vent. Therefore, the BACT requirements for SOx are satisfied.

3. PM_{10} Top-Down BACT Analysis for Permit Unit C-8573-10-0

The source of PM_{10} emissions at the process vent is due to SO_2 emissions forming sulfur-containing particulate matter. Therefore, limiting SO_2 emissions is the principal means to reduce particulate emissions.

Step 1 – Identify all control technologies

The following control technologies have been identified for process vents from chemical plants.

1) Dual Absorption/Particulate Filters (Technologically Feasible)
2) Scrubber (Technologically Feasible

Step 2 - Eliminate Technologically Infeasible Options

None of the above listed technologies are technologically infeasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Rank by Control Effectiveness		
Rank	Control	Achieved in Practice
1	Dual Absorption/Particulate Filters	N
2	Scrubber	N

Step 4 - Cost Effectiveness Analysis

Pursuant to Section IX.D of District Policy APR 1305 – BACT Policy, a cost effectiveness analysis is required for the options that have not been determined to be achieved in practice.

As the applicant has proposed the most effective control technology applicable, a cost effectiveness analysis is not required.

Step 5 - Select BACT

Pursuant to the above Top-Down BACT Analysis, BACT for the chemical plant process vent must be satisfied with the following:

PM_{10}: Dual Absorption/Particulate Filters (Technologically Feasible)

The applicant has proposed a KTS manufacturing chemical plant with a dual absorption process configuration and particulate filters at the process vent. Therefore, the BACT requirements for PM_{10} are satisfied.

Proposed Pages For the BACT Clearinghouse

San Joaquin Valley Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 4.12.X

Emission Unit: Chemical Plant – Potassium Thiosulfate Manufacturing Process Vent

Industry Type: All

Last Update: August 18, 2013

Equipment Rating: None

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
NOx		1. Non-Selective catalytic reduction 2. Selective catalytic reduction	
SOx		1. Dual absorption/Particulate Filters 2. Scrubber	
PM10		1. Dual absorption/Particulate Filters 2. Scrubber	

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

***This is a Summary Page for this Class of Source - Permit Specific BACT Determinations on Next Page(s)**

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 4.12.X A

Emission Unit: Chemical Plant – Potassium Thiosulfate Manufacturing Process Vent

Equipment Rating: None

References: ATC #: C-8573-10-0
Project #: 1132059

Facility: Tessenderlo Kerley, Inc.

Date of Determination: August 18, 2013

Location: 10724 Energy St, Hanford, CA

Pollutant	BACT Requirements
NOx	NONE
SOx	Dual Absorption/Particulate Filters (99% control efficiency)
PM10	Dual Absorption/Particulate Filters (99% control efficiency)
CO	NONE
VOC	NONE

BACT Status:

__ Achieved in practice __ Small Emitter __ T-BACT
X Technologically feasible BACT
__ At the time of this determination achieved in practice BACT was equivalent to technologically feasible BACT
__ Contained in EPA approved SIP
__ The following technologically feasible options were not cost effective:
__ Alternate Basic Equipment
__ The following alternate basic equipment was not cost effective:

BACT CLEARINGHOUSE

--Submission Form--

Category

Source Category	Industrial Inorganic Chemicals
SIC Code	2819
NAICS Code	

View SIC Code List

View NAICS Code List

Emission Unit Information

Manufacturer	N/A
Type	N/A
Model	N/A
Equipment Description	POTASSIUM THIOSULFATE PRODUCTION OPERATION INCLUDING A SULFUR FURNACE (F400), 5 MMBTU/HR NATURAL GAS-FIRED SULFUR IGNITER (IG400), SULFUR THERMAL REACTOR (D400), WASTE HEAT RECOVERY BOILER (B400), TWO SO2 ABSORBERS(T401 AND T402), A POTASSIUM THIOSULFATE REACTION UNIT (R410), AN EVAPORATOR (D411), HIGH EFFICIENCY PARTICULATE FILTERS (D403), AND A POTASSIUM THIOSULFATE PROCESS VENT (S401)
Capacity/Dimensions	N/A
Fuel Type	N/A
Multiple Fuel Types	
Operating Schedule	Continuous 24 hrs/day, 8760 hrs/yr
Function of Equipment	The process vent is the exhaust stack for the chemical plant.

Facility/District Information

Facility Name	Tessenderlo Kerley, Inc.
Facility County	Kings County
Facility Zip Code	93230
District Contact	David Warner, San Joaquin Valley Air Pollution District
District Contact Phone	(559) 230-6000
District Contact E-mail	carlos.garcia@valleyair.org

Project/Permit Information

Application or Permit Number	C-8573-10-0

New Construction/Modification	New Construction
ATC Date (mm-dd-yyyy)	TBD
PTO Date (mm-dd-yyyy)	TBD
Startup Date (mm-dd-yyyy)	TBD
Technology Status	None
Source Test Available	No
Source Test Results	TBD

BACT Information

Pollutant Limit(s) and Control Method(s) – Please include proper units

NOx	Limit: Units: Averaging Time: Control Method Type: Control Method Description:
CO	Limit: Units: Averaging Time: Control Method Type: Control Method Description:
VOC	Limit: Units: Averaging Time: Control Method Type: Control Method Description:
PM	Limit: Units: Averaging Time: Control Method Type: Control Method Description:
PM 2.5	Limit: Units: Averaging Time: Control Method Type: Control Method Description:
PM 10	Limit: 0.00001 Units: lb/dscf Averaging Time: Control Method Type: Dual Absorption/Particulate Filters Control Method Description: Two absorption towers will be utilized with a particulate filters at the process vent (99% control efficiency).
SOx	Limit: 115 Units: ppmvd Averaging Time: Control Method Type: Dual Absorption/Particulate Filters Control Method Description: Two absorption towers will be utilized with a particulate filters at the process vent (99% control efficiency).

Attachment B

Health Risk Assessment Analysis and Ambient Air Quality Analysis

San Joaquin Valley Air Pollution Control District
Risk Management Review

To:	Stanley Tom, AQE – Permit Services
From:	Ester Davila, SAQS – Technical Services
Date:	July 9, 2013
Facility Name:	Tessenderlo Kerley
Location:	10724 Energy Street, Hanford CA
Application #(s):	C-8573-9-0, 10-0, & 11-0
Project #:	C-1132059

A. RMR SUMMARY

Categories	Tanks (Unit 9-0)	KTS Op (Unit 10-0)	Cooling Tower (Unit 11-0)	Project Totals	Facility Totals
Prioritization Score	6.52	0.02	0.0[1]	6.54	>1
Acute Hazard Index	0.19	0.0	NA[1]	0.19	0.19
Chronic Hazard Index	0.02	0.0	NA[1]	0.02	0.02
Maximum Individual Cancer Risk (10^{-6})	0.0	0.00131	NA[1]	0.00131	0.00131
T-BACT Required?	**No**	**No**	**No**		
Special Permit Conditions?	**Yes**	**Yes**	**Yes**		

1 Cancer risk, Acute and Chronic Hazard Indices were not calculated since the prioritization score was less than 1.0.

Proposed Permit Conditions

To ensure that human health risks will not exceed District allowable levels; the following permit conditions must be included for:

Unit # 9-0

1. Tanks will only store sulfur.

Unit # 10-0

1. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
2. Stack height must be at least 150 feet.

Unit 11-0

1. No biocide containing hexavalent chromium will be used in the cooling tower.

B. RMR REPORT

I. Project Description

Technical Services received a request on August 15, 2013 to perform a risk management review for the installation of: a new 22,000 gallon sulfur unloading tank (D202) and a 167,000 gallon sulfur storage tank (V203) served by a H2S scrubber; a potassium thiosulfate production operation including a sulfur furnace (F400) with a 5 MMBtu/hr natural gas fired sulfur igniter; and a 3,000 gallon per minute cooling tower. After review of MSDS for the cooling tower it was determined that there were no HAPs present, therefore the cooling tower would not contribute to the project risk and did not require further analysis.

II. Analysis

Toxic emissions for the proposed units were calculated and provided by the project engineer and applicant. In accordance with the District's *Risk Management Policy for Permitting New and Modified Sources* (APR 1905-1, March 2, 2001), risks from the proposed units' toxic emissions were prioritized using the procedure in the 1990 CAPCOA Facility Prioritization Guidelines and incorporated in the District's HEARTs database. The prioritization score for these proposed units was greater than 1.0 (see RMR Summary Table). Further analysis was required and performed. The AERMOD model was used, with the parameters outlined below and 5 year concatenated meteorological data for Hanford to determine the dispersion factors (i.e., the predicted concentration or X divided by the normalized source strength or Q) for a receptor grid. These dispersion factors were input into the Hot Spots Analysis and Reporting Program (HARP) risk assessment module to calculate the chronic and acute hazard indices and the carcinogenic risk for the project.

The following parameters were used for the review:

Analysis Parameters			
Unit 9-0		**Unit 10-0**	
Source Type	Area	**Source Type**	Point
Unloading Tank Length (m)	10.7	**Stack Height (m)**	45.72
Unloading Tank Diameter	3.05	**Stack Diameter (m)**	0.61
Storage Tank Height (m)	7.32	**Stack Exit Velocity (m/s)**	5.024
Storage Tank Diameter (m)	8.23	**Stack Temperature (°K)**	313.706
Closest Business Receptor (m)	106	**Closest Business Receptor (m)**	106
Closest Residence Receptor (m)	1189	**Closest Residence Receptor (m)**	1189
Hours of Operation	8760	**Hours of Operation**	8760

AAQA:

Technical Services also performed modeling for criteria pollutants CO, NOx, Sox, PM_{10}, and $PM_{2.5}$; as well as the RMR. The emissions rates used for criteria pollutant modeling were:

Unit 10-0	NOx	Sox	CO	PM10	PM2.5
Lbs/hr	0.74	7.88	3.03	1.803	1.803
Lbs/yr	2,754	29,354	11,280	15,799	15,799

The results from the Criteria Pollutant Modeling are as follows:

Criteria Pollutant Modeling Results*

Stack	1 Hour	3 Hours	8 Hours.	24 Hours	Annual
CO	Pass	**X**	Pass	**X**	**X**
NO_x	Pass[1]	**X**	**X**	**X**	Pass
SO_x	Pass[2]	Pass	**X**	Pass	Pass
PM_{10}	**X**	**X**	**X**	Pass[3]	Pass[3]
$PM_{2.5}$	**X**	**X**	**X**	Pass[3]	Pass[3]

*Results were taken from the attached PSD spreadsheet.
[1]The project was compared to the 1-hour NO2 National Ambient Air Quality Standard that became effective on April 12, 2010 using the District's approved procedures. The criteria pollutant 1-hour value passed using TIER I NO_2 NAAQS modeling
[2]The project was compared to the 1-hour SO2 National Ambient Air Quality Standard that became effective on August 23, 2010 using the District's approved procedures.
[3]The maximum predicted concentration for emissions of these criteria pollutants from the proposed unit are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).

III. Conclusion

The criteria modeling runs indicate the emissions from the project will not cause or significantly contribute to a violation of a State or National AAQS.

The prioritization score for the project was greater than 1.0. The acute and chronic indices were less than 1 and the project's cancer risk was less than one in a million. **In accordance with the District's Risk Management Policy, the project is approved without Toxic Best Available Control Technology (T-BACT).**

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

Attachments:

A. RMR request from the project engineer
B. Additional information from the applicant/project engineer
C. Toxic emissions summary
D. Prioritization score
E. HARP Results
F. AAQA Results
G. Facility Summary

AAQA for TKInc (C8573-10)
All Values are in Micrograms per Cubic Meter

	NOx 1 Hour	NOx Annual	CO 1 Hour	CO 8 Hour	SOx 1 Hour	SOx 3 Hour	SOx 24 Hour	SOx Annual	PM 24 Hour	PM Annual
STCK1	1.5	0.1	6.0	2.9	15.7	10.2	3.0	1.5	1.16	0.30
Background	111.0	21.0	3,611.5	2,679.5	159.8	133.2	71.9	26.6	230.00	69.00
Facility Totals	112.4	21.2	3,617.5	2,682.4	175.5	143.4	75.0	28.1	231.2	69.3
AAQS	188.7	56.0	23,000.0	10,000.0	195.0	1,300.0	105.0	80.0	50.0	30.0
	Pass	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**	**Fail**	**Fail**

EPA's Significance Level (ug/m^3)

NOx 1 Hour	NOx Annual	CO 1 Hour	CO 8 Hour	SOx 1 Hour	SOx 3 Hour	SOx 24 Hour	SOx Annual	PM 24 Hour	PM Annual
0.0	1.0	2000.0	500.0	0.0	25.0	5.0	1.0	5.0	1.0

*Since 5-years of metereological data were used, an adjustment factor of 1.75 for Hanford was applied to the annual average concentrations for the devices modeled.

AAQA Emission (g/sec)

Device	NOx 1 Hour	NOx Annual	CO 1 Hour	CO 8 Hour	SOx 1 Hour	SOx 3 Hour	SOx 24 Hour	SOx Annual	PM 24 Hour	PM Annual
STCK1	5.62E-02	3.75E-02	2.28E-01	2.28E-01	5.93E-01	5.93E-01	5.93E-01	4.00E-01	2.27E-01	8.00E-02

*Since 5-years of metereological data were used, an adjustment factor of 1.75 for Hanford was applied to the annual average concentrations for the devices modeled.

Attachment C

Draft Authority to Construct Permits

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: C-8573-9-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: TESSENDERLO KERLEY, INC.
MAILING ADDRESS: 2255 N. 44TH STREET, SUITE 300
PHOENIX, AZ 85008-3279

LOCATION: 10724 ENERGY STREET
HANFORD, CA

EQUIPMENT DESCRIPTION:
22,000 GALLON SULFUR UNLOADING TANK (D202) AND 167,000 GALLON SULFUR STORAGE TANK (V203) SERVED BY AN H2S SCRUBBER

CONDITIONS

1. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
2. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
3. Combined controlled H2S emission rate from the sulfur unloading tank and sulfur storage tank shall not exceed 0.044 lb/ton solution. [District Rule 2201]
4. Throughput for each tank shall not exceed either of the following limits: 400 tons/day or 146,000 tons/year.. [District Rule 2201]
5. Source testing to determine the emission rate of the scrubber shall be conducted at least once every twelve (12) months. [District Rule 2201]
6. The pH of the scrubbing liquid shall be maintained at a level recommended by the scrubber manufacturer. A continuous monitoring device shall be installed and maintained to measure the pH of the scrubbing liquid. [District Rule 2201]
7. The pH range of the scrubbing liquid shall be established during the initial source test of the scrubber. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services
C-8573-9-0 : Feb 18 2014 10:26AM – TOMS : Joint Inspection NOT Required

8. The scrubber liquid operating flow rate shall not be less than the scrubber manufacturer's minimum recommended rate. A flow meter shall be installed and maintained to measure the scrubbing liquid flow rate at the inlet of the scrubber. [District Rule 2201]

9. The flow rate range of the scrubbing liquid shall be established during the initial source test of the scrubber. [District Rule 2201]

10. Scrubber spray and/or nozzles shall be maintained in optimum working condition. [District Rule 2201]

11. Source testing to measure the H2S emission rate from the outlet of the scrubber shall be conducted using ARB Method 15 or using an alternative method approved by the APCO. [District Rules 1081 and 2201]

12. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

13. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]

14. For emissions source testing, the arithmetic average of three test runs shall apply each with a duration of at least 30 consecutive minutes. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rule 1081]

15. The permittee shall maintain daily and annual records, in tons, of the quantity of liquid processed through each storage tank. [District Rules 1070 and 2201]

16. During each day of operation, the permittee shall record the scrubber liquid pH and flow rate (in gallons per minute), and compare the reading with the established ranges listed in this permit. [District Rule 2201]

17. All records shall be maintained and retained on-site for a period of at least five (5) years and shall be made available for District inspection upon request. [District Rule 1070]

18. Disturbances of soil related to any construction, demolition, excavation, extraction, or other earthmoving activities shall comply with the requirements for fugitive dust control in District Rule 8021 unless specifically exempted under Section 4.0 of Rule 8021 or Rule 8011. [District Rules 8011 and 8021]

19. An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. [District Rules 8011 and 8021]

20. When handling bulk materials outside an enclosed structure or building, water or chemical/organic stabilizers/suppressants shall be applied as required to limit Visible Dust Emissions to a maximum of 20% opacity. When necessary to achieve this opacity limitation, wind barriers with less than 50% porosity shall also be used. [District Rules 8011 and 8031]

21. When storing bulk materials outside an enclosed structure or building, water or chemical/organic stabilizers/suppressants shall be applied as required to limit Visible Dust Emissions to a maximum of 20% opacity. When necessary to achieve this opacity limitation, all bulk material piles shall also be either maintained with a stabilized surface as defined in Section 3.58 of District Rule 8011, or shall be protected with suitable covers or barriers as prescribed in Table 8031-1, Section B, of District Rule 8031. [District Rules 8011 and 8031]

22. When transporting bulk materials outside an enclosed structure or building, all bulk material transport vehicles shall limit Visible Dust Emissions to 20% opacity by either limiting vehicular speed, maintaining sufficient freeboard on the load, applying water to the top of the load, or covering the load with a tarp or other suitable cover. [District Rules 8011 and 8031]

23. An owner/operator shall prevent or cleanup any carryout or trackout in accordance with the requirements of District Rule 8041 Section 5.0, unless specifically exempted under Section 4.0 of Rule 8041 or Rule 8011. [District Rules 8011 and 8041]

24. Whenever open areas are disturbed, or vehicles are used in open areas, the facility shall comply with the requirements of Section 5.0 of District Rule 8051, unless specifically exempted under Section 4.0 of Rule 8051 or Rule 8011. [District Rules 8011 and 8051]

DRAFT

CONDITIONS CONTINUE ON NEXT PAGE

25. Any paved road or unpaved road shall comply with the requirements of District Rule 8061 unless specifically exempted under Section 4.0 of Rule 8061 or Rule 8011. [District Rules 8011 and 8061]

26. Water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure shall be applied to unpaved vehicle travel areas as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rules 8011 and 8071]

27. Where dusting materials are allowed to accumulate on paved surfaces, the accumulation shall be removed daily or water and/or chemical/organic dust stabilizers/suppressants shall be applied to the paved surface as required to maintain continuous compliance with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011 and limit Visible Dust Emissions (VDE) to 20% opacity. [District Rules 8011 and 8071]

28. On each day that 50 or more Vehicle Daily Trips or 25 or more Vehicle Daily Trips with 3 axles or more will occur on an unpaved vehicle/equipment traffic area, permittee shall apply water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rules 8011 and 8071]

29. Whenever any portion of the site becomes inactive, Permittee shall restrict access and periodically stabilize any disturbed surface to comply with the conditions for a stabilized surface as defined in Section 3.58 of District Rule 8011. [District Rules 8011 and 8071]

30. Records and other supporting documentation shall be maintained as required to demonstrate compliance with the requirements of the rules under Regulation VIII only for those days that a control measure was implemented. Such records shall include the type of control measure(s) used, the location and extent of coverage, and the date, amount, and frequency of application of dust suppressant, manufacturer's dust suppressant product information sheet that identifies the name of the dust suppressant and application instructions. Records shall be kept for one year following project completion that results in the termination of all dust generating activities. [District Rules 8011, 8031, and 8071]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: C-8573-10-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: TESSENDERLO KERLEY, INC.
MAILING ADDRESS: 2255 N. 44TH STREET, SUITE 300
PHOENIX, AZ 85008-3279

LOCATION: 10724 ENERGY STREET
HANFORD, CA

EQUIPMENT DESCRIPTION:
POTASSIUM THIOSULFATE PRODUCTION OPERATION INCLUDING A SULFUR FURNACE (F400), 5 MMBTU/HR NATURAL GAS-FIRED SULFUR IGNITER (IG400), SULFUR THERMAL REACTOR (D400), WASTE HEAT RECOVERY BOILER (B400), TWO SO2 ABSORBERS(T401 AND T402), A POTASSIUM THIOSULFATE REACTION UNIT (R410), AN EVAPORATOR (D411), HIGH EFFICIENCY PARTICULATE FILTERS (D403), AND A POTASSIUM THIOSULFATE PROCESS VENT (S401)

CONDITIONS

1. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
2. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
3. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
4. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
5. Stack height shall be at least 150 feet. [District Rule 4102]
6. Except during startup and shutdown, emission rates from the process vent shall not exceed any of the following: NOx (as NO2): 15 ppmvd, SOx (as SO2): 115 ppmvd, PM10: 0.00001 lb/dscf, CO: 101 ppmvd, or VOC: 0.0055 lb/MMBtu. [District Rule 2201]
7. During startup and shutdown, emission rates from the process vent shall not exceed any of the following: NOx (as NO2): 45 ppmvd, SOx (as SO2): 341 ppmvd, PM10: 0.000031 lb/dscf, CO: 300 ppmvd, or VOC: 0.0055 lb/MMBtu. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of ~~all other~~ governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services

8. Emission rates from the sulfur igniter shall not exceed any of the following: NOx (as NO2): 0.06 lb/MMBtu, SOx (as SO2): 0.00285 lb/MMBtu, PM10: 0.0076 lb/MMBtu, CO: 0.084 lb/MMBtu, or VOC: 0.0055 lb/MMBtu. [District Rule 2201]
9. The sulfur igniter shall not operate more than 324 hours per year. [District Rule 2201]
10. During steady state operation, the process vent exhaust flow rate shall not exceed 2,729 dscfm. [District Rule 2201]
11. During startup and shutdown, the process vent exhaust flow rate shall not exceed 1,357 dscfm. [District Rule 2201]
12. Source testing to determine initial compliance with the NOx, SOx, PM10, CO, and VOC emission rates from the process vent for normal operation shall be conducted within 60 days of startup. [District Rule 2201]
13. Source testing to determine the SOx and PM10 emission rates from the process vent during normal operation shall be conducted at least once every twelve (12) months. [District Rule 2201]
14. The following source test methods shall be used: NOx (ppmv) - EPA Method 7E or ARB Method 100, CO (ppmv) - EPA Method 10 or ARB Method 100, VOC (lb/MMBtu) - EPA Method 18. Alternative methods may be utilized provided they are previously approved by the District, in writing. [District Rule 2201]
15. SOx and PM10 source testing shall be performed using ARB Methods 1-6 or EPA Methods 5 or 201A, 6, 6B, 8, or ARB 100 or EPA Method 19. Alternative methods may be utilized provided they are previously approved by the District, in writing. [District Rule 2201]
16. All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 1081]
17. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]
18. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]
19. For emissions source testing, the arithmetic average of three test runs shall apply each with a duration of at least 30 consecutive minutes. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rule 1081]
20. The permittee shall maintain annual records of the hours of operation of the sulfur igniter. [District Rules 1070 and 2201]
21. All records shall be maintained and retained on-site for a period of at least five (5) years and shall be made available for District inspection upon request. [District Rule 1070]
22. Disturbances of soil related to any construction, demolition, excavation, extraction, or other earthmoving activities shall comply with the requirements for fugitive dust control in District Rule 8021 unless specifically exempted under Section 4.0 of Rule 8021 or Rule 8011. [District Rules 8011 and 8021]
23. An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. [District Rules 8011 and 8021]
24. When handling bulk materials outside an enclosed structure or building, water or chemical/organic stabilizers/suppressants shall be applied as required to limit Visible Dust Emissions to a maximum of 20% opacity. When necessary to achieve this opacity limitation, wind barriers with less than 50% porosity shall also be used. [District Rules 8011 and 8031]
25. When storing bulk materials outside an enclosed structure or building, water or chemical/organic stabilizers/suppressants shall be applied as required to limit Visible Dust Emissions to a maximum of 20% opacity. When necessary to achieve this opacity limitation, all bulk material piles shall also be either maintained with a stabilized surface as defined in Section 3.58 of District Rule 8011, or shall be protected with suitable covers or barriers as prescribed in Table 8031-1, Section B, of District Rule 8031. [District Rules 8011 and 8031]

DRAFT

CONDITIONS CONTINUE ON NEXT PAGE

26. When transporting bulk materials outside an enclosed structure or building, all bulk material transport vehicles shall limit Visible Dust Emissions to 20% opacity by either limiting vehicular speed, maintaining sufficient freeboard on the load, applying water to the top of the load, or covering the load with a tarp or other suitable cover. [District Rules 8011 and 8031]

27. An owner/operator shall prevent or cleanup any carryout or trackout in accordance with the requirements of District Rule 8041 Section 5.0, unless specifically exempted under Section 4.0 of Rule 8041 or Rule 8011. [District Rules 8011 and 8041]

28. Whenever open areas are disturbed, or vehicles are used in open areas, the facility shall comply with the requirements of Section 5.0 of District Rule 8051, unless specifically exempted under Section 4.0 of Rule 8051 or Rule 8011. [District Rules 8011 and 8051]

29. Any paved road or unpaved road shall comply with the requirements of District Rule 8061 unless specifically exempted under Section 4.0 of Rule 8061 or Rule 8011. [District Rules 8011 and 8061]

30. Water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure shall be applied to unpaved vehicle travel areas as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rules 8011 and 8071]

31. Where dusting materials are allowed to accumulate on paved surfaces, the accumulation shall be removed daily or water and/or chemical/organic dust stabilizers/suppressants shall be applied to the paved surface as required to maintain continuous compliance with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011 and limit Visible Dust Emissions (VDE) to 20% opacity. [District Rules 8011 and 8071]

32. On each day that 50 or more Vehicle Daily Trips or 25 or more Vehicle Daily Trips with 3 axles or more will occur on an unpaved vehicle/equipment traffic area, permittee shall apply water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rules 8011 and 8071]

33. Whenever any portion of the site becomes inactive, Permittee shall restrict access and periodically stabilize any disturbed surface to comply with the conditions for a stabilized surface as defined in Section 3.58 of District Rule 8011. [District Rules 8011 and 8071]

34. Records and other supporting documentation shall be maintained as required to demonstrate compliance with the requirements of the rules under Regulation VIII only for those days that a control measure was implemented. Such records shall include the type of control measure(s) used, the location and extent of coverage, and the date, amount, and frequency of application of dust suppressant, manufacturer's dust suppressant product information sheet that identifies the name of the dust suppressant and application instructions. Records shall be kept for one year following project completion that results in the termination of all dust generating activities. [District Rules 8011, 8031, and 8071]

DRAFT

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: C-8573-11-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: TESSENDERLO KERLEY, INC.
MAILING ADDRESS: 2255 N. 44TH STREET, SUITE 300
PHOENIX, AZ 85008-3279

LOCATION: 10724 ENERGY STREET
HANFORD, CA

EQUIPMENT DESCRIPTION:
3,000 GALLON PER MINUTE COOLING TOWER WITH CELLULAR TYPE DRIFT ELIMINATOR (CT602)

CONDITIONS

1. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
2. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
3. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration excluding condensed water vapor. [District Rule 4201]
4. No biocide containing hexavalent chromium shall be used in the cooling tower. [District Rules 4102 and 7012]
5. Drift eliminator drift rate shall not exceed 0.0005%. [District Rule 2201]
6. Total dissolved solids (TDS) in circulating water shall not exceed 2,000 ppm by weight. [District Rule 2201]
7. Compliance with TDS limit shall be determined by cooling water sample analysis by independent laboratory within 60 days of initial operation and quarterly thereafter. [District Rule 1081]
8. Cooling tower circulation water flow rate shall not exceed 3,000 gallons per minute. [District Rule 2201]
9. Operator shall monitor and record the design circulation water flow rate on a daily basis. [District Rule 2201]
10. PM10 emission rate from the cooling tower shall not exceed 7.2 lb/day. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services

Central Regional Office • 1990 E. Gettysburg Ave. • Fresno, CA 93726 • (559) 230-5900 • Fax (559) 230-6061

11. Compliance with the PM10 daily emission limit shall be demonstrated as follows: PM10 lb/day = circulating water recirculation rate (gal/day) x total dissolved solids concentration in the circulating water (ppm by weight) x manufacturer's design drift rate (%). [District Rule 2201]

12. Permittee shall submit cooling tower design details including the cooling tower type, drift eliminator design details, and materials of construction to the District at least 90 days before the tower is operated. [District Rule 7012]

13. Daily records of the cooling tower circulating water flow rate and quarterly records of the cooling tower water TDS shall be kept at the facility and made readily available for District inspection upon request for five (5) years. [District Rule 1070]

14. Disturbances of soil related to any construction, demolition, excavation, extraction, or other earthmoving activities shall comply with the requirements for fugitive dust control in District Rule 8021 unless specifically exempted under Section 4.0 of Rule 8021 or Rule 8011. [District Rules 8011 and 8021]

15. An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. [District Rules 8011 and 8021]

16. When handling bulk materials outside an enclosed structure or building, water or chemical/organic stabilizers/suppressants shall be applied as required to limit Visible Dust Emissions to a maximum of 20% opacity. When necessary to achieve this opacity limitation, wind barriers with less than 50% porosity shall also be used. [District Rules 8011 and 8031]

17. When storing bulk materials outside an enclosed structure or building, water or chemical/organic stabilizers/suppressants shall be applied as required to limit Visible Dust Emissions to a maximum of 20% opacity. When necessary to achieve this opacity limitation, all bulk material piles shall also be either maintained with a stabilized surface as defined in Section 3.58 of District Rule 8011, or shall be protected with suitable covers or barriers as prescribed in Table 8031-1, Section B, of District Rule 8031. [District Rules 8011 and 8031]

18. When transporting bulk materials outside an enclosed structure or building, all bulk material transport vehicles shall limit Visible Dust Emissions to 20% opacity by either limiting vehicular speed, maintaining sufficient freeboard on the load, applying water to the top of the load, or covering the load with a tarp or other suitable cover. [District Rules 8011 and 8031]

19. An owner/operator shall prevent or cleanup any carryout or trackout in accordance with the requirements of District Rule 8041 Section 5.0, unless specifically exempted under Section 4.0 of Rule 8041 or Rule 8011. [District Rules 8011 and 8041]

20. Whenever open areas are disturbed, or vehicles are used in open areas, the facility shall comply with the requirements of Section 5.0 of District Rule 8051, unless specifically exempted under Section 4.0 of Rule 8051 or Rule 8011. [District Rules 8011 and 8051]

21. Any paved road or unpaved road shall comply with the requirements of District Rule 8061 unless specifically exempted under Section 4.0 of Rule 8061 or Rule 8011. [District Rules 8011 and 8061]

22. Water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure shall be applied to unpaved vehicle travel areas as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rules 8011 and 8071]

23. Where dusting materials are allowed to accumulate on paved surfaces, the accumulation shall be removed daily or water and/or chemical/organic dust stabilizers/suppressants shall be applied to the paved surface as required to maintain continuous compliance with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011 and limit Visible Dust Emissions (VDE) to 20% opacity. [District Rules 8011 and 8071]

24. On each day that 50 or more Vehicle Daily Trips or 25 or more Vehicle Daily Trips with 3 axles or more will occur on an unpaved vehicle/equipment traffic area, permittee shall apply water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rules 8011 and 8071]

CONDITIONS CONTINUE ON NEXT PAGE

25. Whenever any portion of the site becomes inactive, Permittee shall restrict access and periodically stabilize any disturbed surface to comply with the conditions for a stabilized surface as defined in Section 3.58 of District Rule 8011. [District Rules 8011 and 8071]

26. Records and other supporting documentation shall be maintained as required to demonstrate compliance with the requirements of the rules under Regulation VIII only for those days that a control measure was implemented. Such records shall include the type of control measure(s) used, the location and extent of coverage, and the date, amount, and frequency of application of dust suppressant, manufacturer's dust suppressant product information sheet that identifies the name of the dust suppressant and application instructions. Records shall be kept for one year following project completion that results in the termination of all dust generating activities. [District Rules 8011, 8031, and 8071]