Statement of Basis

Permit to Construct No. P-2012.0019
Project ID 61029

Tessenderlo Kerley, Inc.
Burley, Idaho

Facility ID 031-00051

Final

August 7, 2012
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Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
ABS	ammonium bisulfite solution
acfm	actual cubic feet per minute
ATS	ammonium thiosulfate
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gases
HAP	hazardous air pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
MACT	Maximum Achievable Control Technology
mg/m^3	millgrams per cubic meter
MMBtu/hr	million British thermal units per hour
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
O_2	oxygen
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
ppm	parts per million
ppmv	parts per million by volume
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	*Rules for the Control of Air Pollution in Idaho*
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
T/yr	tons per consecutive 12 calendar month period
TAP	toxic air pollutants
TKI	Tessenderlo Kerley, Inc.
VOC	volatile organic compounds

FACILITY INFORMATION

Description

Tessenderlo Kerley, Inc. (TKI) currently owns and operates a Metam Plant consisting of metam sodium reactors, process and storage tanks, two cooling towers, a hot water heater, and loading/unloading stations. A Permit to Construct (PTC) was not required for the Metam Plant when it was constructed in the late 1990's.

At the Ammonium Thiosulfate (ATS) Plant, the first stage of the ATS process takes place in the sulfur incinerator. There, combustion air reacts with liquid elemental sulfur to form sulfur dioxide. Immediately downstream of the incinerator, a waste heat boiler will cool the sulfur dioxide and also produce medium to high pressure steam. The cooled sulfur dioxide vapor stream will be sent to the sulfur dioxide absorber in the ATS process area, where it will be mixed with water and ammonia. The resulting solution is typically a liquid ammonium bisulfite solution (ABS). The ABS solution is then routed to the ATS reactor. The vapor stream will be sent to the vent stack filters, which are high efficiency particulate filters that remove particulate, entrained liquid and remaining traces of sulfur dioxide. The liquid removed in the filters is routed back to the absorber, and the vapor stream is sent to the stack and vented to the atmosphere.

At the ATS reactor, liquid from the sulfur dioxide absorber will react with elemental sulfur, ammonia, and water to produce ATS solution. The final product is a liquid and is approximately 60 percent by weight ATS. It will be stored in two ATS storage tanks. The vapor vented from the ATS reactor is also sent to the vent stack filters. Additional storage tanks will hold raw materials, including elemental sulfur and ammonia. Smaller process tanks, such as the ABS and ATS day tanks, will be located in the process area. The ATS day tank is used for the daily storage of product and is quality checked prior to transfer to bulk storage. A new cooling tower will provide non-contact cooling water to the ATS Plant to cool the process steam as reactions occur. A package steam boiler will provide steam during start-up. During normal operation, steam will be recovered from the waste heat boiler. Additional loading/unloading areas for rail and truck will facilitate loading/unloading of raw materials and finished product

Permitting History

This is the initial PTC for a new ATS facility thus there is no permitting history. The Metam portion of the plant was determined to be exempt in the 1990's.

Application Scope

This permit is the initial PTC for the ATS facility. The applicant has proposed to install and operate an Ammonium Thiosulfate manufacturing facility.

Application Chronology

April 13, 2012	DEQ received an application and an application fee.
April 25-May 10, 2012	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
May 15, 2012	DEQ determined that the application was complete.
June 6, 2012	DEQ received supplemental information from the applicant.
June 28, 2012	DEQ made available the draft permit and statement of basis for peer and regional office review.
July 10, 2012	DEQ made available the draft permit and statement of basis for applicant review.
July 24, 2012	DEQ received the permit processing fee.
August 2, 2012	Additional information received

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Sources	Control Equipment
Package Boiler B600 3.5 MMBtu/hr Propane	None
ATS Vent Stack for sulfur dioxide absorber and ATS reactor	HEPA filter
ATS Cooling Tower	None
Ammonia and Sulfur Storage Tanks	
ABS and ATS day tanks	None
ATS Rail and Truck Loading, loading racks	None

Emissions Inventories

According to facility comments on the draft permit, "There are no emissions directly from the incinerator. All combustion products are routed to the ABS unit and ATS reactor, and any vapors not absorbed in the ABS unit or reacted in the ATS reactor are emitted from the ATS stack."

Propane is used in the incinerator briefly at start-up. The maximum propane and sulfur firing do not occur at the same time. The overlap should be minimal. The propane fuel firing rate is set on temperature control and begins backing out the moment Sulfur flow is introduced to the process.

Emissions from the use of propane are estimated in Appendix A.

The package boiler emissions were estimated based on 8,760 hours of operation and AP-42 factors.

Emissions from the non-contact cooling tower are a minimal amount of particulates from water.

SO_2 emissions from the ATS reactor vent stack were estimated as follows:

$$\frac{115 \text{ lb-mol } SO_2}{1E{+}06 \text{ lb-mol vent gas}} \times \frac{308.2 \text{ lb-mol vent gas}}{1 \text{ hr}} \times \frac{64 \text{ lb } SO_2}{1 \text{ lb-mol } SO_2} = 2.27 \text{ lb } SO_2/\text{hr}$$

308.2 lb-mol/hr vent gas is equivalent to 2451.3 actual cubic feet per minute (acfm), which is the flow rate from the S500 stack that was modeled in the permit application.

115 ppm SO_2 is a limit for a permit issued to a similar facility in Ponca City, Oklahoma. Three tests were done for this similar ATS facility, with results as follows:

Table 2 ATS Stack Test Results from Ponca City Facility

Date of Test	SO_2, ppmv	Production Rate Sulfur, Tons per Day
June 2006	8.67	192
February 2007	4.74	124
February 2007	1.03	111

It is not known what the hourly production rate was during the tests. There are only records of daily production rates of sulfur, not of ATS.

The production capacity of the Ponca City facility is 150 tons of ATS per day. The Burley facility will have a capacity of 191.5 tons of ATS per day.

Although the ATS production rate at the time of the tests is unknown, the rated production rates of the two facilities are similar. The emission rate used to estimate emissions for the Burley facility is 115 ppm. The tested emission rates of SO_2 are well below the 115 ppm value used to estimate emissions. The ATS processes are similar. The estimated emissions are less than the amount that requires air dispersion modeling. Therefore, SO_2 emissions will not be required to be tested.

The CO and PM emissions are estimated similarly to the method used for SO_2, using worst-case source test results from the Ponca City ATS testing that was done.

The NO_X concentration from the ATS vent stack (144 ppm) is also based on the Ponca City source tests, with a small margin of safety built in. This concentration is expected to be conservative, because the Burely ATS plant is expected to have lower temperatures and better O_2 control than the Ponca City plant. Additionally, the Ponca City plant burns ammonia (which results in higher NO_X emissions), whereas the Burely plant does not.

The Ammonia concentration in the ATS stack is based on theoretical values derived from the partial pressure of Ammonia in the ABS solution at the operating temperature and pressure. This theoretical value is expected to be a conservative value as the vent stack filters are wetted and some Ammonia will dissolve in the stack filter recirculation fluid due to its affinity for water. The stack filter recirculation fluid is processed through the ATS plant into final product. Ammonia concentrations have been taken at similar (but not identical) ATS plants by Drager tubes to comply with a Montana permit. The ammonia readings average approximately 50 ppm

Ammonia. 145 ppm of ammonia was used to estimate emissions from the ATS stack. This is higher than the test result from the similar facility. The modeled results show that the concentration of ammonia is below the AAC.

Specification sheets for elemental sulfur do not reference H_2S content. However, the H_2S content used as a basis for the screening modeling analysis was based on the maximum H_2S content in the feed. Additionally, if the H_2S content were assumed to correspond to the maximum possible concentration of H_2S, based on the solubility of H_2S in molten sulfur (0.059% by weight at 280 °F), then the results of the AERSCREEN analysis would still be below the AAC for H_2S (0.063 mg/m^3 compared to an AAC of 0.07 mg/m^3). In reality, some of the H_2S is expected to be fed into the sulfur incinerator and converted to SO_2, and the maximum concentration is expected to be considerably lower (0.037% by wt., rather than 0.059%).

Potential to Emit

IDAPA 58.01.01 defines Potential to Emit as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions do not count in determining the potential to emit of a facility or stationary source.

Uncontrolled Potential to Emit

Using the definition of Potential to Emit, uncontrolled Potential to Emit is then defined as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall **not** be treated as part of its design **since** the limitation or the effect it would have on emissions **is not** state or federally enforceable.

The uncontrolled Potential to Emit is used to determine if a facility is a "Synthetic Minor" source of emissions. Synthetic Minor sources are facilities that have an uncontrolled Potential to Emit for regulated air pollutants or HAP above the applicable Major Source threshold without permit limits.

The following table presents the uncontrolled Potential to Emit for the ATS facility for regulated air pollutants as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit.

Table 3 UNCONTROLLED POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS FOR THE ATS FACILITY

	$PM_{10}/PM_{2.5}$	SO_2	NOx	CO	VOC	CO_2e
Source	**T/yr**	**T/yr**	**T/yr**	**T/yr**	**T/yr**	**T/yr**
Point Sources						
B600 package steam boiler	0.12	0.003	2.18	1.3	0.17	2142
ATS cooling tower	0.05/0.001	NE	NE	NE	NE	NE
S500 ATS Vent (controlled emissions)	1.16	9.95	8.92	1.3	NE	NE
Total, Point Sources	**1.33**	**9.95**	**11.10**	**2.6**	**0.17**	**2142**
Fugitive Sources						
Source	**$PM_{10}/PM_{2.5}$ T/yr**	**SO_2 T/yr**	**NOx T/yr**	**CO T/yr**	**VOC T/yr**	**CO_2e T/yr**
Fugitives	NE	0.05	NE	NE	0.39	NE
Total, Fugitive Sources	**NE**	**0.05**	**NE**	**NE**	**0.39**	**NE**

NE = None expected

Fugitive road dust emissions were not estimated in the application. These emissions are not expected to be significant.

The ATS Vent emissions of particulate are controlled by a HEPA filter, which would have an efficiency that exceeds 99%. Therefore, uncontrolled emissions of PM_{10} and pm2.5 could exceed 100 tons per year.

Non-Carcinogenic TAP Emissions

A summary of the estimated PTE for emissions increase of non-carcinogenic toxic air pollutants (TAP) is provided in the following table.

Table 4 POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS

Non-Carcinogenic Toxic Air Pollutants	24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
H_2S	1.42	0.933	Yes
Ammonia	2.2	1.2	Yes
Nitrous Oxide	0.034	6.0	No

Some of the PTEs for non-carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is required for H_2S and ammonia because the 24-hour average non-carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Carcinogenic TAP Emissions

No carcinogenic TAPs emissions were identified in the application.

HAP Emissions

No HAP emissions were identified in the application for the ATS plant (there are HAPs, less than major source levels, for the existing Metam plant, but that is not a part of this project). Any HAPs would be from the combustion of propane. AP-42 has no TAP or HAP emission factors for propane for boilers.

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, VOC, HAP, and TAP from this project were below published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline[1]. Refer to the Emissions Inventories section for additional information concerning the emission inventories.

The applicant has demonstrated pre-construction compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard. The applicant has also demonstrated pre-construction compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP). A summary of the Ambient Air Impact Analysis for TAP is provided in Appendix B.

An ambient air quality impact analyses document has been crafted by DEQ based on a review of the modeling analysis submitted in the application. That document is part of the final permit package for this permitting action (see Appendix B).

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Cassia County, which is designated as attainment or unclassifiable for $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

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1 Criteria pollutant thresholds in Table 1, State of Idaho Air Quality Modeling Guideline, Doc ID AQ-011, rev. 1, December 31, 2002.

Facility Classification

"Synthetic Minor" classification for criteria pollutants is defined as the uncontrolled Potential to Emit for criteria pollutants are above the applicable major source thresholds and the Potential to Emit for criteria pollutants fall below the applicable major source thresholds.

The facility has an uncontrolled potential to emit for SO_2, NO_x, CO, and VOC emissions are less than the Major Source thresholds of 100 T/yr for each pollutant. The uncontrolled PM_{10} and $PM_{2.5}$ emissions may exceed 100 tons per year. In addition, the facility has uncontrolled potential HAP emissions of less than the Major Source threshold of 10 T/yr and for all HAP combined less than the Major Source threshold of 25 T/yr. Because of the potential uncontrolled PM_{10} and $PM_{2.5}$ emission rates, this facility is designated as a Synthetic Minor facility.

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 ....Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for the proposed new emissions source. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 ....Tier II Operating Permit

The application was submitted for a permit to construct (refer to the Permit to Construct section), and an optional Tier II operating permit has not been requested. Therefore, the procedures of IDAPA 58.01.01.400–410 were not applicable to this permitting action.

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625..Visible Emissions

The sources of PM_{10} emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is included in the permit.

Standards for Minor and Existing Sources (IDAPA 58.01.01.677)

IDAPA 58.01.01.677..Standards for Minor and Existing Sources

The fuel burning equipment located at this facility have a maximum rated input of less than 10 MMBtu/hr and therefore are subject to this rule. The particulate limit for burning gas is 0.015 gr/dscf at 3% O_2.

From AP-42, for the boiler, the PM emission rate is calculated to be 0.12 T/yr, or 0.027 lb/hr, at maximum capacity. The F-factor for propane is 8710 dscf/10^6 Btu. The rating of the boiler is 3.5 MMBtu/hr. This results in 30,485 dscf/hr. The emission rate is 0.027 lb PM/hr at maximum capacity, or 0.006 gr/dscf, which is less than 0.015 gr/dscf. Therefore, as long as the boiler uses propane exclusively, this calculation shows that the estimated emissions will not exceed this regulatory limit. The permit requires that the boiler use only propane.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301 ....Requirement to Obtain Tier I Operating Permit

This is a chemical process plant, and is therefore a designated facility. Fugitive emission estimates are required to be included in estimating emissions in accordance with IDAPA 58.01.01.008.10.c.i for determining if the source is a major facility.

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for PM_{10}, SO_2, NOx, CO, VOC, and HAP or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories Section of this analysis. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006 and the requirements of IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 .... Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is/is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

The facility is not subject to any NSPS requirements 40 CFR Part 60.

40 CFR 60, Subpart Dc .... Standards of Performance for Small Industrial–Commercial–Institutional Steam Generating Units

The boiler at this facility is less than 10 MMBtu/hr and is therefore not subject to this regulation.

NSPS 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

The ATS Plant will include two ATS storage tanks, a sulfur storage tank, a sulfur unloading tank, two ammonia storage tanks, and an ABS day tank. ATS, sulfur, ammonia, and ABS do not meet the definition of volatile organic liquid. Therefore, the ATS storage tanks, sulfur storage tanks, ammonia storage tanks, and ABS day tank are not subject to NSPS Subpart Kb.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

MACT Applicability (40 CFR 63)

The facility is not subject to any MACT standards in 40 CFR Part 63.

The boiler MACT does not apply because the boiler operates on propane. The boiler MACT provisions do not apply to gas-fired boilers.

Permit Conditions Review

This section describes the permit conditions for this initial permit.

Initial Permit Condition 2.3

Emissions from the boiler or ATS stack, or any other stack, vent, or functionally equivalent opening associated with the boiler or ATS reactor, shall not exceed 20% opacity for a period or periods aggregating more than three minutes in any 60-minute period as required by IDAPA 58.01.01.625. Opacity shall be determined by the procedures contained in IDAPA 58.01.01.625.

This permit condition was written to include the applicable visible emissions limitation.

Initial Permit Condition 2.4

Propane exclusively shall be combusted in the boiler.

This permit condition was written to limit the boiler fuel to the type (propane) listed in the permit application.

Initial Permit Condition 2.5

A HEPA filter shall be used to control PM_{10} emissions from the ATS stack.

The emission estimates for particulate included a HEPA filter, so this was written as a condition.

Initial Permit Condition 2.6

The production rate of ammonium thiosulfate shall not exceed 191.5 tons per any consecutive 24-hour period.

The process emissions are low enough that no emissions limits or testing are necessary based on the production rate of ATS of 191.5 tons per day. In order to assess that this rate is not exceeded, and the emission rates associated with it, this rate was set as a limit, and monitoring and recordkeeping are required.

Initial Permit Condition 2.7

The permittee shall monitor and record the rate of ammonium thiosulfate production once per day in order to demonstrate compliance with the ATS throughput limit.

This permit condition was written to assess compliance with the production rate limit.

Initial Permit Condition 3.1

The duty to comply general compliance provision requires that the permittee comply with all of the permit terms and conditions pursuant to Idaho Code §39-101.

Initial Permit Condition 3.2

The maintenance and operation general compliance provision requires that the permittee maintain and operate all treatment and control facilities at the facility in accordance with IDAPA 58.01.01.211.

Initial Permit Condition 3.3

The obligation to comply general compliance provision specifies that no permit condition is intended to relieve or exempt the permittee from compliance with applicable state and federal requirements, in accordance with IDAPA 58.01.01.212.01.

Initial Permit Condition 3.4

The inspection and entry provision requires that the permittee allow DEQ inspection and entry pursuant to Idaho Code §39-108.

Initial Permit Condition 3.5

The permit expiration construction and operation provision specifies that the permit expires if construction has not begun within two years of permit issuance or if construction has been suspended for a year in accordance with IDAPA 58.01.01.211.02.

Initial Permit Condition 3.6

The notification of construction and operation provision requires that the permittee notify DEQ of the dates of construction and operation, in accordance with IDAPA 58.01.01.211.03.

Initial Permit Condition 3.7

The performance testing notification of intent provision requires that the permittee notify DEQ at least 15 days prior to any performance test to provide DEQ the option to have an observer present, in accordance with IDAPA 58.01.01.157.03.

Initial Permit Condition 3.8

The performance test protocol provision requires that any performance testing be conducted in accordance with the procedures of IDAPA 58.01.01.157, and encourages the permittee to submit a protocol to DEQ for approval prior to testing.

Initial Permit Condition 3.9

The performance test report provision requires that the permittee report any performance test results to DEQ within 30 days of completion, in accordance with IDAPA 58.01.01.157.04-05.

Initial Permit Condition 3.10

The monitoring and recordkeeping provision requires that the permittee maintain sufficient records to ensure compliance with permit conditions, in accordance with IDAPA 58.01.01.211.

Initial Permit Condition 3.11

The excess emissions provision requires that the permittee follow the procedures required for excess emissions events, in accordance with IDAPA 58.01.01.130-136.

Initial Permit Condition 3.12

The certification provision requires that a responsible official certify all documents submitted to DEQ, in accordance with IDAPA 58.01.01.123.

Initial Permit Condition 3.13

The false statement provision requires that no person make false statements, representations, or certifications, in accordance with IDAPA 58.01.01.125.

Initial Permit Condition 3.14

The tampering provision requires that no person render inaccurate any required monitoring device or method, in accordance with IDAPA 58.01.01.126.

Initial Permit Condition 3.15

The transferability provision specifies that this permit to construct is transferable, in accordance with the procedures of IDAPA 58.01.01.209.06.

Initial Permit Condition 3.16

The severability provision specifies that permit conditions are severable, in accordance with IDAPA 58.01.01.211.

PUBLIC REVIEW

Public Comment Opportunity

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c or IDAPA 58.01.01.404.01.c. During this time, there were no comments on the application and there was not a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

APPENDIX A – EMISSIONS INVENTORIES

Table 1 below provides the calculations for the maximum hourly propane emissions and for the expected annual emission rates from propane combustion.

Table 1. ATS Plant Incinerator Propane Combustion Emissions

Description	Capacity[a] (MMBtu/hr)	Fuel Type	Annual Operation (MMBtu/yr)	Pollutant	Emission Factor[b] (lb/MMBtu)	Potential Emissions	
						(lb/hr)	(tpy)
Incinerator Propane	4.92	Propane	2,105	$PM/PM_{10}/PM_{2.5}$[c]	0.00765	0.04	0.01
				SO_2[d]	0.000219	0.0011	0.000
				NO_x	0.1421	0.70	0.15
				VOC	0.0109	0.05	0.01
				CO	0.0820	0.40	0.09
				CO_2	136.6120	672.13	144
				N_2O	0.0098	0.05	0.01
					0.0022	0.01	0.00
				CO2e[e]	---	672.19	144

a Propane burner maximum hourly capacity and annual operation provided via e-mail by Dawn Kominski, TKI to Anna Henolson, Trinity Consultants on 07/31/2012.

b Propane emission factors are based on emission factors for LPG Combustion, Industrial Boiler, given in AP-42 Section 1.5 Liquefied Petroleum Gas Combustion, July 2008. Per Table 1.5-1, a heat content of 91.5 MMBtu1000 gas is used for propane.

c It is conservatively assumed that $PM_{2.5} = PM_{10} = PM$

d Sulfur content in fuel conservatively assumed to be 0.2 grains/100 cubic feet

e Carbon dioxide equivalent (CO_2e) is the sum of CO_2, N_2O, and CH_4. Global warming potentials are considered when determining the potential emissions of each GHG.. Global warming potentials are as follows : $CO_2 - 1$; N_2O -310 ; and CH_4 – 21

Table B-1. ATS Plant Emission Summary (pounds per hour)

Source Category	Hourly Emissions (lb/hr)										
	NOx	CO	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	H_2S	NH_3	GHGs	HAP
Combustion	0.34	0.29	0.03	0.03	0.03	0.02	2.06E-03	-	-	-	-
Fugitives	-	-	-	-	-	0.39	0.05	-	1.43	-	-
Loading Racks	-	-	-	-	-	0.00	-	-	-	-	-
Cooling Towers	-	-	0.01	0.01	2.46E-04	-	-	-	-	-	-
ATS Vent Stack	2.04	0.29	0.27	0.27	0.27	-	2.271	-	0.761	-	-
Storage Tanks	-	-	-	-	-	-	-	1.41	-	-	-
Total Increases	2.38	0.58	0.30	0.30	0.29	0.40	2.32	1.41	2.20		0
Level II Threshold	2.4	175		2.6	0.63		2.5				

Table B-2. ATS Plant Emission Summary (tons per year)

Source Category	Annual Emissions (tpy)										
	NOx	CO	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	H_2S	NH_3	GHG	HAP
Combustion	1.50	1.26	0.11	0.11	0.11	0.08	0.01	-	-	2,142	-
Fugitives	-	-	-	-	-	1.69	0.22	-	6.28	-	-
Loading Racks	-	-	-	-	-	-	-	-	-	-	-
Cooling Towers	-	-	0.06	0.05	1.08E-03	-	-	-	-	-	-
ATS Vent Stack	8.92	1.27	1.16	1.16	1.16	-	9.95	-	3.33	-	-
Storage Tanks	-	-	-	-	-	-	-	6.20	-	-	-
Total Increases	10.43	2.54	1.34	1.32	1.28	1.77	10.18	6.20	9.62	2,142	0
Significant Emission Rate (SER)	40	100	25	15	-	40	40	10	-	75,000	-
10% SER	4.0	10.0	2.5	1.5		4.0	4.0	1.0		7,500	
Level II Threshold	14				4.1		14				

Table B-3. Facility-wide Emission Summary (pounds per hour) [a]

Source Category	Hourly Emissions (lb/hr)													
	NOx	CO	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	H_2S	NH_3	CS_2	MMA	Metam	GHG	HAP
Combustion	0.56	0.41	0.04	0.04	0.04	0.04	2.39E-03	-	-	-	-	-	-	-
Fugitives	-	-	-	-	-	4.24	0.05	-	1.43	1.84	1.57	0.44	-	-
Loading Racks	-	-	-	-	-	83.55	-	-	-	-	-	83.55	-	-
Cooling Towers	-	-	0.32	0.26	5.81E-03	-	-	-	-	-	-	-	-	-
ATS Vent Stack	2.037	0.29	0.27	0.27	0.27	-	2.271	-	0.761	-	-	-	-	-
Storage Tanks	-	-	-	-	-	-	-	1.41	-	-	-	-	-	-
Site-Wide Totals	2.59	0.70	0.62	0.57	0.31	87.82	2.32	1.41	2.20	1.84	1.57	83.99		3.42
Major Source Thresholds														

[a] Table B-3 includes the total emissions from the ATS Plant and existing Metam Plant

Table B-4. Facility-wide Emission Summary (tons per year) [a]

Source Category	Annual Emissions (tpy)													
	NOx	CO	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	H_2S	NH_3	CS_2	MMA [b]	Metam	GHG	HAP [c]
Combustion	2.43	1.80	0.16	0.16	0.16	0.15	0.01	-	-	-	-	-	891	-
Fugitives	-	-	-	-	-	18.59	0.22	-	6.28	8.07	6.89	1.93	-	-
Loading Racks	-	-	-	-	-	8.76	-	-	-	-	-	8.76	-	-
Cooling Towers	-	-	1.40	1.15	2.55E-02	-	-	-	-	-	-	-	-	-
ATS Vent Stack	8.92	1.27	1.16	1.16	1.16	-	9.95	-	3.33	-	-	-	-	-
Storage Tanks	-	-	-	-	-	-	-	6.20	-	-	-	-	-	-
Site-Wide Totals	11.36	3.07	2.73	2.48	1.35	27.50	10.18	6.20	9.62	8.07	6.89	10.69	891	14.97
Major Source Thresholds	100	100	100	100	100	100	100	10	10	10	10	10	75,000	25

[a] Table B-4 includes the total emission from the ATS Plant and the existing Metam Plant.

[b] MMA is methyl methacrylate; MMA is a regulated HAP.

[c] The maximum annual emissions of any individual HAP is 8.07 tons per year of carbon disulfide.

Table B-5. ATS Plant Uncontrolled Emission Summary (pounds per hour)

Source Category	Hourly Emissions (lb/hr)										
	NOx	CO	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	H_2S	NH_3	GHGs	HAP
Combustions	0.34	0.29	0.03	0.03	0.03	0.02	0.00	-	-	-	-
Fugitives	-	-	-	-	-	0.39	0.05	-	1.43	-	-
Loading Racks	-	-	-	-	-	0.00	-	-	-	-	-
Cooling Towers	-	-	0.01	0.01	0.00	-	-	-	-	-	-
ATS Vent Stack	2.04	0.29	53.06	53.06	53.06	-	2.27	-	0.76	-	-
Storage Tanks	-	-	-	-	-	-	-	1.41	-	-	-
Total Increases	**2.38**	**0.58**	**53.10**	**53.10**	**53.09**	**0.40**	**2.32**	**1.41**	**2.20**		**0**
Level II Threshold	**2.4**	**175**		**2.6**	**0.63**		**2.5**				

Table B-6. ATS Plant Uncontrolled Emission Summary (tons per year)

Source Category	Annual Emissions (tpy)										
	NOx	CO	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	H_2S	NH_3	GHG	HAP
Combustions	1.50	1.26	0.11	0.11	0.11	0.08	0.01	-	-	2,142	-
Fugitives	-	-	-	-	-	1.69	0.22	-	6.28	-	-
Loading Racks	-	-	-	-	-	-	-	-	-	-	-
Cooling Towers	-	-	0.06	0.05	0.00	-	-	-	-	-	-
ATS Vent Stack [a]	8.92	1.27	232.40	232.40	232.40	-	9.95	-	3.33	-	-
Storage Tanks	-	-	-	-	-	-	-	6.20	-	-	-
Total Increases	**10.43**	**2.54**	**232.58**	**232.57**	**232.52**	**1.77**	**10.18**	**6.20**	**9.62**	**2,142**	**0**
Significant Emission Rate (SER)	**40**	**100**	**25**	**15**	**-**	**40**	**40**	**10**	**-**	**75,000**	
10% SER	**4.0**	**10.0**	**2.5**	**1.5**		**4.0**	**4.0**	**1.0**		**7,500**	
Level II Threshold	14				4.1		14				

[a] The only control devices present at the ATS Plant are the high efficiency particulate filters in the 8500 Vent Stack. According to the specification sheet for the Kimre Technologies Fiber-Bed Filters, the high efficiency filters have a removal efficiency of 99.5 percent for particulate smaller than a micron in diameter. The filters may provide some control of ammonia and sulfur dioxide, but no information is available regarding the level of control provided.

Table B-7. Fugitive Emission Factors

Component Type	Component Service	SOCMI Average Emission Factors [1] (kg/hr/Comp)
Valves	Gas	0.00597
	Light Liquid	0.00403
	Heavy Liquid	0.00023
Pumps	Light Liquid	0.0199
	Heavy Liquid	0.00862
Compressors	Gas	0.228
PRVs	Gas	0.104
Connectors	Gas	0.00183
	Light Liquid	0.00183
	Heavy Liquid	0.00183
Open-Ended Lines	Gas	0.0017
	Light Liquid	0.0017
	Heavy Liquid	0.0017
Sampling Connections	Gas	0.015
	Light Liquid	0.015
	Heavy Liquid	0.015

[1] Emission Factors acquired from "TABLE 2-1. SOCMI AVERAGE EMISSION FACTORS" of the *EPA Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, November 1995.*

Table B-8. ATS Plant Component Count

ATS Plant		H2S ppm		NH3 - 100%		S02 - 19%		S02 ppm		Natural Gas		Other
		Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Count
P&ID	00SZ306											
Sulfur storage	Pumps											
	Compressors											
	Relief Devices											
	Instrumentation											
	Valves											
	Vent Sulfur Storage											
	Flanges (to equipment)											
	Sum	0	0	0	0	0	0	0	0	0	0	0
P&ID	00SZ307											
Sulfur storage	Pumps											
	Compressors											
	Relief Devices											
	Instrumentation											
	Valves											
	Vent Sulfur Storage											
	Flanges (to equipment)											
	Sum	0	0	0	0	0	0	0	0	0	0	0
P&ID	00SZ402											
Incinerator	Pumps											
	Compressors											
	Relief Devices											
	Instrumentation										3	
	Valves										15	
	Vent Sulfur Storage											
	Flanges (to equipment)						9				1	
	Sum	0	0	0	0	0	9	0	0	0	19	0
P&ID	00SZ403											
Inc. Boiler	Pumps											
	Compressors											
	Relief Devices											
	Instrumentation						2					
	Valves											
	Vent Sulfur Storage											
	Flanges (to equipment)						3					
	Sum	0	0	0	0	0	5	0	0	0	0	0
P&ID	00SZ501											
ABS 1st stg	Pumps											
	Compressors											
	Relief Devices			4								
	Instrumentation			1			1					
	Valves			17								
	Vent Sulfur Storage											
	Flanges (to equipment)											
	Sum	0	0	22	0	0	1	0	0	0	0	0
P&ID	00SZ502											
ABS 2nd stg	Pumps			0								
	Compressors											
	Relief Devices			4								
	Instrumentation			1	0							
	Valves			14	0							
	Vent Sulfur Storage											
	Flanges (to equipment)			0								
	Sum	0	0	19	0	0	0	0	0	0	0	0

P&ID	005Z503											
Gas filters	Pumps											
	Compressors											
	Relief Devices											
	Instrumentation											
	Valves											
	Vent Sulfur Storage											
	Flanges (to equipment)											
	Sum	0	0	0	0	0	0	0	0	0	0	0
P&ID	005Z504											
Stack	Pumps											
	Compressors											
	Relief Devices											
	Instrumentation											
	Valves											
	Vent Sulfur Storage											
	Flanges (to equipment)											
	Sum	0	0	0	0	0	0	0	0	0	0	
P&ID	005Z505											
ATS Reactor	Pumps											
	Compressors											
	Relief Devices			4								
	Instrumentation			1								
	Valves			8								
	Vent Sulfur Storage											
	Flanges (to equipment)											
	Sum	0	0	13	0	0	0	0	0	0	0	
P&ID	005Z506											
NH3 storage	Pumps			2								
	Compressors				1							
	Relief Devices			9	3							
	Instrumentation			6	7							
	Valves			20	18							
	Vent Sulfur Storage											
	Flanges (to equipment)			9	15							
	Sum	0	0	46	44	0	0	0	0	0	0	0
P&ID	005Z601											
Nat. Gas	Pumps											
	Compressors											
	Relief Devices											
	Instrumentation										1	
	Valves										4	
	Vent Sulfur Storage											
	Flanges (to equipment)											
	Sum	0	0	0	0	0	0	0	0	0	5	0
	Totals											
	Pumps	0	0	2	0	0	0	0	0	0	0	0
	Compressors	0	0	0	1	0	0	0	0	0	0	0
	Relief Devices	0	0	21	3	0	0	0	0	0	0	0
	Instrumentation	0	0	9	7	0	3	0	0	0	4	0
	Valves	0	0	59	18	0	0	0	0	0	19	0
	Vent Sulfur Storage	0	0	0	0	0	0	0	0	0	0	0
	Flanges (to equipment)	0	0	9	15	0	12	0	0	0	1	0
	Sum	0	0	100	44	0	15	0	0	0	24	0

Table B-9. Metam Plant Component Count [a]

Metam Plant		CS2 - 100%		MMA - 100%		Reactor 1		Reactor 2		Vent header	
		Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor
P&ID	005Z102										
CS2 tanks	Pumps	2									
	Compressors										
	Relief Devices	6	6								
	Instrumentation	2	13								
	Valves	40	25								
	Flanges (to equipment)	6	24								
	Sum	56	68	0	0	0	0	0	0	0	0
P&ID	005Z103										
MMA tanks	Pumps			2							
	Compressors				1						
	Relief Devices			5	6						
	Instrumentation			5	8						
	Valves			26	16						
	Flanges (to equipment)				10						
	Sum	0	0	38	41	0	0	0	0	0	0
P&ID	005Z105										
Day tanks	Pumps										
	Compressors										
	Relief Devices										
	Instrumentation										
	Valves										
	Flanges (to equipment)										
	Sum	0	0	0	0	0	0	0	0	0	0
P&ID	005Z108										
Reactors	Pumps					2		2			
	Compressors										
	Relief Devices										2
	Instrumentation			1		11		8			
	Valves	9		9		26		28			13
	Flanges (to equipment)					4		4			8
	Sum	9	0	10	0	43	0	42	0	0	23
P&ID	005Z109										
Flash vessels	Pumps	1									
	Compressors										
	Relief Devices	1									
	Instrumentation	1	1								
	Valves	5	4				3		3		3
	Flanges (to equipment)	1	5				2		2		2
	Sum	9	10	0	0	0	5	0	5	0	5
	Totals										
	Pumps	3	0	2	0	2	0	2	0	0	0
	Compressors	0	0	0	1	0	0	0	0	0	0
	Relief Devices	7	6	5	6	0	0	0	0	0	2
	Instrumentation	3	14	6	8	11	0	8	0	0	0
	Valves	54	29	35	16	26	3	28	3	0	16
	Flanges (to equipment)	7	29	0	10	4	2	4	2	0	10
	Sum	74	78	48	41	43	5	42	5	0	28

[a] Table B-9 provides the component count for the existing Metam Plant.

Table B-10. ATS Plant Fugitive Emission Calculation

Unit	Component Type	Component Service	Average Emission Factor (kg/hr/Comp)	Control Efficiency (%)	NH_3 Component Count	NH_3 Content (wt%)	NH_3 Emissions (lb/hr)	NH_3 Emissions (tpy)	SO_2 Component Count	SO_2 Content (wt%)	SO_2 Emissions (lb/hr)	SO_2 Emissions (tpy)	Propane Component Count	Propane Content (wt%)	Propane Emissions (lb/hr)	Propane Emissions (tpy)
P&ID: 0052306																
Sulfur Storage	Pumps	Light Liquid	0.01990	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Light Liquid	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Light Liquid	0.00403		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: Sulfur Storage					0		0.00	0.00	0		0.00	0.00	0		0.00	0.00
P&ID: 0052307																
Sulfur Storage	Pumps	Light Liquid	0.01990	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Light Liquid	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Light Liquid	0.00403		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: Sulfur Storage					0		0.00	0.00	0		0.00	0.00	0		0.00	0.00
P&ID: 0052402																
Incinerator	Pumps	Light Liquid	0.01990	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	3	100	0.10	0.43
	Instrumentation	Light Liquid	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		0	100	0.00	0.00	0	35	0.00	0.00	15	100	0.20	0.86
	Valves	Light Liquid	0.00403		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		0	100	0.00	0.00	9	35	0.01	0.06	1	100	0.00	0.02
	Flanges (to equipment)	Light Liquid	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: Incinerator					0		0.00	0.00	9		0.01	0.06	19		0.30	1.31

P&ID: 0057-403																
Incn. Boiler	Pumps	Light Liquid	0.01990	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		0	100	0.00	0.00	2	35	0.02	0.10	0	100	0.00	0.00
	Instrumentation	Light Liquid	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Light Liquid	0.00403		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		0	100	0.00	0.00	3	35	0.00	0.02	0	100	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: Incn. Boiler					**0**		**0.00**	**0.00**	**5**		**0.03**	**0.12**	**0**		**0.00**	**0.00**
P&ID: 0052-901																
ABS 1st stg	Pumps	Light Liquid	0.01990	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	4	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		0	100	0.00	0.00	1	35	0.01	0.05	0	100	0.00	0.00
	Instrumentation	Light Liquid	0.01500		1	100	0.03	0.14	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Light Liquid	0.00403		17	100	0.15	0.66	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: ABS 1st stg					**22**		**0.1837**	**0.80**	**1**		**0.01**	**0.05**	**0**		**0.00**	**0.00**
P&ID: 0057-902																
ABS 2nd stg	Pumps	Light Liquid	0.01990	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	4	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Light Liquid	0.01500		1	100	0.03	0.14	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Light Liquid	0.00403		14	100	0.12	0.54	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: ABS 2nd stg					**19**		**0.1571**	**0.69**	**0**		**0.00**	**0.00**	**0**		**0.00**	**0.00**

P&ID: 0052503																
Gas filters	Pumps	Light Liquid	0.01990	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Light Liquid	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Light Liquid	0.00403		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: Gas filters					**0**		**0.00**	**0.00**	**0**		**0.00**	**0.00**	**0**		**0.00**	**0.00**
P&ID: 0052504																
Stack	Pumps	Light Liquid	0.01990	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Light Liquid	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Light Liquid	0.00403		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: Stack					**0**		**0.00**	**0.00**	**0**		**0.00**	**0.00**	**0**		**0.00**	**0.00**
P&ID: 0052505																
ATS Reactor	Pumps	Light Liquid	0.01990	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	4	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Light Liquid	0.01500		1	100	0.03	0.14	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Light Liquid	0.00403		8	100	0.07	0.31	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: ATS Reactor					13		0.1039	0.46	**0**		**0.00**	**0.00**	**0**		**0.00**	**0.00**

P&ID: 0052506																
NH_3 Storage	Pumps	Light Liquid	0.01990	100	2	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800	90	1	100	0.05	0.22	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	3	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	9	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		7	100	0.23	1.01	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Light Liquid	0.01500		6	100	0.20	0.87	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		18	100	0.24	1.04	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Light Liquid	0.00403		20	100	0.18	0.78	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		15	100	0.06	0.26	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.00183		9	100	0.04	0.16	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: NH3 Storage					**90**		**0.9895**	**4.33**	**0**		**0.00**	**0.00**	**0**		**0.00**	**0.00**
P&ID: [illegible]																
Propane	Pumps	Light Liquid	0.01990	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Compressors	Gas	0.22800		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Gas	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Relief Devices	Light Liquid	0.10400	100	0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Instrumentation	Gas	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	1	100	0.03	0.14
	Instrumentation	Light Liquid	0.01500		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Valves	Gas	0.00597		0	100	0.00	0.00	0	35	0.00	0.00	4	100	0.05	0.23
	Valves	Light Liquid	0.00403		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Vent Sulfur Storage	Gas	0.00170		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Gas	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.00183		0	100	0.00	0.00	0	35	0.00	0.00	0	100	0.00	0.00
Subtotal: Propane					**0**		**0.00**	**0.00**	**0**		**0.00**	**0.00**	**5**		**0.09**	**0.37**
Total ATS Plant	Pumps	Light Liquid			2		0.00	0.00	0		0.00	0.00	0		0.00	0.00
	Compressors	Gas			1		0.05	0.22	0		0.00	0.00	0		0.00	0.00
	Relief Devices	Gas			3		0.00	0.00	0		0.00	0.00	0		0.00	0.00
	Relief Devices	Light Liquid			21		0.00	0.00	0		0.00	0.00	0		0.00	0.00
	Instrumentation	Gas			7		0.23	1.01	3		0.03	0.15	4		0.13	0.58
	Instrumentation	Light Liquid			9		0.30	1.30	0		0.00	0.00	0		0.00	0.00
	Valves	Gas			18		0.24	1.04	0		0.00	0.00	19		0.25	1.09
	Valves	Light Liquid			59		0.52	2.29	0		0.00	0.00	0		0.00	0.00
	Vent Sulfur Storage	Gas			0		0.00	0.00	0		0.00	0.00	0		0.00	0.00
	Flanges (to equipment)	Gas			15		0.06	0.26	12		0.02	0.07	1		0.00	0.02
	Flanges (to equipment)	Light Liquid			9		0.04	0.16	0		0.00	0.00	0		0.00	0.00
					144		**1.43**	**6.28**	**15**		**0.05**	**0.22**	**24**		**0.39**	**1.69**

Table B-21. Metron Plant Fugitive Emissions

Unit	Component Type	Component Service	Average Emission Factor (lb/hr/comp)	Control Efficiency (%)	Cl_2 Component Count	Cl_2 Content (wt%)	Cl_2 Emissions (lb/hr)	Cl_2 Emissions (tpy)	MMA Component Count	MMA Content (wt%)	MMA Emissions (lb/hr)	MMA Emissions (tpy)	Reactor 1 Component Count	Reactor 1 Cl_2 Content (wt%)	Reactor 1 - Cl_2 Emissions (lb/hr)	Reactor 1 - Cl_2 Emissions (tpy)	Reactor 1 MMA Content (wt%)	Reactor 1 - MMA Emissions (lb/hr)	Reactor 1 - MMA Emissions (tpy)	Reactor 1 Mixture Content (wt%)	Reactor 1 - Mixture Emissions (lb/hr)	Reactor 1 - Mixture Emissions (tpy)	Reactor 2 Component Count	Reactor 2 Cl_2 Content (wt%)	Reactor 2 - Cl_2 Emissions (lb/hr)	Reactor 2 - Cl_2 Emissions (tpy)	Reactor 2 MMA Content (wt%)	Reactor 2 - MMA Emissions (lb/hr)	Reactor 2 - MMA Emissions (tpy)	Reactor 2 Mixture Content (wt%)	Reactor 2 - Mixture Emissions (lb/hr)	Reactor 2 - Mixture Emissions (tpy)	Vent Header Component Count	Vent Header - Cl_2 Content (wt%)	Vent Header - Cl_2 Emissions (lb/hr)	Vent Header - Cl_2 Emissions (tpy)	Vent Header - MMA Content (wt%)	Vent Header - MMA Emissions (lb/hr)	Vent Header - MMA Emissions (tpy)
Cl_2 tanks	Pumps	Light Liquid	0.019900	100	2	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Compressors	Gas	0.228000		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Relief Devices	Gas	0.104000	100	6	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Relief Devices	Light Liquid	0.104000	100	6	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Instrumentation	Gas	0.015000		13	100	0.43	1.88	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Instrumentation	Light Liquid	0.015000		3	100	0.07	0.29	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Valves	Gas	0.005970		28	100	0.33	1.44	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Valves	Light Liquid	0.004030		40	100	0.35	1.55	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Flanges (to equipment)	Gas	0.001830		24	100	0.10	0.42	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.001830		6	100	0.02	0.11	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
Subtotal: Cl_2 tanks					134		1.16	5.09	0		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00
MMA tanks	Pumps	Light Liquid	0.019900	100	0	100	0.00	0.00	2	100	0.07	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Compressors	Gas	0.228000		0	100	0.00	0.00	1	100	0.50	2.20	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Relief Devices	Gas	0.104000	100	0	100	0.00	0.00	6	100	0.06	0.26	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Relief Devices	Light Liquid	0.104000	100	0	100	0.00	0.00	5	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Instrumentation	Gas	0.015000		0	100	0.00	0.00	8	100	0.26	1.14	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Instrumentation	Light Liquid	0.015000		0	100	0.00	0.00	5	100	0.17	0.72	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Valves	Gas	0.005970		0	100	0.00	0.00	16	100	0.21	0.92	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Valves	Light Liquid	0.004030		0	100	0.00	0.00	36	100	0.23	1.01	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Flanges (to equipment)	Gas	0.001830		0	100	0.00	0.00	10	100	0.04	0.18	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.001830		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
Subtotal: MMA tanks					0		0.00	0.00	78		1.47	6.19	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00
Day tanks	Pumps	Light Liquid	0.019900	100	0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Compressors	Gas	0.228000		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Relief Devices	Gas	0.104000	100	0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Relief Devices	Light Liquid	0.104000	100	0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Instrumentation	Gas	0.015000		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Instrumentation	Light Liquid	0.015000		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Valves	Gas	0.005970		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Valves	Light Liquid	0.004030		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Flanges (to equipment)	Gas	0.001830		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.001830		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
Subtotal: Day tanks					0		0.00	0.00	0		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00
Reactors	Pumps	Light Liquid	0.019900	100	0	100	0.00	0.00	0	100	0.00	0.00	2	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	2	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Compressors	Gas	0.228000		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Relief Devices	Gas	0.104000	100	0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	3	85.6	0.00	0.00	7.3	0.00	0.00
	Relief Devices	Light Liquid	0.104000	100	0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Instrumentation	Gas	0.015000		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Instrumentation	Light Liquid	0.015000		0	100	0.00	0.00	1	100	0.03	0.14	11	9.6	0.03	0.15	4.4	0.02	0.07	30.1	0.11	0.48	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.11	0.49	0	85.6	0.00	0.00	7.3	0.00	0.00
	Valves	Gas	0.005970		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	13	85.6	0.15	0.64	7.3	0.01	0.05
	Valves	Light Liquid	0.004030		9	100	0.08	0.35	0	100	0.00	0.35	28	9.5	0.02	0.10	4.4	0.01	0.04	30.1	0.07	0.30	20	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.10	0.46	0	85.6	0.00	0.00	7.3	0.00	0.00
	Flanges (to equipment)	Gas	0.001830		0	100	0.00	0.00	0	100	0.00	0.00	0	9.5	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.01	0	85.6	0.05	0.12	7.3	0.00	0.01
	Flanges (to equipment)	Light Liquid	0.001830		0	100	0.00	0.00	0	100	0.00	0.00	4	9.6	0.00	0.01	4.4	0.00	0.00	30.1	0.00	0.02	4	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.01	0.03	0	85.6	0.00	0.00	7.3	0.00	0.00
Subtotal: Reactors					9		0.08	0.25	10		0.11	0.47	45		0.06	0.26		0.03	0.11		0.18	0.80	42		0.00	0.00		0.00	0.00		0.22	0.98	30		0.17	0.76		0.01	0.07
Flash vessels	Pumps	Light Liquid	0.019900	100	1	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Compressors	Gas	0.228000		0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Relief Devices	Gas	0.104000	100	0	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Relief Devices	Light Liquid	0.104000	100	1	100	0.00	0.00	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Instrumentation	Gas	0.015000		1	100	0.03	0.14	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Instrumentation	Light Liquid	0.015000		1	100	0.03	0.14	0	100	0.00	0.00	0	9.6	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Valves	Gas	0.005970		4	100	0.05	0.23	0	100	0.00	0.00	3	9.6	0.00	0.02	4.4	0.00	0.01	30.1	0.01	0.03	3	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.02	0.07	3	85.6	0.03	0.15	7.3	0.00	0.01
	Valves	Light Liquid	0.004030		3	100	0.04	0.19	0	100	0.00	0.00	0	9.5	0.00	0.00	4.4	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
	Flanges (to equipment)	Gas	0.001830		3	100	0.02	0.09	0	100	0.00	0.00	2	9.5	0.00	0.00	4.6	0.00	0.00	30.1	0.00	0.01	2	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.01	2	85.6	0.01	0.01	7.3	0.00	0.00
	Flanges (to equipment)	Light Liquid	0.001830		1	100	0.00	0.02	0	100	0.00	0.00	0	9.5	0.00	0.00	4.6	0.00	0.00	30.1	0.00	0.00	0	0.0	0.00	0.00	0.4	0.00	0.00	42.2	0.00	0.00	0	85.6	0.00	0.00	7.3	0.00	0.00
Subtotal: Flash vessels					17		0.19	0.82	0		0.00	0.00	5		0.00	0.02		0.00	0.01		0.01	0.05	5		0.00	0.00		0.00	0.00		0.02	0.08	5		0.04	0.16		0.00	0.01
Total Metron Plant	Pumps	Light Liquid			2		0.00	0.00	2		0.00	0.00	2		0.00	0.00		0.00	0.00		0.00	0.00	2		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00
	Compressors	Gas			0		0.00	0.00	1		0.50	2.20	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00
	Relief Devices	Gas			6		0.00	0.00	6		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	3		0.00	0.00		0.00	0.00
	Relief Devices	Light Liquid			7		0.00	0.00	5		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00
	Instrumentation	Gas			14		0.46	2.02	8		0.26	1.36	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00		0.00	0.00	0		0.00	0.00		0.00	0.00
	Instrumentation	Light Liquid			3		0.10	0.43	6		0.20	0.87	11		0.03	0.15		0.02	0.07		0.11	0.48	0		0.00	0.00		0.00	0.00		0.11	0.49	0		0.00	0.00		0.00	0.00
	Valves	Gas			29		0.38	1.67	16		0.21	0.92	3		0.00	0.02		0.00	0.01		0.01	0.03	3		0.00	0.00		0.00	0.00		0.02	0.07	16		0.18	0.79		0.02	0.07
	Valves	Light Liquid			54		0.48	2.10	35		0.31	1.36	28		0.02	0.10		0.01	0.04		0.07	0.30	20		0.00	0.00		0.00	0.00		0.10	0.46	0		0.00	0.00		0.00	0.00
	Flanges (to equipment)	Gas			29		0.12	0.52	10		0.04	0.18	2		0.00	0.00		0.00	0.00		0.00	0.01	2		0.00	0.00		0.00	0.00		0.00	0.01	10		0.03	0.13		0.00	0.00
	Flanges (to equipment)	Light Liquid			7		0.03	0.12	0		0.00	0.00	4		0.00	0.01		0.00	0.00		0.00	0.02	4		0.00	0.00		0.00	0.00		0.01	0.03	0		0.00	0.00		0.00	0.00
					143		1.37	6.02	88		1.52	6.59	49		0.05	0.30		0.03	0.13		0.20	0.87	47		0.00	0.00		0.00	0.00		0.24	1.06	29		0.21	0.94		0.02	0.08

Table B-12. ATS Plant Sulfur Dioxide Emissions

Stream		Sulfur [1] 1				Combustion Air [1] 2				Incinerator Tail Gas [2]			
COMP	MW	MOLS	M%	LBS	W%	MOLS	M%	LBS	W%	MOLS	M%	LBS	W%
N2	28.01					277.65	79	7778	76.71	277.65	79.00	7,777.0	63.39
O2	32.00					73.81	21	2361.7	23.29	7.37	2.10	235.70	1.92
H2S	34.08	0.023	0.035	0.792	0.059								
SO2 [3]	64.06									66.43	18.90	4,255.7	34.69
S	32.07	66.41	99.97	2129.6	99.941								
H2O	18.02					0.003	7.27E-04	0.046	4.54E-04	0.03	0.0074	0.47	0.0038
Total		**66.43**	**100.0**	**2,130.4**	**100.0**	**351.46**	**100.0**	**10,140**	**100.0**	**351.47**	**100.00**	**12,268.8**	**100.00**

[1] Stream composition per Process Flow Diagram for Sulfur Burning dated 10/11/2011.

[2] Assuming 100% conversion of S and H_2S into SO_2.

[3] Calculated volume percent (18.9%) is consistent with data provided by TKI (19%).

Table B-13. ATS Plant Combustion Emissions

Description	Capacity [a] (MMBtu/hr)	Fuel Type	Annual Operation (hr/yr)	Pollutant	Emission Factor [b] (lb/MMbtu)	Potential Emissions (lb/hr)	Potential Emissions (tpy)
B600 Package Steam Boiler	3.50	Propane	8,760	$PM/PM_{10}/PM_{2.5}$ [c]	0.00765	0.03	0.12
				SO_2	0.000219	0.001	0.003
				NO_X	0.1421	0.50	2.18
				VOC	0.01093	0.04	0.17
				CO	0.0820	0.29	1.26
				CO_2	136.6120	478.14	2,094
				N_2O	0.0098	0.03	46.74
				CH_4	0.0022	0.01	0.70
				CO_2e [e]	--	--	2,142
Hot Water Heater	1.50	Propane	8,760	$PM/PM_{10}/PM_{2.5}$ [c]	0.00765	0.01	0.05
				SO_2 [d]	0.000219	0.0003	0.001
				NO_X	0.1421	0.21	0.93
				VOC	0.0109	0.02	0.07
				CO	0.0820	0.12	0.54
				CO_2	136.6120	204.51	896
				N_2O	0.0098	0.01	20.0
				CH_4	0.0022	0.00	0.30
				CO_2e [e]	--	--	916

[a] The capacity of the B600 Package Steam Boiler is given in the ATS Plant equipment list included in Appendix A. Water heater capacity provided via email by Dawn Kominski, TKI to Anna Henolson, Trinity Consultants on 12/14/2011.

[b] Propane emission factors are based on emission factors for LPG Combustion, Industrial Boilers, given in AP-42 Section 1.5 Liquified Petroleum Gas Combustion, July 2008. Per Table 1.5-1, a heat content of 91.5 MMBtu/1000 gal is used for propane.

[c] It is conservatively assumed that $PM_{2.5} = PM_{10} = PM$.

[d] Sulfur content in fuel conservatively assumed to be 0.2 grains/100 cubic feet

[e] Carbon dioxide equivalent (CO_2e) is the sum of CO_2, N_2O, and CH_4. Global warming potentials are considered when determining the potential emissions of each GHG. Global warming potentials are as follows: CO_2 - 1; N_2O - 310; and CH_4 - 21.

Table B-14. Cooling Tower Particulate Emissions

Unit ID	Description	Cooling Tower Water Circulation Rate [1] (gal/min)	Concentration of Total Dissolved Solids in Water [2] (ppm by weight)	Drift Loss of Circulating Water [3] (%)	Hourly Emissions (lb/hr) [4,5] PM	Hourly Emissions (lb/hr) PM_{10}	Hourly Emissions (lb/hr) $PM_{2.5}$	Annual Emissions (tpy) PM	Annual Emissions (tpy) PM_{10}	Annual Emissions (tpy) $PM_{2.5}$
CT01	Metam Cooling Tower #1	1,500	1,500	0.020	0.225	0.185	0.0041	0.99	0.81	0.018
CT02	Metam Cooling Tower #2	540	1,500	0.020	0.081	0.067	0.0015	0.36	0.29	0.006
CT600	ATS Cooling Tower	1,000	2,700	0.001	0.014	0.011	0.0002	0.06	0.05	0.001
Totals					*0.320*	*0.263*	*0.0058*	*1.40*	*1.15*	*0.025*

[1] Metam plant cooling tower pump flowrate provided via email by Dawn Kominski, TKI to Anna Henolson, Trinity Consultants on December 14 and 15, 2011.
ATS cooling tower pump flowrate provided via email by Dawn Kominski, TKI to Anna Henolson, Trinity Consultants on January 31, 2012.
[2] TSD for cooling tower water (with softening system) provided via email by Dawn Kominski, TKI to Anna Henolson, Trinity Consultants on January 31, 2012.
[3] Drift rate for CT600 cooling tower provided via email by Dawn Kominski, TKI to Anna Henolson, Trinity Consultants on January 3, 2012. The Metam cooling towers drift rates are based on AP-42 Table 13.4-1.

[4] Hourly PM emission rate (lbs/hr) = (Cooling tower water circulation rate [gal/min]) x (Concentration of total dissolved solids in circulating water [ppm by weight]) / (1,000,000) x (Drift loss of circulating water [%]) / (100) x (Density of water [lb/gal]) x (60 min/hr),
where, Density of water: 8.35 lb/gal
[5] The PM_{10} and $PM_{2.5}$ speciation methodology is based on the technical paper "Calculating Realistic PM Emissions from Cooling Towers", by Joel Reisman and Gordon Frisbie.
Hourly PM10 emission rate (lbs/hr) = (Hourly emissions of PM) x (Percent of PM10 emissions (%)/100)
Hourly PM2.5 emission rate (lbs/hr) = (Hourly emissions of PM) x (Percent of PM2.5 emissions (%)/100)

Table B-15. Particle Size Distribution Based on TDS [1]

TDS (ppm)	1,500	
EPRI Droplet Diameter (um) [2]	Solid Particle Diameter (um) [3]	EPRI % Mass Smaller [2]
10	0.88	0
20	1.76	0.196
30	2.64	0.226
40	3.52	0.514
50	4.40	1.816
60	5.28	5.702
70	6.16	21.348
90	7.92	49.812
110	9.68	70.509
130	11.44	82.023
150	13.20	88.012
180	15.84	91.032
210	18.48	92.468
240	21.12	94.091

[1] Particle size distribution calculated based on emission calculations outlined in *Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers" Greystone Environmental Consultants, Inc., 650 University Avenue, Suite 100, Sacramento, CA 95825.*

[2] The EPRI Droplet Diameter and the EPRI % Mass Smaller were provided by Brentwood Industries, a drift eliminator manufacturer, from a test conducted by Environmental Systems Corporation (ESC) at the Electric Power Research Institute (EPRI) test facility. The drift eliminator used in this study achieved a tested drift rate of 0.0003 percent. The droplets produced during the study are expected to be smaller than those produced from Linde's drift eliminator, which has a larger drift rate.

[3] Solid particle diameter is calculated from EPRI droplet diameter assuming that each water droplet evaporates shortly after being emitted into a single, solid, spherical particle. Other assumptions include:

$\rho_{droplet}$	1	g/cm^3
ρ_{solid}	2.2	g/cm^3

Table B-16. Particle Size Distribution for PM2.5 and PM10

TDS (ppm)	Solid Particle Diameter used for PM10 (um)	% of Particles where diameter < 10 um	Solid Particle Diameter used for PM2.5 (um) [1]	% of Particles where diameter < 2.5 um
1500	11.44	82.023	4.40	1.816

[1] For conservatism, the particle size diameter which is two increments greater than 2.5 um size classification is used in determining the fraction of particles less than 2.5 um in diameter.

Table B-17. S500 Vent Stack Controlled Emissions

Emission Factor/Total	Pollutant			
	PM	PM_{10} [d]	$PM_{2.5}$ [d]	CO
Emission Factor (lb/dscf) (x10^-6) [a]	2.02	2.02	2.02	2.22
Emission Factor (lb/hr) [b]	0.27	0.27	0.27	0.29
Emission Total (tpy) [c]	1.16	1.16	1.16	1.27

[a] Pound per dry standard cubic foot emission factors are based on source testing at a similar ATS Plant.

[b] The pound per hour emission factor is based on a flow rate of 2451.3 acfm and 5.029 vapor weight percent.

[c] Assumes continuous operation of 8,760 hours per year.

[d] Conservatively assumes all particulate emissions are less than 2.5 microns in diameter; i.e., $PM = PM_{10} = PM_{2.5}$.

Table B-18. Sulfur Storage Tank Emissions

Unit ID	Description	Stream Composition [a]		Throughput [b]	H_2S Emissions [c]	
		S wt%	H_2S wt%	(tpy)	(lb/hr)	(tpy)
V315	Sulfur Storage Tank	99.941	0.059	16,745	2.26	9.88

[a] Stream composition per Process Flow Diagram for Sulfur Burning dated 10/11/2011.

[b] Annual throughput per Products RM Logistics dated 11/01/11.

[c] It is conservatively assumed that all H_2S in the sulfur feed is released during storage.

Table B-19. Emission Factor for Liquid Loading

Description	Material Loaded	Vapor Molecular Weight (lb/lb-mol)	Density [a] (lb/gal)	Vapor Pressure [b] (psia)	Saturation Factor [c]	Loading Loss [d] (lb/1,000 gal)
Metam by Rail	Metam	129.19	10.07	0.41	1.45	1.80
Metam by Truck	Metam	129.19	10.07	0.41	1.45	1.80
ATS by Rail [e]	ATS	148.21	-	N/A	N/A	-
ATS by Truck [e]	ATS	148.21	-	N/A	N/A	-

[a] Density at 68 °F per TKI MSDS #65700 for Metam

[b] Vapor pressure provided via email by Dawn Kominski, TKI to Anna Henolson, Trinity Consultants on 12/09/2011.

[c] Saturation factor per EPA AP-42, Section 5.2, Transportation And Marketing Of Petroleum Liquids, July 2008, for Splash loading of a clean cargo tank.

[d] Methodology from AP-42, Section 5.2, Transportation And Marketing Of Petroleum Liquids, July 2008. Note that due to the low volatility of ATS, the loading loss associated with the ATS Plant is negligible.

It is assumed that loading temperature for Metam is 68 °F, which i 527.67 °R

[e] No loading emission is expected from ATS loading operation due to low volatility of the ATS solution.

Sample Calculation - Metam Rail Loading

$L_L = 12.46\ (SPM/T)$

where

L_L = loading loss, lb/1,000 gallons of liquid loaded
S = saturation factor (from AP-42 Table 5.2-1)
P = true vapor pressure, psia
M = vapor molecular weight
T = temperature of liquid loaded, °R

Loading Loss (lb/1,000 gal):

$$\frac{12.46 \;\; 1.45 \;\; 0.41\ \text{psia} \;\; 129.19\ \text{lb}}{\text{lb-mol} \;\; 527.67\ \text{R}} = \frac{1.80\ \text{lb}}{1{,}000\ \text{gal}}$$

Table B-20. Material Transfer Rate for Liquid Loading

Description	Material Loaded	Short-Term Transfer Rate (gal/min)	Short-Term Transfer Rate (1,000 gal/hr)	Annual Transfer Rate (tpy)	Annual Transfer Rate (1,000 gal/yr)
Metam by Rail	Metam	400	24.00	24,560	4,878
Metam by Truck	Metam	375	22.50	24,560	4,878

[1] Short-Term Transfer Rate provided via email by Dawn Kominski, TKI to Anna Henolson, Trinity Consultants on 12/14/2011.

[2] Annual throughput was conservatively estimated by applying 10% buffer on top of the highest historic actual annual throughput (2010).

Table B-21. Emissions from Liquid Loading

Description	Material Loaded	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Metam by Rail	Metam	43.12	4.38
Metam by Truck	Metam	40.43	4.38
Totals	***Metam***	***83.55***	***8.76***

Sample Calculation - Metam Rail Loading

Maximum Hourly Emissions (lb/hr):

$$\frac{1.80\ \text{lb}}{1{,}000\ \text{gal}} \times \frac{24 \times 1{,}000\ \text{gal}}{\text{hr}} = \frac{43.12\ \text{lb}}{\text{hr}}$$

Annual Emissions (tpy):

$$\frac{1.797\ \text{lb}}{1{,}000\ \text{gal}} \times \frac{4{,}878 \times 1{,}000\ \text{gal}}{\text{yr}} \times \frac{\text{ton}}{2{,}000\ \text{lb}} = \frac{4.38\ \text{ton}}{\text{yr}}$$

Table B-22. TAPs Project Emission Screening Calculations[a]

Pollutant	CAS	HAP (Y/N)	TAP (Y/N)	B600 Package Boiler (lb/hr)	S500 Vent Stack (lb/hr)	R505 ATS Reactor (lb/hr)	T501502 ABS Tower (lb/hr)	D540AB Ammonia Storage Tanks (lb/hr)	D314 or V135 Sulfur Tank[b] (lb/hr)	Total TAP (lb/hr)	Total HAP (lb/hr)	Averaging Period	EL (lb/hr)	ACC (mg/m^3)	Is Modeling Required?
Ammonia	7664-41-7	N	Y		7.610E-01	1.039E-01	3.408E-01	9.895E-01		2.195E+00	–	24-hr	1.20E+00	9.00E-01	Yes
Hydrogen Sulfide	7783-06-4	N	Y						2.256E+00	2.256E+00	–	24-hr	9.33E-01	7.00E-01	Yes
Nitrous Oxide	10024-97-2	N	Y	3.443E-02						3.443E-02	–	24-hr	6.00E+00	4.50E+00	No
Total Emissions (lb/hr)										4.485E+00	0.000E+00				
Total Emissions (tpy)										1.965E+01	0.000E+00				

[a] Includes TAP and HAP increases from the ATS Plant; facility-wide TAP and HAP emission totals are given in Table A-16.

[b] **100 percent of hydrogen sulfide emissions are assumed to emanate from either the D314 Sulfur Unloading Tank or the V315 Sulfur Storage Tanks. The more conservative modeling result is assumed; i.e., screening analyses are conducted for both sulfur tanks assuming 100 percent of hydrogen sulfide emissions from each. The worse-case scenario is assumed.**

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: August 8, 2012

TO: Carole Zundel, Air Program

FROM: Kevin Schilling, Stationary Source Modeling Coordinator, Air Program

PROJECT: P-2012.0019 PROJ61029 PTC Application for the Tessenderlo Kerley, Inc. Permit to Construct

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs)

1.0 Summary

Tessenderlo Kerley, Inc. (TKI) submitted a Permit to Construct (PTC) application for modifications at their existing metam sodium production facility, operated in Burley. Site-specific air quality impact analyses involving atmospheric dispersion modeling of emissions associated with the facility were submitted to DEQ to demonstrate that the facility would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02 and 203.03 [Idaho Air Rules Section 203.02 and 203.03]). Trinity Consultants (Trinity), TKI's consultant, submitted the analyses and applicable information and data enabling DEQ evaluate impacts to ambient air.

Trinity performed site-specific air quality impact analyses to assure compliance with air quality standards for the operations at the facility associated with the proposed modification. The submitted information and air quality analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that predicted pollutant concentrations from emissions associated with the facility as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or b) that predicted pollutant concentrations from emissions associated with the facility as modeled, when appropriately combined with co-contributing sources and background concentrations, were below applicable National Ambient Air Quality Standards (NAAQS) at ambient air locations; 5) showed that Toxic Air Pollutant (TAP) emissions increases associated with operation of the modification do not result in increased ambient air impacts exceeding allowable TAP increments. Table 1 presents key assumptions and results to be considered in the development of the permit.

Air impact analyses are required by Idaho Air Rules to be conducted according to methods outlined in 40 CFR 51, Appendix W (Guideline on Air Quality Models). Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition. The submitted information and analyses demonstrated to the satisfaction of the Department that operation of the proposed facility or modification will not cause or significantly contribute to a violation of any ambient air quality standard, provided the key conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition.

Table 1. KEY CONDITIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Emissions rates of criteria pollutants are not greater than stated in the submitted application.	Modeling of criteria pollutant emissions was not required because emissions rates were below Level II Modeling Thresholds[a]. NAAQS compliance is not assured for greater emissions rates.
TAP emissions rates for applicable averaging periods are not greater than those used in the modeling analyses, as listed in this memorandum.	Compliance has not been demonstrated for emissions rates greater than those used in the modeling analyses.
TAPs compliance is assured provided stack parameters of exhaust temperature and flow rate are not less than about 75 percent of values listed in this memorandum.	Higher temperatures and flow rates increase plume rise, allowing the plume to disperse to a larger degree before impacting ground level.

a. State of Idaho Guideline for Performing Air Quality Impact Analyses. Doc. ID AQ-011 (rev. 2, July 2011). http://www. Deq.idaho.gov/media/355037-modeling-guideline.pdf.

2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air qualitystandards and analyses used to demonstrate compliance.

2.1.1 Area Classification

The TKI facility is an existing, stationary facility. The area is designated as attainment or unclassifiable for all criteria pollutants.

2.1.2 Significant and Cumulative NAAQS Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources associated with the proposed modificationexceed the significantimpact levels (SILs) of Idaho Air Rules Section006 (referred to as a significant contribution in Idaho Air Rules)or as incorporated by reference as per Idaho Air Rules Section 107.03.b, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section203.02. A cumulative NAAQS impact analysis for attainment area pollutants involves adding ambient impactsfrom facility-wide emissions, and emissions from any nearby co-contributing sources, to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averagingtime at the facility location and the area of significant impactThe resulting maximum pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SILs and specifies the modeled value that must be used for comparison to the NAAQS.

New NO_2 and SO_2 short-term standards have recently been promulgated by EPA. The standards became applicable for permitting purposes in Idaho when they were incorporated by reference sine die into Idaho Air Rules (Spring 2011). The analyses performed accounted for the new standards.

TKI asserted that emissions of all criteria pollutants were below Level I or Level II modeling thresholds specified in the *Idaho Air Quality Modeling Guideline*(State of Idaho Guideline for Performing Air Quality Impact Analyses. Doc. ID AQ011 {rev. 2, July 2011}. http://www. deq.idaho.gov/media/355037-modeling-guideline.pdf.). Since modeling thresholds are based on conservative generic modeling analyses, showing that emissions are below thresholds demonstrates compliance with Idaho Air Rules Section 203.02.

Table 2. APPLICABLE REGULATORY LIMITS				
Pollutant	Averaging Period	Significant Impact Levels[a] (µg/m³)[b]	Regulatory Limit[c] (µg/m³)	Modeled Value Used[d]
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	Annual	0.3	15[i]	Mean of maximum 1st highest[j]
	24-hour	1.2	35[k]	Mean of maximum 1st highest[j]
Carbon monoxide (CO)	8-hour	500	10,000[l]	Maximum 2nd highest[m]
	1-hour	2,000	40,000[l]	Maximum 2nd highest[m]
Sulfur Dioxide (SO_2)	Annual	1.0	80[n]	Maximum 1st highest[m]
	24-hour	5	365[l]	Maximum 2nd highest[m]
	3-hour	25	1,300[l]	Maximum 2nd highest[m]
	1-hour	3 ppb[o] (7.8 µg/m³)	75 ppb[p] (196 µg/m³)	Mean of maximum 4th highest[q]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[n]	Maximum 1st highest[m]
	1-hour	4 ppb[o] (7.5 µg/m³)	100 ppb[r] (188 µg/m³)	Mean of maximum 8th highest[s]
Lead (Pb)	Quarterly	NA	1.5[n]	Maximum 1st highest[m]
	3-month[t]	NA	0.15[n]	Maximum 1st highest[m]

a. Idaho Air Rules Section 006 (definition for significant contribution).
b. Micrograms per cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107.
d. The maximum 1st highest modeled value is always used for the significant impact analysis unless indicated otherwise.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers.
f. Never expected to be exceeded more than once in any calendar year.
g. Concentration at any modeled receptor when using five years of meteorological data
h. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
i. 3-year average of annual concentration.
j. Mean (of 5 years of data) of the maximum of 1st highest maximum modeled concentrations at any modeled receptor for each year of meteorological data modeled. The monitoring design value is used for background concentrations for $PM_{2.5}$ analyses. This approach is also used for the significant impact analysis.
k. 3-year average of the upper 98th percentile of 24-hour concentrations.
l. Not to be exceeded more than once per year.
m. Concentration at any modeled receptor.
n. Not to be exceeded in any calendar year.
o. Interim SIL established by EPA policy memorandum.
p. 3-year average of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
q. Mean (of 5 years of data) of the maximum of 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year average of maximum modeled 1-hour impacts for each year is used.
r. 3-year average of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
s. Mean (of 5 years of data) of the maximum of 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year average of maximum modeled 1-hour impacts for each year is used.
t. 3-month rolling average.

2.1.3 *Toxic Air Pollutant Analyses*

Emissions of toxic substances are generally addressed by Idaho Air Rules Section 161:

> *Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.*

Permit requirements for toxic air pollutants from new or modified sources are specifically addressed by Idaho Air Rules Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the*

stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.

Per Section 210, if the total project-wide emissions increase of any TAP associated with a new source or modification exceeds screening emission levels (ELs) of Idaho Air Rules Section 585 or 586, then the ambient impact of the emissions increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of Idaho Air Rules Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of Idaho Air Rules Section 586, then compliance with TAP requirements has been demonstrated. If DEQ determines T-RACT is used to control emissions of carcinogenic TAPs, then modeled concentrations of 10 times the AACC are considered acceptable, as per Idaho Air Rules Section 210.12.

2.2 Background Concentrations

Background concentrations are used in the cumulative NAAQS impact analyses to account for impacts from sources not explicitly modeled. Since all criteria pollutant emissions were below modeling thresholds, cumulative NAAQS impact analyses were not performed and background concentrations were not needed.

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

This section describes the modeling methods used by the applicant's consultant, Trinity, to demonstrate compliance with applicable air quality standards.

3.1.1 Overview of Analyses

The applicant performed site-specific analyses that were determined to be reasonably representative of the existing facility and the proposed modification Results of the submitted analyses demonstrating compliance with applicable air quality standards to DEQ's satisfaction provided the facility is operated as described in the submitted application and in this memorandum

Table 3 provides a brief description ofparameters used in the modeling analyses.

Table 3. MODELING PARAMETERS		
Parameter	**Description/Values**	**Documentation/Addition Description**
General Facility Location	Burley	The area is an attainment or unclassified for all criteria pollutants.
Model	AERSCREEN AERMOD	AERMOD with the PRIME downwash algorithm, version 11353.
Meteorological Data	Burley	2006-2010. See Section 3.1.5
Terrain	Considered	Receptor, building, and emissions source elevations were determined using 1/3rd arc-second National Elevation dataset (NED) files.
Building Downwash	Considered	Downwash was accounted for the structures associated with the facility.
Receptor Grid	Grid 1	10-meter spacing along the boundary
	Grid 2	50-meter spacing out to 2,000 meters

3.1.2 Modeling protocol and Methodology

A modeling protocol was submittedto DEQ prior to the application. The protocol was submitted by Trinity and DEQ provided an electronic protocol approval letter. Ste-specific modeling was generally conducted using data and methods described in the *Idaho Air Quality Modeling Guideline*.

Trinity initially used AERSCREEN to evaluate impacts of hydrogen sulfide and ammonia to ambient air. Table 4 lists the AERSCREEN parameters used in the analysesfor hydrogen sulfide. AERSCREEN parameters for the ammonia analyses are not listed because compliance with the AAC was ultimately demonstrated by refined AERMOD analyses.

Table 4. AERSCREEN PARAMETERS		
Parameter	**Values for D314**	**Values for V315**
Building height	2.8 m	10.7 m
Minimum horizontal building dimension	2.8 m	11.5
Maximum horizontal building dimension	18.3 m	52.2
Building orientation to North	20.14°	NA[a]
Stack direction from building center	0°	NA[a]
Distance from stack to building center	0 m	NA[a]
Minimum Temperature	242.6 K	242.6 K
Maximum Temperature	313.1 K	313.1 K
Surface profile	Cultivated land	Cultivated land
Climate profile	Average	Average
Distance to ambient air	14.8 m	48.6 m

a. Model used a BPIP input file for building data.

3.1.3 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in 40 CFR 51, Appendix W (Guideline on Air Quality Models). The refined, steady state, multiple source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. AERMOD retains the single straight line trajectory of ISCST3, but includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

Screening level modeling was performed using AERSCREEN, the screening model for AERMOD.

Impacts of ammonia predicted by AERSCREEN exceeded the AAC, so refined AERMOD analyses were performed.

3.1.5 Meteorological Data

DEQ provided model-ready meteorological data processed from Burley surface and Boise upper air meteorological data. These data were processed by DEQ using AERMINUTE. DEQ determined these data were reasonably representative for the proposed site.

3.1.6 Terrain Effects

Trinity used 1/3rd arc-second NED data for the modeled domain, obtained from the USGS NED files were used to calculate elevations of buildings, sources, and receptors. The files used the NAD83 datum.

3.1.7 Facility Layout

Trinity provided DEQ with detailed information on the property boundary, building locations and dimensions, and emissions source locations for the facility.

3.1.8 Building Downwash

Potential downwash effects were accounted for in the model by using building parameters as described by Trinity. The Building Profile Input Program for the PRIME downwash algorithm (BPIPPRIME) was used to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and release parameters for AERMOD and for AERSCREEN impacts from the Sulfur Storage Tank (V315) DEQ verified proper building placement in the model by comparing the layout in the model with that shown in submitted drawings.

3.1.9 Ambient Air Boundary

The application indicated that a fence would be used along the ambient air boundary to preclude public access. The facility is located in a rural area and DEQ determined these measure were adequate to preclude public access.

3.1.10 Receptor Network

Table 3 describes the receptor network used in the submitted modeling analyses. DEQ contends that the receptor network was adequate to assure compliance with applicable air quality standards at all ambient air locations.

3.2 Emission Rates

Emissions rates of criteria pollutants and TAPs associated with operations of the proposed modification were provided by the applicant for various applicable averaging periods.

3.2.1 Criteria Pollutant Emissions Rates

Table 5 lists the increase in criteria pollutant emissions rates at the facility and compares those rates to modeling thresholds specified in the *Idaho Air Quality Modeling Guideline.*

Emissions exceeded Level I thresholds for $PM_{2.5}$, PM_{10}, NOx, and SO_2, but were below level II thresholds. DEQ considered the following in evaluating whether Level II thresholds are adequately protective of NAAQS for the proposed modification:

1. Emissions are less than half the Level II threshold values for all pollutants except NOx.
2. The ATS vent stack is about30 meters from the ambient air boundary, providing reasonable time for an emitted plume to further disperse.
3. The ATS vent stack is 33.5 meters tall, which promotes good dispersion before plume impact to ground level.
4. There are currently no sensitive receptors located near the facility.
5. The facility is not located in an area of identified poor air quality, with pollutant levels already near applicable standards.
6. There is no complex terrain in the area most impacted by the emissions sources.
7. The existing facility is not a major source of criteria pollutants (less than 100 tons per year of any criteria pollutant); therefore, existing pollutant conentrations in ambient air are likely to be well below applicable standards.

Table 5. PROJECT EMISSIONS INCREASES AND MODELING THRESHOLDS

Pollutant	Averaging Period	Emissions Rate (lb/hr)[a]	Level I Threshold[b]	Level II Threshold[c]	Site-Specific Modeling Required
$PM_{2.5}$	24-hour	0.29	0.054 lb/hr	0.63 lb/hr	No
	Annual	1.28	0.35 tpy	4.1 tpy	No
PM_{10}	24-hour	0.30	0.22 lb/hr	2.6 lb/hr	No
NOx	1-hour	2.38	0.20 lb/hr	2.4 lb/hr	No
	Annual	10.43	1.2 tpy	14 tpy	No
SO_2	1-hour	2.32	0.21 lb/hr	2.5 lb/hr	No
	24-hour	2.32	0.21 lb/hr	2.5 lb/hr	No
	Annual	10.18	1.2 tpy	14 tpy	No
CO	1-hour	0.29	15 lb/hr	175 lb/hr	No
	8-hour	0.29	15 lb/hr	175 lb/hr	No

a. Pounds per hour emissions rate used for specified averaging periods.

b. Thresholds in pounds/hour (lb/hr) or ton/year (tpy) averaged over the specified averaging period. Level I thresholds are unconditional thresholds.

c. Thresholds in pounds/hour (lb/hr) or ton/year (tpy) averaged over the specified averaging period. Level II thresholds are conditional thresholds. Approval is dependent upon DEQ review of the source characteristics.

3.2.2 TAP Emissions Rates

Trinity modeled TAP emissions of hydrogen sulfide and ammonia from operations of the proposed modification. Emissions of other TAPs from the facility are below emissions screening levels (ELs) of Idaho Air Rules Section 585 and 586. Table6 lists TAP emissions used in the modeling analyses.

Table 6. TAP EMISSIONS USED IN ANALYSES			
Emissions Point in Model	**Pollutant**	**Averaging Period**	**Emissions Rate (lb/hr)[a]**
Sulfur Unloading Tank (D314) and Sulfur Storage Tank (V315)[b]	Hydrogen sulfide	24-hour	1.415
Vent Stack (S500)	Ammonia	24-hour	0.7610
ATS Reactor (R505)	Ammonia	24-hour	0.1039
ABS Tower (T501/502)	Ammonia	24-hour	0.3408
Ammonia Storage Tanks (D540A/B)	Ammonia	24-hour	0.9895

a. Pounds per hour emissions rate used in modeling analyses for specified averaging periods.
b. Emissions occur from either D314 or V315.

Hydrogen sulfide emissions occur from the sulfur unloading tank (D314) or the sulfur storage tank (V315) or a combination of the two. Rather than opt for a separate limit from each source, Trinity elected to model hydrogen sulfide emissions using two scenarios: 1) total allowable emissions from D314; 2) total allowable emissions from V315. The maximum impact of the two scenarios was then used to demonstrate TAP compliance with the AAC.

3.3 Emission Release Parameters and Plant Criteria

Table 7 lists emissions release parameters for sources modeled.

Table 7. EMISSIONS RELEASE PARAMETERS					
Release Point /Location	**Source Type**	**Stack Height (m)[a]**	**Modeled Diameter (m)**	**Stack Gas Temp. (K)[b]**	**Stack Gas Flow Velocity (m/sec)[c]**
D314	Point	8.9	0.24	411	1.22
V315	Point	11.6	0.24	344	0.91
S500	Point	33.5	0.64	311	3.65
Volume Sources					
Release Point /Location	**Source Type**	**Release Height (m)**	**Initial Horizontal Dispersion Coefficient σ_{y0} (m)**	**Initial Vertical Dispersion Coefficient σ_{z0} (m)**	
R505	Volume	6.10	5.30	5.67	
T501/502	Volume	17.1	0.305	4.54	
D540A/B	Volume	1.83	1.77	1.71	

a. Meters
b. Kelvin
c. Meters per second

3.4 *Results for TAPs Analyses*

Trinity submitted 24-hour hydrogen sulfide and ammoniamodeling analyses and results, as listed in Table 8.

Trinity demonstrate TAP compliance for hydrogen sulfide by multiplying the maximum hourly impact to ambient air, as determined by screening modeling,by a persistence factor of 0.4, as specified in Idaho Air Rules Section 210.03(a)(i). The Idaho Air Rules were promulgated when the screening model was SCREEN3, and the appropriate SCREEN3 persistence factor was0.4 to convert a maximum hourly concentration to a 24-hour averaged concentration. AERSCREEN using a persistence factor of 0.6, as built into the model. Since TAP compliance was also demonstrated using the more appropriate 0.6 persistence factor, resolution of the issue was not necessary.

Table 8. RESULTS FOR TAP IMPACT ANALYSES

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)[a]	AAC[d] ($\mu g/m^3$)	Percent of AAC
Hydrogen sulfuide	24-hour	397[c] 595[d]	700	57[c] 85[d]
Ammonia	24-hour	700	900	78

a. Micrograms per cubic meter.
b. Acceptable Ambient Concentration.
c. Maximum impact from AERSCREEN for the scenario of all emissions from V315. Value submitted by trinity calculated by multiplying the maximum hourly impact by a persistence factor of 0.4.
d. DEQ value obtained from AERSCREEN output file for a 24-hour average (AERSCREEN uses a persistence factor of 0.6 for a 24-hour averaging period).

4.0 Conclusions

The ambient air impact analysesdemonstrated to DEQ's satisfaction that emissions from the facility will not cause or significantly contribute to a violation of anyambient air quality standard.

APPENDIX C – FACILITY DRAFT COMMENTS

The following comments were received from the facility on July 25, 2012:

Facility Comment: TKI requests that the hot water heater be removed from the equipment list shown in Table 1.1 of the permit. The hot water heater is an existing unit that is part of the Metam plant, rather than the ATS plant. TKI also requests that references to the hot water heater be removed from the statement of basis as related to the ATS plant (pages 5, 6, 7, and 9).

DEQ Response: All references to the hot water heater use related to the ATS plant have been removed.

Facility Comment: On page 4 of the statement of basis, the first sentence in the third paragraph of the Description section reads, "At the ATS reactor, liquid from the sulfur dioxide absorber will react with elemental sulfur and water to produce ATS solution." The addition of ammonia is also included in the ATS reaction; therefore, TKI requests to update the sentence to be updated to include ammonia, as follows: "At the ATS reactor, liquid from the sulfur dioxide absorber will react with elemental sulfur, ammonia, and water to produce ATS solution."

DEQ Response: This change was made to the SOB and to the permit.

Facility Comment: On page 6 of the statement of basis, a the first sentence after the Emission Inventories heading reads, "There are no emissions from the incinerator. It does not use propane or other fuel to operate." However, the sulfur in the incinerator can be considered a fuel, and propane will be used in the incinerator during startup. Therefore, TKI requests to amend the description of the incinerator emissions as follows: "There are no emissions directly from the incinerator. All combustion products are routed to the ABS unit and ATS reactor, and any vapors not absorbed in the ABS unit or reacted in the ATS reactor are emitted from the ATS stack."

DEQ Response: The wording has been changed and the emissions from the use of propane in the incinerator are now included in Appendix A.

APPENDIX D – PROCESSING FEE

PTC Fee Calculation

Instructions:
Fill in the following information and answer the following questions with a Y or N. Enter the emissions increases and decreases for each pollutant in the table.

Company:	**Tessenderlo Kerley, Inc.**
Address:	**480 S 250 W**
City:	**Burley**
State:	**ID**
Zip Code:	**83318**
Facility Contact:	**Dawn Kominski**
Title:	**Director of Regulatory Affairs**
AIRS No.:	**031-00051**

N Does this facility qualify for a general permit (i.e. concrete batch plant, hot-mix asphalt plant)? Y/N

Y Did this permit require engineering analysis? Y/N

N Is this a PSD permit Y/N (IDAPA 58.01.01.205.04)

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO_X	12.0	0	12.0
SO_2	10.0	0	10.0
CO	3.0	0	3.0
PM_{10}	1.4	0	1.4
VOC	0.2	0	0.2
TAPS/HAPS	8.1	0	8.1
Total:	34.6	0	**34.6**
Fee Due	**$ 5,000.00**		

Comments: