Statement of Basis

Permit to Construct No. P-2010.0050
Project ID 62207

Pico Energy, LLC
Jerome, Idaho

Facility ID 053-00017

Final

July 8, 2019
Kelli Wetzel KW
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.

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ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
Btu	British thermal units
CAA	Clean Air Act
CAS No.	Chemical Abstracts Service registry number
cfm	cubic feet per minute
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
GACT	Generally Available Control Technology
gph	gallons per hour
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
HHV	higher heating value
hp	horsepower
hr/yr	hours per consecutive 12 calendar month period
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
iwg	inches of water gauge
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
m	meters
MACT	Maximum Achievable Control Technology
mg/dscm	milligrams per dry standard cubic meter
MMBtu	million British thermal units
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&M	operation and maintenance
O_2	oxygen
PAH	polyaromatic hydrocarbons
PC	permit condition
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
POM	polycyclic organic matter
ppm	parts per million
ppmw	parts per million by weight

PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge
PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
PW	process weight rate
RICE	reciprocating internal combustion engines
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_x	sulfur oxides
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
ULSD	ultra-low sulfur diesel
U.S.C.	United States Code
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

Pico Energy, LLC owns and operated the biogas processing facility located at the Bettencourt 6 Dairy near Jerome, Idaho. Pico Energy, LLC is a subsidiary of Montauk Renewable Ag, LLC. The Pico Energy facility is associated with an anaerobic digester which produces biogas from on-site dairy cattle manure. The resulting biogas is passed through a caustic bio-scrubber to decrease the concentration of H_2S in the gas stream. The scrubbed biogas is combusted in two Jenbacher reciprocating IC engines to power electrical generators. In the event of an emergency, the IC engines are taken offline and biogas is combusted in an enclosed flare.

Pico Energy, LLC is proposing to increase allowable biogas throughput and add gas conversion capability. A gas-processing unit is being proposed which will convert digester-produced biogas to pipeline-quality natural gas for input into a nearby pipeline. All gas compressors associated with this facility are electric-powered and do not produce combustion emissions. The flare capacity will be increased to meet the new biogas capacity, and the NOx emission limits on the IC engines will be adjusted to reflect the combustion of natural gas. The permit modification also includes a name change back to Pico Energy, LLC.

Permitting History

The following information was derived from a review of the permit files available to DEQ. Permit status is noted as active and in effect (A) or superseded (S).

October 31, 2018	P-2010.0050, Revised permit for name change to Montauk Renewable Ag, LLC, Permit status (A, but will become S upon issuance of this permit)
December 8, 2015	P-2010.0050, Revised permit for name change to Pico Energy LLC, Permit status (S)
May 21, 2012	P-2010.0050, Revised permit for change of facility operator, Permit status (S)
April 29, 2010	P-2010.0050, Revised permit to correct a typographical error, Permit status (S)
August 11, 2009	P-2010.0050, Initial PTC for an anaerobic digester, a flare, and two IC engines, Permit status (S)

Application Scope

This PTC is for a modification at an existing minor facility.

The applicant has proposed to:

- Install and operate a biogas processing unit.
- Increase the production of biogas from the anaerobic digester, increase flare capacity, and increase the H_2S limits.
- Change the ownership of the facility.

Application Chronology

March 25, 2019	DEQ received an application and an application fee.
April 1 – April 16, 2019	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
April 16, 2019	DEQ received supplemental information from the applicant.
April 26, 2019	DEQ determined that the application was incomplete.
May 8, 2019	DEQ received supplemental information from the applicant.
May 20, 2019	DEQ determined that the application was complete.

June 17, 2019	DEQ made available the draft permit and statement of basis for peer and regional office review.
June 24, 2019	DEQ made available the draft permit and statement of basis for applicant review.
July 2, 2019	DEQ received the permit processing fee.
July 8, 2019	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
1	Anaerobic Digester Biogas produced: 1,584,000 cubic feet per day	H_2S Scrubber: Manufacturer: Pacques Model: Thiopaq Type: Caustic	N/A
2	IC Engine/IC-1 Manufacturer: GE Model: Jenbacher J416 Rated Power: 1573 brake horsepower Ignition Type: Spark Generating Capacity: 1138 kW Fuel: Biogas, Natural Gas	Lean Burn Combustion	IC-1
	IC Engine/IC-2 Manufacturer: GE Model: Jenbacher J416 Rated Power: 1573 brake horsepower Ignition Type: Spark Generating Capacity: 1138 kW Fuel: Biogas, Natural Gas	Lean Burn Combustion	IC-2
3	Flare Manufacturer: Catalytic Combustion Model: Enclosed Ground Flare Maximum Capacity: 1,584,000 ft^3/day Rated Heat Input: 37.3 MMBtu/hr	None	Flare
4	Biogas Processing System Manufacturer: Air Liquide Maximum Capacity: 1,100 scfm		Biogas Processor
5	Waste Oil Heater Manufacturer: Clean Burn or Equivalent Model: CB-5000 Maximum Heat Input: 0.5MMBtu/hr Maximum Capacity: 3.6 gph		Heater

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.

Using this definition of Potential to Emit an emission inventory was developed for the two IC engines, flare, heater, and biogas processing unit at the facility (see Appendix A) associated with this proposed project. Emissions estimates of criteria pollutant, HAP, and TAP were based on emission factors from AP-42, the EPA RACT/BACT LAER Clearinghouse (RBLC) ID #IA-0088, operation of 8,760 hours per year for the engines and 4,565 hours per year for the flare, and process information specific to the facility for this proposed project.

The biogas processing unit treats the biogas and produces pipeline-quality natural gas. The gas permeate from the gas processing unit is referred to as "tail gas" and consists primarily of carbon dioxide. The tail gas will be vented to the atmosphere without any additional processing or combustion. Emission estimates of the tail gas constituents are included in Appendix A and consist of methane, carbon dioxide, oxygen, nitrogen, hydrogen sulfide (included in the TAP analysis), and water.

Pre-Project Potential to Emit

Pre-project Potential to Emit is used to establish the change in emissions at a facility as a result of this project.

The following table presents the pre-project potential to emit for all criteria pollutants from all emissions units at the facility as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 2 PRE-PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr(a)	T/yr(b)	lb/hr(a)	T/yr(b)	lb/hr(a)	T/yr(b)	lb/hr(a)	T/yr(b)	lb/hr(a)	T/yr(b)
IC Engine (IC-1)	0.095	0.43	1.15	4.45	3.82	16.73	10.395	45.57	0.87	3.79
IC Engine (IC-2)	0.095	0.43	1.15	4.45	3.82	16.73	10.395	45.57	0.87	3.79
Flare	0.15	0.64	13.93	61.02	1.94	8.51	3.89	17.02	7.00	30.64
Pre-Project Totals[c]	**0.19**	**0.86**	**13.93**	**61.02**	**7.64**	**33.46**	**20.79**	**91.14**	**7.00**	**30.64**

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.
b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.
c) The Pre-Project Totals are the worst-case emissions from either the total for the two IC engines or the flare (DEQ assumption for worst-case emissions).

Post Project Potential to Emit

Post project Potential to Emit is used to establish the change in emissions at a facility and to determine the facility's classification as a result of this project. Post project Potential to Emit includes all permit limits resulting from this project.

The following table presents the post project Potential to Emit for criteria pollutants from all emissions units at the facility as determined by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 3 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]
IC Engine (IC-1)	0.097	0.425	5.21	22.83	6.94	30.38	10.40	45.57	0.87	3.80
IC Engine (IC-2)	0.097	0.425	5.21	22.83	6.94	30.38	10.40	45.57	0.87	3.80
Flare	0.50	1.145	26.70	60.94	2.54	5.79	11.56	26.39	24.61	56.18
Heater	0.084	0.370	0.096	0.42	0.058	0.25	0.008	0.03	0.004	0.02
Biogas Processing Unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Totals[c]	**0.58**	**1.51**	**26.80**	**61.36**	**13.94**	**61.01**	**20.81**	**91.17**	**24.61**	**56.19**

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.
b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.
c) The Post-Project Totals are the worst-case emissions from either the total of the two IC engines and the heater or the flare and the heater.

Change in Potential to Emit

The change in facility-wide potential to emit is used to determine if a public comment period may be required and to determine the processing fee per IDAPA 58.01.01.225. The following table presents the facility-wide change in the potential to emit for criteria pollutants.

Table 4 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Pre-Project Potential to Emit	0.19	0.86	13.93	61.02	7.64	33.46	20.79	91.14	7.00	30.64
Post Project Potential to Emit	0.58	1.51	26.80	61.36	13.94	61.01	20.81	91.17	24.61	56.19
Changes in Potential to Emit	**0.39**	**0.65**	**12.87**	**0.34**	**6.30**	**27.55**	**0.02**	**0.03**	**17.61**	**25.55**

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.

Pre- and post-project, as well as the change in, non-carcinogenic TAP emissions are presented in the following table:

Table 5 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS

Non-Carcinogenic Toxic Air Pollutants	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
1,2-Dichlorobenzene	0.00E-03	4.39E-05	4.39E-05	20	No
1,4-Dichlorobenzene	0.00E-03	4.39E-05	4.39E-05	30	No
Antimony	0.00E-03	1.22E-06	1.22E-06	0.033	No
Barium	0.00E-03	1.61E-04	1.61E-04	0.033	No
Chromium	0.00E-03	7.35E-04	7.35E-04	0.033	No
Cobalt	0.00E-03	2.36E-05	2.36E-05	0.0033	No
Copper (fume)	0.00E-03	3.11E-05	3.11E-05	0.013	No
Cyclopentane	0.00E-03	4.41E-03	4.41E-03	114.667	No
Dibutylphthalate	0.00E-03	1.22E-07	1.22E-07	0.333	No
Hexane	0.00E-03	6.58E-02	6.58E-02	12	No
Hydrogen Chloride	0.00E-03	2.38E-02	2.38E-02	0.05	No
Hydrogen Sulfide	0.00E-03	8.15E-03	8.15E-03	0.933	No

Non-Carcinogenic Toxic Air Pollutants	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Manganese	0.00E-03	2.18E-05	2.18E-05	0.067	No
Methylcyclohexane	0.00E-03	2.39E-02	2.39E-02	107	No
Molybdenum	0.00E-03	4.02E-05	4.02E-05	0.333	No
Naphthalene	0.00E-03	6.91E-05	6.91E-05	3.33	No
Nonane	0.00E-03	2.14E-03	2.14E-03	70	No
Octane	0.00E-03	6.82E-03	6.82E-03	93.3	No
Pentane	0.00E-03	1.46E-01	1.46E-01	118	No
Phenol	0.00E-03	8.64E-06	8.64E-06	1.27	No
Phosphorus	0.00E-03	1.30E-04	1.30E-04	0.007	No
Selenium	2.1E-04	8.77E-07	-2.09E-04	0.013	No
Toluene	5.1E-03	1.24E-04	-4.98E-03	25	No
Trimethyl benzene	0.00E-03	1.38E-03	1.38E-03	8.2	No
Zinc	0.00E-03	1.06E-03	1.06E-03	0.667	No

All changes in emissions rates for non-carcinogenic TAP were below EL (screening emissions level) as a result of this project. Therefore, modeling is not required for any non-carcinogenic TAP because none of the 24-hour average non-carcinogenic screening ELs identified in IDAPA 58.01.01.585 were exceeded.

Carcinogenic TAP Emissions

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

Table 6 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR CARCINOGENIC TOXIC AIR POLLUTANTS

Carcinogenic Toxic Air Pollutants	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Arsenic	0.00E-03	1.63E-05	1.63E-05	1.50E-06	Yes
Benzene	1.3E-02	7.68E-05	-1.29E-05	8.00E-04	No
Beryllium	0.00E-03	6.92E-06	6.92E-06	2.80E-05	No
Cadmium	0.00E-03	4.08E-05	4.08E-05	3.70E-06	Yes
Formaldehyde	3.7E-03	2.74E-03	-9.6E-04	5.10E-04	No
Nickel	3.9E-05	2.57E-04	2.18E-04	2.70E-05	Yes
2-Methylnaphthalene	0.00E-03	8.77E-07	8.77E-07	9.10E-05	No
3-Methylcholanthrene	0.00E-03	6.58E-08	6.58E-08	9.10E-05	No
7,12-Dimethylbenz(a)anthracene	0.00E-03	5.85E-07	5.85E-07	9.10E-05	No
Acenaphthene	0.00E-03	6.58E-08	6.58E-08	9.10E-05	No
Acenaphthylene	0.00E-03	6.58E-08	6.58E-08	9.10E-05	No
Anthracene	0.00E-03	3.97E-05	3.97E-05	9.10E-05	No
Benzo(g,h,i)perylene	0.00E-03	4.39E-08	4.39E-08	9.10E-05	No
Fluoranthene	0.00E-03	1.10E-07	1.10E-07	9.10E-05	No
Fluorene	0.00E-03	1.02E-07	1.02E-07	9.10E-05	No
POM[a]	0.00E-03	4.17E-07	4.17E-07	2.00E-06	No

a) Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. The total is compared to benzo(a)pyrene.

Some of the PTEs for carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is required for arsenic, cadmium, and nickel because the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

In accordance with IDAPA 58.01.01.210.20, if TAP emissions from a specific emissions source are regulated by DEQ or EPA under 40 CFR 60, 61, or 63, then an increment analysis is not required for that TAP from that emissions source. Because the IC engines are regulated by 40 CFR 60, Subpart JJJJ, the TAP emissions from these emissions units are excluded.

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, HAP, and TAP from this project exceeded applicable screening emission levels (EL) and 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 A.

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 Gooding 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.

Facility Classification

The AIRS/AFS facility classification codes are as follows:

For HAPs (Hazardous Air Pollutants) Only:

A = Use when any one HAP has permitted emissions > 10 T/yr or if the aggregate of all HAPS (Total HAPs) has permitted emissions > 25 T/yr.

SM80 = Use if a synthetic minor (uncontrolled HAPs emissions are > 10 T/yr or if the aggregate of all uncontrolled HAPs (Total HAPs) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits > 8 T/yr of a single HAP or ≥ 20 T/yr of Total HAPs.

SM = Use if a synthetic minor (uncontrolled HAPs emissions are > 10 T/yr or if the aggregate of all uncontrolled HAPs (Total HAPs) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits < 8 T/yr of a single HAP and/or < 20 T/yr of Total HAPs.

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[1] Criteria pollutant thresholds in Table 2, State of Idaho Guideline for Performing Air Quality Impact Analyses, Doc ID AQ-011, September 2013.

B = Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 10 and 25 T/yr HAP major source thresholds.

UNK = Class is unknown.

For All Other Pollutants:

A = Use when permitted emissions of a pollutant are > 100 T/yr.

SM80 = Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are ≥ 80 T/yr.

SM = Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are < 80 T/yr.

B = Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 100 T/yr major source threshold.

UNK = Class is unknown.

Table 8 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM	< 100	1.51	**100**	B
PM_{10}	< 100	1.51	**100**	B
$PM_{2.5}$	< 100	1.51	**100**	B
SO_2	> 100	61.36	**100**	SM
NO_X	< 100	61.01	**100**	B
CO	< 100	91.17	**100**	B
VOC	< 100	56.19	**100**	B
HAP (single)	4.49	4.49	**10**	B
Total HAPs	6.45	6.45	**25**	B

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 modified 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 emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Condition 2.8.

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

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

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO, and VOC 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 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)

Because the facility has two spark-ignited IC engines, the facility is subject to the requirements of 40 CFR 60, Subpart JJJJ. DEQ is delegated this Subpart.

40 CFR 60, Subpart JJJJ ....Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

§ 60.4230 Am I subject to this subpart?

(a) The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified in paragraphs (a)(1) through (6) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

(4) Owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:

(i) On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP);

The facility operates two 1,573 bhp, lean-burn, SI ICE that can combust biogas or natural gas.

§ 60.4231 What emission standards must I meet if I am a manufacturer of stationary SI internal combustion engines or equipment containing such engines?

The facility will be an operator of SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

§ 60.4232 How long must my engines meet the emission standards if I am a manufacturer of stationary SI internal combustion engines?

The facility will be an operator of SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

§ 60.4233 What emission standards must I meet if I am an owner or operator of a stationary SI internal combustion engine?

(e) Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 to this subpart for their stationary SI ICE. For owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 100 HP (except gasoline and rich burn engines that use LPG) manufactured prior to January 1, 2011 that were certified to the certification emission standards in 40 CFR part 1048 applicable to engines that are not severe duty engines, if such stationary SI ICE was certified to a carbon monoxide (CO) standard above the standard in Table 1 to this subpart, then the owners and operators may meet the CO certification (not field testing) standard for which the engine was certified.

Table 9 40 CFR 60, SUBPART JJJJ, TABLE 1 SUMMARY

Engine Type and Fuel	Maximum Engine Horsepower (bhp)	Manufacture Date	Emission Standards[a]					
			g/bhp-hr			ppmvd at 15% O_2		
			NO_x	CO	VOC[2]	NO_x	CO	VOC[b]
Non-Emergency SI Natural Gas and Non-Emergency SI Lean Burn LPG (except lean burn 500≤HP<1,350)	HP≥500	7/1/2007	2.0	4.0	1.0	160	540	86
Landfill/Digester Gas (except lean burn 500≤HP<1,350)	HP≥500	7/1/2008	3.0	5.0	1.0	220	610	80

a) Owners and operators of stationary non-certified SI engines may choose to comply with the emission standards in units of either g/HP-hr or ppmvd at 15 percent O_2.

b) For purposes of this subpart, when calculating emissions of volatile organic compounds, emissions of formaldehyde should not be included.

§ 60.4234 How long must I meet the emission standards if I am an owner or operator of a stationary SI internal combustion engine?

Owners and operators of stationary SI ICE must operate and maintain stationary SI ICE that achieve the emission standards as required in §60.4233 over the entire life of the engine.

The facility must operate and maintain both engines to achieve the emission standards over the entire life of the engines.

§ 60.4235 What fuel requirements must I meet if I am an owner or operator of a stationary SI gasoline fired internal combustion engine subject to this subpart?

Owners and operators of stationary SI ICE subject to this subpart that use gasoline must use gasoline that meets the per gallon sulfur limit in 40 CFR 80.195.

The facility is not subject to this section of the rule as gasoline is not combusted in either engine.

§ 60.4236 What is the deadline for importing or installing stationary SI ICE produced in previous model years?

The engines were installed prior to any deadline mentioned in the Subpart and therefore this section is not applicable.

§ 60.4237 What are the monitoring requirements if I am an owner or operator of an emergency stationary SI internal combustion engine?

The engines are not considered emergency engines and therefore this section is not applicable.

§ 60.4238 What are my compliance requirements if I am a manufacturer of stationary SI internal combustion engines ≤19 KW (25 HP) or a manufacturer of equipment containing such engines?

The facility will be an operator of SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

§ 60.4239 What are my compliance requirements if I am a manufacturer of stationary SI internal combustion engines >19 KW (25 HP) that use gasoline or a manufacturer of equipment containing such engines?

The facility will be an operator of SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

§ 60.4240 What are my compliance requirements if I am a manufacturer of stationary SI internal combustion engines >19 KW (25 HP) that are rich burn engines that use LPG or a manufacturer of equipment containing such engines?

The facility will be an operator of SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

§ 60.4241 What are my compliance requirements if I am a manufacturer of stationary SI internal combustion engines participating in the voluntary certification program or a manufacturer of equipment containing such engines?

The facility will be an operator of SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

§ 60.4242 What other requirements must I meet if I am a manufacturer of stationary SI internal combustion engines or equipment containing stationary SI internal combustion engines or a manufacturer of equipment containing such engines?

The facility will be an operator of SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

§ 60.4243 What are my compliance requirements if I am an owner or operator of a stationary SI internal combustion engine?

(b) If you are an owner or operator of a stationary SI internal combustion engine and must comply with the emission standards specified in §60.4233(d) or (e), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) and (2) of this section.

> (2) Purchasing a non-certified engine and demonstrating compliance with the emission standards specified in §60.4233(d) or (e) and according to the requirements specified in §60.4244, as applicable, and according to paragraphs (b)(2)(i) and (ii) of this section.
>
> > (ii) If you are an owner or operator of a stationary SI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance.

(e) Owners and operators of stationary SI natural gas fired engines may operate their engines using propane for a maximum of 100 hours per year as an alternative fuel solely during emergency operations, but must keep records of such use. If propane is used for more than 100 hours per year in an engine that is not certified to the emission standards when using propane, the owners and operators are required to conduct a performance test to demonstrate compliance with the emission standards of §60.4233.

The facility must keep a maintenance plan. The initial performance test has already been conducted by subsequent performance testing must occur every 8,760 hours or 3 years, whichever comes first, to demonstrate compliance. The facility may also fire the engines on propane for a maximum of 100 hours per year solely during emergency operations and keep records.

§ 60.4244 What test methods and other procedures must I use if I am an owner or operator of a stationary SI internal combustion engine?

Owners and operators of stationary SI ICE who conduct performance tests must follow the procedures in paragraphs (a) through (f) of this section.

(a) Each performance test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and according to the requirements in §60.8 and under the specific conditions that are specified by Table 2 to this subpart.

(b) You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in §60.8(c). If your stationary SI internal combustion engine is non-operational, you do not need to startup the engine solely to conduct a performance test; however, you must conduct the performance test immediately upon startup of the engine.

(c) You must conduct three separate test runs for each performance test required in this section, as specified in §60.8(f). Each test run must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and last at least 1 hour.

(d) To determine compliance with the NO_X mass per unit output emission limitation, convert the concentration of NO_X in the engine exhaust using Equation 1 of this section.

(e) To determine compliance with the CO mass per unit output emission limitation, convert the concentration of CO in the engine exhaust using Equation 2 of this section.

(f) For purposes of this subpart, when calculating emissions of VOC, emissions of formaldehyde should not be included. To determine compliance with the VOC mass per unit output emission limitation, convert the concentration of VOC in the engine exhaust using Equation 3 of this section.

The procedures detailed above must be followed when conducting performance tests on the engines.

§ 60.4245 What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary SI internal combustion engine?

Owners or operators of stationary SI ICE must meet the following notification, reporting and recordkeeping requirements.

(a) Owners and operators of all stationary SI ICE must keep records of the information in paragraphs (a)(1) through (4) of this section.

(1) All notifications submitted to comply with this subpart and all documentation supporting any notification.

(2) Maintenance conducted on the engine.

(3) If the stationary SI internal combustion engine is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR parts 90, 1048, 1054, and 1060, as applicable.

(4) If the stationary SI internal combustion engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to §60.4243(a)(2), documentation that the engine meets the emission standards.

(c) Owners and operators of stationary SI ICE greater than or equal to 500 HP that have not been certified by an engine manufacturer to meet the emission standards in §60.4231 must submit an initial notification as required in §60.7(a)(1). The notification must include the information in paragraphs (c)(1) through (5) of this section.

(d) Owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test as conducted in §60.4244 within 60 days after the test has been completed. Performance test reports using EPA Method 18, EPA Method 320, or ASTM D6348-03 (incorporated by reference—see 40 CFR 60.17) to measure VOC require reporting of all QA/QC data. For Method 18, report results from sections 8.4 and 11.1.1.4; for Method 320, report results from sections 8.6.2, 9.0, and 13.0; and for ASTM D6348-03 report results of all QA/QC procedures in Annexes 1-7.

The facility must meet the notification, reporting, and recordkeeping requirements as detailed above. Initial notifications have already been made.

§ 60.4246 What parts of the General Provisions apply to me?

Table 3 to this subpart shows which parts of the General Provisions in §§60.1 through 60.19 apply to you.

NESHAP Applicability (40 CFR 61)

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

MACT/GACT Applicability (40 CFR 63)

Because the facility has two spark-ignited IC engines, the facility is subject to the requirements of 40 CFR 63, Subpart ZZZZ. DEQ is delegated this Subpart.

40 CFR 63, Subpart ZZZZ.................................National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

§ 63.6580 What is the purpose of subpart ZZZZ?

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

§ 63.6585 Am I subject to this subpart?

You are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

(a) A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

(c) An area source of HAP emissions is a source that is not a major source.

(d) If you are an owner or operator of an area source subject to this subpart, your status as an entity subject to a standard or other requirements under this subpart does not subject you to the obligation to obtain a permit under 40 CFR part 70 or 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable.

§ 63.6590 What parts of my plant does this subpart cover?

This subpart applies to each affected source.

(a) Affected source. An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand.

(2) *New stationary RICE.*

(iii) A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(c) *Stationary RICE subject to Regulations under 40 CFR Part 60.* An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

Both engines are subject to 40 CFR 60, Subpart JJJJ and therefore the requirements of Subpart ZZZZ are met and no further requirements apply under Subpart ZZZZ.

Permit Conditions Review

This section describes the permit conditions for this initial permit or only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action.

Revised Table 1.1

This table was revised to include the increased biogas production, the new flare, biogas processing system, and waste oil heater.

Revised Table 2.1

This table was revised to include the new biogas processing system and waste oil heater.

Revised Permit Condition 2.3 and Table 2.2

This permit condition and table were revised to include the new emission limits for the IC engines, flare, and heater. The flare emission limits are based on all biogas passing through the flare at a concentration of 2,400 ppmv H_2S.

Revised Permit Condition 2.5

This permit condition was revised to include the increased biogas production limit of 1,584,000 scf per day.

Revised Permit Condition 2.6

This permit condition was revised based on the NO_x emission limit in 40 CFR 60, Subpart JJJJ for the combustion of natural gas in the IC engines.

Revised Permit Condition 2.10

This permit condition and Table 2.3 were revised to include the emissions standards for the engines when combusting natural gas.

Deleted Old Permit Condition 2.12

This permit condition was removed as all facility biogas is no longer combusted but instead a portion or all of the biogas may be converted to pipeline quality natural gas.

Added Permit Condition 2.13

This permit condition was added to ensure that biogas combustion emission remain at previously permitted levels.

Added Permit Condition 2.14

This permit condition was added to ensure that all biogas from the facility will either be converted to natural gas or directed to the IC engines or flare for combustion.

Added Permit Condition 2.19

This permit condition was added for recordkeeping of the hours of flare operation to ensure compliance with the flare operating hours limit.

Revised Permit Condition 2.21

This permit condition was revised to include placing a flow rate monitor before the gas processing unit.

Revised Permit Conditions 2.22 – 2.24

These permit conditions were revised to include the gas processing unit.

Revised Permit Condition 2.28

This permit condition was revised to include the option of using propane as an alternative fuel during emergency operations in accordance with 40 CFR 60.4243.

Revised Permit Condition 2.30

This permit condition was revised to include standard language from 40 CFR 60.4245.

Added Permit Condition 2.32

This permit condition was added to ensure that should there be a conflict between 40 CFR Part 60 and the requirements of a permit condition, the requirements of the NSPS shall govern.

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. During this time, 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

PICO ENERGY, LLC - FACILITY NUMBER 053-00017

Potential to Emit Emission Inventory (tons per year), Revision 1 April 15, 2019

Process Information

	Proposed Production (scf)			Current Production (scf)			Notes
	hourly*	daily	annual	hourly	daily	annual	
Biodigester (with H_2S scrubber)	66,000	1,584,000	578,160,000	34,396	825,500	301,307,500	scf, saturated wet at 98°F
Flare	66,000	1,584,000	301,290,000	34,396	825,500	301,307,500	4,565 hr/yr, proposed limit
Internal Combustion (IC) Engines	34,396	825,500	301,307,500	34,396	825,500	301,307,500	Biogas of natural gas
Biogas Processed in Gas Processing Unit	66,000	1,584,000	578,160,000	--	--	--	Entire digester production
Natural Gas Produced , estimated	37,980	911,520	332,704,800				C1 Gas (methane) sent to pipeline
Tail Gas from Gas Processing Unit	23,220	557,280	203,407,200	--	--	--	Tail gas is not burned
Electrical Compressors	0	0	0	--	--	--	

*The IC engines do not have increased capacity.

Annual Emissions Summary, Estimated Actual

Sources	PM10 (ton/yr)	PM2.5 (ton/yr)	SO2 (ton/yr)	NOx (ton/yr)	VOC (ton/yr)	CO (ton/yr)
Existing Sources (current permit limit of 825,000 scf/day)						
IC1, ESTIMATED ACTUAL	0.425	0.425	4.44	14.59	1.15	28.88
IC2, ESTIMATED ACTUAL	0.425	0.425	4.44	14.10	0.99	28.31
BIOGAS FLARE	0.597	0.597	4.63	3.02	29.27	13.75
Existing PTE (highest of the flare or the two IC engines)	***0.850***	***0.850***	***8.88***	***28.69***	***29.27***	***57.19***

Annual Emissions Summary, Proposed Permit, IC Engine H2S Increased to 1800 ppm

Sources	PM10 (ton/yr)	PM2.5 (ton/yr)	SO2 (ton/yr)	NOx (ton/yr)	VOC (ton/yr)	CO (ton/yr)
Proposed Sources (proposed permit limit of 1,512,000 scf/day)						
IC1, PROPOSED PERMIT	0.425	0.425	22.83	30.38	3.80	45.57
IC2, PROPOSED PERMIT	0.425	0.425	22.83	30.38	3.80	45.57
USED-OIL HEATER, PROPOSED PERMIT	0.370	0.271	0.42	0.25	0.02	0.03
Subtotal of IC1, IC2 and Heater	*1.22*	*1.12*	*46.09*	*61.01*	*7.61*	*91.17*
BIOGAS-FIRED FLARE, PROPOSED PERMIT	1.145	1.145	60.94	5.79	56.18	26.39
USED-OIL HEATER, PROPOSED PERMIT	0.370	0.271	0.422	0.252	0.016	0.033
Tail Gas Venting *(no criteria pollutants)*	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal of Full Flare and Heater	1.51	1.42	61.36	6.04	56.19	26.42
PROPOSED PTE (max of IC engines & heater or flare& heater)	**1.51**	**1.42**	**61.36**	**61.01**	**56.19**	**91.17**

General Notes:

-- Fugitive emissions are negligible and are not included

-- Flare emissions increase due to biogas production increase. Engine NOx emissions increase due to raising permit limit from 1.1 g/bhp-hr to the 2.0 g/bhp-hr. PTE is either the total emissions for the engines and partial flare (with 350 ppm SO_2) , or full flare operation (with 2,400 ppm SO_2).

GHG and HAP Emissions Summary

Sources	GHG (ton/yr)	CO_2e (MT/yr)	Total HAP (ton/yr)	Formaldehyde max HAP (tpy)
IC1 and IC2, Internal Combustion Engines, Maximum Capacity	4,732	10,923	6.15	4.49
Flare, annual permit limit	9,751	8,909	0.158	0.01
Used-oil Heater, permit-exempt	354	323	0.109	--
Gas Processing Unit Tail Gas, no combustion	11,237	13,211	0.036	--
TOTAL	**26,074**	**33,367**	**6.45**	**4.50**

PICO ENERGY, LLC **FACILITY NUMBER 053-00017**

INTERNAL COMBUSTION ENGINES - CRITERIA POLLUTANTS

Estimated Actual Emissions based on Source Tests and tracked H2S of 350 ppm

Manufacturer: GE		
Model: Jenbacher J416		
Rated Power 1573 brake horsepower (bhp)		
Ignition Type: Spark		
Generating Capacity 1138 kW		
Lean-burn combustion technology		
Annual Power Production	1,573	bhp/hr, potential, each
PTE Hours of Operation	8,760	Hours/Year
Brake-specific fuel consumption rate	6,174	Btu heat input per bhp power output (calculated)
Heat Input, per engine	9.71	mmBtu/hr for each engine
Annual Heat Input, per engine	85,068	mmBtu/year
Biogas Heat Content	565	Btu/scf
Natural Gas Heat Content	1,020	Btu/scf

CRITERIA POLLUTANTS	**IC1, ESTIMATED ACTUAL**		**IC2, ESTIMATED ACTUAL**		
PM10/PM2.5 (uncontrolled):	Emission Factor		Emission Factor		Reference/Notes
Emission Factor:	0.010	lb/mmBtu	0.010	lb/mmBtu	(AP-42, Table 3.2-2, PM10/PM2.5 + condensable PM)
Emissions:	0.425	tons/year	0.425	tons/year	(permit limit 0.425 tpy each)
	0.097	lbs/hr	0.097	lbs/hr	(permit limit 0.095 lb/hr each)
Sulfur Dioxide:					
Emission Factor:	0.1044	lb/mmBtu	0.1044	lb/mmBtu	AP-42, Table 5.3-1, **Based on 350 ppm H2S.**
Emissions:	4.441	tons/year	4.441	tons/year	SO2 (lb/scf) = 1685 (0.035 mol% H_2S) = 58.975 lb/mmscf
	1.014	lbs/hr	1.014	lbs/hr	58.975 lb/mmscf / 565 scf/Btu = 0.1044 lb/mmBtu
Nitrogen Oxides (NOx)					
Emissions:	14.59	tons/year	14.10	tons/year	Average 2016-2018 test result
	3.33	lbs/hr	3.22	lbs/hr	Average 2016-2018 test result
Volatile Organic Compounds (VOC)					
Emissions:	1.15	tons/year	0.99	tons/year	Average 2016-2018 test result
	0.26	lbs/hr	0.23	lbs/hr	Average 2016-2018 test result
Carbon Monoxide (CO)					
Emissions:	28.88	tons/year	28.31	tons/year	Average 2016-2018 test result
	6.59	lbs/hr	6.46	lbs/hr	Average 2016-2018 test result

IC1, PROPOSED PERMIT **IC2, PROPOSED PERMIT**

CRITERIA POLLUTANTS			
PM10/PM2.5 (uncontrolled):	Emission Factor		Reference/Notes
Emission Factor:	0.010	lb/mmBtu	(AP-42, Table 3.2-2, PM10/PM2.5 + condensable PM)
Emissions:	0.425	tons/year	(permit limit 0.425 tpy each)
	0.097	lbs/hr	(permit limit 0.095 lb/hr each)
Sulfur Dioxide:			
Emission Factor:	0.5368	lb/mmBtu	AP-42, Table 5.3-1, Updated 1/95, Based on 1800 ppm H2S on short term.
Emissions:	22.832	tons/year	SO2 (lb/scf) = 1685 (0.180 mol% H_2S) = 303.3 lb/mmscf
	5.213	lbs/hr	303.3 lb/mmscf / 565 scf/Btu = 0.5368 lb/mmBtu
Nitrogen Oxides (NOx)			
Emission Factor:	2.0	g/hp-hr	Proposed permit limit based on NSPS Subpart JJJJ
Emissions:	30.38	tons/year	Permit Limit = 16.72 tpy, each
	6.94	lbs/hr	Permit Limit = 3.82 lb/hr, each
Volatile Organic Compounds (VOC)			
Emission Factor:	0.25	g/hp-hr	Manufacturer's Information, supported by stack test results
Emissions:	3.80	tons/year	Permit Limit = 3.79 tpy
	0.87	lbs/hr	Permit Limit = 0.87 lb/hr
Carbon Monoxide (CO)			
Emission Factor:	3.00	g/hp-hr	Current Permit Limit, supported by stack test results
Emissions:	45.57	tons/year	Permit Limit = 45.53 tpy
	10.40	lbs/hr	Permit Limit = 10.41 lb/hr

GREENHOUSE GAS POLLUTANTS			
GH emission factors obtained from AP-42 Table 3.2-2.			
Carbon Dioxide (CO_2)			
Emission Factor:	110.0	lb/MMBtu	AP-42 Table 3.2-2
Emissions:	4,679	tpy	Single IC Engine
	8,507	MT/yr	Both IC Engines
Methane (CH_4)			
Emission Factor:	1.25	lb/MMBtu	3.2-2
Emissions:	53.2	tpy	Single IC Engine
	96.7	MT/yr	Both IC Engines
Carbon Dioxide Equivalent (CO_2e)			
Emissions:	10,923	MT/yr	
Emission Factor:	1	CO_2	Global Warming Potentials
	25	Methane (CH_4)	

PICO ENERGY, LLC
FACILITY NUMBER 053-00017
INTERNAL COMBUSTION ENGINES - HAPs &TAPs
Emission Factor Source: AP-42 Chapter 3.2, 7/00, Natural Gas-fired Reciprocating Engines; Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines

Design Parameters

19.42 mmBtu/hr; Heat input capacity for both engines
8,760 hrs/yr; Maximum operating hours

Potential Hazardous Air Pollutant Emissions (both engines)

CAS Nbr.	Pollutant	Emission Factor (lb/mmBtu)	Emission Rates (lb/hr)	Emission Rates (tpy)	Notes
75343	1,1-Dichloroethane	2.36E-05	4.58E-04	2.01E-03	
79345	1,1,2,2-Tetrachloroethane	4.00E-05	7.77E-04	3.40E-03	
79005	1,1,2-Trichloroethane	3.18E-05	6.18E-04	2.71E-03	
107062	1,2-Dichloroethane	2.36E-05	4.58E-04	2.01E-03	
78875	1,2-Dichloropropane	2.69E-05	5.22E-04	2.29E-03	
106990	1,3-Butadiene	2.67E-04	5.19E-03	2.27E-02	
542756	1,3-Dichloropropene	2.64E-05	5.13E-04	2.25E-03	
540841	2,2,4-Trimethylpentane	2.50E-04	4.86E-03	2.13E-02	
91576	2-Methylnaphthalene	3.32E-05	6.45E-04	2.82E-03	b
833210	Acenaphthene	1.25E-06	2.43E-05	1.06E-04	b
208969	Acenaphthylene	5.53E-06	1.07E-04	4.70E-04	b
75070	Acetaldehyde	8.36E-03	1.62E-01	7.11E-01	
107028	Acrolein	5.14E-03	9.98E-02	4.37E-01	
71432	Benzene	4.40E-04	8.55E-03	3.74E-02	
205992	Benzo(b)fluoranthene	1.66E-07	3.22E-06	1.41E-05	b
192972	Benzo(e)pyrene	4.15E-07	8.06E-06	3.53E-05	b
191242	Benzo(g,h,i)perylene	4.14E-07	8.04E-06	3.52E-05	b
92524	Biphenyl	2.12E-04	4.12E-03	1.80E-02	
56235	Carbon Tetrachloride	3.67E-05	7.13E-04	3.12E-03	
108907	Chlorobenzene	3.04E-05	5.90E-04	2.59E-03	
75003	Chloroethane	1.87E-06	3.63E-05	1.59E-04	
67663	Chloroform	2.85E-05	5.54E-04	2.42E-03	
218019	Chrysene	6.93E-07	1.35E-05	5.90E-05	b
100414	Ethylbenzene	3.97E-05	7.71E-04	3.38E-03	
106934	Ethylene Dibromide	4.43E-05	8.60E-04	3.77E-03	
206440	Fluoranthene	1.11E-06	2.16E-05	9.44E-05	b
86738	Fluorene	5.67E-06	1.10E-04	4.82E-04	b
50000	Formaldehyde	5.28E-02	1.03E+00	4.49E+00	
110543	Hexane	1.11E-03	2.16E-02	9.44E-02	
67561	Methanol	2.50E-03	4.86E-02	2.13E-01	
75092	Methylene Chloride	2.00E-05	3.88E-04	1.70E-03	
91203	Naphthalene	7.44E-05	1.44E-03	6.33E-03	
85019	Phenanthrene	1.04E-05	2.02E-04	8.85E-04	b
108952	Phenol	2.40E-05	4.66E-04	2.04E-03	
129001	Pyrene	1.36E-06	2.64E-05	1.16E-04	b
100425	Styrene	2.36E-05	4.58E-04	2.01E-03	
25322207	Tetrachloroethane	2.48E-06	4.82E-05	2.11E-04	
108883	Toluene	4.08E-04	7.92E-03	3.47E-02	
75014	Vinyl Chloride	1.49E-05	2.89E-04	1.27E-03	
1330207	Xylene	1.84E-04	3.57E-03	1.57E-02	
		TOTAL	1.40	6.15	

Potential Toxic (non-HAP) Air Pollutant Emissions (both engines)

CAS Nbr.	Pollutant	Emission Factor (lb/mmBtu)	Emission Rates (lb/hr)	Emission Rates (tpy)	Notes
25551137	1,2,3-Trimethylbenzene	2.30E-05	4.47E-04	1.96E-03	a
25551137	1,2,4-Trimethylbenzene	1.43E-05	2.78E-04	1.22E-03	a
25551137	1,3,5-Trimethylbenzene	3.38E-05	6.56E-04	2.88E-03	a
287923	Cyclopentane	2.27E-04	4.41E-03	1.93E-02	
108872	Methylcyclohexane	1.23E-03	2.39E-02	1.05E-01	
111842	Nonane	1.10E-04	2.14E-03	9.36E-03	
111659	Octane	3.51E-04	6.82E-03	2.99E-02	
109660	Pentane	2.60E-03	5.05E-02	2.21E-01	

Notes:

General: Engine HAP emissions will be subject to NESHAP ZZZZ and will therefore be exempt from demonstrating preconstruction compliance with toxic standards per IDAPA 58.01.01.210 (reference IDAPA 58.01.01.210.20). Engine NESHAP ZZZZ requirements are adherence to 40 CFR Part 60, Subpart JJJJ.

(a) Trimethyl benzene TAP accounts for mixed and individual isomers. 1,2,3-Trimethylbenzene, 1,2,4-Trimethylbenzene, and 1,3,5-Trimethylbenzene are added in the TAPs Summary and compared to trimethyl benzene TAP EL.

(b) Polycyclic Organic Matter (POM) and/or Polycyclic Aromatic Hydrocarbon (PAH), a subset of POM

PICO ENERGY, LLC

FACILITY NUMBER 053-00017

BIOGAS FLARE - ESTIMATED ACTUAL, ASSUMED H2S 350 PPM

Catalytic Combustion flare with a heat input rating of 19.43 mmBtu/hr

	Peak hourly heat input	19.43	mmBtu/hr
	Site-specific gas fuel heating value	565	Btu/scf
	Estimated actual hours of operation	4,565	hr/yr, estimated

CRITERIA POLLUTANTS, CURRENT ACTUAL			
PM10/PM2.5 (uncontrolled):	Emission Factor		Reference/Notes
Emission Factor:	7.6	lb/mmscf	AP-42 Table 1.4-2, external natural gas combustion
Emissions:	0.60	tons/year	(permit limit 0.64 tpy)
	0.26	lbs/hr	(permit limit 0.15 lb/hr, will be updated)
Sulfur Dioxide:			
Emission Factor:	0.1044	lb/mmBtu	AP-42, Table 5.3-1. Updated 1/95
Emissions:	4.630	tons/year	350 ppm H2S = 0.035 mole % H2S = S
	2.028	lbs/hr	SO2 (lb/scf) = 1685 (S) = 58.98 lb/mmscf
			58.98 lb/mmscf / 565 scf/Btu = 0.1044 lb/mmBtu
Nitrogen Oxides (NOx)			
Emission Factor:	0.068	lb/mmBtu	AP-42 13.5-2, Updated Feb. 2018
Emissions:	3.016	tons/year	(permit limit 8.51 tpy)
	1.321	lbs/hr	(permit limit 1.94 lb/hr)
Volatile Organic Compounds (VOC)			
Emission Factor:	0.660	lb/mmBtu	AP-42 13.5-2, Updated Feb. 2018
Emissions:	29.270	tons/year	(permit limit 30.64 tpy based on RBLC #IA=0088)
	12.824	lbs/hr	(permit limit 7.00 lb/hr based on RBLC #IA-0088)
Carbon Monoxide (CO)			
Emission Factor:	0.310	lb/mmBtu	AP-42 13.5-2, Updated Feb. 2018
Emissions:	13.748	tons/year	(permit limit 17.02 tpy based on RBLC #IA-0088)
	6.023	lbs/hr	(permit limit 3.89 lb/hr based on RBLC #IA-0088)
Lead (Pb)			
Emission Factor:	5.00E-04	lb/mmscf	AP-42 Table 1.4-2 (07/98)
Emissions:	0.64	tons/year	
	1.72E-05	lbs/hr	
	1.28E-02	lbs/month	

BIOGAS-FIRED FLARE, PROPOSED PERMIT			
Catalytic Combustion flare with a heat input rating of 37.3 mmBtu/hr			
Peak hourly heat input	37.3	mmBtu/hr	
Biogas Heat Content	565	Btu/scf	
Maximum hours of operation	4,565	hr/yr, permit limited	
Annual Heat Input at Proposed Limit	170,229	mmBtu/yr	
CRITERIA POLLUTANTS, PROPOSED			
PM10/PM2.5 (uncontrolled):	Emission Factor		Reference/Notes
Emission Factor:	7.6	lb/mmscf	AP-42 Table 1.4-2
Emissions:	1.14	tons/year	for external combustion of natural gas
	0.50	lbs/hr	
Sulfur Dioxide:			
Emission Factor:	0.716	lb/mmBtu	AP-42, Table 5.3-1. Updated 1/95
Emissions:	60.94	tons/year	2400 ppm H2S = 0.24 mole % H2S = S
	26.70	lbs/hr	SO2 (lb/scf) = 1685 (S) = 404.4 lb/mmscf
Nitrogen Oxides (NOx)			
Emission Factor:	0.068	lb/mmBtu	AP-42 13.5-2, Updated Feb. 2018
Emissions:	5.79	tons/year	Current permit based on 0.100 lb/mmBtu from
	2.54	lbs/hr	RBLC ID#IA-0088

Volatile Organic Compounds (VOC)			
Emission Factor:	0.660	lb/mmBtu	AP-42 13.5-2, Updated Feb. 2018
Emissions:	56.18	tons/year	Current permit based on 0.36 lb/mmBtu from
	24.611	lbs/hr	RBLC ID#IA-0088
Carbon Monoxide (CO)			
Emission Factor:	0.310	lb/mmBtu	AP-42 13.5-2, Updated Feb. 2018
Emissions:	26.39	tons/year	Current permit based on 0.20 lb/mmBtu from
	11.56	lbs/hr	RBLC ID#IA-0088
Lead (Pb)			
Emission Factor:	4.90E-07	lb/mmBtu	AP-42 Table 1.4-2 (07/98)
Emissions:	4.17E-05	tons/year	
	1.83E-05	lbs/hr	
	0.014	lbs/month	

GREENHOUSE GAS POLLUTANTS			
40CFR98 Subpart C contains factors for external combustion boilers, used for flare.			
Carbon Dioxide (CO_2)			
Emission Factor:	52.07	kg/mmBtu	Table C-1, 40 CFR 98.30 Subpart C - General Stationary Fuel Combustion Sources
Emissions:	8,864	MT/yr	
	9,750	tpy	
Methane (CH_4)			
Emission Factor:	3.20E-03	kg/mmBtu	Table C-2, 40 CFR 98.30 Subpart C - Biomass fuels gaseous
Emissions:	5.45E-01	MT/yr	
	0.60	tpy	
Nitrous Oxide (N_2O)			
Emission Factor:	6.30E-04	kg/mmBtu	Table C-2, 40 CFR 98.3 Subpart C - General Stationary Fuel Combustion Sources
Emissions:	1.07E-01	MT/yr	
	0.12	tpy	
Carbon Dioxide Equivalent (CO_2e)			
Emissions:	8,909	MT/yr	
Emission Factor:	1	CO_2	Global Warming Potentials (GWPs); 40 CFR 98, Subpart A, Table A-1
	25	Methane (CH_4)	
	298	Nitrous oxide (N_2O)	

PICO ENERGY, LLC
JEROME, IDAHO - FACILITY NUMBER 053-00017
BIOGAS FLARE - HAPs & TAPs
HAP and TAP Emission factor source: AP-42 Table 1.4-3 (07/98).
Design Parameters

565 Btu/scf, site-specific biogas fuel heating value
37 mmBtu/hr, peak hourly heat input
4,565 hr/yr, proposed permit limit
2,000 lb/ton

Flare Potential Hazardous and Toxic Air Pollutant Emissions

CAS Nbr.	Pollutant	Emission Factor (lb/mmscf)	Emission Factor (lb/mmBtu)	Emission Rates (lb/hr)	Emission Rates (tpy)	IDAPA Table[a]	Notes
7440382	Arsenic	2.00E-04	1.96E-07	7.31E-06	1.67E-05	586	annual model
71432	Benzene	2.10E-03	2.06E-06	7.68E-05	1.75E-04	586	annual model
7440417	Beryllium	1.20E-05	1.18E-08	4.39E-07	1.00E-06	586	annual model
7440439	Cadmium	1.10E-03	1.08E-06	4.02E-05	9.18E-05	586	annual model
7440473	Chromium	1.40E-03	1.37E-06	5.12E-05	1.17E-04	585	24-hr model
7440484	Cobalt	8.40E-05	8.24E-08	3.07E-06	7.01E-06	585	24-hr model
106467	1,4-Dichlorobenzene (para-)	1.20E-03	1.18E-06	4.39E-05	1.00E-04	585	24-hr model, b
50000	Formaldehyde	7.50E-02	7.35E-05	2.74E-03	6.26E-03	586	annual model
110543	Hexane	1.80E+00	1.76E-03	6.58E-02	1.50E-01	585	24-hr model
7439965	Manganese	3.80E-04	3.73E-07	1.39E-05	3.17E-05	585	24-hr model
7439976	Mercury	2.60E-04	2.55E-07	9.51E-06	2.17E-05	Non-TAP	
91203	Naphthalene	6.10E-04	5.98E-07	2.23E-05	5.09E-05	585	24-hr model
7440020	Nickel	2.10E-03	2.06E-06	7.68E-05	1.75E-04	586	annual model
7782492	Selenium	2.40E-05	2.35E-08	8.77E-07	2.00E-06	585	24-hr model
108883	Toluene	3.40E-03	3.33E-06	1.24E-04	2.84E-04	585	24-hr model
Polyaromatic Hydrocarbons (except 7-PAH group)				--		--	c
91576	2-Methylnaphthalene	2.40E-05	2.35E-08	8.77E-07	2.00E-06	586	annual model
56495	3-Methylcholanthrene	1.80E-06	1.76E-09	6.58E-08	1.50E-07	586	annual model
57977	7,12-Dimethylbenz(a)anthracene	1.60E-05	1.57E-08	5.85E-07	1.34E-06	586	annual model
83329	Acenaphthene	1.80E-06	1.76E-09	6.58E-08	1.50E-07	586	annual model
203968	Acenaphthylene	1.80E-06	1.76E-09	6.58E-08	1.50E-07	586	annual model
120127	Anthracene	2.40E-06	2.35E-09	8.77E-08	2.00E-07	586	annual model
191242	Benzo(g,h,i)perylene	1.20E-06	1.18E-09	4.39E-08	1.00E-07	586	annual model
206440	Fluoranthene	3.00E-06	2.94E-09	1.10E-07	2.50E-07	586	annual model
86737	Fluorene	2.80E-06	2.75E-09	1.02E-07	2.34E-07	586	annual model
85018	Phenanathrene	1.70E-05	1.67E-08	6.22E-07	1.42E-06	Non-TAP	
129000	Pyrene	5.00E-06	4.90E-09	1.83E-07	4.17E-07	Non-TAP	
Polycyclic Organic Matter or 7-PAH group Sum of the following:				4.17E-07	9.51E-07	586	annual model, d
56553	Benzo(a)anthracene	1.80E-06	1.76E-09	6.58E-08	1.50E-07	586	annual model
205992	Benzo(b)fluoranthene	1.80E-06	1.76E-09	6.58E-08	1.50E-07	586	annual model
205823	Benzo(k)fluoranthene	1.80E-06	1.76E-09	6.58E-08	1.50E-07	586	annual model
53703	Dibenzo(a,h)anthracene	1.20E-06	1.18E-09	4.39E-08	1.00E-07	586	annual model
218019	Chrysene	1.80E-06	1.76E-09	6.58E-08	1.50E-07	586	annual model
193395	Indenol(1,2,3-cd)pyrene	1.80E-06	1.76E-09	6.58E-08	1.50E-07	586	annual model
50328	Benzo(a)pyrene	1.20E-06	1.18E-09	4.39E-08	1.00E-07	586	annual model
		TOTAL		0.07	0.16		

Flare Potential Toxic (non-HAP) Air Pollutant Emissions

CAS Nbr.	Pollutant	Emission Factor (lb/mmscf)	Emission Factor (lb/mmBtu)	Emission Rates (lb/hr)	Emission Rates (tpy)	IDAPA Table[a]	Notes
95501	1,2-Dichlorobenzene (ortho-)	1.20E-03	1.18E-06	4.39E-05	1.00E-04	585	24-hr model, b
7440393	Barium	4.40E-03	4.31E-06	1.61E-04	3.67E-04	585	24-hour model
7440508a	Copper (fume)	8.50E-04	8.33E-07	3.11E-05	7.09E-05	585	24-hour model
7439987a	Molybdenum (soluble compounds)	1.10E-03	1.08E-06	4.02E-05	9.18E-05	585	24-hour model
109660	Pentane	2.6	2.55E-03	9.51E-02	2.17E-01	585	24-hour model
7440666	Zinc	2.90E-02	2.84E-05	1.06E-03	2.42E-03	585	24-hour model

Notes:

General: Flare HAP emissions are not subject NESHAP standards and therefore are not exempt from demonstrating preconstruction compliance with toxic standards per IDAP 58.01.01.210.20. They will be assessed in the TAPs summary in comparison to DEQ emission screening levels.

(a) Non-carcinogenic pollutants (IDAPA Table 585) emission rates are based on 24-hour average natural gas flow rates for comparison with non-carcinogenic increments in IDAPA 58.01.01.585. Carcinogenic pollutants (IDAPA Table 586) emission rates are based on annual average natural gas flow rates for comparison with carcinogenic increments in IDAPA 58.01.01.586. The spreadsheet uses an "IF" function to apply the correct gas flow rate value based on the IDAPA section in which a particular TAP is listed.

(b) AP-42 provides an emission factor for total Dichlorobenze which comprises three chemical compounds: ortho-, meta-, and para-dichlorobenzene. The total factor will be used for each individual compound. IDAPA 58.01.01.585 provides emission limits for ortho- and para- compounds. Clean Air Act Section 112(b) identifies para-Dichlorobenzene ("1,4-Dichlorobenzene(p)") as a HAP.

(c) Polyaromatic Hydrocarbons are considered TAPs (excluding the 7-PAH group) per IDAPA 58.01.01.586

(d) An October 8, 2008 memorandum produced by Carl Brown of the Idaho DEQ states that the Polycyclic Organic Matter (POM) group should be considered one TAP with an equivalent potency to benzo(a)pyrene. Additional PAHs should be analyzed independently when evaluating carcinogenic risk.

PICO ENERGY, LLC
FACILITY NUMBER 053-00017
TAIL GAS VENTING - NO COMBUSTION PRODUCTS

Mass Flow Determination
PV = nRT, V = nRT/P
Standard Conditions, Society of Petroleum Engineers:
T = 15 C = 59 F. P = 100 kPa = 0.9869 atm = 14.504 psia.

T =	560	R (100 F)
P=	15.504	psia (1 psig)
n =	1	lbmol
R =	10.73	psia-ft3/lbmol-R
V =	387.6	ft3/lbmol
Q =	23,220	scf/hr
Mass Flow	59.91	lbmol/hr

Tail Gas Composition - No Combustion Products

Gas	**Mol%**	**MW**	**lb/hr**	**tpy**
C1 (methane)	3.27	16	31.35	137.30
CO2	96.13	44	2534	11,100
O2	0.15	32	2.88	12.60
N2	0.12	28	2.01	8.82
H2S	0.0004	34	0.0081	0.0357
H2O	0.32	18	3.45	15.12
	100.0			

H2S = 4 ppmv, =0.0004 Mol%

GREENHOUSE GAS POLLUTANTS	
Based on un-combusted Tail-gas	
Carbon Dioxide (CO_2)	
Emissions:	11,100 tpy
Emissions:	10,090 metric tons per year (MT/yr)
Methane (CH_4)	
Emissions:	137.30 tpy
Emissions:	124.82 metric tons per year (MT/yr)
Carbon Dioxide Equivalent (CO_2e)	
Emissions:	13,211 CO_2e, MT/yr
Emission Factor:	1 CO_2 GWP
	25 CH_4 GWP

PICO ENERGY, LLC
FACILITY NUMBER 053-00017
USED OIL HEATER - CRITERIA POLLUTANTS
PTE Emission and Calculations Supporting Level II Permitting Exemption for Used Oil Burner
IDAPA 58.01.01.220, 58.01.01.222(h)(i thru v), and 58.01.01.223

Operational Characteristics:					
3.6	gal fuel/hr				
31,536	gal fuel/yr, PTE, not expected				
4,352	mmBtu/yr (0.138 mmBtu/gal)				
Fuel Characteristics:					
0.46	% Ash by weight for diesel oil[A]		A= % ash by weight in fuel		
0.0057	% Lead by weight for diesel oil[A]		L = % Lead by weight in fuel		
0.25	% Sulfur by weight for diesel oil		S=% Sulfur by weight in fuel		
0.1	% chlorine by weight		% chlorine by weight		

Emissions from Used Oil Heater
Criteria Pollutant Emission factors AP-42 section 1-11

Pollutant	**PM**	**PM-10**	**PM-25**	**Lead**	**NOx**	**SOx**	**CO**	**TOC**	**HCl***
Reference	*AP-42 table 1.11-1 (lbs/1000 gal)*				*AP-42 table 1.11-2*			*AP-42 Table 1.11-3*	
Emission Factor (lbs/1000 gal)	64A	51A		55L		107S			66Cl
Emission Factor (lbs/1000 gal)	29.44	23.46	17.18	0.3135	16	26.75	2.1	1	6.60
Emissions (lb/hr)	0.106	0.084	0.062	1.13E-03	0.058	0.096	0.008	0.004	2.38E-02
Maximum PTE (tpy)	0.46	0.37	0.27	4.94E-03	2.52E-01	4.22E-01	3.31E-02	1.58E-02	1.04E-01

* HCl is the highest HAP
Notes:
A) Fuel characteristics per *Vermont Used Oil Analysis and Waste Oil Furnace Emission Study, revised 1996.*
Mean ash % by wt = 0.54% for gas engines, 0.46% for diesel engines, and 0.55% for No. 2 fuel
Mean lead content = 47.23 ppm for gas engines, 57.00 for diesel engines, and ,10.00 ppm for No. 2 fuel

https://www3.epa.gov/ttncatc1/dir1/w_oilacr.pdf

HAP	Emission Factor (lb/1000 gal)	Emissions (tpy)	Emissions (lb/hr)	Notes
Antimony	3.40E-04	5.36E-06	1.22E-06	
Arsenic	2.50E-03	3.94E-05	9.00E-06	
Beryllium	1.80E-03	2.84E-05	6.48E-06	
Cadmium	1.50E-04	2.37E-06	5.40E-07	
Chromium	1.90E-01	3.00E-03	6.84E-04	
Cobalt	5.70E-03	8.99E-05	2.05E-05	
Dibutylphthalate	3.40E-05	5.36E-07	1.22E-07	
Hydrogen Chloride	6.60E+00	1.04E-01	2.38E-02	
Manganese	2.20E-03	3.47E-05	7.92E-06	
Napthalene	1.30E-02	2.05E-04	4.68E-05	
Nickel	5.00E-02	7.88E-04	1.80E-04	
Phenanthrene/ anthracene	1.10E-02	1.73E-04	3.96E-05	
Phenol	2.40E-03	3.78E-05	8.64E-06	
Phosphorus	3.60E-02	5.68E-04	1.30E-04	
Pyrene[A]	7.10E-03	1.12E-04	2.56E-05	Non-TAP
	TOTAL	0.109	0.025	

Notes:
HAP Emission factors per AP-42 Ch. 1-11 for all listed EPA regulated HAPs for Vaporizing Burner
A) Non-TAP, HAP emission

GREENHOUSE GAS POLLUTANTS

40CFR98 Subpart C contains factors for external combustion boilers, used for heater.

Carbon Dioxide (CO_2)				
	Emission Factor:	74.00	kg/mmBtu	Table C-1, 40 CFR 98.30 General Stationary Fuel Combustion Sources
	Emissions:	322	MT/yr	
		354	tpy	
Methane (CH_4)				
	Emission Factor:	3.20E-03	kg/mmBtu	Table C-2, 40 CFR 98.30 - Biomass fuels gaseous
	Emissions:	1.39E-02	MT/yr	
		0.02	tpy	
Nitrous Oxide (N_2O)				
	Emission Factor:	6.30E-04	kg/mmBtu	Table C-2, 40 CFR 98.3 - General Stationary Fuel Combustion Sources
	Emissions:	2.74E-03	MT/yr	
		0.003	tpy	
Carbon Dioxide Equivalent (CO_2e)				
	Emissions:	323	MT/yr	
	Emission Factor:	1	CO_2	Global Warming Potentials (GWPs); 40 CFR 98, Subpart A, Table A-1
		25	Methane (CH_4)	
		298	Nitrous oxide (N_2O)	

PICO ENERGY, LLC
JEROME, IDAHO - FACILITY NUMBER 053-00017
TAP POTENTIAL TO EMIT EMISSIONS SUMMARY

PROJECT TAP EMISSIONS SUMMARY POTENTIAL TO EMIT[(a)]

CAS Nbr.	Pollutant	Emission Rates (lb/hr)				Emission Rates (lb/hr)	Screening Emission Level[(b)] (lb/hr)	Exceeds Screening Level?	IDAPA 58.01.01 Section	Notes
		Engine[g]	Flare	Heater	Gas Process Unit					
95501	1,2-Dichlorobenzene (ortho-)	--	4.39E-05	--	--	4.39E-05	20	No	585	c
106467	1,4-Dichlorobenzene (para-)	--	4.39E-05	--	--	4.39E-05	30	No	585	c
7440360	Antimony	--	--	1.22E-06	--	1.22E-06	0.033	No	585	
7440393	Barium	--	1.61E-04	--	--	1.61E-04	0.033	No	585	
7440473	Chromium	--	5.12E-05	6.84E-04	--	7.35E-04	0.033	No	585	
7440484	Cobalt	--	3.07E-06	2.05E-05	--	2.36E-05	0.0033	No	585	
7440508	Copper (fume)	--	3.11E-05	--	--	3.11E-05	0.013	No	585	
287923	Cyclopentane	4.41E-03	--	--	--	4.41E-03	114.667	No	585	
84742	Dibutylphthalate	--	--	1.22E-07	--	1.22E-07	0.333	No	585	
110543	Hexane	--	6.58E-02	--	--	6.58E-02	12	No	585	
7647010	Hydrogen Chloride	--	--	2.38E-02	--	2.38E-02	0.05	No	585	
7783064	Hydrogen Sulfide	--	--	--	8.15E-03	8.15E-03	0.933	No	585	
7439965	Manganese	--	1.39E-05	7.92E-06	--	2.18E-05	0.067	No	585	
108872	Methylcyclohexane	2.39E-02	--	--	--	2.39E-02	107	No	585	
7439987	Molybdenum (soluble cmpnds)	--	4.02E-05	--	--	4.02E-05	0.333	No	585	
91203	Naphthalene	--	2.23E-05	4.68E-05	--	6.91E-05	3.33	No	585	
111842	Nonane	2.14E-03	--	--	--	2.14E-03	70	No	585	
111659	Octane	6.82E-03	--	--	--	6.82E-03	93.3	No	585	
109660	Pentane	5.05E-02	9.51E-02	--	--	1.46E-01	118	No	585	
108952	Phenol	--	--	8.64E-06	--	8.64E-06	1.27	No	585	
7723140	Phosphorus	--	--	1.30E-04	--	1.30E-04	0.007	No	585	
7782492	Selenium	--	8.77E-07	--	--	8.77E-07	0.013	No	585	
108883	Toluene	--	1.24E-04	--	--	1.24E-04	25	No	585	
25551137	Trimethyl benzene	1.38E-03	--	--	--	1.38E-03	8.2	No	585	d,f
7440666	Zinc	--	1.06E-03	--	--	1.06E-03	0.667	No	585	
7440382	Arsenic	--	7.31E-06	9.00E-06	--	1.63E-05	1.50E-06	Yes	586	Annual modeling
71432	Benzene	--	7.68E-05	--	--	7.68E-05	8.00E-04	No	586	
7440417	Beryllium	--	4.39E-07	6.48E-06	--	6.92E-06	2.80E-05	No	586	
7440439	Cadmium	--	4.02E-05	5.40E-07	--	4.08E-05	3.70E-06	Yes	586	Annual modeling
50000	Formaldehyde	--	2.74E-03	--	--	2.74E-03	5.10E-04	Yes	586	Annual modeling
7440020	Nickel	--	7.68E-05	1.80E-04	--	2.57E-04	2.70E-05	Yes	586	Annual modeling
Polyaromatic Hydrocarbons (except 7-PAH group)						---	---	---	586	e
91576	2-Methylnaphthalene	--	8.77E-07	--	--	8.77E-07	9.10E-05	No	586	e
56495	3-Methylcholanthrene	--	6.58E-08	--	--	6.58E-08	9.10E-05	No	586	e
57977	7,12-Dimethylbenz(a)anthracene	--	5.85E-07	--	--	5.85E-07	9.10E-05	No	586	e
83329	Acenaphthene	--	6.58E-08	--	--	6.58E-08	9.10E-05	No	586	e
203968	Acenaphthylene	--	6.58E-08	--	--	6.58E-08	9.10E-05	No	586	e
120127	Anthracene	--	8.77E-08	3.96E-05	--	3.97E-05	9.10E-05	No	586	e
191242	Benzo(g,h,i)perylene	--	4.39E-08	--	--	4.39E-08	9.10E-05	No	586	e
206440	Fluoranthene	--	1.10E-07	--	--	1.10E-07	9.10E-05	No	586	e
86737	Fluorene	--	1.02E-07	--	--	1.02E-07	9.10E-05	No	586	e
Polycyclic Organic Matter or 7-PAH group Sum of the following:		--	4.17E-07	--	--	4.17E-07	2.00E-06	No	586	f
56553	Benzo(a)anthracene	--	6.58E-08	--	--	6.58E-08	--	---		f
205992	Benzo(b)fluoranthene	--	6.58E-08	--	--	6.58E-08	--	---		f
205823	Benzo(k)fluoranthene	--	6.58E-08	--	--	6.58E-08	--	---		f
53703	Dibenzo(a,h)anthracene	--	4.39E-08	--	--	4.39E-08	--	---		f
218019	Chrysene	--	6.58E-08	--	--	6.58E-08	--	---		f
193395	Indenol(1,2,3-cd)pyrene	--	6.58E-08	--	--	6.58E-08	--	---		f
50328	Benzo(a)pyrene	--	4.39E-08	--	--	4.39E-08	--	---		f

Notes:

(a) Potential emission rate is based on total emissions for the project.

(b) Emission rate screening levels per IDAPA 58.01.01.585.

(c) AP-42 provides an emission factor for total Dichlorobenze which comprise of three chemical compounds: ortho-, meta-, and para-dichlorobenzene. The total factor will be used for each individual compound. IDAPA 58.0101.585 provides emission limits for ortho- and para- compounds.

(d) Trimethyl benzene TAP for mixed and individual isomers. This project accounts for 1,2,3-Trimethylbenzene, 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene. These isomer emissions are summed and compared to the trimethyl benzene TAP EL

(e) Polyaromatic Hydrocarbons are considered TAPs (excluding the 7-PAH) group per IDAPA 58.0101.586

(f) An October 8, 2008 memorandum produced by Carl Brown of the Idaho DEQ states that the Polycyclic Organic Matter (POM) group should be considered one TAP with an equivalent potency to benzo(a)pyrene. Additional PAHs should be analyzed independently when evaluating carcinogenic risk.

(g) Engines may emit these TAPS/HAPS but are exempt under IDAPA 58.01.01.210.20 because they are regulated by NESHAP Subpart ZZZZ and are accounted for in HAPS summary.

(h) Hg standard in lb/year for compliance with IDAPA 58.01.01.215 standard of 25 lb/year.

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: June 13, 2019

TO: Kelli Wetzel, Permit Writer, Air Program

FROM: Pao Baylon, Modeling Review Analyst, Air Program

PROJECT: P-2010.0050 PROJ 62207, Modification to Increase the Allowable Biogas Throughput and to Add Gas Conversion Capability at the Existing Pico Energy, LLC Biodigester Facility located in Jerome, Idaho.

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses.

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Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a non-carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
acfm	Actual cubic feet per minute
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
As	Arsenic
ASOS	Automated Surface Observing System
Bison	Bison Engineering, Inc. (permittee's permitting and modeling consultant)
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
Cd	Cadmium
CFR	Code of Federal Regulations
CH_2O	Formaldehyde
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
DEM	Digital Elevation Map
DEQ	Idaho Department of Environmental Quality
DV	Design Values
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
ft	Feet
fps	Feet per second
GEP	Good Engineering Practice
hr	hours
IC	Internal Combustion
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
lb/hr	Pounds per hour
m	Meters
m/sec	Meters per second
MMBtu	Million British Thermal Units
NAAQS	National Ambient Air Quality Standards
NAD83	North American Datum of 1983
NED	National Elevation Dataset
Ni	Nickel
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen

NW AIRQUEST	Northwest International Air Quality Environmental Science and Technology Consortium
NWS	National Weather Service
O_3	Ozone
OLM	Ozone Limiting Method
Pb	Lead
Pico Energy	Pico Energy, LLC (permittee)
PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
ppb	parts per billion
ppm	parts per million
PRIME	Plume Rise Model Enhancement
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PTE	Potential to Emit
PVMRM	Plume Volume Molar Ratio Method
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TAP	Toxic Air Pollutant
tpy	Tons per year
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
°C	Degrees Celsius
°F	Degrees Fahrenheit
$\mu g/m^3$	Micrograms per cubic meter of air

1.0 Summary

Pico Energy, LLC (Pico Energy) submitted a Permit to Construct (PTC) application for modifications to their existing facility located in Jerome, Idaho. The proposed project will modify the existing facility to increase allowable biogas processing and to add gas conversion capability. Project-specific air quality analyses involving atmospheric dispersion modeling of estimated emissions associated with the proposed modification were submitted to DEQ to demonstrate that applicable emissions do not result in violation of a National Ambient Air Quality Standard (NAAQS) or Toxic Air Pollutant (TAP) increment as required by the Idaho Administrative Procedures Act 58.01.01.203.02 and 203.03 (Idaho Air Rules Section 203.02 and 203.03). This memorandum provides a summary of the applicability assessment for analyses and air impact analyses used to demonstrate compliance with applicable NAAQS and TAP increments, as required by Idaho Air Rules Section 203.02 and 203.03.

Bison Engineering, Inc. (Bison), on behalf of Pico Energy, prepared the PTC application and performed ambient air impact analyses for this project. DEQ review of submitted data and DEQ analyses summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that estimated emissions associated with operation of the facility will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not address/evaluate compliance with other rules or analyses not pertaining to the air impact analyses. Evaluation of emission estimates was the responsibility of the DEQ permit writer and is addressed in the main body of the DEQ Statement of Basis, and emission calculation methods were not evaluated in this modeling review memorandum.

Table 1 presents key assumptions and results to be considered in the development of the permit. Idaho Air Rules require air impact analyses be conducted in accordance with methods outlined in 40 CFR 51, Appendix W *Guideline on Air Quality Models* (Appendix W). Appendix W requires that air quality impacts be assessed using atmospheric dispersion models with emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

The submitted information and analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emission estimates was addressed by the DEQ permit writer); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that estimated potential/allowable emissions are at a level defined as below regulatory concern (BRC) and do not require a NAAQS compliance demonstration; b) that predicted pollutant concentrations from emissions associated with the project as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or c) that predicted pollutant concentrations from emissions associated with the project, when appropriately combined with co-contributing sources and background concentrations, were below applicable NAAQS at ambient air locations where and when the project has a significant impact; 5) showed that TAP emission increases associated with the project will not result in increased ambient air impacts exceeding allowable TAP increments. This conclusion assumes that conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition. The DEQ permit writer should use Table 1 and other information presented in this memorandum to generate appropriate permit provisions/restrictions to assure emissions do not exceed applicable regulatory thresholds requiring further analyses and to assure the requirements of Appendix W are met regarding emissions representative of design capacity or permit allowable rates.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
General Emission Rates. Emission rates used in the air impact analyses, as listed in this memorandum, must represent maximum potential emissions as given by design capacity, inherently limited by the nature of the process or configuration of the facility, or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emission rates greater than those used in the air impact analyses.
Air Impact Analyses for Criteria Pollutant Emissions. Facility-wide emissions of all criteria pollutants ($PM_{2.5}$[a], PM_{10}[b], NO_2, CO, and SO_2) except for Pb are greater than DEQ Level I modeling thresholds. Therefore, these pollutants and all averaging times are subject to NAAQS Compliance Demonstration requirements.	Project-specific air impact analyses demonstrating compliance with NAAQS, as required by Idaho Air Rules Section 203.02, are required for pollutant increases above BRC thresholds, or for pollutants having an emissions increase that is greater than Level I modeling applicability thresholds (where the BRC exclusion cannot be used).
Air Impact Analyses for TAP Emissions. Allowable emissions of TAPs other than Arsenic, Cadmium, Formaldehyde, and Nickel are below ELs. Analyses demonstrating compliance with Arsenic, Cadmium, Formaldehyde, and Nickel TAP increments were performed.	A TAP increment compliance demonstration would be required for any TAPs with emissions above ELs.
Stack Parameters for Internal Combustion (IC) Engines 1 and 2. IC engines 1 and 2 were modeled with an exit diameter of 0.72 m (2.36 ft), a stack height of 10.15 m (33.3 ft), an exit temperature of 453 K (356 °F), and an exit velocity of 3.44 m/sec (11.28 fps). Using these assumptions, modeled 1-hr SO_2 design value and background concentrations add up to a total impact that is 99.2% of the 1-hr SO_2 NAAQS.	Modeled design value for 1-hr SO_2 and background concentrations add up to a total impact that is very close to NAAQS. Source-group analysis suggests that IC engines contribute vastly to the modeled DVs. Compliance has not been demonstrated for an IC engine exit stack diameter larger than 0.72 m, stack height lower than 10.15 m, exit temperature lower than 453 K, and exit velocity lower than 3.44 m/sec.
Stack Parameters for Used-oil Heater. The used-oil heater has not yet been purchased or installed. This point source was modeled with an exit diameter of 0.20 m (0.67 ft), a stack height of 7.62 m (25 ft), and an exit temperature of 505 K (450 °F).	The exhaust flue for the used-oil heater should be built to the height and diameter used in the dispersion model (Tables 8-9 of this modeling memo).

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

Summary of Submittals and Actions

January 23, 2019	Bison submitted a modeling protocol to DEQ via e-mail.
March 1, 2019	DEQ provided a modeling protocol approval to Bison via e-mail.
March 25, 2019	PTC application received by DEQ.
April 8, 2019	DEQ requested for additional information on stack parameter documentation.
April 16, 2019	Bison submitted a revised emission inventory and updated modeling files to DEQ via e-mail.
April 26, 2019	PTC application determined incomplete by DEQ.
May 8, 2019	DEQ received supplemental materials to an incomplete application determination via e-mail.
May 15, 2019	Bison submitted revised air dispersion modeling report to DEQ via e-mail.
May 20, 2019	PTC application determined complete by DEQ.

2.0 Background Information

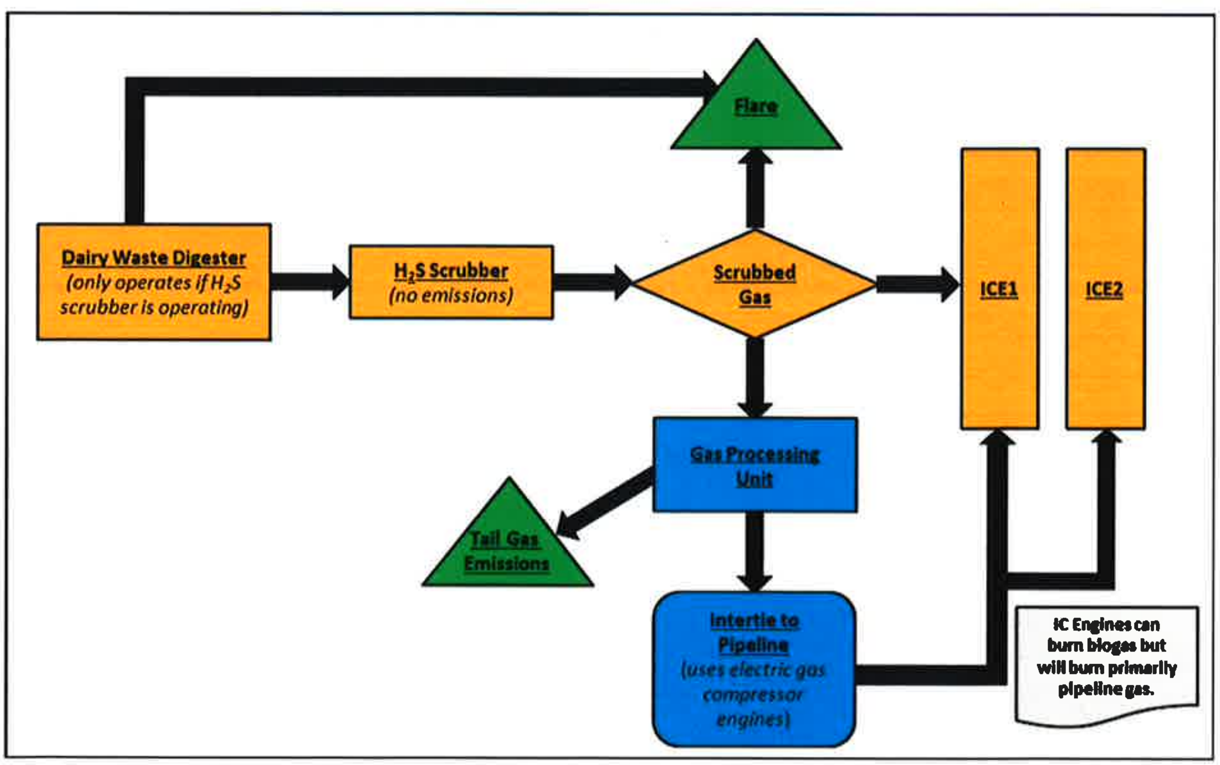
This section provides background information applicable to the project and the site proposed for the facility. It also provides a brief description of the applicable air impact analyses requirements for the project.

2.1 Project Description

The Pico Energy facility located in Jerome, Idaho is associated with an anaerobic digester which produces biogas from on-site dairy cattle manure. The resulting biogas is passed through a caustic bio-scrubber to decrease the concentration of H_2S in the gas stream (Figure 1). The scrubbed biogas is currently combusted in two Jenbacher reciprocating internal combustion (IC) engines to power electrical generators. In the event of an emergency, the IC engines are taken offline, and the excess biogas is combusted in an enclosed flare.

The proposed project will modify the existing facility to increase allowable biogas processing and to add gas conversion capability. The gas processing system removes carbon dioxide, water vapor, nitrogen, and oxygen from the biogas, producing a methane stream that is pipeline-quality natural gas. The natural gas will be compressed and inserted into the pipeline via electric compressor engines. The gas permeate from gas processing unit is referred to as "tail gas." The tail gas stream from the gas processing unit can contain up to 3.27% methane and 4 ppm H_2S and will not be combusted. The IC engines will retain the ability to burn biogas but will generally be fired using natural gas. Figure 1 shows a process flow diagram of the proposed modifications to the Pico Energy facility.

Figure 1. PROCESS FLOW DIAGRAM OF PROPOSED MODIFICATIONS TO THE PICO ENERGY FACILITY IN JEROME, IDAHO.



2.2 Project Location and Area Classification

The facility is located in Jerome, within Gooding County (Northing: 4,732,014 m; Easting: 694,562 m; UTM Zone 11). This area is designated as an attainment or unclassifiable area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}), and particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$). The area is not classified as non-attainment for any criteria pollutants.

2.3 Air Impact Analyses Required for All Permits to Construct

Idaho Air Rules Sections 203.02 and 203.03:

> *No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:*
>
> ***02. NAAQS.*** *The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.*
>
> ***03. Toxic Air Pollutants.*** *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.*

Atmospheric dispersion modeling, using computerized simulations, is used to demonstrate compliance with both NAAQS and TAPs. Idaho Air Rules Section 202.02 states:

> ***02. Estimates of Ambient Concentrations.*** *All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses

If specific criteria pollutant emission increases associated with the proposed permitting project cannot qualify for a BRC exemption as per Idaho Air Rules Section 221, then the permit cannot be issued unless the application demonstrates that applicable emission increases will not cause or significantly contribute to a violation of NAAQS, as required by Idaho Air Rules Section 203.02.

The first phase of a NAAQS compliance demonstration is to evaluate whether the proposed facility/project could have a significant impact to ambient air. Section 3.1.1 of this memorandum describes the applicability evaluation of Idaho Air Rules Section 203.02. The Significant Impact Level (SIL) analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the facility or modification to determine the potential impacts to ambient air. Air impact analyses are required by Idaho Air Rules to be conducted in accordance with methods outlined in Appendix W. Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

A facility or modification is considered to have a significant impact on air quality if maximum modeled impacts to ambient air exceed the established SIL listed in Idaho Air Rules Section 006 (referred to as a "significant contribution" in Idaho Air Rules) or as incorporated by reference as per Idaho Air Rules Section 107.03.b. Table 2 lists the applicable SILs.

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Impact Levels[a] (μg/m³)[b]	Regulatory Limit[c] (μg/m³)	Modeled Design Value Used[d]
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.2	12[k]	Mean of maximum 1st highest[l]
Carbon monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2nd highest[n]
	8-hour	500	10,000[m]	Maximum 2nd highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 μg/m³)	75 ppb[p] (196 μg/m³)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
	24-hour	5	365[m]	Maximum 2nd highest[n]
	Annual	1.0	80[r]	Maximum 1st highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 μg/m³)	100 ppb[s] (188 μg/m³)	Mean of maximum 8th highest[t]
	Annual	1.0	100[r]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1st highest[n]
	Quarterly	NA	1.5[r]	Maximum 1st highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	70 ppb[w]	Not typically modeled

a. Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.
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. Modeled design values are calculated for each ambient air receptor.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. Not to be exceeded more than once per year on average over 3 years.
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 mean of the upper 98th percentile of the annual distribution of 24-hour concentrations.
j. 5-year mean of the 8th highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. For the SIL analysis, the 5-year mean of the 1st highest modeled 24-hour impacts at the modeled receptor for each year.
k. 3-year mean of annual concentration.
l. 5-year mean of annual averages at the modeled receptor.
m. Not to be exceeded more than once per year.
n. Concentration at any modeled receptor.
o. Interim SIL established by EPA policy memorandum.
p. 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
q. 5-year mean of the 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1st highest modeled 1-hour impacts for each year is used.
r. Not to be exceeded in any calendar year.
s. 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
t. 5-year mean of the 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of maximum modeled 1-hour impacts for each year is used.
u. 3-month rolling average.
v. An annual emissions rate of 40 ton/year of VOCs is considered significant for O_3.
w. Annual 4th highest daily maximum 8-hour concentration averaged over three years.

If modeled maximum pollutant impacts to ambient air from the emission sources associated with a new facility or modification exceed the SILs, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts (typically the design values consistent with the form of the standard) from potential/allowable emissions resulting from the project and emissions from any nearby co-contributing sources (including existing emissions from the facility that are unrelated to the project), and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-period at the facility location and the area of significant impact. The resulting pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SILs and specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on a receptor-by-receptor basis for the modeling domain.

If the cumulative NAAQS impact analysis indicates a violation of the standard, the permit may not be issued if the proposed project has a significant contribution (exceeding the SIL) to the modeled violation. If project-specific impacts are below the SIL, then the project does not have a significant contribution to the specific violations.

Compliance with Idaho Air Rules Section 203.02 is generally demonstrated if: a) applicable specific criteria pollutant emission increases are at a level defined as BRC, using the criteria established by DEQ regulatory interpretation[1]; or b) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the cumulative NAAQS impact analysis (modeling all emissions from the facility and co-contributing sources, and adding a background concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or d) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

2.5 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.*

Permitting requirements for toxic air pollutants (TAPs) 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 emission 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 emission 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.

Idaho Air Rules Section 210.20 states that if TAP emissions from a specific source are regulated by the Department or EPA under 40 CFR 60, 61, or 63, then a TAP impact analysis under Section 210 is not required for that TAP. The DEQ permit writer evaluates the applicability of specific TAPs to the Section 210.20 exclusion.

3.0 Analytical Methods and Data

This section describes the methods and data used in the analyses to demonstrate compliance with applicable air quality impact requirements. The DEQ Statement of Basis provides a discussion of the methods and data used to estimate criteria and TAP emission rates.

3.1 Emission Source Data

Emissions of criteria pollutants and TAPs resulting from operation of the proposed modification were estimated by Bison for various applicable averaging periods. The calculation of potential emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emission estimates is not addressed in this modeling memorandum. DEQ air impact analysts are responsible for assuring that potential emission rates provided in the emission inventory are properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emission rates used in the impact modeling applicability analyses and any modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emission inventory. All modeled criteria air pollutant and TAP emission rates must be equal to or greater than the facility's potential emissions calculated in the PTC emission inventory or proposed permit allowable emission rates.

3.1.1 Modeling Applicability and Modeled Criteria Pollutant Emission Rates

If project-specific emission increases for criteria pollutants would qualify for a BRC permit exemption as per Idaho Air Rules Section 221 if it were not for potential emissions of one or more pollutants exceeding the BRC threshold of 10 percent of emissions defined by Idaho Air Rules as significant, then a NAAQS compliance demonstration may not be required for those pollutants with emissions below BRC levels. DEQ's regulatory interpretation policy of exemption provisions of Idaho Air Rules is that: "A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant.[1]" The interpretation policy also states that the exemption criteria of uncontrolled potential to emit (PTE) not to exceed 100 ton/year (Idaho Air Rules Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analyses is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year. The BRC exemption cannot be used to exempt a project from a pollutant-specific NAAQS compliance demonstration in most cases where a PTC is required for the action regardless of emission quantities, such as the modification of an existing emission or throughput limit.

A NAAQS compliance demonstration must be performed for pollutant increases that would not qualify for the BRC exemption from the requirement to demonstrate compliance with NAAQS. In this project, applicable facility-wide emissions of all criteria pollutants except Pb (lead) exceed BRC thresholds. Therefore, modeling is required for these pollutants.

Site-specific air impact modeling analyses may not be necessary for some pollutants, even where such emissions do not qualify for the BRC exemption. DEQ has developed modeling applicability thresholds, below which a site-specific modeling analysis is not required. DEQ generic air impact modeling analyses that were used to develop the modeling thresholds provide a conservative SIL analysis for projects with emissions below identified threshold levels. Project-specific modeling applicability thresholds are provided in the *Idaho Air Modeling Guideline*[2]. These thresholds were based on assuring an ambient impact of less than the established SIL for specific pollutants and averaging periods.

If total project-specific emission rate increases of a pollutant are below Level I Modeling Applicability Thresholds, then project-specific air impact analyses are not necessary for permitting. Use of Level II Modeling Applicability Thresholds are conditional, requiring DEQ approval. DEQ approval is based on dispersion-affecting characteristics of the emission sources such as stack height, stack gas exit velocity, stack gas temperature, distance from sources to ambient air, presence of elevated terrain, and potential exposure to sensitive public receptors.

Table 3 provides a comparison between facility-wide proposed emissions and modeling applicability thresholds. The short-term PTE emissions are equal to the sum of the flare, IC engines, and heater emissions. The annual PTE emissions are based on the highest of the flare or IC engine emissions, plus the heater.

Table 3. SITE-SPECIFIC CRITERIA POLLUTANT MODELING APPLICABILITY

Pollutant	Averaging Period	Emissions	Level I Modeling Thresholds	Level II Modeling Thresholds	Site-Specific Modeling Required?
PM_{10}[a]	24-hour	0.78 lb/hr	0.22	2.6	Yes
$PM_{2.5}$[b]	24-hour	0.76 lb/hr	0.054	0.63	Yes
	Annual	1.42 ton/yr	0.35	4.1	Yes
Carbon Monoxide (CO)	1-hour, 8-hour	32.4 lb/hr	15	175	Yes
Sulfur Dioxide (SO_2)	1-hour, 3-hour, 24-hour	37.2 lb/hr	0.21	2.5	Yes
	Annual	61.4 ton/yr	1.2	14	Yes
Nitrogen Oxides (NOx)	1-hour	16.5 lb/hr	0.20	2.4	Yes
	Annual	61.0 ton/yr	1.2	14	Yes
Lead (Pb)	monthly	0.85 lb/month	14		No

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

As indicated in Table 3, modeling is required for all pollutants except for lead (Pb) based on the Level I modeling thresholds. Short-term PTE emissions of SO_2 and NO_2, and annual emissions of SO_2 and NO_2 also exceeded the Level II modeling thresholds.

Table 4 lists criteria pollutant emission rates used in the SIL Analysis. Modeled emission rates in the SIL Analysis represent project-specific increase in potential/allowable emission for the averaging period specified for the pollutant.

Table 4. MODELED EMISSION RATES FOR SIL ANALYSES				
Source ID	**Source Description**	**Pollutant**	**Averaging Period**	**Emission Change[a]**
ICE1	IC Engine	$PM_{2.5}$	24-hour	0 lb/hr[b]
			Annual	0 tpy[c]
		PM_{10}	24-hour	0 lb/hr
		NOx	1-hour	3.61 lb/hr
			Annual	15.79 tpy
		CO	1-hour	3.81 lb/hr
			8-hour	3.81 lb/hr
		SO_2	1-hour	4.20 lb/hr
			3-hour	4.20 lb/hr
			24-hour	4.20 lb/hr
			Annual	18.39 tpy
ICE2	IC Engine	$PM_{2.5}$	24-hour	0 lb/hr
			Annual	0 tpy
		PM_{10}	24-hour	0 lb/hr
		NOx	1-hour	3.61 lb/hr
			Annual	15.79 tpy
		CO	1-hour	3.81 lb/hr
			8-hour	3.81 lb/hr
		SO_2	1-hour	4.20 lb/hr
			3-hour	4.20 lb/hr
			24-hour	4.20 lb/hr
			Annual	18.39 tpy
FLARE	Flare	$PM_{2.5}$	24-hour	0.24 lb/hr
			Annual	0.55 tpy
		PM_{10}	24-hour	0.24 lb/hr
		NOx	1-hour	1.21 lb/hr
			Annual	2.77 tpy
		CO	1-hour	5.54 lb/hr
			8-hour	5.54 lb/hr
		SO_2	1-hour	24.67 lb/hr
			3-hour	24.67 lb/hr
			24-hour	24.67 lb/hr
			Annual	56.31 tpy
HEATER	Used-oil Heater	$PM_{2.5}$	24-hour	0.06 lb/hr
			Annual	0.27 tpy
		PM_{10}	24-hour	0.08 lb/hr
		NOx	1-hour	0.06 lb/hr
			Annual	0.25 tpy
		CO	1-hour	0.01 lb/hr
			8-hour	0.01 lb/hr
		SO_2	1-hour	0.10 lb/hr
			3-hour	0.10 lb/hr
			24-hour	0.10 lb/hr
			Annual	0.42 tpy

a. Modeled emission rate is the project-specific increase in potential/allowable emission increase for the averaging period specified for the pollutant.
b. Pounds per hour.
c. Tons per year

Table 5 lists criteria pollutant emission rates used in the cumulative NAAQS impact analyses. NAAQS modeling is based on all sources operating at full capacity. The flare and IC engines have been modeled as operating at the same time for short-term and annual impacts. This provides conservative modeling results.

Table 5. MODELED EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSES				
Source ID	Source Description	Pollutant	Averaging Period	Emission Total[a]
ICE1	IC Engine	$PM_{2.5}$	24-hour	0.097 lb/hr[b]
			Annual	0.425 tpy[c]
		PM_{10}	24-hour	0.097 lb/hr
		NOx	1-hour	6.94 lb/hr
			Annual	30.28 tpy
		SO_2	1-hour	5.21 lb/hr
			3-hour	5.21 lb/hr
			24-hour	5.21 lb/hr
			Annual	22.83 tpy
ICE2	IC Engine	$PM_{2.5}$	24-hour	0.097 lb/hr
			Annual	0.425 tpy
		PM_{10}	24-hour	0.097 lb/hr
		NOx	1-hour	6.94 lb/hr
			Annual	30.28 tpy
		SO_2	1-hour	5.21 lb/hr
			3-hour	5.21 lb/hr
			24-hour	5.21 lb/hr
			Annual	22.83 tpy
FLARE	Flare	$PM_{2.5}$	24-hour	0.50 lb/hr
			Annual	1.14 tpy
		PM_{10}	24-hour	0.50 lb/hr
		NOx	1-hour	2.54 lb/hr
			Annual	5.79 tpy
		SO_2	1-hour	26.7 lb/hr
			3-hour	26.7 lb/hr
			24-hour	26.7 lb/hr
			Annual	60.9 tpy
HEATER	Used-oil Heater	$PM_{2.5}$	24-hour	0.062 lb/hr
			Annual	0.271 tpy
		PM_{10}	24-hour	0.084 lb/hr
		NOx	1-hour	0.058 lb/hr
			Annual	0.252 tpy
		SO_2	1-hour	0.096 lb/hr
			3-hour	0.096 lb/hr
			24-hour	0.096 lb/hr
			Annual	0.422 tpy

a. Modeled emission rate is the total potential/allowable emission rate for the averaging period specified for the pollutant.
b. Pounds per hour.
c. Tons per year

Ozone (O_3) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O_3 is formed in the atmosphere through reactions of VOCs, NOx, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses cannot be used to estimate O_3 impacts resulting from VOC and NOx emissions from an industrial facility. O_3 concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource-intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting. Addressing secondary formation of O_3 within the context of permitting a new stationary source has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

. . . footnote 1 to sections 51.166(I)(5)(I) of the EPA's regulations says the following: "No de minimis air quality level is provided for ozone. However, any net emission increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data."

The EPA believes it unlikely a source emitting below these levels would contribute to such a violation of the 8-hour ozone NAAQS, but consultation with an EPA Regional Office should still be conducted in accordance with section 5.2.1.c. of Appendix W when reviewing an application for sources with emissions of these ozone precursors below 100 TPY."

DEQ determined it was not appropriate or necessary to require a quantitative source-specific O_3 impact analysis because allowable emission estimates of VOCs and NOx are below the 100 tons/year threshold.

3.1.2 TAPs Modeling Applicability

TAP emission regulations under Idaho Air Rules Section 210 are only applicable for new or modified sources constructed after July 1, 1995.

Facility-wide emissions of Arsenic (As), Cadmium (Cd), Formaldehyde (CH_2O), and Nickel (Ni) exceed the applicable emission screening levels (ELs) of Idaho Air Rules Section 586. Air impact modeling analyses were then required to demonstrate that maximum impacts of As, Cd, CH_2O, and Ni are below applicable ambient increment standards expressed in Idaho Air Rules Section 585 and 586 as AACs and AACCs.

As, Cd, CH_2O, and Ni are carcinogenic TAPs that are regulated on a long-term averaging basis. Therefore, the appropriate emission rates for impact analyses are maximum annual emissions, expressed as an average pound/hour value over an 8,760-hour period.

Table 6 provides a summary of TAP emission increases for the project for those TAPs that had an increase exceeding the ELs of Idaho Air Rules Section 585 or 586.

Table 6. TAP EMISSION INCREASES THAT TRIGGER MODELING

Toxic Air Pollutant	Emissions (lb/hr)[a]	Screening Emissions Level (lb/hr)
Arsenic[b]	1.63E-05	1.50E-06
Cadmium[b]	4.08E-05	3.70E-06
Formaldehyde[b]	2.74E-03	5.10E-04
Nickel[b]	2.57E-04	2.70E-05

a. Pounds per hour.
b. Carcinogenic TAP. ELs are annual maximum emissions expressed as pounds/hour. The emission rate is the annual emissions divided by 8,760 hours/year.

Table 7 lists TAP emission rates used in the TAPs Analysis.

Table 7. MODELED EMISSION RATES FOR TAPS IMPACT ANALYSES

Source ID	Source Description	Arsenic (lb/hr)[a]	Cadmium (lb/hr)	Formaldehyde (lb/hr)	Nickel (lb/hr)
FLARE	Flare	7.31E-06	4.02E-05	2.74E-03	7.68E-05
HEATER	Used-oil Heater	9.00E-06	5.40E-07	0	1.80E-04

a. Pounds per hour.

3.1.3 Emission Release Parameters

Tables 8 and 9 list emission release parameters, including stack height, exhaust temperature, exhaust velocity, and stack diameter for emission sources modeled in the air impact analyses, in metric and English units, respectively. Emission point release parameters were based on information provided in the application. Justification for emission release parameters is summarized in the next section.

Table 8. POINT SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS

Release Point	Description	UTM[a] Coordinates		Stack Height (m)	Stack Gas Flow Temp. (K)[c]	Stack Gas Flow Velocity (m/sec)[d]	Modeled Stack Diameter (m)	Orient. Of Release[e]
		Easting-X (m)[b]	Northing-Y (m)					
ICE1	IC Engine	694,591	4,731,969	10.15	453	3.44	0.72	V
ICE2	IC Engine	694,594	4,731,976	10.15	453	3.44	0.72	V
FLARE	Flare	694,609	4,731,965	10.67	1089	8.63	1.93	V
HEATER	Used-oil Heater	694,570	4,731,964	7.62	505	5.82	0.20	V

a. Universal Transverse Mercator.
b. Meters.
c. Kelvin.
d. Meters per second.
e. Vertical uninterrupted release.

Table 9. POINT SOURCE EMISSION RELEASE PARAMETERS IN ENGLISH UNITS

Release Point	Description	UTM[a] Coordinates		Stack Height (ft)[c]	Stack Gas Flow Temp. (°F)[d]	Stack Gas Flow Velocity (ft/sec)[e]	Modeled Stack Diameter (ft)	Orient. Of Release[f]
		Easting-X (m)[b]	Northing-Y (m)					
ICE1	IC Engine	694,591	4,731,969	33.3	356	11.28	2.36	V
ICE2	IC Engine	694,594	4,731,976	33.3	356	11.28	2.36	V
FLARE	Flare	694,609	4,731,965	35.0	1500	28.30	6.33	V
HEATER	Used-oil Heater	694,570	4,731,964	25.0	450	19.10	0.67	V

a. Universal Transverse Mercator.
b. Meters.
c. Feet.
d. Degrees Fahrenheit.
e. Feet per second.
f. Vertical uninterrupted release.

3.1.4 Emission Release Parameter Justification

Internal Combustion Engines (ICE) 1 and 2

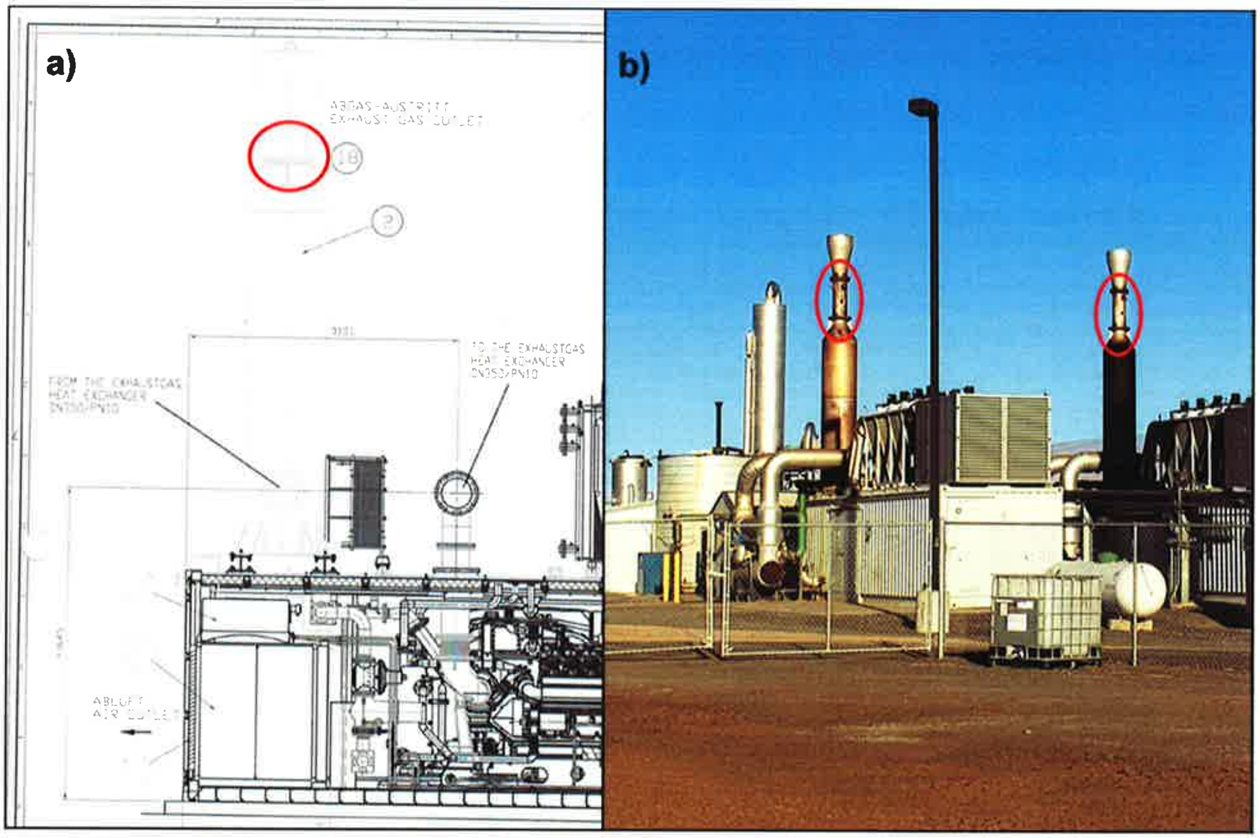
Model IDs: ICE1 and ICE2

The IC engines are existing sources with open vertical stacks. The listed manufacturer for both IC engines (model J416) is GE-Jenbacher.

The stack exit diameter has been modeled at 0.72 m (2.36 ft) to represent the outlet of the cone surrounding the stack. This value was verified by DEQ using the schematic diagrams of the Jenbacher IC engines provided by Bison (Figure 2a). DEQ notes that the internal diameter of the pipe is 0.33 m (1.07

ft) but it was not clear from the schematic diagrams how far the 0.33-meter internal diameter section extends into the length of the cone. Therefore, DEQ believes that the larger stack diameter used in modeling (0.72 m or 2.36 ft), which corresponds to a lower exit velocity, adds a high level of conservatism to the modeling results.

Figure 2. (a) SCHEMATIC DIAGRAM AND (b) FIELD PHOTO OF THE INTERNAL COMBUSTION ENGINE POINT STACKS AT PICO ENERGY IN JEROME, IDAHO.



The spreadsheet provided matches the modeled volumetric flow rate of 2,965 actual cubic feet per minute (acfm) at 356 °F. This value is adequately supported. The corresponding modeled exit velocity is 3.44 m/sec.

$$IC\ exit\ velocity = 2{,}965\frac{ft^3}{min} \times \frac{4}{\pi(2.36\ ft)^2} \times \frac{1\ min}{60\ sec} \times \frac{1\ meter}{3.28\ ft} = 3.44\frac{meters}{sec}$$

The top-of-cone stack height is 10.15 m (33.3 ft) based on field measurements. While the submitted Jenbacher diagrams (Figure 2a) suggest a shorter stack height of 9.05 m (29.7 ft), field pictures submitted by Bison via e-mail indicate a longer neck in the stack (Figure 2b). The neck is indicated by red circles in Figures 2a and 2b. Therefore, DEQ concurs that a modeled stack height of 10.15 m (33.3 ft) for both IC engines is reasonably acceptable.

A stack temperature of 453 K (356 °F, 180 °C) was used in the modeling analysis. This value was based on information contained in the Clarke Energy website for use of exhaust gas heat exchangers on Jenbacher gas engines. The site states that "Care must be taken for biogas applications to ensure that the exhaust temperature does not drop below 180 °C in order to stay above the point of condensation." DEQ agrees that the modeled exhaust temperature is adequately supported.

IC engine release parameters were appropriately documented and justified.

Enclosed Flare

Model IDs: FLARE

The listed manufacturer for the existing flare (model 45M-1200) is Catalytic Combustion. Release height (10.67 m or 35.0 ft), exit diameter (1.93 m or 6.33 ft), and exit temperature (1,089 K or 1,500 °F) of the flare are adequately supported. The flare release height and exit diameter were based on measurements during site visits. Exit temperature was based on the flare normal operating temperature as indicated in the submitted flare manual from Catalytic Combustion. Volumetric flow of the gas exiting the flare (53,472 acfm) was based on the volume of combustion gas produced plus the additional biogas components that are not combusted. This results in a combustion gas volume that is approximately 40% larger than would be expected based on the heat content of the gas combusted. DEQ agrees that the flare exhaust flow rate calculation was adequately supported in the submitted spreadsheet. The corresponding exit velocity is 8.63 m/sec.

$$Flare\ exit\ velocity = 53{,}472\frac{ft^3}{min} \times \frac{4}{\pi(6.33\,ft)^2} \times \frac{1\,min}{60\,sec} \times \frac{1\,meter}{3.28\,ft} = 8.63\frac{meters}{sec}$$

Flare release parameters were appropriately documented and justified.

Used-oil Heater

Model IDs: HEATER

The used-oil heater has not yet been purchased or installed. Therefore, there was no supporting documentation provided with the application. The used-oil heater was modeled with a stack height of 7.62 m (25.0 ft), an exit diameter of 0.20 m (0.67 ft), a gas flow temperature of 505 K (450 °F), and an exit velocity of 5.82 m/sec (19.1 fps).

3.2 Background Concentrations

Background concentrations are used if a cumulative NAAQS impact analysis is needed to demonstrate compliance with applicable NAAQS. Background design values (DV) for 24-hour and annual $PM_{2.5}$, 24-hour PM_{10}, 1-hour and annual NO_2, and 1-hour, 3-hour; 24-hour, and annual SO_2 were obtained from the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST; https://arcg.is/1jXmHH) using the project site coordinates. These background air pollutant levels are based on regional scale air pollution modeling of pollutants in Washington, Oregon, and Idaho, with modeling results adjusted according to available monitoring data. The values from NW AIRQUEST are listed in Table 10.

Table 10. DEQ-RECOMMENDED AMBIENT BACKGROUND CONCENTRATIONS

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)[a,b]
$PM_{2.5}$[c]	24-hr	13.3
	Annual	5.68

PM_{10}[d]	24-hr	75.1
NO_2[e]	1-hr	32.2
	Annual	5.60
SO_2[f]	1-hr	12.52
	8-hr	16.7
	24-hr	6.32
	Annual	1.18

a. Micrograms per cubic meter, except where noted otherwise.
b. NW AIRQUEST ambient background lookup tool, mid 2014–mid 2017.
c. Particulate matter with an aerodynamic diameter of 2.5 microns or less.
d. Particulate matter with an aerodynamic diameter of 10 microns or less.
e. Nitrogen dioxide.
f. Sulfur dioxide.

3.3 Impact Modeling Methodology

This section describes the modeling methods used by Bison on behalf of Pico Energy to demonstrate preconstruction compliance with applicable air quality standards.

3.3.1 General Overview of Impact Analyses

Bison performed the project-specific air pollutant emission inventory and air impact analyses that were submitted with the application. The submitted information/analyses, in combination with results from DEQ's air impact analyses, demonstrate 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 11 provides a brief description of parameters used in the modeling analyses.

Table 11. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Jerome, Idaho	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 18081.
Meteorological Data	Jerome surface data; Boise upper air data	See Section 3.3.4 of this memorandum for additional details on the meteorological data.
Terrain	Considered	National Elevation Dataset (NED) was acquired from the USGS for the surrounding area. AERMAP version 11103 was used to process terrain elevation data for all buildings and receptors. See Section 3.3.5 for more details.
Building Downwash	Considered	Considered in a generic method. See Section 3.3.6.
NOx Chemistry	Tier 2	Tier 2 Ambient Ratio Method (ARM2) assumes default minimum (0.5) and maximum (0.9) ambient ratios of NO_2/NOx. See Section 3.3.7.
Receptor Grid	**SIL Analysis** The selection of receptors for use in the SIL Analyses is as follows (see Section 3.3.9):	
	Fenceline	25-meter spacing along the ambient air boundary
	Fenceline to 250 m	25-meter spacing
	250 m to 1 km	100-meter spacing
	1 km to 3 km	250-meter spacing
	3 km to 10 km	500-meter spacing
	10 km to 50 km	1000-meter spacing
	Cumulative NAAQS Impact Analyses NAAQS Analysis used only the specific impact receptors from each pollutant and averaging period. Hotspot receptors with 10-meter spacing were added to the 1-hour SO_2 modeling. See Figure 7b for the location of the hotspot receptors.	
	TAPs Analyses The same receptor grid was used for the TAPs Analyses as for the Significant Impact Level	

	Analyses (full receptor grid).

3.3.2 *Modeling Methodology*

Project-specific modeling and other required impact analyses were generally conducted using data and methods described in the *Idaho Air Quality Modeling Guideline*[2].

3.3.3 *Model Selection*

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in Appendix W. 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 it includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

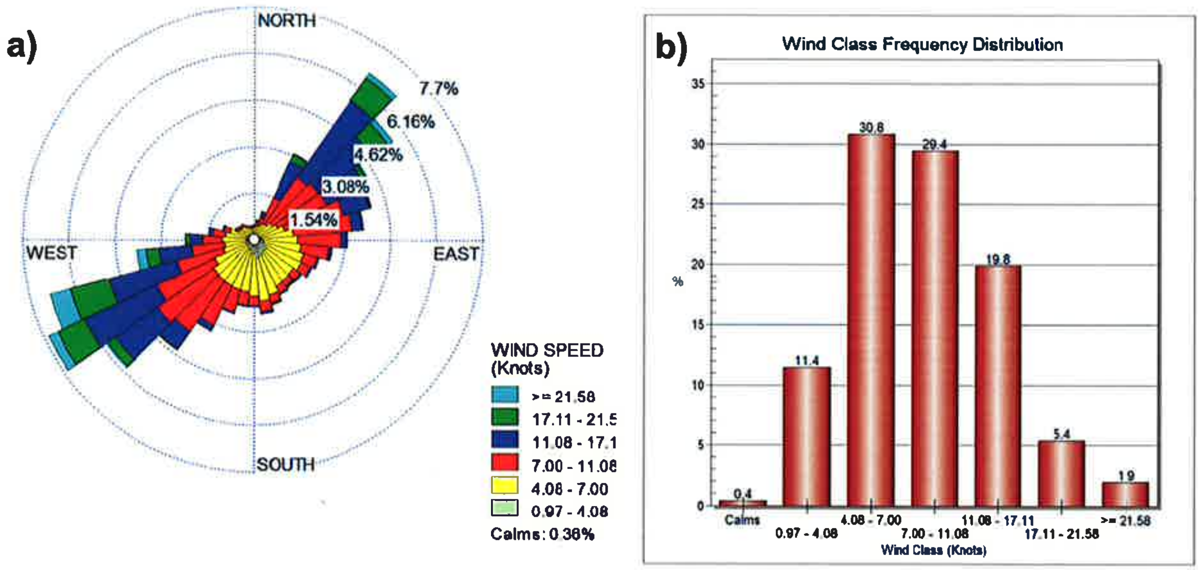
AERMOD version 18081 was used by Bison for the modeling analyses to evaluate impacts of the facility. This version was the current version at the time the application was received by DEQ.

3.3.4 *Meteorological Data*

DEQ processed a meteorological dataset from Jerome, Idaho (KJER; station ID 726816-04110) covering the years 2012-2017. The year 2013 was not utilized due to significant missing Automated Surface Observing Systems (ASOS) wind data in that time period. The upper air soundings required by AERMET were obtained from the Boise airport station (site ID 24131). Surface characteristics were determined by DEQ staff using AERSURFACE version 13016. DEQ modeling staff evaluated annual moisture conditions for the AERSURFACE runs based on thirty years of Jerome airport precipitation data. Conditions were determined to be "wet" for 2014 and 2015 and "average" for 2012, 2016, and 2017. Average moisture content is defined as within a 30 percentile of the 30-year mean of 10.07 inches. Calms were relatively low, and less than 1 percent of the data were missing from the 5-year record.

Figure 3 shows a wind rose and wind speed histogram at Jerome Airport. AERMINUTE version 15272 was used to process Automated Surface Observing Systems (ASOS) wind data for use in AERMET. AERMET version 18081 was used to process surface and upper air data and to generate a model-ready meteorological data input file. The "adjust u star" (ADJ_U*) option was applied in AERMET to enhance model performance during low wind speeds under stable conditions. DEQ provided meteorological data to Bison, with and without the ADJ_U* option enabled. In the submitted modeling files, Bison used the meteorological data without the ADJ_U* option enabled. DEQ determined that these data are adequately representative of the meteorology at the Pico Energy site for minor source permitting.

Figure 3. (a) WIND ROSE AND (b) WIND SPEED HISTOGRAM AT JEROME AIRPORT IN IDAHO.

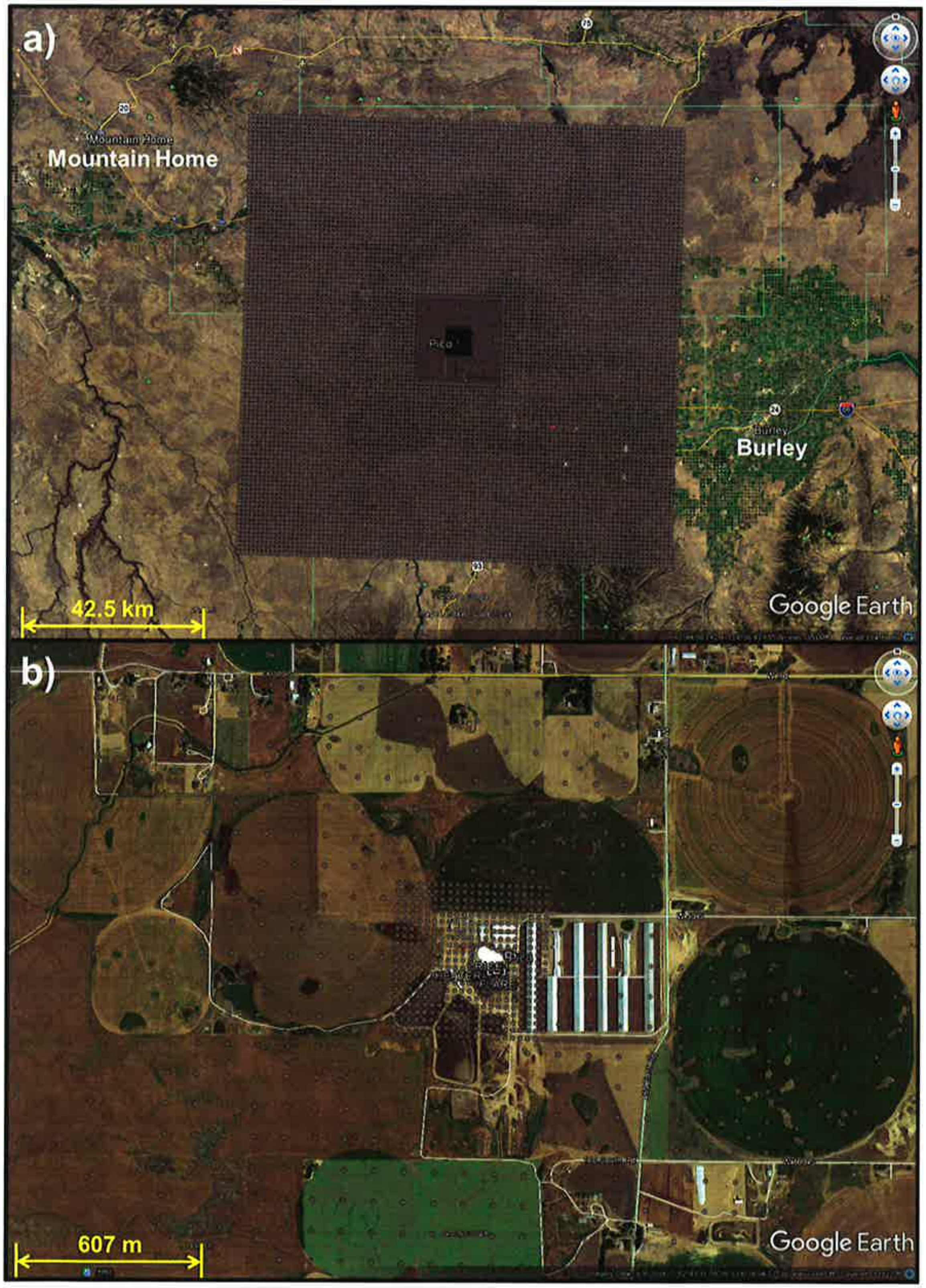


3.3.5 Effects of Terrain on Modeled Impacts

Submitted ambient air impact analyses used terrain data extracted from United States Geological Survey (USGS) National Elevation Dataset (NED) files.

The terrain preprocessor AERMAP version 11103 was used by Bison to extract the elevations from the NED files and assign them to receptors in the modeling domain in a format usable by AERMOD. AERMAP also determined the hill-height scale for each receptor. The hill-height scale is an elevation value based on the surrounding terrain which has the greatest effect on that individual receptor. AERMOD uses those heights to evaluate whether the emissions plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain. Figure 4 depicts the receptor grid used in the analyses, overlaid on a terrain image from Google Earth. Figure 4a shows the full receptor grid while Figure 4b shows the two inner receptor grids.

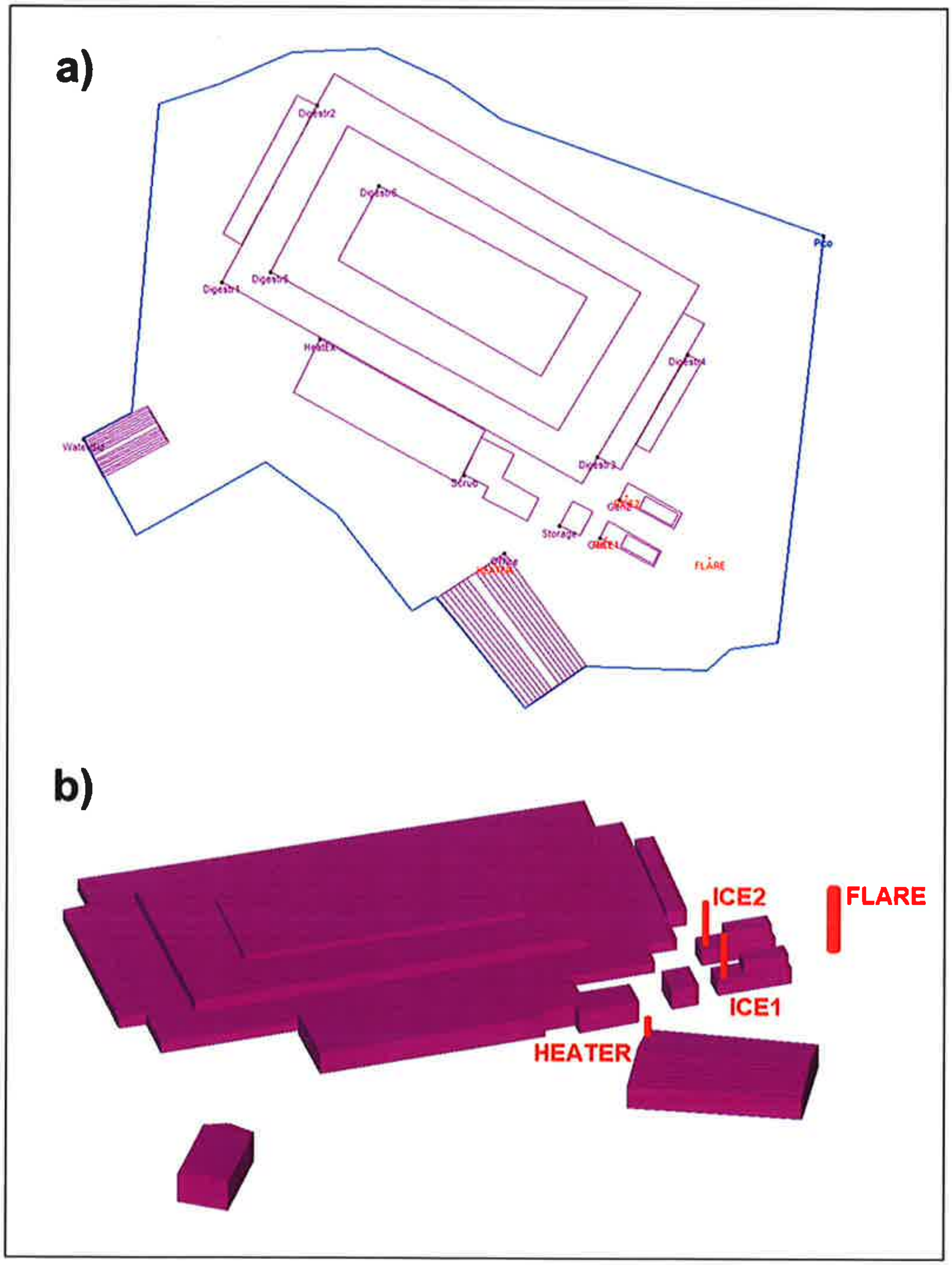
Figure 4. (a) THE FULL AND (b) THE TWO INNER RECEPTOR GRIDS CENTERED AT THE PICO ENERGY FACILITY IN JEROME, IDAHO.



3.3.6 Facility Layout and Downwash

Figure 5 shows the facility's structures and emission sources in the modeling analyses. Red dots in Figure 5a represent point sources. Figure 5b depicts a three-dimensional view of the modeled buildings and point sources, as viewed from the southwest.

Figure 5. PICO ENERGY MODEL SETUP WITH BUILDING STRUCTURES AND POINT SOURCES LABELED.



DEQ verified proper identification of the site location, equipment locations, and the ambient air boundary by comparing a graphical representation of the modeling input file to plot plans submitted in the application. Aerial photographs on Google Earth (available at https://www.google.com/earth) were also used to assure that horizontal coordinates were accurate as described in the application.

Potential downwash effects on emission plumes were accounted for in the model by using building dimensions and locations (locations of building corners, base elevation, and building heights). Dimensions and orientation of proposed buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME version 04274) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD.

3.3.7 NOx Chemistry

The atmospheric chemistry of NO, NO_2, and O_3 complicates accurate prediction of NO_2 impacts resulting from NOx emissions. The conversion of NO to NO_2 can be conservatively addressed through the use of several methods as outlined in a *2014 EPA NO_2 Modeling Clarification Memorandum.*[3] The guidance outlines a three-tiered approach:

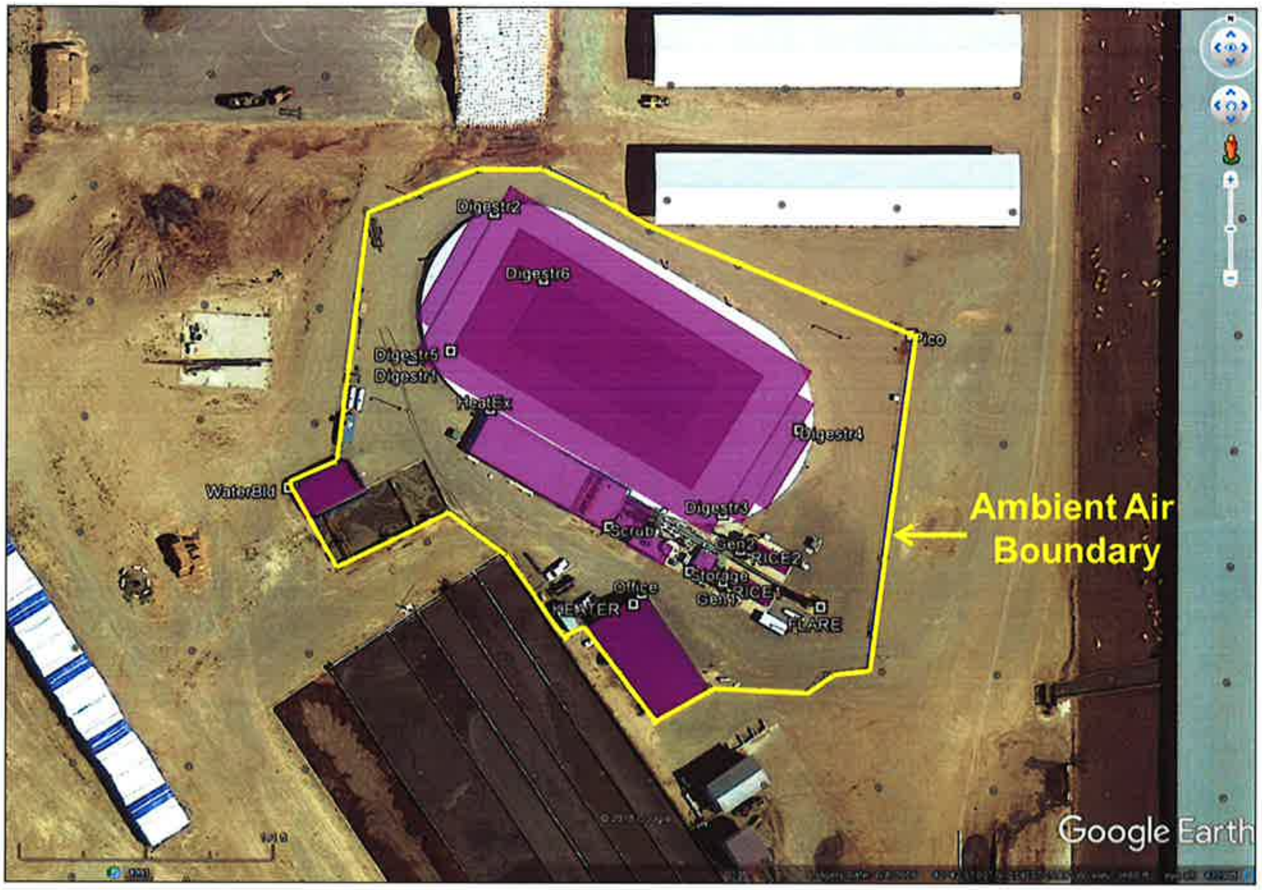
- Tier 1 – assume full conversion of NO to NO_2 where total NOx emissions are modeled and modeled impacts are assumed to be 100 percent NO_2.
- Tier 2 – use an ambient ratio to adjust impacts from the Tier 1 analysis.
- Tier 3 – use a detailed screening method to account for $NO/NO_2/O_3$ chemistry such as the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM).

Bison used the ARM2 method, a Tier 2 analysis method which assumes an ambient equilibrium between NO and NO_2, in which the conversion of NO to NO_2 is predicted using hourly ambient NOx monitoring data. ARM2 has been adopted by the EPA as a default regulatory Tier 2 option. A minimum and maximum NO_2/NOx ratio of 0.5 and 0.9, respectively, were specified in the model.

3.3.8 Ambient Air Boundary

Ambient air is defined in Section 006 of the Idaho Air Rules as "that portion of the atmosphere, external to buildings, to which the general public has access." The ambient air boundary for the Pico Energy facility is based on the property boundary, as shown below in Figure 6. The ambient air boundary is slightly smaller than the complete property boundary and includes the fenced area surrounding the digester facility. The digester facility is fenced, and no unauthorized persons are expected to be present on the property or near the digester area. Part of the fence is shown in Figure 2b.

Figure 6. PICO ENERGY AMBIENT AIR BOUNDARY.



3.3.9 Receptor Network

DEQ determined that the receptor grid used in the submitted modeling analyses was adequate to resolve maximum modeled impacts.

Table 11 describes the receptor network used in the submitted modeling analyses. The full grid, along with the fenceline receptors, includes a total of 12,684 receptors (Figure 4a). The receptor grids used in the model provided good resolution of the maximum design concentrations for the project and provided extensive coverage. The full receptor grid was used for the SIL and TAPs ambient air impact analyses. Only receptors that exceed applicable SILs were used for the NAAQS ambient air impact analyses. Additional hotspot receptors in 10-meter spacing were used in the 1-hr SO_2 modeling. Figure 7b in Section 4.1.2 of this modeling memo shows the location of these hotspot receptors.

DEQ determined that the receptor network was effective in reasonably assuring compliance with applicable air quality standards at all ambient air locations.

3.3.10 Good Engineering Practice Stack Height

An allowable good engineering practice (GEP) stack height may be established using the following equation in accordance with Idaho Air Rules Section 512.03.b:

H = S + 1.5L, where:

H = good engineering practice stack height measured from the ground-level elevation at the base of the stack.

S = height of the nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension, height or projected width, of the nearby structure.

All source stack release heights at the Pico Energy facility are below GEP stack height. Therefore, consideration of downwash caused by nearby buildings was required.

4.0 NAAQS and TAPs Impact Modeling Results

This section describes the air impact modeling results for both NAAQS and TAPs analyses.

4.1 *Results for NAAQS Analyses*

4.1.1 *Significant Impact Level Analyses*

Table 12 provides results for the significant impact level (SIL) analysis. It shows that the maximum predicted impacts from the facility are above the SIL for 24-hour and annual $PM_{2.5}$, 24-hour PM_{10}, 1-hour and annual NO_2, and 1-hr, 3-hr, 24-hr and annual SO_2. Therefore, cumulative NAAQS impact analyses were performed for these pollutants.

Table 12. RESULTS FOR SIGNIFICANT IMPACT LEVEL ANALYSES

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)[a]	Significant Impact Level ($\mu g/m^3$)	Impact Percentage of Significant Impact Level	Cumulative NAAQS Analysis Required?
$PM_{2.5}$[b]	24-hour	3.51	1.2	293%	Yes
	Annual	1.02	0.2	510%	Yes
PM_{10}[c]	24-hour	5.21	5.0	104%	Yes
NO_2[d]	1-hour	110	7.5	1467%	Yes
	Annual	13.8	1.0	1380%	Yes
SO_2[e]	1-hour	210	7.8	2692%	Yes
	3-hour	224	25	896%	Yes
	24-hour	132	5	2640%	Yes
	Annual	16.8	1.0	1680%	Yes
CO[f]	1-hour	137	2,000	7%	No
	8-hour	116	500	23%	No

a. Micrograms per cubic meter.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
d. Nitrogen dioxide.
e. Sulfur dioxide.
f. Carbon monoxide.

4.1.2 *Cumulative NAAQS Impact Analyses*

Table 13 provides results for the Cumulative NAAQS Impact Analysis. For each modeled pollutant, the total impact was calculated by adding the design value (DV) of the impact to the ambient background value. The sum was then compared to the NAAQS. Ambient impacts for the facility, when combined with approved ambient backgrounds, were below the NAAQS at all receptors where the facility-modeled impacts exceeded the SIL.

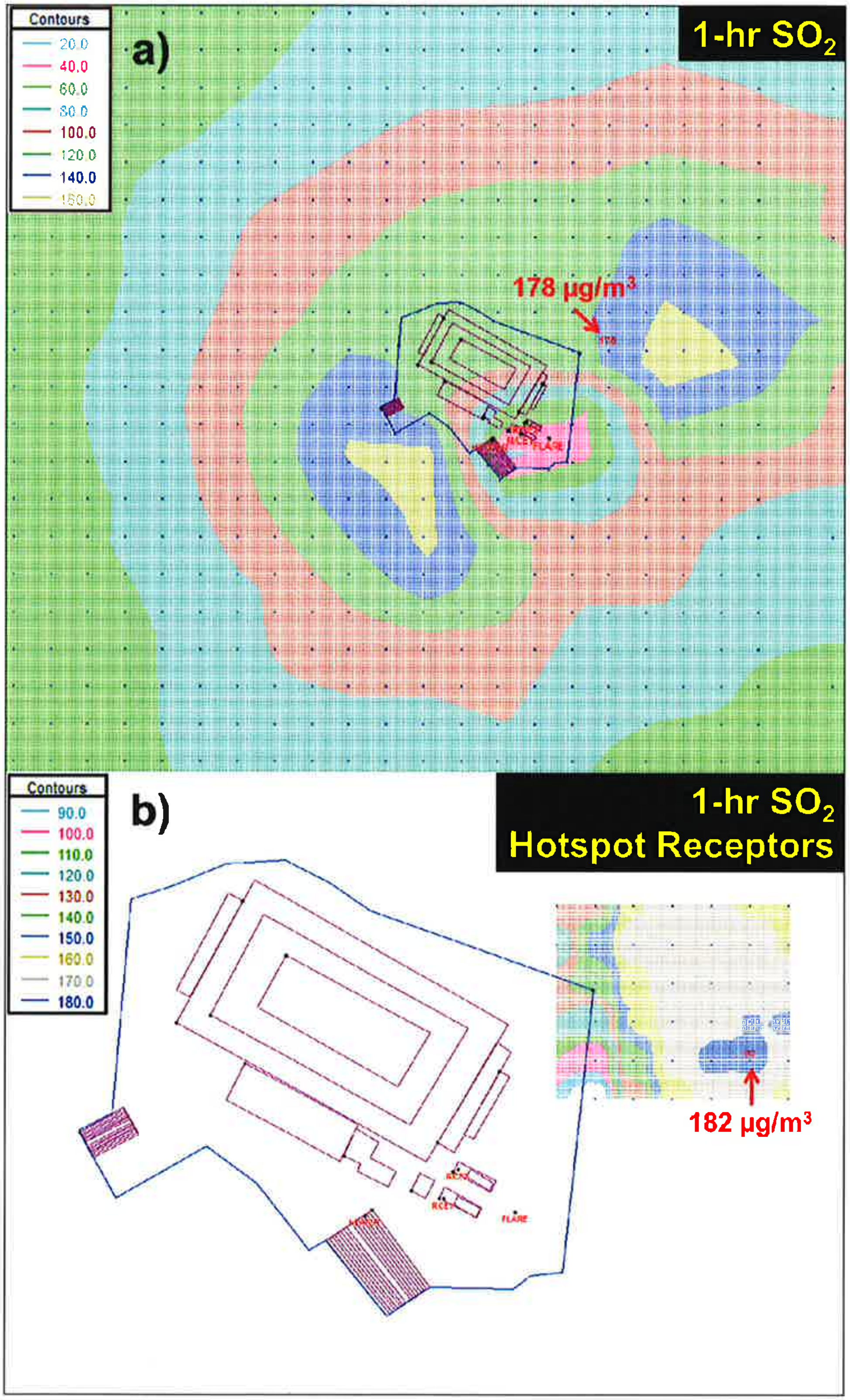
Table 13. RESULTS FOR CUMULATIVE NAAQS IMPACT ANALYSES

Pollutant	Averaging Period	Modeled Design Value Concentration ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Percent of NAAQS
$PM_{2.5}$[b]	24-hour	2.94	13.34	16.28	35	46.5%
	Annual	1.01	5.68	6.69	12	55.8%
PM_{10}[c]	24-hour	4.84	75.1	79.94	150	53.3%
NO_2[d]	1-hour	138	32.2	170.2	188	90.5%
	Annual	25.9	5.60	31.5	100	31.5%
SO_2[e]	1-hour	178	12.52	190.52	196	97.2%
	1-hour, hotspot	182	12.52	194.52	196	99.2%
	3-hour	216	16.73	232.73	1,300	17.9%
	24-hr	132	6.32	138.32	365	37.9%
	Annual	20.6	1.18	21.78	80	27.2%

a. Micrograms per cubic meter.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
d. Nitrogen dioxide.
e. Sulfur dioxide.

Figures 7a and 7b show plots of design value concentrations for 1-hr SO_2. Hotspot receptors in 10-meter grid spacing are shown in Figure 7b. Maximum modeled concentrations are shown in red font. These plots show that high design value concentrations are limited to a relatively small area close to the facility.

Figure 7. MODELED DESIGN VALUES FOR 1-HR SO_2 CUMULATIVE NAAQS IMPACT ANALYSES.



4.2 Results for TAPs Impact Analyses

Dispersion modeling was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 585 and 586 for those TAPs with facility-wide emissions exceeding screening emission levels (ELs). Table 14 lists the maximum modeled impacts for specific TAPs. All modeled impacts are below applicable AACs and AACCs.

Table 14. TAP AIR IMPACT ANALYSIS RESULTS

TAP	Maximum Modeled Impact ($\mu g/m^3$)[a]	AACC ($\mu g/m^3$)	Percent of AACC
Arsenic[b]	1.6E-04	2.3E-04	69.6%
Cadmium[b]	1.0E-05	5.6E-04	1.8%
Formaldehyde[b]	3.5E-04	7.7E-02	0.5%
Nickel[b]	3.2E-03	4.2E-02	7.6%

a. Micrograms per cubic meter.

b. Carcinogenic TAP. Modeled impacts and AACC represent annual or period-average concentration.

5.0 Conclusions

The information submitted with the PTC application, combined with DEQ air impact analyses, demonstrated to DEQ's satisfaction that emissions from the Pico Energy modification project will not cause or significantly contribute to a violation of any applicable ambient air quality standard or TAP increment.

References

1. *Policy on NAAQS Compliance Demonstration Requirements.* Idaho Department of Environmental Quality Policy Memorandum. July 11, 2014.

2. *State of Idaho Guideline for Performing Air Quality Impact Analyses*. Idaho Department of Environmental Quality. September 2013. State of Idaho DEQ Air Doc. ID AQ-011. Available at http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf.

3. *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard.* Office of Air Quality Planning and Standards. Air Quality Modeling Group. Research Triangle Park, NC. Guidance memorandum from R. Chris Owen and Roger Brode to Regional Dispersion Modeling Contacts. September 30, 2014.

APPENDIX C – FACILITY DRAFT COMMENTS

The following comments were received from the facility on June 28, 2019:

Facility Comment: Table 1.1: 1,512,000 ft^3/day should be 1,584,000 scf/day. All the analyses have been performed at 1,584,000 scf/day. The other value was discussed early in the process but all analyses have used the higher number. Also, the units in the current permit are scf/day. Units vary in the draft permit, but should be scf/day. The same error is in SOB Table 2.

DEQ Response: The requested change has been made.

Facility Comment: Table 2.2: The VOC annual emission for the flare contains an error - it should be 56.18 T/yr. The same error is in the SOB Table 3.

DEQ Response: The requested change has been made.

Facility Comment: Condition 2.5 also has the wrong biogas limit. It should be changed to 1,584,000 scf per day (scf/day).

DEQ Response: The requested change has been made.

APPENDIX D – PROCESSING FEE

PTC Processing Fee Calculation Worksheet

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:	Pico Energy, LLC
Address:	3350 S. 2400 E.
City:	Jerome
State:	ID
Zip Code:	83338
Facility Contact:	Jay Loesche
Title:	Director of Digester Operations
AIRS No.:	053-00017

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	27.6	0	27.6
SO_2	0.3	0	0.3
CO	0.0	0	0.0
PM10	0.7	0	0.7
VOC	25.6	0	25.6
Total:	54.1	0	**54.1**
Fee Due	**$ 5,000.00**		

Comments: