Statement of Basis

Permit to Construct No. P-2009.0088
Project ID 62581

City of Meridian Water Resource Recovery Facility
Meridian, Idaho

Facility ID 001-00228

Final

July 23, 2021
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Permit Writer

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

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ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

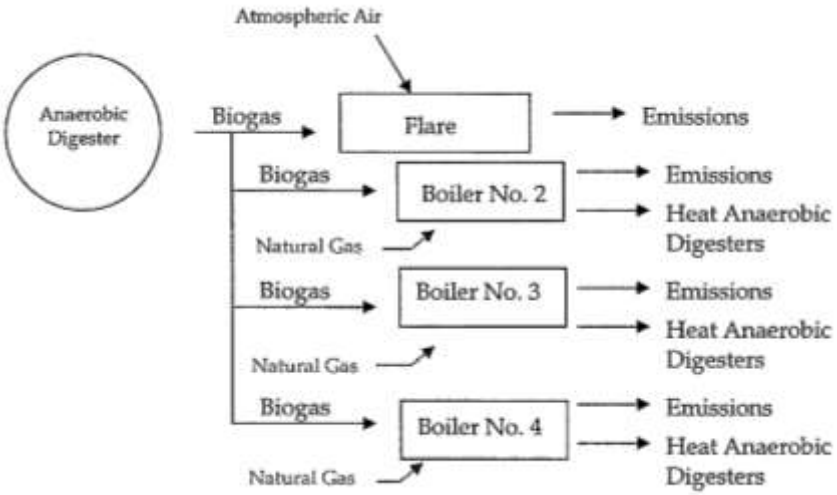
AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
Btu	British thermal units
CFR	Code of Federal Regulations
CI	compression ignition
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
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
lb/hr	pounds per hour
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
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
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
ppmV	parts per million by volume
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
RICE	reciprocating internal combustion engines
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
T/yr	tons per consecutive 12 calendar month period
TAP	toxic air pollutants
VOC	volatile organic compounds

FACILITY INFORMATION

Description

The City of Meridian Waste Water Division operates a Water Resource Recovery Facility (WRRF) to manage and treat municipal wastewater for the City of Meridian. Four diesel powered generators located in the generator building (Building 8) supply emergency backup power to the entire WRRF facility. Three boilers are located within the WRRF facility: Building No.18 (Boiler 2), and Building No. 20 (Boilers 3 and 4). Boilers 2 through 4 use biogas as the primary fuel and natural gas as the secondary fuel. Excess biogas is combusted in one of two flares located onsite. In addition, eight natural gas heaters are used throughout the facility for comfort heating and air conditioning purposes.

Biogas is a byproduct of the anaerobic digesters with a composition of 55 to 60-percent methane (CH4), 40 to 45-percent carbon dioxide (CO2), and less than 1-percent hydrogen sulfide (H2S). Four anaerobic digesters break down waste organic matter and generate biogas at the facility. The biogas that is produced by the digesters is cooled to precipitate and remove water vapor, and then pumped to three existing boilers used to maintain digester temperature and heat facility buildings. The boilers may use natural gas as a fuel source when biogas is not available. Excess biogas produced in the digesters is burned off in one of the onsite flares. Ferric chloride is injected into the sludge feed prior to the anaerobic digesters to control struvite (a crystalline compound that damages equipment) and reduces the hydrogen sulfide in the biogas, which reduces the sulfur dioxide emissions from the boilers and flares. Below is a process flow diagram of the biogas combustion process.



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).

September 24, 2009	P-2009.0088, Initial PTC for a wastewater treatment plant, Permit status (S)
August 24, 2015	P-2009.0088, Removal of equipment from the permit, modified the H2S monitoring requirements, and changed the responsible official, Permit status (A, but will become S upon issuance of this permit)

Application Scope

This PTC is a revision of an existing PTC.

The applicant has proposed to:

- Add a new Anaerobic Digester (Digester #6) to the list of regulated sources. The new digester has a design capacity of 834,000 gallons.
- Add a new Varec Open Flare (Flare 2) to the list of regulated sources. The new flare has a maximum burning rate of 228,480 scf/day of biogas. This flare will be the primary control for the boilers with the Candlestick Flare (Flare 1) operating as the secondary control.
- Reduce the H_2S concentration limit from 3,600 parts per million by volume (ppmV) to 1,200 ppmV on the biogas combustion in the boilers and flares.

Application Chronology

February 11, 2021	DEQ received an application.
February 16, 2021	DEQ received an application fee.
February 22 – March 9, 2021	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
March 18, 2021	DEQ determined that the application was incomplete.
April 5, 2021	DEQ received supplemental information from the applicant.
May 5, 2021	DEQ determined that the application was complete.
June 25, 2021	DEQ made available the draft permit and statement of basis for peer and regional office review.
June 30, 2021	DEQ made available the draft permit and statement of basis for applicant review.
July 20, 2021	DEQ received the permit processing fee.
July 23, 2021	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.	Source Description	Control Equipment
Anaerobic Digesters #3, #4, #5, and #6	Capacity #3: 507,000 gallons – Construction 2000 Capacity #4 & 5: 750,000 gallons – Construction 2008 Capacity #6: 834,000 gallons – Construction 2021 Biogas production: 120,000 cubic feet per day, each	Varec Flare (Primary): Manufacturer: Varec Biogas Model: 244W Series Installation Date: 2021 Candlestick Flare (Secondary): Manufacturer: Varec Biogas Model: VB86042 Installation Date: 2000
Boiler #2	Manufacturer: Kewanee Model: M-265 KG Serial Number: SFD72753 Construction Date: 1999 Rated Capacity: 3.31 MMBtu/hr Fuel Type: Primary: Biogas Secondary: NG Heat Content: 650 Btu/scf Biogas 1020 Btu/scf NG	None
Boiler #3	Manufacturer: Cleaver Brooks Model: CB700 X-60 Serial Number: OL 105735 Construction Date: 2008 Rated Capacity: 2.511 MMBtu/hr Fuel Type: Primary: Biogas Secondary: NG Heat Content: 650 Btu/scf Biogas 1020 Btu/scf NG	None
Boiler #4	Manufacturer: Cleaver Brooks Model: CB700 X-60 Serial Number: OL 105736 Construction Date: 2008 Rated Capacity: 2.511 MMBtu/hr Fuel Type: Primary: Biogas Secondary: NG Heat Content: 650 Btu/scf Biogas 1020 Btu/scf NG	None
Generator #1	Manufacturer: Caterpillar Model: 3412 C27 ACERT Serial Number: DJN00541 Construction Date: 2005 Model Year: 2005 Rated Power: 800 kW Ignition Type: Compression Fuel Type: Distillate #2 Fuel consumption: 58.6 gal/hr Actual fuel: 46.5 gal/hr Sulfur content: 0.5%	None

Source ID No.	Source Description	Control Equipment
Generator #2	Manufacturer: Caterpillar Model: 3412 C27 ACERT Serial Number: DJN00542 Construction Date: 2005 Model Year: 2005 Rated Power: 800 kW Ignition Type: Compression Fuel Type: Distillate #2 Fuel consumption: 58.6 gal/hr Actual fuel: 46.5 gal/hr Sulfur content: 0.5%	None
Generator #3	Manufacturer: Caterpillar Model: 3412 C27 ACERT Serial Number: DJN00911 Construction Date: 2005 Model Year: 2005 Rated Power: 800 kW Ignition Type: Compression Fuel Type: Distillate #2 Fuel consumption: 58.6 gal/hr Actual fuel: 46.5 gal/hr Sulfur content: 0.5%	None
Generator #4	Manufacturer: Caterpillar Model: 3412 C27 ACERT Serial Number: DJN00912 Construction Date: 2005 Model Year: 2005 Rated Power: 800 kW Ignition Type: Compression Fuel Type: Distillate #2 Fuel consumption: 58.6 gal/hr Actual fuel: 46.5 gal/hr Sulfur content: 0.5%	None
Heater #1	Manufacturer: Renzor Model: Series 100 Model F Construction Date: 1979 Max Capacity: 125,000 Btu/hr Fuel Type: Natural gas	None
Heater #2	Manufacturer: Renzor Model: Series 100 Model F Construction Date: 1978 Max Capacity: 125,000 Btu/hr Fuel Type: Natural gas	None
HVAC #1	Manufacturer: Hastings Model: HRCH-4 Construction Date: 1978 Max Capacity: 100,000 Btu/hr Fuel Type: Natural gas	None

Source ID No.	Source Description	Control Equipment
HVAC #2	Manufacturer: Hastings Model: HR-MUB-500V Construction Date: 2007 Max Capacity: 500,000 Btu/hr Fuel Type: Natural gas	None
HVAC #3	Manufacturer: Hastings Model: HR-MUB-500V Construction Date: 2007 Max Capacity: 500,000 Btu/hr Fuel Type: Natural gas	None
HVAC #4 and #5	Manufacturer: Renzor Model: RDF2-80-3 Construction Date: 2003 Max Capacity: 500,000 Btu/hr Fuel Type: Natural gas	None
HVAC #6	Manufacturer: Renzor Model: RDF2-80-3 Construction Date: 2003 Max Capacity: 500,000 Btu/hr Fuel Type: Natural gas	None

Emissions Inventories

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 flares, boilers, heaters, and generators in operation at the facility (see **Error! Reference source not found.**) associated with this proposed project. Emissions estimates of criteria pollutant and HAP PTE were based on emission factors from AP-42, mass balance, and the South Coast Air Quality Management District emissions reporting program. Operations of 8,760 hours per year were used on all sources PTE except for the emergency generators that were limited to 45 hours per year for maintenance and testing. Process information specific to the facility for the proposed project was used in the PTE calculations.

Uncontrolled Potential to Emit

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

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

The following table presents the uncontrolled Potential to Emit for regulated air pollutants as submitted by the Applicant and verified by DEQ staff. See **Error! Reference source not found.** for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this WRRF operation uncontrolled Potential to Emit is based upon a worst-case for operation of the facility of 8,760 hr/yr with the exception of the emergency generators that are limited to 45 hr/yr.

Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$	SO_2	NO_X	CO	VOC
	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources					
Flare1	0.17	3.868	0.968	4.413	0.897
Flare2	0.32	7.364	1.843	8.402	1.708
Boiler 2 (NG & Biogas)	0.17	4.297	2.232	1.875	0.123
Boiler 3 (NG & Biogas)	0.17	3.320	2.019	0.621	0.069
Boiler 4 (NG & Biogas)	0.17	3.320	2.019	0.621	0.069
Generator 1	0.02	0.000	0.421	0.093	0.015
Generator 2	0.02	0.000	0.421	0.093	0.015
Generator 3	0.02	0.000	0.421	0.093	0.015
Generator 4	0.02	0.000	0.421	0.093	0.015
Heater 1	0.004	3.22E-04	0.054	0.045	0.003
Heater 2	0.004	3.22E-04	0.054	0.045	0.003
HVAC 1	0.003	2.58E-04	0.043	0.036	0.002
HVAC 2	0.02	1.29E-03	0.215	0.180	0.012
HVAC 3	0.02	1.29E-03	0.215	0.180	0.012
HVAC 4	0.01	6.44E-04	0.107	0.090	0.006
HVAC 5	0.01	6.44E-04	0.107	0.090	0.006
HVAC 6	0.02	1.29E-03	0.215	0.180	0.012
Total, Point Sources	**1.14**	**22.18**	**11.78**	**17.15**	**2.98**

The following table presents the uncontrolled Potential to Emit for HAP pollutants as submitted by the Applicant and verified by DEQ staff. See **Error! Reference source not found.** for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this WRRF operation uncontrolled Potential to Emit is based upon a worst-case for operation of the facility of 8,760 hr/yr with the exception of the emergency generators that are limited to 45 hr/yr. Then, the worst-case maximum HAP Potential to Emit was determined for this WRRF operation.

Table 3 UNCONTROLLED POTENTIAL TO EMIT FOR HAZARDOUS AIR POLLUTANTS

Hazardous Air Pollutants	PTE (T/yr)
Acetaldhyde	1.79E-03
Acrolein	4.23E-04
Benzene	6.98E-03
Ethylbenzene	6.02E-02
Formaldehyde	5.61E-02
Hexane	1.77E-01
Hydrogen Sulfide	7.80E-01
Naphthalene	5.19E-04
Toluene	2.96E-03
Xylene	1.35E-03
Total PAHs	1.48E-04
POM	5.23E-07
Arsenic	1.75E-05
Beryllium	1.05E-06
Cadmium	9.62E-05
Chromium	1.22E-04
Cobalt	7.35E-06
Lead	3.31E-05
Manganese	3.32E-05
Mercury	2.27E-05
Nickel	1.84E-04
Selenium	2.10E-06
Total	**1.09**

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 **Error! Reference source not found.** for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 4 PRE-PROJECT 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
Boiler 2 (NG & Biogas)	0.04	0.17	2.94	12.89	0.51	2.23	0.43	1.88	0.03	0.12
Boiler 3 (NG & Biogas)	0.04	0.17	2.27	9.96	0.46	2.02	0.14	0.62	0.02	0.07
Boiler 4 (NG & Biogas)	0.04	0.17	2.27	9.96	0.46	2.02	0.14	0.62	0.02	0.07
Generator 1	0.70	0.02	0.00	0.00	18.73	0.42	4.15	0.09	0.68	0.02
Generator 2	0.70	0.02	0.00	0.00	18.73	0.42	4.15	0.09	0.68	0.02
Generator 3	0.70	0.02	0.00	0.00	18.73	0.42	4.15	0.09	0.68	0.02
Generator 4	0.70	0.02	0.00	0.00	18.73	0.42	4.15	0.09	0.68	0.02
Flare	0.04	0.17	2.65	11.60	0.22	0.97	1.20	5.27	0.20	0.90
Heater 1	0.001	0.004	0.0001	0.0003	0.01	0.05	0.01	0.05	0.0007	0.003
Heater 2	0.001	0.004	0.0001	0.0003	0.01	0.05	0.01	0.05	0.0007	0.003
HVAC 1	0.001	0.003	0.00006	0.0003	0.01	0.04	0.01	0.04	0.0005	0.002
HVAC 2	0.004	0.02	0.00029	0.00129	0.05	0.21	0.04	0.18	0.003	0.01
HVAC 3	0.004	0.02	0.00029	0.00129	0.05	0.21	0.04	0.18	0.003	0.01
HVAC 4	0.002	0.01	0.00015	0.00064	0.025	0.11	0.02	0.09	0.001	0.01
HVAC 5	0.002	0.01	0.00015	0.00064	0.025	0.11	0.02	0.09	0.001	0.01
HVAC 6	0.004	0.02	0.00029	0.00129	0.05	0.21	0.04	0.18	0.003	0.01
Pre-Project Totals	**2.97**	**0.82**	**10.14**	**44.42**	**76.80**	**9.93**	**18.71**	**9.61**	**3.00**	**1.27**

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 **Error! Reference source not found.** for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 5 POST PROJECT 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
Flare1	0.04	0.17	0.88	3.87	0.22	0.97	1.01	4.41	0.20	0.90
Flare2	0.07	0.32	1.68	7.36	0.42	1.84	1.92	8.40	0.39	1.71
Boiler 2 (NG & Biogas)	0.04	0.17	0.98	4.30	0.51	2.23	0.43	1.88	0.03	0.12
Boiler 3 (NG & Biogas)	0.04	0.17	0.76	3.32	0.46	2.02	0.14	0.62	0.02	0.07
Boiler 4 (NG & Biogas)	0.04	0.17	0.76	3.32	0.46	2.02	0.14	0.62	0.02	0.07
Generator 1	0.70	0.02	0.00	0.00	18.73	0.42	4.15	0.09	0.68	0.02
Generator 2	0.70	0.02	0.00	0.00	18.73	0.42	4.15	0.09	0.68	0.02
Generator 3	0.70	0.02	0.00	0.00	18.73	0.42	4.15	0.09	0.68	0.02
Generator 4	0.70	0.02	0.00	0.00	18.73	0.42	4.15	0.09	0.68	0.02
Heater 1	0.001	0.004	0.0001	0.0003	0.01	0.05	0.01	0.05	0.0007	0.003
Heater 2	0.001	0.004	0.0001	0.0003	0.01	0.05	0.01	0.05	0.0007	0.003
HVAC 1	0.001	0.003	0.00006	0.0003	0.01	0.04	0.01	0.04	0.0005	0.002
HVAC 2	0.004	0.02	0.00029	0.00129	0.05	0.21	0.04	0.18	0.003	0.01
HVAC 3	0.004	0.02	0.00029	0.00129	0.05	0.21	0.04	0.18	0.003	0.01
HVAC 4	0.002	0.01	0.00015	0.00064	0.025	0.11	0.02	0.09	0.001	0.01
HVAC 5	0.002	0.01	0.00015	0.00064	0.025	0.11	0.02	0.09	0.001	0.01
HVAC 6	0.004	0.02	0.00029	0.00129	0.05	0.21	0.04	0.18	0.003	0.01
Post-Project Totals	**3.05**	**1.14**	**5.06**	**22.18**	**77.22**	**11.78**	**20.43**	**17.15**	**3.39**	**2.98**

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 6 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	**2.97**	**0.82**	**10.14**	**44.42**	**76.80**	**9.93**	**18.71**	**9.61**	**3.00**	**1.27**
Post Project Potential to Emit	**3.05**	**1.14**	**5.06**	**22.18**	**77.22**	**11.78**	**20.43**	**17.15**	**3.39**	**2.98**
Changes in Potential to Emit	**0.08**	**0.32**	**-5.08**	**-22.24**	**0.42**	**1.85**	**1.72**	**7.54**	**0.39**	**1.71**

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 7 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)
Acrolein	2.59E-04	3.54E-04	9.52E-05	0.017	No
Ammonia	4.07E-02	4.07E-02	0.00	1.2	No
Ethyl benzene	0.00	1.37E-02	1.37E-02	29	No
Hexane (n-Hexane)	4.01E-02	4.04E-02	2.76E-04	12	No
Hydrogen sulfide	2.36E-01	1.78E-01	-5.81E-02	0.933	No
Naphthalene	3.55E-05	1.40E-04	1.05E-04	3.33	No
Pentane	5.79E-02	5.79E-02	0.00	118	No
Toluene (toluol)	9.30E-03	9.85E-03	5.52E-04	25	No
Xylene (o-, m-, p-isomers)	6.33E-03	6.61E-03	2.76E-04	29	No
Barium, soluble compounds, as Ba	8.79E-05	8.79E-05	0.00	0.033	No
Chromium metal[(a)]	2.80E-05	2.80E-05	0.00	0.033	No
Cobalt metal, dust, and fume	1.68E-06	1.68E-06	0.00	0.0033	No
Copper: Fume	1.70E-05	1.70E-05	0.00	0.013	No
Manganese as Mn Including: Dust & compounds	7.59E-06	7.59E-06	0.00	0.333	No
Molybdenum as Mo - Including: Soluble compounds	2.20E-05	2.20E-05	0.00	0.333	No
Selenium	4.79E-07	4.79E-07	0.00	0.013	No
Vanadium, as V2O5 Respirable Dust & fume	4.59E-05	4.59E-05	0.00	0.003	No
Zinc metal (ID)	0.667	0.667	0.00	0.667	No

a) Chromium Metal – Including: Chromium (II) compounds, as Cr and Chromium (III) compounds, as Cr.

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 8 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)
3-methylcholanthrene	4.01E-08	4.01E-08	0.00	2.5E-06	No
Acetaldehyde	4.25E-06	4.14E-04	4.09E-04	3.0E-03	No
Benzene	2.09E-04	1.72E-03	1.51E-03	8.0E-04	Yes
Benzo(a)pyrene	7.00E-08	7.00E-08	0.00	2.0E-06	No
Formaldehyde	1.68E-03	1.28E-02	1.11E-02	5.1E-04	Yes
Polyaromatic Hydrocarbons (except 7-PAH group)	4.08E-05	6.94E-05	2.86E-05	9.1E-05	No
POM (7-PAH)[(b)]	1.19E-07	1.19E-07	0.00	2.00E-06	No
Arsenic compounds	3.99E-06	3.99E-06	0.00	1.5E-06	No
Beryllium & compounds	2.40E-07	2.40E-07	0.00	2.8E-05	No
Cadmium and compounds	2.20E-05	2.20E-05	0.00	3.7E-06	No
Nickel	4.19E-05	4.19E-05	0.00	2.7E-05	No

b) 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 Benzene and Formaldehyde because the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Post Project HAP Emissions

The following table presents the post project potential to emit for HAP pollutants from all emissions units at the facility as submitted by the Applicant and verified by DEQ staff. See **Error! Reference source not found.** for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 9 HAZARDOUS AIR POLLUTANTS EMISSIONS POTENTIAL TO EMIT SUMMARY

Hazardous Air Pollutants	PTE (lb/hr)	PTE (T/yr)
Acetaldhyde	4.14E-04	1.79E-03
Acrolein	3.54E-04	4.23E-04
Benzene	1.72E-03	6.98E-03
Ethylbenzene	1.37E-02	6.02E-02
Formaldehyde	1.28E-02	5.61E-02
Hexane	4.04E-02	1.77E-01
Hydrogen Sulfide	1.78E-01	7.80E-01
Naphthalene	1.40E-04	5.19E-04
Toluene	9.85E-03	2.96E-03
Xylene	6.61E-03	1.35E-03
Total PAHs	6.94E-05	1.48E-04
POM	1.19E-07	5.23E-07
Arsenic	3.99E-06	1.75E-05
Beryllium	2.40E-07	1.05E-06
Cadmium	2.20E-05	9.62E-05
Chromium	2.80E-05	1.22E-04
Cobalt	1.68E-06	7.35E-06
Lead	7.56E-06	3.31E-05
Manganese	7.59E-06	3.32E-05
Mercury	5.19E-06	2.27E-05
Nickel	4.19E-05	1.84E-04
Selenium	4.79E-07	2.10E-06
Total	**0.264**	**1.09**

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of SO_2 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 **Error! Reference source not found.**.

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).

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

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Ada 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.

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 10 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM	1.14	1.14	**100**	B
PM_{10}	1.14	1.14	**100**	B
$PM_{2.5}$	1.14	1.14	**100**	B
SO_2	22.18	22.18	**100**	B
NO_X	11.78	11.78	**100**	B
CO	17.15	17.15	**100**	B
VOC	2.98	2.98	**100**	B
HAP (single)	0.78	0.78	**10**	B
Total HAPs	1.09	1.09	**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 2.5.

Standards for New Sources (IDAPA 58.01.01.676)

IDAPA 58.01.01.676..... Standards for New Sources

The fuel burning equipment located at this facility, with a maximum rated input of ten (10) million BTU per hour or more, are subject to a particulate matter limitation of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume when combusting gaseous fuels. Fuel-Burning Equipment is defined as any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer. This requirement is not applicable as all fuel burning equipment at the facility is below the ten (10) million BTU per hour threshold.

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 of PM_{10}, SO_2, NO_X, CO, or VOC nor greater than 10 tons per year for any one HAP nor greater than 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 four emergency generators, 40 CFR 60, Subpart IIII may apply. The following is an applicability analysis for the existing emergency generators at the facility.

40 CFR 60, Subpart IIII…….Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

§ 60.4200 Am I subject to this subpart?

(a)(2) Owners and operators of stationary CI ICE that commence construction after July 11, 2005 where the stationary CI ICE are:

(i) Manufactured after April 1, 2006 and are not fire pump engines, or

(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

(a)(3) Owners and operators of stationary CI ICE that modify or reconstruct their stationary CI ICE after July 11, 2005.

To be applicable, a facility must have a compression ignition generator that was constructed (ordered by facility) after July 11, 2005 and manufactured after April 11, 2006 or modify the unit after July 11, 2005.

The facility does include four CI generators, but all were manufactured prior to April 11, 2006 and ordered before July 11, 2005. Additionally, they have not been modified. Therefore, this NSPS does not apply.

NESHAP Applicability (40 CFR 61)

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

MACT Applicability (40 CFR 63)

Because the facility has three boilers, 40 CFR 63, Subpart JJJJJJ may apply. The following is an applicability analysis for the existing boilers at the facility.

40 CFR 63, Subpart JJJJJJ……...National Emissions Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources

§63.11193 Am I subject to this subpart?

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

The requirements of this subpart do not apply to the City of Meridian WRRF because the facility is an area source that owns and operates three dual-fuel gas-fired boilers (ie. Boilers 2-4) that meet the excluded definitions in 40 CFR 63.11195.

§63.11195 Are any boilers not subject to this subpart?

The types of boilers listed in paragraphs (a) through (k) of this section are not subject to this subpart and to any requirements in this subpart.

(a) Any boiler specifically listed as, or included in the definition of, an affected source in another standard(s) under this part.

(b) Any boiler specifically listed as an affected source in another standard(s) established under section 129 of the Clean Air Act.

(c) A boiler required to have a permit under section 3005 of the Solid Waste Disposal Act or covered by subpart EEE of this part (e.g., hazardous waste boilers), unless such units do not combust hazardous waste and combust comparable fuels.

(d) A boiler that is used specifically for research and development. This exemption does not include boilers that solely or primarily provide steam (or heat) to a process or for heating at a research and development facility. This exemption does not prohibit the use of the steam (or heat) generated from the boiler during research and

development, however, the boiler must be concurrently and primarily engaged in research and development for the exemption to apply.

(e) A gas-fired boiler as defined in this subpart.

§63.11237 What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act, in §63.2 (the General Provisions), and in this section as follows:

Gas-fired boiler includes any boiler that burns gaseous fuels not combined with any solid fuels and burns liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or periodic testing on liquid fuel. Periodic testing of liquid fuel shall not exceed a combined total of 48 hours during any calendar year.

Gaseous fuels includes, but is not limited to, natural gas, process gas, landfill gas, coal derived gas, refinery gas, hydrogen, and biogas.

The WRRF will maintain three dual-fuel boilers that satisfy the definition of gas-fired boilers that burn gaseous fuel exclusively (ie. digester gas (biogas) as primary fuel and natural gas as secondary fuel). Therefore, these boilers are not subject to this subpart, nor to any requirements in this subpart.

Because the facility has four emergency engines the requirements of 40 CFR 63, Subpart ZZZZ apply to this facility.

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

§ 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.

The facility operates one four emergency engines that are used periodically throughout the year and is used in emergency situations only. The facility is an area source for HAPs.

§ 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.

(1) Existing stationary RICE.

(iii) For stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

The four emergency engines located at the facility are considered existing as they commenced before June 12, 2006.

§ 63.6595 When do I have to comply with the subpart?

(a)(1) If you have an existing stationary RICE, excluding existing non-emergency CI stationary RICE, with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the applicable emission limitations and operating limitations no later than June 15, 2007. If you have an existing non-emergency CI stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, an existing stationary CI RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, or an existing stationary CI RICE located at an area source of HAP emissions, you must comply with the applicable emission limitations and operating limitations no later than May 3, 2013. If you have an existing stationary SI RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, or an existing stationary SI RICE located at an area source of HAP emissions, you must comply with the applicable emission limitations and operating limitations no later than October 19, 2013.

The four emergency engines must be in compliance with the Subpart no later than May 3, 2013.

§63.6603 What emission limitations, operating limitations, and other requirements must I meet if I own or operate an existing stationary RICE located at an area source of HAP emissions?

(a) If you own or operate an existing stationary RICE located at an area source of HAP emissions, you must comply with the requirements in Table 2d to this subpart and the operating limitations in Table 2b to this subpart that apply to you.

Table 2d applies to the four emergency engines as it applies to emergency CI RICE. Table 2d specifies that except during periods of startup, the engines are subject to changing the oil and filter every 500 hours of operation, inspecting the air cleaner every 1,000 hours of operation and replace as necessary, and inspect all hoses and belts every 500 hours of operation and replace as necessary. Each of the maintenance procedures shall occur at the indicated interval or annually, whichever occurs first.

§63.6604 What fuel requirements must I meet if I own or operate a stationary CI RICE?

(a) If you own or operate an existing non-emergency, non-black start CI stationary RICE with a site rating of more than 300 brake HP with a displacement of less than 30 liters per cylinder that uses diesel fuel, you must use diesel fuel that meets the requirements in 40 CFR 80.510(b) for nonroad diesel fuel.

The four emergency engines shall use diesel fuel that meets the requirements of 40 CFR 80.510(b).

§ 63.6605 What are my general requirements for complying with this Subpart?

(a) You must be in compliance with the emission limitations and operating limitations in this Subpart that apply to you at all times.

(b) At all times you must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require you to make any further efforts to reduce emissions if levels required by this standard have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source.

When operating the IC engines, they must be operated in a manner that is consistent with reducing emissions and compliance with appropriate limitations applies at all times.

§ 63.6625 What are my monitoring, installation, collection, operation, and maintenance requirements?

(e) If you own or operate any of the following stationary RICE, you must operate and maintain the stationary RICE and after-treatment control device (if any) according to the manufacturer's emission-related written instructions or develop your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions:

(3) An existing emergency or black start stationary RICE located at an area source of HAP emissions;

The four emergency engines shall be operated in accordance with manufacturer's specifications or a maintenance plan may be developed that is consistent with good air pollution control practices.

(f) If you own or operate an existing emergency stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing emergency stationary RICE located at an area source of HAP emissions, you must install a non-resettable hour meter if one is not already installed.

A non-resettable hour meter shall be installed on all four emergency engines.

(h) If you operate a new, reconstructed, or existing stationary engine, you must minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the emission standards applicable to all times other than startup in Tables 1a, 2a, 2c, and 2d to this subpart apply.

Idle startup time may not exceed 30 minutes.

(i) If you own or operate a stationary CI engine that is subject to the work, operation or management practices in items 1 or 2 of Table 2c to this subpart or in items 1 or 4 of Table 2d to this subpart, you have the option of utilizing an oil analysis program in order to extend the specified oil change requirement in Tables 2c and 2d to this subpart. The oil analysis must be performed at the same frequency specified for changing the oil in Table 2c or 2d to this subpart. The analysis program must at a minimum analyze the following three parameters: Total Base Number, viscosity, and percent water content. The condemning limits for these parameters are as follows: Total Base Number is less than 30 percent of the Total Base Number of the oil when new; viscosity of the oil has changed by more than 20 percent from the viscosity of the oil when new; or percent water content (by volume) is greater than 0.5. If all of these condemning limits are not exceeded, the engine owner or operator is not required to change the oil. If any of the limits are exceeded, the engine owner or operator must change the oil within 2 days of receiving the results of the analysis; if the engine is not in operation when the results of the analysis are received, the engine owner or operator must change the oil within 2 days or before commencing operation, whichever is later. The owner or operator must keep records of the parameters that are analyzed as part of the program, the results of the analysis, and the oil changes for the engine. The analysis program must be part of the maintenance plan for the engine.

This section allows the facility to develop their own oil analysis program to modify the oil changing frequency if the program meets all criteria set forth in subsection i of the subpart.

§ 63.6635 How do I monitor and collect data to demonstrate continuous compliance?

(a) If you must comply with emission and operating limitations, you must monitor and collect data according to this section.

(b) Except for monitor malfunctions, associated repairs, required performance evaluations, and required quality assurance or control activities, you must monitor continuously at all times that the stationary RICE is operating. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.

(c) You may not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels. You must, however, use all the valid data collected during all other periods.

The permittee must monitor and collect data continuously when the engines are in operation.

§ 63.6640 How do I demonstrate continuous compliance with the emission limitations and operating limitations?

(a) You must demonstrate continuous compliance with each emission limitation and operating limitation in Tables 1a and 1b, Tables 2a and 2b, Table 2c, and Table 2d to this subpart that apply to you according to methods specified in Table 6 to this subpart.

(b) You must report each instance in which you did not meet each emission limitation or operating limitation in Tables 1a and 1b, Tables 2a and 2b, Table 2c, and Table 2d to this subpart that apply to you. These instances are

deviations from the emission and operating limitations in this subpart. These deviations must be reported according to the requirements in §63.6650. If you change your catalyst, you must reestablish the values of the operating parameters measured during the initial performance test. When you reestablish the values of your operating parameters, you must also conduct a performance test to demonstrate that you are meeting the required emission limitation applicable to your stationary RICE.

(f) If you own or operate an emergency stationary RICE, you must operate the emergency stationary RICE according to the requirements in paragraphs (f)(1) through (4) of this section. In order for the engine to be considered an emergency stationary RICE under this subpart, any operation other than emergency operation, maintenance and testing, emergency demand response, and operation in non-emergency situations for 50 hours per year, as described in paragraphs (f)(1) through (4) of this section, is prohibited. If you do not operate the engine according to the requirements in paragraphs (f)(1) through (4) of this section, the engine will not be considered an emergency engine under this subpart and must meet all requirements for non-emergency engines.

(1) There is no time limit on the use of emergency stationary RICE in emergency situations.

(2) You may operate your emergency stationary RICE for any combination of the purposes specified in paragraphs (f)(2)(i) through (iii) of this section for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraphs (f)(3) and (4) of this section counts as part of the 100 hours per calendar year allowed by this paragraph (f)(2).

(i) Emergency stationary RICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency RICE beyond 100 hours per calendar year.

(ii) Emergency stationary RICE may be operated for emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP-002-3, Capacity and Energy Emergencies (incorporated by reference, see §63.14), or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2 as defined in the NERC Reliability Standard EOP-002-3.

(iii) Emergency stationary RICE may be operated for periods where there is a deviation of voltage or frequency of 5 percent or greater below standard voltage or frequency.

(4) Emergency stationary RICE located at area sources of HAP may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing and emergency demand response provided in paragraph (f)(2) of this section. Except as provided in paragraphs (f)(4)(i) and (ii) of this section, the 50 hours per year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

The above requirements pertain to the four emergency engines at the facility.

§ 63.6655 What records must I keep?

(e) You must keep records of the maintenance conducted on the stationary RICE in order to demonstrate that you operated and maintained the stationary RICE and after-treatment control device (if any) according to your own maintenance plan if you own or operate any of the following stationary RICE;

(2) An existing stationary emergency RICE.

(f) If you own or operate any of the stationary RICE in paragraphs (f)(1) through (2) of this section, you must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. The owner or operator must document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. If the engine is used for the purposes specified in §63.6640(f)(2)(ii) or (iii) or §63.6640(f)(4)(ii), the owner or operator must keep records of the notification of the emergency situation, and the date, start time, and end time of engine operation for these purposes.

*(2) An existing emergency stationary RICE loca*ted at an area source of HAP emissions that does not meet the standards applicable to non-emergency engines.

The facility needs to maintain records demonstrating that the engines are being operated in accordance with an appropriate maintenance plan. Records of operational hours from the non-resettable meter must also be kept as well as how many hours were spent in emergency situations and demand response.

§ 63.6660 In what form and how long must I keep my records?

(a) Your records must be in a form suitable and readily available for expeditious review according to §63.10(b)(1).

(b) As specified in §63.10(b)(1), you must keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record.

(c) You must keep each record readily accessible in hard copy or electronic form for at least 5 years after the date of each occurrence, measurement, maintenance, corrective action, report, or record, according to §63.10(b)(1).

All records must be kept by the permittee for a minimum of five (5) years for each record.

Permit Conditions Review

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

Revised Permit Condition 1.1

The purpose of the permit was revised to include the new digester and capacity of the WRRF along with the new flare and name change.

Revised Permit Condition 1.3

This permit condition was revised to state the permit information that this permit replaces.

Revised Permit Table 1.1

This permit condition has been revised to add Digester #6 with an 834,000 gallon capacity and also added the Varec Flare as the primary control equipment with the existing Candlestick Flare moved to a secondary control position. In addition, a note was added to the heaters and HVAC units that states those units are permitted for 8,760 hours with maximum capacity ratings and no other permit conditions.

Revised Permit Condition 2.1

The permit condition has been revised to describe the WRRF process.

Revised Permit Condition 2.2 and Table 2.1

This permit condition was revised to include Digester #6 with the 834,000 gallon capacity and the new Varec Flare.

Initial Permit Condition 2.3 and Table 2.2

This is a new permit condition that lists the emission limits not to exceed in Table 2.2 for the flares and boilers.

Revised Permit Condition 2.4

This permit condition has been revised with a limit of 1,200 ppmV for H_2S.

Revised Permit Condition 2.5

This permit condition has been revised to include the flare stacks to the opacity limits.

Revised Permit Condition 2.8

This permit condition has been revised to clarify where biogas produced in the digesters shall be combusted.

Revised Permit Condition 2.9

This permit condition has been revised to include biogas flared at either of the onsite flares.

Revised Permit Condition 2.13

This permit condition has been revised to include the monitoring and recording the biogas combusted in the new flare.

Revised Permit Condition 2.14

This permit condition has been revised to include the new flare in the H_2S monitoring location.

Revised Permit Condition 2.15

This permit condition has been revised to include the new flare in the biogas flow monitoring.

Revised Permit Condition 2.16

This permit condition was revised the requirements on the O&M Manuals at the facility.

- The Biogas Flow-rate Monitor O&M Manual: Removed the requirement for the operational maintenance plan, the procedures during upsets/breakdowns, and the maximum flow rate. Added the requirement for a flow rate measurement range.
- The H_2S Monitor O&M Manual: Removed the requirement for the operational maintenance plan and the procedures during upsets/breakdowns. Added the requirement for a H_2S concentration measurement range.
- The Pilot Flame Detector O&M Manual: Removed the requirement for the operational maintenance plan and the procedures during upsets/breakdowns.

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

City of Meridian WRRF Baseline and Updated Scenario Emission Comparison Summary

Criteria Pollutant: Total Annual Emissions

	Uncontrolled Emission Rate (ton/year)							
Scenario	**PM**	**PM2.5[1]**	**PM10**	**NOx**	**SO2**	**CO**	**Lead**	**VOC**
Pre-emissions	0.82	0.82	0.82	9.93	44.42	9.61	3.31E-05	1.27
Post emissions	1.138	1.14	1.14	11.777	22.175	17.154	3.31E-05	2.982
Facility Wide Emission Change	0.32	0.32	0.32	1.84	-22.25	7.55	0.00	1.71
Flare 2 Emissions	0.317	0.317	0.317	1.843	7.364	8.402	0.000	1.708

Criteria Pollutant: Total Hourly Emissions

	Uncontrolled Emission Rate (lb/hr)							
Scenario	**PM**	**PM2.5[1]**	**PM10**	**NOx**	**SO2**	**CO**	**Lead**	**VOC**
Pre-emissions	2.973	2.973	2.973	76.803	10.142	18.708	0.000	2.997
Post emissions	3.045	3.045	3.045	77.224	5.063	20.431	0.000	3.387
Facility Wide Emission Change	0.072	0.072	0.072	0.421	-5.079	1.723	0.000	0.390
Flare 2 Emissions	0.072	0.072	0.072	0.421	1.681	1.918	0.000	0.390

[1] PM2.5assumed equal to total PM emissions for conservativeness

Emission Comparison **Flare 2**

Criteria Pollutant	Level 1 Threshold (tpy)[1]	Flare 2 Emissions (tpy)	Exceeds Level I Threshold?
PM2.5	0.35	0.32	No
PM10	--	0.32	No
NOx	1.2	1.84	Yes
SO2	1.2	7.36	Yes
CO	--	8.40	No
Lead	14 lb/month	0.00	No
VOC	--	1.71	No

Emission Comparison **Flare 2**

Criteria Pollutant	Level 1 Threshold (lb/hr)[1]	Flare 2 Emissions (lb/hr)	Exceeds Level I Threshold?
PM2.5	0.054	0.07	Yes
PM10	0.22	0.07	No
NOx	0.2	0.42	Yes
SO2	0.21	1.68	Yes
CO	15	1.92	No
Lead	--	0.00	No
VOC	--	0.39	No

1. Level 1 Thresholds found in *STATE OF IDAHO GUIDELINE FOR PERFORMING AIR QUALITY IMPACT ANA*

Toxic Air Pollutants - Flare 2	**CAS ID No.**	**PTE (lb/hr)**	**EL (lb/hr)**	**Exceeds EL?**	**AAC (mg/m3)**	**AACC (ug/m3)**
Hydrogen sulfide	7783-06-4	0.0993768	0.933	No	0.7	-
Benzene	71-43-2	1.51E-03	0.0008	Exceeds	-	1.20E-01
Formaldehyde	50-00-0	1.11E-02	0.00051	Exceeds	-	7.70E-02
Total PAH	1151	2.86E-05	0.000091	No	-	1.40E-02
Naphthalene	91-20-3	1.05E-04	9.10E-05	Exceeds		1.40E-02
Acetaldehyde	75-07-0	4.09E-04	0.003	No	-	4.50E-01
Acrolein	107-02-8	9.52E-05	0.017	No	0.0125	-
Ethylbenzene	100-41-4	1.37E-02	29	No	21.75	-
Hexane	110-54-3	2.76E-04	12	No	9	-
Toluene	108-88-3	5.52E-04	25	No	18.75	-
Xylenes	1330-20-7	2.76E-04	29	No	21.75	-

LYSES, 1

Table 2. Modeling thresholds for criteria pollutants

Pollutant	Potential Emission Rate from a New Source or Facility-wide Emissions Increase from a Modification	
	Level I Thresholds	**Level II Thresholds**[a]
CO	15 pounds per hour[b]	175 pounds per hour[c]
NO_x	1.2 ton per year[b] and 0.20 pounds per hour[b]	(14 ton per year)[c] and (2.4 pounds per hour)[c]
SO_2	1.2 ton per year[b] and 0.21 pounds per hour[b]	(14 ton per year)[c] and (2.5 pounds per hour)[c]
PM_{10}	0.22 pounds per hour[b]	(2.6 pounds per hour)[c]
$PM_{2.5}$	0.35 ton per year[b] and 0.054 pounds per hour[b]	(4.1 ton per year)[c] and (0.63 pounds per hour)[c]
Pb	14 pounds per month	

a. Modeling may be required for emissions below the Level II threshold for the following:
1. Sources where a substantial portion of the new or modified emissions have poor dispersion characteristics (e.g., rain caps, horizontal stacks, fugitive releases, or building downwash) in close proximity to ambient air
2. Sources located in complex terrain (e.g., there is terrain above stack height that is in close proximity to the source)
3. Sources located in areas with poor existing air quality
4. Modifications at existing major stationary sources, including grandfathered sources that have never been modeled before

b. Level I thresholds are emissions rates below which modeling will not be required in most instances. Thorough justification for using Level I thresholds is not generally required. These thresholds are based on the following methods and assumptions: AERSCREEN with the MAKEMET program run separately for land use of grassland, conifer forest, and desert shrubland, using the maximum impact of the tree. The highest value was taken and compared to the significant contribution levels. Stack height = 10 m, exit temperature = 150 °F, diameter = 0.3 m, exit velocity = 10 meters per second, ambient air is 100 meters from stack in all direction, building of 4 m (w) by 4 m (l) by 5 m (h).

c. The Level II thresholds, in parentheses, are applicable on a case-by-case conditional basis. They are based on the following analyses/assumptions: AERSCREEN with the MAKEMET program run for landuse of grassland, conifer forest, and desert shrubland, using the maximum impact of the tree. The highest value was taken and compared to the significant contribution levels. Stack height = 15 m, exit temperature = 260° F, diameter = 1.0 m, exit velocity = 20 meters per second, ambient air is 100 meters from the stack in all directions, there is a 10 m (w) by 10 m (l) by 5 m (h) building present at the stack location.

WRRF Facility-Wide Emission Estimate Summary

Post Annual Emissions

Criteria Pollutants[1]		Uncontrolled Emission Rate (ton/year)						
Stack Name	**Stack ID**	**PM**	**PM10**	**NOx**	**SO2**	**CO**	**VOC**	**Lead**
Flare1	FLARE1	0.166	0.17	0.968	3.868	4.413	0.897	
Flare2	FLARE2	0.317	0.32	1.843	7.364	8.402	1.708	
Boiler 2 (NG & Biogas)	BOILER2	0.170	0.17	2.232	4.297	1.875	0.123	1.12E-05
Boiler 3 (NG & Biogas)	BOILER3	0.173	0.17	2.019	3.320	0.621	0.069	8.46E-06
Boiler 4 (NG & Biogas)	BOILER4	0.173	0.17	2.019	3.320	0.621	0.069	8.46E-06
Generator 1	GEN1	0.016	0.02	0.421	0.000	0.093	0.015	
Generator 2	GEN2	0.016	0.02	0.421	0.000	0.093	0.015	
Generator 3	GEN3	0.016	0.02	0.421	0.000	0.093	0.015	
Generator 4	GEN4	0.016	0.02	0.421	0.000	0.093	0.015	
Heater 1	HEATER1	0.004	0.004	0.054	3.22E-04	0.045	0.003	2.68E-07
Heater 2	HEATER2	0.004	0.004	0.054	3.22E-04	0.045	0.003	2.68E-07
HVAC 1	HVAC1	0.003	0.003	0.043	2.58E-04	0.036	0.002	2.15E-07
HVAC 2	HVAC2	0.016	0.02	0.215	1.29E-03	0.180	0.012	1.07E-06
HVAC 3	HVAC3	0.016	0.02	0.215	1.29E-03	0.180	0.012	1.07E-06
HVAC 4	HVAC4	0.008	0.01	0.107	6.44E-04	0.090	0.006	5.37E-07
HVAC 5	HVAC5	0.008	0.01	0.107	6.44E-04	0.090	0.006	5.37E-07
HVAC 6	HVAC6	0.016	0.02	0.215	1.29E-03	0.180	0.012	1.07E-06
Total		**1.14**	**1.14**	**11.78**	**22.18**	**17.15**	**2.98**	**3.31E-05**

Post or Maximum Hourly Emissions

Criteria Pollutants[1]		Uncontrolled Emission Rate (lb/hr)						
Stack Name	**Stack ID**	**PM**	**PM10**	**NOx**	**SO2**	**CO**	**VOC**	**Lead**
Flare1	FLARE1	0.038	0.04	0.221	0.883	1.008	0.205	
Flare2	FLARE2	0.072	0.07	0.421	1.681	1.918	0.390	
Boiler 2 (NG & Biogas)	BOILER2	0.039	0.04	0.510	0.981	0.428	0.028	2.55E-06
Boiler 3 (NG & Biogas)	BOILER3	0.039	0.04	0.461	0.758	0.142	0.016	1.93E-06
Boiler 4 (NG & Biogas)	BOILER4	0.039	0.04	0.461	0.758	0.142	0.016	1.93E-06
Generator 1	GEN1	0.700	0.70	18.730	1.24E-04	4.150	0.680	
Generator 2	GEN2	0.700	0.70	18.730	1.24E-04	4.150	0.680	
Generator 3	GEN3	0.700	0.70	18.730	1.24E-04	4.150	0.680	
Generator 4	GEN4	0.700	0.70	18.730	1.24E-04	4.150	0.680	
Heater 1	HEATER1	0.001	0.001	0.012	7.35E-05	0.010	0.001	6.13E-08
Heater 2	HEATER2	0.001	0.001	0.012	7.35E-05	0.010	0.001	6.13E-08
HVAC 1	HVAC1	0.001	0.001	0.010	5.88E-05	0.008	0.001	4.90E-08
HVAC 2	HVAC2	0.004	0.004	0.049	2.94E-04	0.041	0.003	2.45E-07
HVAC 3	HVAC3	0.004	0.004	0.049	2.94E-04	0.041	0.003	2.45E-07
HVAC 4	HVAC4	0.002	0.002	0.025	1.47E-04	0.021	0.001	1.23E-07
HVAC 5	HVAC5	0.002	0.002	0.025	1.47E-04	0.021	0.001	1.23E-07
HVAC 6	HVAC6	0.004	0.004	0.049	2.94E-04	0.041	0.003	2.45E-07
Total		**3.05**	**3.05**	**77.22**	**5.06**	**20.43**	**3.39**	**7.56E-06**

Table 2. Facility-Wide PTE TAPs/HAPs

Toxics[2] **Toxic Air Pollutants**	**Boiler 2** **(lb/hr)**	**Boiler 3** **(lb/hr)**	**Boiler 4** **(lb/hr)**	**Flare 1** **(lb/hr)**	**Flare 2** **(lb/hr)**	**Gen 1** **(lb/hr)**	**Gen 2** **(lb/hr)**	**Gen 3** **(lb/hr)**	**Gen 4** **(lb/hr)**	**Heater 1** **(lb/hr)**	**Heater 2** **(lb/hr)**	**HVAC 1** **(lb/hr)**	**HVAC 2** **(lb/hr)**	**HVAC3** **(lb/hr)**	**HVAC 4** **(lb/hr)**	**HVAC 5** **(lb/hr)**	**HVAC 6** **(lb/hr)**	**Total** **(lb/hr)**	**IDAPA 58.01.01.585/ 586 - EL** **(lb/hr)**	**Total Pre TAP/HAP** **(lb/hr)**
3-Methylchloranthrene	1.41E-08	1.09E-08	1.09E-08	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.21E-10	2.21E-10	1.76E-10	8.82E-10	8.82E-10	4.41E-10	4.41E-10	8.82E-10	4.01E-08	2.50E-06	4.01E-08
Acetaldehyde	--	--	--	--	4.09E-04	--	--	--	--	--	--	--	--	--	--	--	--	4.09E-04	3.00E-03	4.25E-06
Acrolein	--	--	--	--	9.52E-05	--	--	--	--	--	--	--	--	--	--	--	--	9.52E-05	0.017	2.59E-04
Ammonia	1.60E-02	1.24E-02	1.24E-02	9.60E-07	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.07E-02	1.20	4.07E-02
Benzene	--	--	--	--	1.51E-03	--	--	--	--	--	--	--	--	--	--	--	--	1.51E-03	8.00E-04	2.09E-04
Benzo(a)pyrene	9.42E-09	7.27E-09	7.27E-09	0.00E+00	--	1.08E-08	1.08E-08	1.08E-08	1.08E-08	1.47E-10	1.47E-10	1.18E-10	5.88E-10	5.88E-10	2.94E-10	2.94E-10	5.88E-10	7.00E-08	2.00E-06	7.00E-08
Ethylbenzene	--	--	--	--	1.37E-02	--	--	--	--	--	--	--	--	--	--	--	--	1.37E-02	29	
Formaldehyde	--	--	--	--	1.11E-02	--	--	--	--	--	--	--	--	--	--	--	--	1.11E-02	5.10E-04	1.68E-03
Hexane	--	--	--	--	2.76E-04	--	--	--	--	--	--	--	--	--	--	--	--	2.76E-04	12	4.01E-02
Hydrogen Sulfide	1.04E-02	8.07E-03	8.07E-03	5.22E-02	9.94E-02	--	--	--	--	--	--	--	--	--	--	--	--	1.78E-01	0.933	2.36E-01
Naphthalene	--	--	--	--	1.05E-04	--	--	--	--	--	--	--	--	--	--	--	--	1.05E-04	9.10E-05	3.55E-05
Pentane	2.04E-02	1.58E-02	1.58E-02	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.19E-04	3.19E-04	2.55E-04	1.27E-03	1.27E-03	6.37E-04	6.37E-04	1.27E-03	5.79E-02	118	5.79E-02
Toluene	--	--	--	--	5.52E-04	--	--	--	--	--	--	--	--	--	--	--	--	5.52E-04	25	9.30E-03
Xylenes	--	--	--	--	2.76E-04	--	--	--	--	--	--	--	--	--	--	--	--	2.76E-04	29	6.33E-03
Total PAH	--	--	--	--	2.86E-05	--	--	--	--	--	--	--	--	--	--	--	--	2.86E-05	9.10E-05	4.08E-05
POM (7-PAH)[3]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00	2.00E-06	1.19E-07
Toxic Air Pollutants-Metals																				
Arsenic	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00	1.50E-06	3.99E-06
Barium	3.45E-05	2.67E-05	2.67E-05	-	-	-	-	-	-	5.39E-07	5.39E-07	4.31E-07	2.16E-06	2.16E-06	1.08E-06	1.08E-06	2.16E-06	8.79E-05	3.30E-02	8.79E-05
Beryllium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00	2.80E-05	2.40E-07
Cadmium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00	3.70E-06	2.20E-05
Chromium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00	3.30E-02	2.80E-05
Cobalt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00	3.30E-03	1.68E-06
Copper	6.67E-06	5.15E-06	5.15E-06	-	-	-	-	-	-	1.04E-07	1.04E-07	8.33E-08	4.17E-07	4.17E-07	2.08E-07	2.08E-07	4.17E-07	1.70E-05	1.30E-02	1.70E-05
Manganese	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00	6.70E-02	7.59E-06
Mercury	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00	1.00E-03	5.19E-06
Molybdenum	8.63E-06	6.67E-06	6.67E-06	-	-	-	-	-	-	1.35E-07	1.35E-07	1.08E-07	5.39E-07	5.39E-07	2.70E-07	2.70E-07	5.39E-07	2.20E-05	3.33E-01	2.20E-05
Nickel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00	2.75E-05	4.19E-05
Selenium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00	1.30E-02	4.79E-07
Vanadium	1.80E-05	1.39E-05	1.39E-05	-	-	-	-	-	-	2.82E-07	2.82E-07	2.25E-07	1.13E-06	1.13E-06	5.64E-07	5.64E-07	1.13E-06	4.59E-05	3.00E-03	4.59E-05
Zinc	2.28E-04	1.76E-04	1.76E-04	-	-	-	-	-	-	3.55E-06	3.55E-06	2.84E-06	1.42E-05	1.42E-05	7.11E-06	7.11E-06	1.42E-05	5.79E-04	3.33E-01	5.79E-04
Total HAPs																			**2.20 tpy**	

Notes

[1]AP-42 emission factors were utilized to estimate emissions for particulate matter (PM), oxides of nitrogen (NOx), sulfur oxides (SOx), carbon monoxide (CO), and volatile organic compounds (VOCs).

2 Toxic Air Pollutants (EPA AP-42, Section 1.4 and Section 3.4) &"Reporting Procedures for AB2588 Facilities Reporting their Quadrennial Air Toxic Emission Inventory in the Annual Emission Reporting Program", Table B-7: DEFAULT EF FOR DIGESTER GAS COMBUSTION; SOURCE: Flare, Non-Refinery, South Coast Air

[3]Polycyclic Organic Matter is the sum of benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene.

WRRF Baseline (Pre-Emissions) Summary

Baseline or Pre Annual Emissions Criteria Pollutants[1]		Uncontrolled Emission Rate (ton/year)						
Stack Name	**Stack ID**	**PM**	**PM10**	**NOx**	**SO2**	**CO**	**VOC**	**Lead**
Boiler 2 (NG & Biogas)	BOILER2	0.17	0.17	2.23	12.89	1.88	0.12	1.12E-05
Boiler 3 (NG & Biogas)	BOILER3	0.17	0.17	2.02	9.96	0.62	0.07	8.46E-06
Boiler 4 (NG & Biogas)	BOILER4	0.17	0.17	2.02	9.96	0.62	0.07	8.46E-06
Generator 1	GEN1	0.02	0.02	0.42	0.00	0.09	0.02	
Generator 2	GEN2	0.02	0.02	0.42	0.00	0.09	0.02	
Generator 3	GEN3	0.02	0.02	0.42	0.00	0.09	0.02	
Generator 4	GEN4	0.02	0.02	0.42	0.00	0.09	0.02	
Flare	FLARE	0.17	0.17	0.97	11.60	5.27	0.90	
Heater 1	HEATER1	0.004	0.004	0.05	0.0003	0.05	0.003	2.68E-07
Heater 2	HEATER2	0.004	0.004	0.05	0.0003	0.05	0.003	2.68E-07
HVAC 1	HVAC1	0.003	0.003	0.04	0.0003	0.04	0.002	2.15E-07
HVAC 2	HVAC2	0.02	0.02	0.21	0.00129	0.18	0.01	1.07E-06
HVAC 3	HVAC3	0.02	0.02	0.21	0.00129	0.18	0.01	1.07E-06
HVAC 4	HVAC4	0.01	0.01	0.11	0.00064	0.09	0.01	5.37E-07
HVAC 5	HVAC5	0.01	0.01	0.11	0.00064	0.09	0.01	5.37E-07
HVAC 6	HVAC6	0.02	0.02	0.21	0.00129	0.18	0.01	1.07E-06
Total		**0.82**	**0.82**	**9.93**	**44.42**	**9.61**	**1.27**	**3.31E-05**

Baseline or Maximum Pre Hourly Emissions Criteria Pollutants[1]		Uncontrolled Emission Rate (lb/hr)						
Stack Name	**Stack ID**	**PM**	**PM10**	**NOx**	**SO2**	**CO**	**VOC**	**Lead**
Boiler 2 (NG & Biogas)	BOILER2	0.04	0.04	0.51	2.94	0.43	0.03	2.55E-06
Boiler 3 (NG & Biogas)	BOILER3	0.04	0.04	0.46	2.27	0.14	0.02	1.93E-06
Boiler 4 (NG & Biogas)	BOILER4	0.04	0.04	0.46	2.27	0.14	0.02	1.93E-06
Generator 1	GEN1	0.70	0.70	18.73	0.00	4.15	0.68	
Generator 2	GEN2	0.70	0.70	18.73	0.00	4.15	0.68	
Generator 3	GEN3	0.70	0.70	18.73	0.00	4.15	0.68	
Generator 4	GEN4	0.70	0.70	18.73	0.00	4.15	0.68	
Flare 1	FLARE	0.04	0.04	0.22	2.65	1.20	0.20	
Heater 1	HEATER1	0.0009	0.001	0.01	0.0001	0.01	0.0007	6.13E-08
Heater 2	HEATER2	0.0009	0.001	0.01	0.0001	0.01	0.0007	6.13E-08
HVAC 1	HVAC1	0.0007	0.001	0.01	0.00006	0.01	0.0005	4.90E-08
HVAC 2	HVAC2	0.004	0.004	0.05	0.00029	0.04	0.003	2.45E-07
HVAC 3	HVAC3	0.004	0.004	0.05	0.00029	0.04	0.003	2.45E-07
HVAC 4	HVAC4	0.002	0.002	0.025	0.00015	0.02	0.001	1.23E-07
HVAC 5	HVAC5	0.002	0.002	0.025	0.00015	0.02	0.001	1.23E-07
HVAC 6	HVAC6	0.004	0.004	0.05	0.00029	0.04	0.003	2.45E-07
Total		**2.97**	**2.97**	**76.80**	**10.14**	**18.71**	**3.00**	**7.56E-06**

Toxics[2] **Toxic Air Pollutants**	**Boiler 2** **(lb/hr)**	**Boiler 3** **(lb/hr)**	**Boiler 4** **(lb/hr)**	**Flare 1** **(lb/hr)**	**Gen 1** **(lb/hr)**	**Gen 2** **(lb/hr)**	**Gen 3** **(lb/hr)**	**Gen 4** **(lb/hr)**	**Heater 1** **(lb/hr)**	**Heater 2** **(lb/hr)**	**HVAC 1** **(lb/hr)**	**HVAC 2** **(lb/hr)**	**HVAC3** **(lb/hr)**	**HVAC 4** **(lb/hr)**	**HVAC 5** **(lb/hr)**	**HVAC 6** **(lb/hr)**	**Total** **(lb/hr)**	**IDAPA 58.01.01.585/586 - EL** **(lb/hr)**	**Compare to EL**
3-Methylchloranthrene	1.41E-08	1.09E-08	1.09E-08						2.21E-10	2.21E-10	1.76E-10	8.82E-10	8.82E-10	4.41E-10	4.41E-10	8.82E-10	4.01E-08	2.50E-06	Below
Acetaldehyde*					1.06E-06	1.06E-06	1.06E-06	1.06E-06									4.25E-06		
Acrolein*					6.46E-05	6.46E-05	6.46E-05	6.46E-05									2.59E-04		
Ammonia	1.60E-02	1.24E-02	1.24E-02	9.60E-07													4.07E-02	1.20E+00	Below
Benzene*	2.90E-05	2.24E-05	2.24E-05	4.77E-08	3.27E-05	3.27E-05	3.27E-05	3.27E-05	2.57E-07	2.57E-07	2.06E-07	1.03E-06	1.03E-06	5.15E-07	5.15E-07	1.03E-06	2.09E-04	8.00E-04	Below
Benzo(a)pyrene	9.42E-09	7.27E-09	7.27E-09		1.08E-08	1.08E-08	1.08E-08	1.08E-08	1.47E-10	1.47E-10	1.18E-10	5.88E-10	5.88E-10	2.94E-10	2.94E-10	5.88E-10	7.00E-08	2.00E-06	Below
Formaldehyde*	5.88E-04	4.55E-04	4.55E-04	3.51E-07	3.32E-06	3.32E-06	3.32E-06	3.32E-06	9.19E-06	9.19E-06	7.35E-06	3.68E-05	3.68E-05	1.84E-05	1.84E-05	3.68E-05	1.68E-03	5.10E-04	**Exceeds**
Hexane*	1.41E-02	1.09E-02	1.09E-02						2.21E-04	2.21E-04	1.76E-04	8.82E-04	8.82E-04	4.41E-04	4.41E-04	8.82E-04	4.01E-02	1.20E+01	Below
Hydrogen Sulfide*	3.13E-02	2.42E-02	2.42E-02	1.57E-01													2.36E-01	9.33E-01	Below
Naphthalene*	4.79E-06	3.70E-06	3.70E-06		5.48E-06	5.48E-06	5.48E-06	5.48E-06	7.48E-08	7.48E-08	5.98E-08	2.99E-07	2.99E-07	1.50E-07	1.50E-07	2.99E-07	3.55E-05	9.10E-05	Below
Pentane	2.04E-02	1.58E-02	1.58E-02						3.19E-04	3.19E-04	2.55E-04	1.27E-03	1.27E-03	6.37E-04	6.37E-04	1.27E-03	5.79E-02	1.18E+02	Below
Toluene*	2.67E-05	2.06E-05	2.06E-05		2.30E-03	2.30E-03	2.30E-03	2.30E-03	4.17E-07	4.17E-07	3.33E-07	1.67E-06	1.67E-06	8.33E-07	8.33E-07	1.67E-06	9.30E-03	2.50E+01	Below
Xylenes*					1.58E-03	1.58E-03	1.58E-03	1.58E-03									6.33E-03		
Total PAH*	2.00E-06	1.55E-06	1.55E-06	4.20E-09	8.93E-06	8.93E-06	8.93E-06	8.93E-06									4.08E-05	9.10E-05	Below
POM (7-PAH)3*	3.70E-08	2.81E-08	2.81E-08						1.40E-09	1.40E-09	1.12E-09	5.59E-09	5.59E-09	2.79E-09	2.79E-09	5.59E-09	1.19E-07	2.00E-06	Below
Toxic Air Pollutants-Metals																			
Arsenic*	1.57E-06	1.21E-06	1.21E-06	-	-	-	-	-	2.45E-08	2.45E-08	1.96E-08	9.80E-08	9.80E-08	4.90E-08	4.90E-08	9.80E-08	3.99E-06	1.50E-06	**Exceeds**
Barium	3.45E-05	2.67E-05	2.67E-05	-	-	-	-	-	5.39E-07	5.39E-07	4.31E-07	2.16E-06	2.16E-06	1.08E-06	1.08E-06	2.16E-06	8.79E-05	3.30E-02	Below
Beryllium*	9.42E-08	7.27E-08	7.27E-08	-	-	-	-	-	1.47E-09	1.47E-09	1.18E-09	5.88E-09	5.88E-09	2.94E-09	2.94E-09	5.88E-09	2.40E-07	2.80E-05	Below
Cadmium*	8.63E-06	6.67E-06	6.67E-06	-	-	-	-	-	1.35E-07	1.35E-07	1.08E-07	5.39E-07	5.39E-07	2.70E-07	2.70E-07	5.39E-07	2.20E-05	3.70E-06	**Exceeds**
Chromium*	1.10E-05	8.49E-06	8.49E-06	-	-	-	-	-	1.72E-07	1.72E-07	1.37E-07	6.86E-07	6.86E-07	3.43E-07	3.43E-07	6.86E-07	2.80E-05	3.30E-02	Below
Cobalt*	6.59E-07	5.09E-07	5.09E-07	-	-	-	-	-	1.03E-08	1.03E-08	8.24E-09	4.12E-08	4.12E-08	2.06E-08	2.06E-08	4.12E-08	1.68E-06	3.30E-03	Below
Copper	6.67E-06	5.15E-06	5.15E-06	-	-	-	-	-	1.04E-07	1.04E-07	8.33E-08	4.17E-07	4.17E-07	2.08E-07	2.08E-07	4.17E-07	1.70E-05	1.30E-02	Below
Manganese*	2.98E-06	2.30E-06	2.30E-06	-	-	-	-	-	4.66E-08	4.66E-08	3.73E-08	1.86E-07	1.86E-07	9.31E-08	9.31E-08	1.86E-07	7.59E-06	6.70E-02	Below
Mercury*	2.04E-06	1.58E-06	1.58E-06	-	-	-	-	-	3.19E-08	3.19E-08	2.55E-08	1.27E-07	1.27E-07	6.37E-08	6.37E-08	1.27E-07	5.19E-06	1.00E-03	Below
Molybdenum	8.63E-06	6.67E-06	6.67E-06	-	-	-	-	-	1.35E-07	1.35E-07	1.08E-07	5.39E-07	5.39E-07	2.70E-07	2.70E-07	5.39E-07	2.20E-05	3.33E-01	Below
Nickel*	1.65E-05	1.27E-05	1.27E-05	-	-	-	-	-	2.57E-07	2.57E-07	2.06E-07	1.03E-06	1.03E-06	5.15E-07	5.15E-07	1.03E-06	4.19E-05	2.75E-05	**Exceeds**
Selenium*	1.88E-07	1.45E-07	1.45E-07	-	-	-	-	-	2.94E-09	2.94E-09	2.35E-09	1.18E-08	1.18E-08	5.88E-09	5.88E-09	1.18E-08	4.79E-07	1.30E-02	Below
Vanadium	1.80E-05	1.39E-05	1.39E-05	-	-	-	-	-	2.82E-07	2.82E-07	2.25E-07	1.13E-06	1.13E-06	5.64E-07	5.64E-07	1.13E-06	4.59E-05	3.00E-03	Below
Zinc	2.28E-04	1.76E-04	1.76E-04	-	-	-	-	-	3.55E-06	3.55E-06	2.84E-06	1.42E-05	1.42E-05	7.11E-06	7.11E-06	1.42E-05	5.79E-04	3.33E-01	Below

Notes

[1]AP-42 emission factors were utilized to estimate emissions for particulate matter (PM), oxides of nitrogen (NOx), sulfur oxides (SOx), carbon monoxide (CO), and volatile organic compounds (VOCs).

[2] Toxic Air Pollutants (EPA AP-42, Section 1.4 and Section 3.4).

[3]Polycyclic Organic Matter is the sum of benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene.

City of Meridian WRRF Biogas Flare 1

Heat Input (MMBtu/hr)	3.25
Manufacturer	Varec Biogas
Fuel Type	Biogas
Biogas Heat Value (Btu/scf)	650
Max Biogas Production (scf/day) (based on highest expected sulfate concentration)	120,000
Biogas Primary Fuel Use (10^6 scf/hr)	0.0050
Operation (hrs/yr)	8,760
Hydrogen Sulfide (H_2S) Biogas Concentration (ppmv)	1,200
H_2S Biogas Concentration (mg/m^3)	1,674
Uncontrolled H_2S Mass Feedrate (lb/hr)	0.5
Assumed H_2S Conversion for SO_2 Emissions	90%

Based on average cubic feet per day of biogas produce over a year

Note 800 ppmv is max over last 3 years.

				Uncontrolled Potential to Emit		
Criteria Pollutant	**CAS No.**	**Emission Factor [1]**		**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
Total Particulate Matter (PM) [2]		7.6	lb MM cf NG	0.04	333	0.17
Nitrogen Oxides (NOx)		0.068	lb/MM Btu	0.22	1,936	0.97
Sulfur Dioxide (SO_2) [3]		H_2S / SO_2 Mass Balance		0.88	7,735	3.87
Carbon Monoxide (CO)		0.31	lb/MM Btu	1.01	8,826	4.41
VOC		0.06	lb/MM Btu	0.20	1,794	0.90

				Primary Fuel - Biogas				
				Controlled Potential to Emit				
Toxic Air Pollutants - H_2S	**CAS No.**	**Emission Factor [4] (% Destruction)**		**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**IDAPA 58.01.01.585/586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**
Hydrogen sulfide	7783-06-4	90%		5.22E-02	7.88E+03	3.94E+00	9.33E-01	Below

				Primary Fuel - Biogas [5]				
				Uncontrolled Potential to Emit				
Toxic Air Pollutants - Others [5]	**CAS No.**	**Digester Gas Emission Factor ($lb/10^6$ scf)**	**Natural Gas Emission Factor ($lb/10^6$ scf)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**IDAPA 58.01.01.585/586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**
Ammonia	7664-41-7	3.20E+00		1.60E-02	1.40E+02	7.01E-02	1.20E+00	Below
Benzene	71-43-2	1.59E-01	1.59E-01	7.95E-04	6.96E+00	3.48E-03	8.00E-04	Below
Formaldehyde	50-00-0	1.17E+00	1.17E+00	5.85E-03	5.12E+01	2.56E-02	5.10E-04	Exceeds
Total PAHs	na	1.40E-02	1.40E-02	7.00E-05	6.13E-01	3.07E-04	9.10E-05	Below

Notes:

[1] Criteria pollutants emission rates from AP-42, Section 13.5 (Industrial Flares) w/ exception of PM and SO_2 (see below).

[2] PM emissions based on natural gas combustion, per AP-42 Table 1.4-2, due to extreme range and concentration-based format of industrial flare PM factors

[3] SO_2 Emission factor for biogas assumes 100% conversion of H_2S to SO_2 . Natural gas SO2 factor based on AP-42, Table 1.4-2.

[4] Conservatively estimated H_2S destruction based on engineering judgement and combustion properties of H_2S

[5] Emission factors from "General Instruction Book for the 2003 - 2004 Annual Emissions Reporting Program", Tables 4 and 10, South Coast Air Quality Managment District (SCAQMD).

City of Meridian WRRF Biogas Flare 2

Heat Input (MMBtu/hr)	6.19
Manufacturer	Varec Biogas
Fuel Type	Biogas
Biogas Heat Value (Btu/scf)	650
Max Biogas Production (scf/day) (based on highest expected sulfate concentration)	228,480
Biogas Primary Fuel Use (10^6 scf/hr)	0.0095
Operation (hrs/yr)	8,760
Hydrogen Sulfide (H_2S) Biogas Concentration (ppmv)	1,200
H_2S Biogas Concentration (mg/m^3)	1,674
Uncontrolled H_2S Mass Feedrate (lb/hr)	1.0
Assumed H_2S Conversion for SO_2 Emissions	90%

Flare capacity based on MOP 8 gas feeder pipe velocities. ***Gas Flare21303 City of Meridian Submittal.pdf*** **, pg 10. 9520 ft^3/hr gas volumetric flow**

Note 800 ppmv is max over last 3 years.

				Uncontrolled Potential to Emit		
Criteria Pollutant	**CAS No.**	**Emission Factor [1]**		**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
Total Particulate Matter (PM) [2]		7.6	lb MM cf NG	0.0724	634	0.32
Nitrogen Oxides (NOx)		0.068	lb/MM Btu	0.42	3,686	1.84
Sulfur Dioxide (SO_2) [3]		H_2S / SO_2 Mass Balance		1.68	14,728	7.36
Carbon Monoxide (CO)		0.31	lb/MM Btu	1.92	16,804	8.40
VOC		0.06	lb/MM Btu	0.39	3,415	1.71

				Primary Fuel - Biogas Controlled Potential to Emit				
Toxic Air Pollutants - H_2S	**CAS No.**	**Emission Factor [4] (% Destruction)**		**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**IDAPA 58.01.01.585/586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**
Hydrogen sulfide	7783-06-4	90%		0.10	7.88E+03	3.94E+00	9.33E-01	Below

				Primary Fuel - Biogas [3] Uncontrolled Potential to Emit					
Toxic Air Pollutants - Others	**CAS No.**	**Digester Gas Emission Factor[5] ($lb/10^6$ scf)**	**Natural Gas Emission Factor[6] ($lb/10^6$ scf)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**IDAPA 58.01.01.585/586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**	**Acceptable ambient concentrations for carcinogens (AACC)**
Benzene	71-43-2	0.159	0.159	1.51E-03	1.33E+01	0.006629918	8.00E-04	Exceeds	1.20E-01
Formaldehyde	50-00-0	1.169	1.169	1.11E-02	9.75E+01	0.048744494	5.10E-04	Exceeds	7.70E-02
Total PAH	1151	0.003	0.003	2.86E-05	2.50E-01	1.25E-04	9.10E-05	Below	
Naphthalene	91-20-3	0.011	0.011	1.05E-04	9.17E-01	4.59E-04	0.00	Exceeds	
Acetaldehyde	75-07-0	0.043	0.043	4.09E-04	3.59E+00	1.79E-03	3.00E-03	Below	
Acrolein	107-02-8	0.010	0.010	9.52E-05	8.34E-01	4.17E-04	0.017	Below	
Ethylbenzene	100-41-4	1.444	1.444	1.37E-02	1.20E+02	6.02E-02	29.0	Below	
Hexane	110-54-3	0.029	0.029	2.76E-04	2.42E+00	1.21E-03	12.0	Below	
Toluene	108-88-3	0.058	0.058	5.52E-04	4.84E+00	2.42E-03	25.0	Below	
Xylenes	1330-20-7	0.029	0.029	2.76E-04	2.42E+00	1.21E-03	29.0	Below	

Notes:

[1] Criteria pollutants emission rates from AP-42, Section 13.5 (Industrial Flares) w/ exception of PM and SO_2 (see below).

[2] PM emissions based on natural gas combustion, per AP-42 Table 1.4-2, due to extreme range and concentration-based format of industrial flare PM factors

[3] SO_2 Emission factor for biogas assumes 100% conversion of H_2S to SO_2 . Natural gas SO2 factor based on AP-42, Table 1.4-2.

[4] Conservatively estimated H_2S destruction based on engineering judgement and combustion properties of H_2S

[5] Emission factors from "Reporting Procedures for AB2588 Facilities Reporting their Quadrennial Air Toxic Emission Inventory in the Annual Emission Reporting Program", Table B-7: DEFAULT EF FOR DIGESTER GAS C

[6] Emission factors from "Reporting Procedures for AB2588 Facilities Reporting their Quadrennial Air Toxic Emission Inventory in the Annual Emission Reporting Program", Table B-1: DEFAULT EF FOR NATURAL GAS CC

City of Meridian WRRF Boiler 2 (Duel fuel-Biogas & NG)

Boiler Heat Input (MMBtu/hr)	3.313
Model No.	M265KG
Primary Fuel Type	Biogas
Max Biogas Production (scf/day) (based on highest expected sulfate concentration)	120,000
Biogas Heat Value (Btu/scf)	650
Biogas Primary Fuel Use (10^6 scf/hr)	0.0050
Secondary Fuel Type	Natural Gas
Secondary Fuel Heat Value (Btu/scf)	1,020
Secondary Fuel Use (10^6 scf/hr)	0.0032
Max Heat input from Biogas (MMBtu/hr)	3.2500
Operation (hrs/yr)	8,760
Hydrogen Sulfide (H_2S) Biogas Concentration (ppmv)	1,200
H_2S Biogas Concentration (mg/m^3)	1,674
UncontrolledMax H_2S Mass Feedrate (lb/hr)	0.5
Assumed H_2S Conversion for SO_2 Emissions	100%

1999 Kewanee

Note: That Boiler 2 only can operate one fuel type at a time . The worse case emissions are used between the two fuel types.

Based on average cubic feet per day of biogas produce over a year

Max Biogas Feed: 5.10E-03 MMscf/hr

For Biogas Feed of 5.00E-03 MMscf/hr, additional natural gas req'd is 0.0630 MMBtu/hr = 6.18E-05 scf/hr natural gas

Note 800 ppmv is max over last 3 years.

				Uncontrolled Potential to Emit							
				Primary Fuel - Biogas			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation	
Criteria Pollutant	**CAS No.**	**Emission Factor [1] ($lb/10^6$ scf)**	**Emission Factor [2] (lb/MM BTU)**	**Emission Rate [3] (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (ton/yr)**
Total Particulate Matter (PM) [4]		7.600	0.007	0.0387	339	0.17	0.025	216	0.1	0.04	0.17
Nitrogen Oxides (NOx)		100.000	0.098	0.5097	4,465	2.23	0.325	2845	1.4	0.51	2.23
Sulfur Dioxide (SO_2) [5]		0.600	0.001	0.9811	8,595	4.30	0.002	17	0.0	0.98	4.30
Carbon Monoxide (CO)		84.000	0.082	0.4281	3,751	1.88	0.273	2390	1.2	0.43	1.88
VOC		5.500	0.005	0.0280	246	0.12	0.018	156	0.1	0.03	0.12
Lead		5.00E-04	4.90E-07	2.55E-06	2.23E-02	1.12E-05	1.62E-06	1.42E-02	7.11E-06	2.55E-06	1.12E-05

				Controlled Potential to Emit								
				Primary Fuel - Biogas			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation		
Toxic Air Pollutants - H_2S	**CAS No.**	**Emission Factor [6] (% Destruction)**		**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**IDAPA 58.01.01.585/586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**
Hydrogen sulfide	7783-06-4	98%		1.04E-02	8.58E+03	4.29E+00				1.04E-02	9.33E-01	Below

				Uncontrolled Potential to Emit								
				Primary Fuel - Biogas [7]			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation		
Toxic Air Pollutants - Non-metals [9]	CAS No.	EPA AP-42 Natural Gas Emission Factor ($lb/10^6$ scf)	SCAQMD [8] Digester Gas Emission Factor ($lb/10^6$ scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	IDAPA 58.01.01.585/58 6 - EL (lb/hr)	PTE Emission Rate vs. EL
3-Methylchloranthrene	56-49-5	1.80E-06		1.41E-08	1.24E-04	6.19E-08	5.85E-09	5.12E-05	2.56E-08	1.41E-08	2.50E-06	Below
Ammonia	7664-41-7		3.20E+00	1.60E-02	1.40E+02	7.01E-02				1.60E-02	1.20E+00	Below
Benzene	71-43-2	2.10E-03	5.80E-03	2.90E-05	2.54E-01	1.27E-04	6.82E-06	5.98E-02	2.99E-05	2.90E-05	8.00E-04	Below
Benzo(a)pyrene*	50-32-8	1.20E-06		9.42E-09	8.25E-05	4.12E-08	3.90E-09	3.41E-05	1.71E-08	9.42E-09	2.00E-06	Below
Formaldehyde	50-00-0	7.50E-02	1.23E-02	5.88E-04	5.15E+00	2.58E-03	2.44E-04	2.13E+00	1.07E-03	5.88E-04	5.10E-04	Exceeds
Hexane	110-54-3	1.80E+00		1.41E-02	1.24E+02	6.19E-02	5.85E-03	5.12E+01	2.56E-02	1.41E-02	1.20E+01	Below
Naphthalene	91-20-3	6.10E-04		4.79E-06	4.19E-02	2.10E-05	1.98E-06	1.74E-02	8.68E-06	4.79E-06	9.10E-05	Below
Total PAHs	na		4.00E-04	2.00E-06	1.75E-02	8.76E-06				2.00E-06	9.10E-05	Below
Pentane	109-66-0	2.60E+00		2.04E-02	1.79E+02	8.94E-02	8.44E-03	7.40E+01	3.70E-02	2.04E-02	1.18E+02	Below
Toluene	108-88-3	3.40E-03		2.67E-05	2.34E-01	1.17E-04	1.10E-05	9.67E-02	4.84E-05	2.67E-05	2.50E+01	Below
Benzo(a)anthracene*	56-55-3	1.80E-06					5.85E-09	5.12E-05	2.56E-08			
Benzo(b)fluoranthene*	205-82-3	1.80E-06					5.85E-09	5.12E-05	2.56E-08			
Benzo(k)fluoranthene*	205-82-3	1.80E-06					5.85E-09	5.12E-05	2.56E-08			
Chrysene*	218-01-9	1.80E-06					5.85E-09	5.12E-05	2.56E-08			
Dibenzo(a,h)anthracene*	53-70-3	1.20E-06					3.90E-09	3.41E-05	1.71E-08			
Indeno(1,2,3-cd)pyrene*	193-39-5	1.80E-06					5.85E-09	5.12E-05	2.56E-08			
POM (7-PAH)[10]							3.70E-08	3.24E-04	1.62E-07	3.70E-08	2.00E-06	Below

				Uncontrolled Potential to Emit								
				Primary Fuel - Biogas			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation		
Toxic Air Pollutants-Metals [11]	CAS Number	Emission Factor ($lb/10^6$ scf)		Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	IDAPA 58.01.01.585/58 6 - EL (lb/hr)	PTE Emission Rate vs. EL
Arsenic	7440-38-2	2.00E-04		1.57E-06	1.37E-02	6.87E-06	6.50E-07	5.69E-03	2.85E-06	1.57E-06	1.50E-06	Exceeds
Barium	7440-39-3	4.40E-03		3.45E-05	3.02E-01	1.51E-04	1.43E-05	1.25E-01	6.26E-05	3.45E-05	3.30E-02	Below
Beryllium	7440-41-7	1.20E-05		9.42E-08	8.25E-04	4.12E-07	3.90E-08	3.41E-04	1.71E-07	9.42E-08	2.80E-05	Below
Cadmium	7440-43-9	1.10E-03		8.63E-06	7.56E-02	3.78E-05	3.57E-06	3.13E-02	1.56E-05	8.63E-06	3.70E-06	Exceeds
Chromium	7440-47-3	1.40E-03		1.10E-05	9.62E-02	4.81E-05	4.55E-06	3.98E-02	1.99E-05	1.10E-05	3.30E-02	Below
Cobalt	7440-48-4	8.40E-05		6.59E-07	5.77E-03	2.89E-06	2.73E-07	2.39E-03	1.20E-06	6.59E-07	3.30E-03	Below
Copper	7440-50-8	8.50E-04		6.67E-06	5.84E-02	2.92E-05	2.76E-06	2.42E-02	1.21E-05	6.67E-06	1.30E-02	Below
Manganese	7439-96-5	3.80E-04		2.98E-06	2.61E-02	1.31E-05	1.23E-06	1.08E-02	5.41E-06	2.98E-06	6.70E-02	Below
Mercury	7439-97-6	2.60E-04		2.04E-06	1.79E-02	8.94E-06	8.44E-07	7.40E-03	3.70E-06	2.04E-06	1.00E-03	Below
Molybdenum	7439-98-7	1.10E-03		8.63E-06	7.56E-02	3.78E-05	3.57E-06	3.13E-02	1.56E-05	8.63E-06	3.33E-01	Below
Nickel	7440-02-0	2.10E-03		1.65E-05	1.44E-01	7.22E-05	6.82E-06	5.98E-02	2.99E-05	1.65E-05	2.75E-05	Below
Selenium	7782-49-2	2.40E-05		1.88E-07	1.65E-03	8.25E-07	7.80E-08	6.83E-04	3.41E-07	1.88E-07	1.30E-02	Below
Vanadium	1314-62-1	2.30E-03		1.80E-05	1.58E-01	7.90E-05	7.47E-06	6.54E-02	3.27E-05	1.80E-05	3.00E-03	Below
Zinc	7440-66-6	2.90E-02		2.28E-04	1.99E+00	9.97E-04	9.42E-05	8.25E-01	4.13E-04	2.28E-04	3.33E-01	Below

Notes:

[1] Criteria Pollutants, small uncontrolled boilers (EPA AP-42, Section 1.4 Natural Gas Combustion, Tables 1.4-1 and 1.4-2).
Because emission factor is in lb/MM Btu heat input basis, same factor applied for biogas and natural gas combustion.

[2] Based on AP-42 conversion from $lb/10^6$ scf to lb/MMBtu, divide by 1,020 (AP-42 Section 1.4, Table 1.4-2 footnote a)

[3] To convert from Natural Gas to Biogas, multiply the NG emission rate by heat value ratio (650 Biogas/1020 NG)

[4] PM emission factor is assumed to equal PM_{10}.

[5] SO_2 Emission factor for biogas assumes 100% conversion of H_2S to SO_2 ; manufacturer SO_2 emission factor not used

[6] Conservatively estimated H_2S destruction based on engineering judgement and combustion properties of H_2S

[7] Biogas toxic air pollutant emissions based on EPA AP-42 emission factors, times ratio of Biogas heat value to natural gas heat value, unless higher emisson factor available through SCAQMD.

[8] Emission factors from "General Instruction Book for the 2003 - 2004 Annual Emissions Reporting Program", Table 10 (Default Emission factors for Digester Gas Combustion) South Coast Air Quality Managment District (SCAQMD).

[9] Toxic Air Pollutants (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

[10] 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. Designated by *

[11] Metals from Natural Gas Combustion (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).

City of Meridian WRRF Boiler 3 (Duel fuel-Biogas & NG)

Boiler Heat Input (MMBtu/hr)	2.511	2008 Cleaver Brooks
Model No.	CB-700 X-60	
Primary Fuel Type	Biogas	**Note: That Boiler 3 only can operate one fuel type at a time . The worse case emissions are used between the two fuel types.**
Max Biogas Production (scf/day) (based on highest expected sulfate concentration)	120,000	**Based on average cubic feet per day of biogas produce over a year**
Biogas Heat Value (Btu/scf)	650	
Biogas Primary Fuel Use (10^6 scf/hr)	0.0039	**Max Biogas Feed: 3.86E-03 MMscf/hr**
Secondary Fuel Type	Natural Gas	
Secondary Fuel Heat Value (Btu/scf)	1,020	
Secondary Fuel Use (10^6 scf/hr)	0.0025	
Max Heat input from Biogas (MMBtu/hr)	2.5110	
Operation (hrs/yr)	8,760	
Hydrogen Sulfide (H_2S) Biogas Concentration (ppmv)	1,200	**Note 800 ppmv is max over last 3 years.**
H_2S Biogas Concentration (mg/m^3)	1,674	
Uncontrolled Max H_2S Mass Feedrate (lb/hr)	0.4	
Assumed H_2S Conversion for SO_2 Emissions	100%	

				Uncontrolled Potential to Emit							
				Primary Fuel - Biogas			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation	
Criteria Pollutant	**CAS No.**	**Emission Factor [1] (lb/MM Btu)**		**Emission Rate [2] (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (ton/yr)**
Total Particulate Matter (PM) [3]		0.01		0.039	345	0.2	0.025	220	0.1	0.04	0.17
Nitrogen Oxides (NOx)		0.117		0.461	4,039	2.0	0.294	2,574	1.3	0.46	2.02
Sulfur Dioxide (SO_2) [4]		0.0017		0.758	6,640	3.3	0.004	37	0.0	0.76	3.32
Carbon Monoxide (CO)		0.036		0.142	1,243	0.6	0.090	792	0.4	0.14	0.62
VOC		0.004		0.016	138	0.1	0.010	88	0.0	0.02	0.07
Lead		4.90E-07		1.93E-06	1.69E-02	8.46E-06	1.23E-06	1.08E-02	5.39E-06	1.93E-06	8.46E-06

				Controlled Potential to Emit								
				Primary Fuel - Biogas			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation		
Toxic Air Pollutants - H_2S	**CAS No.**	**Emission Factor [5] (% Destruction)**		**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**IDAPA 58.01.01.585/586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**
Hydrogen sulfide	7783-06-4	98%		8.07E-03	8.58E+03	4.29E+00				8.07E-03	9.33E-01	Below

				Uncontrolled Potential to Emit								
				Primary Fuel - Biogas [6]			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation		
Toxic Air Pollutants - Non-metals [8]	CAS No.	EPA AP-42 Natural Gas Emission Factor ($lb/10^6$ scf)	SCAQMD [7] Digester Gas Emission Factor ($lb/10^6$ scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	IDAPA 58.01.01.585/586 - EL (lb/hr)	PTE Emission Rate vs. EL
3-Methylchloranthrene	56-49-5	1.80E-06		1.09E-08	9.56E-05	4.78E-08	4.43E-09	3.88E-05	1.94E-08	1.09E-08	2.50E-06	Below
Ammonia	7664-41-7		3.20E+00	1.24E-02	1.08E+02	5.41E-02				1.24E-02	1.20E+00	Below
Benzene	71-43-2	2.10E-03	5.80E-03	2.24E-05	1.96E-01	9.81E-05	5.17E-06	4.53E-02	2.26E-05	2.24E-05	8.00E-04	Below
Benzo(a)pyrene*	50-32-8	1.20E-06		7.27E-09	6.37E-05	3.19E-08	2.95E-09	2.59E-05	1.29E-08	7.27E-09	2.00E-06	Below
Formaldehyde	50-00-0	7.50E-02	1.23E-02	4.55E-04	3.98E+00	1.99E-03	1.85E-04	1.62E+00	8.09E-04	4.55E-04	5.10E-04	Below
Hexane	110-54-3	1.80E+00		1.09E-02	9.56E+01	4.78E-02	4.43E-03	3.88E+01	1.94E-02	1.09E-02	1.20E+01	Below
Naphthalene	91-20-3	6.10E-04		3.70E-06	3.24E-02	1.62E-05	1.50E-06	1.32E-02	6.58E-06	3.70E-06	9.10E-05	Below
Total PAHs	na		4.00E-04	1.55E-06	1.35E-02	6.77E-06				1.55E-06	9.10E-05	Below
Pentane	109-66-0	2.60E+00		1.58E-02	1.38E+02	6.90E-02	6.40E-03	5.61E+01	2.80E-02	1.58E-02	1.18E+02	Below
Toluene	108-88-3	3.40E-03		2.06E-05	1.81E-01	9.03E-05	8.37E-06	7.33E-02	3.67E-05	2.06E-05	2.50E+01	Below
Benzo(a)anthracene*	56-55-3	1.80E-06					4.43E-09	3.88E-05	1.94E-08			Below
Benzo(b)fluoranthene*	205-82-3	1.80E-06					4.43E-09	3.88E-05	1.94E-08			Below
Benzo(k)fluoranthene*	205-82-3	1.80E-06					4.43E-09	3.88E-05	1.94E-08			Below
Chrysene*	218-01-9	1.80E-06					4.43E-09	3.88E-05	1.94E-08			Below
Dibenzo(a,h)anthracene*	53-70-3	1.20E-06					2.95E-09	2.59E-05	1.29E-08			Below
Indeno(1,2,3-cd)pyrene*	193-39-5	1.80E-06					4.43E-09	3.88E-05	1.94E-08			Below
POM (7-PAH)[9]							2.81E-08	2.46E-04	1.23E-07	2.81E-08	2.00E-06	Below

				Uncontrolled Potential to Emit								
				Primary Fuel - Biogas			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation		
Toxic Air Pollutants-Metals [10]	CAS Number	Emission Factor ($lb/10^6$ scf)		Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	IDAPA 58.01.01.585/586 - EL (lb/hr)	PTE Emission Rate vs. EL
Arsenic	7440-38-2	2.00E-04		1.21E-06	1.06E-02	5.31E-06	4.92E-07	4.31E-03	2.16E-06	1.21E-06	1.50E-06	Below
Barium	7440-39-3	4.40E-03		2.67E-05	2.34E-01	1.17E-04	1.08E-05	9.49E-02	4.74E-05	2.67E-05	3.30E-02	Below
Beryllium	7440-41-7	1.20E-05		7.27E-08	6.37E-04	3.19E-07	2.95E-08	2.59E-04	1.29E-07	7.27E-08	2.80E-05	Below
Cadmium	7440-43-9	1.10E-03		6.67E-06	5.84E-02	2.92E-05	2.71E-06	2.37E-02	1.19E-05	6.67E-06	3.70E-06	Exceeds
Chromium	7440-47-3	1.40E-03		8.49E-06	7.43E-02	3.72E-05	3.45E-06	3.02E-02	1.51E-05	8.49E-06	3.30E-02	Below
Cobalt	7440-48-4	8.40E-05		5.09E-07	4.46E-03	2.23E-06	2.07E-07	1.81E-03	9.06E-07	5.09E-07	3.30E-03	Below
Copper	7440-50-8	8.50E-04		5.15E-06	4.51E-02	2.26E-05	2.09E-06	1.83E-02	9.17E-06	5.15E-06	1.30E-02	Below
Manganese	7439-96-5	3.80E-04		2.30E-06	2.02E-02	1.01E-05	9.35E-07	8.19E-03	4.10E-06	2.30E-06	6.70E-02	Below
Mercury	7439-97-6	2.60E-04		1.58E-06	1.38E-02	6.90E-06	6.40E-07	5.61E-03	2.80E-06	1.58E-06	1.00E-03	Below
Molybdenum	7439-98-7	1.10E-03		6.67E-06	5.84E-02	2.92E-05	2.71E-06	2.37E-02	1.19E-05	6.67E-06	3.33E-01	Below
Nickel	7440-02-0	2.10E-03		1.27E-05	1.12E-01	5.58E-05	5.17E-06	4.53E-02	2.26E-05	1.27E-05	2.75E-05	Below
Selenium	7782-49-2	2.40E-05		1.45E-07	1.27E-03	6.37E-07	5.91E-08	5.18E-04	2.59E-07	1.45E-07	1.30E-02	Below
Vanadium	1314-62-1	2.30E-03		1.39E-05	1.22E-01	6.11E-05	5.66E-06	4.96E-02	2.48E-05	1.39E-05	3.00E-03	Below
Zinc	7440-66-6	2.90E-02		1.76E-04	1.54E+00	7.70E-04	7.14E-05	6.25E-01	3.13E-04	1.76E-04	3.33E-01	Below

Notes:

[1] Criteria Pollutants emission factors supplied by Cleaver Brooks manufacturer. Except for Lead, which is from EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-2. Because emission factor is in lb/MM Btu heat input basis, same factor applied for biogas and natural gas combustion.

[2] To convert from Natural Gas to Biogas, multiply the NG emission rate by heat value ratio (650 Biogas/1020 NG)

[3] PM emission factor is assumed to equal PM_{10}.

[4] SO_2 Emission factor for biogas assumes 100% conversion of H_2S to SO_2 ; manufacturer SO_2 emission factor not used

[5] Conservatively estimated H_2S destruction based on engineering judgement and combustion properties of H_2S

[6] Biogas toxic air pollutant emissions based on EPA AP-42 emission factors, times ratio of Biogas heat value to natural gas heat value, unless higher emisson factor available through SCAQMD.

[7] Emission factors from "General Instruction Book for the 2003 - 2004 Annual Emissions Reporting Program", Table 10 (Default Emission factors for Digester Gas Combustion) South Coast Air Quality Managment District (SCAQMD).

[8] Toxic Air Pollutants (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

[9] 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. Designated by *

[10] Metals from Natural Gas Combustion (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).

City of Meridian WRRF Boiler 4 (Duel fuel-Biogas & NG)

Boiler Heat Input (MMBtu/hr)	2.511	2008 Cleaver Brooks
Model No.	CB-700 X-60	
Primary Fuel Type	Biogas	**Note: That Boiler 3 only can operate one fuel type at a time . The worse case emissions are used between the two fuel types.**
Max Biogas Production (scf/day) (based on highest expected sulfate concentration)	120,000	**Based on average cubic feet per day of biogas produce over a year**
Biogas Heat Value (Btu/scf)	650	
Biogas Primary Fuel Use (10^6 scf/hr)	0.0039	**Max Biogas Feed: 3.86E-03 MMscf/hr**
Secondary Fuel Type	Natural Gas	
Secondary Fuel Heat Value (Btu/scf)	1,020	
Secondary Fuel Use (10^6 scf/hr)	0.0025	
Max Heat input from Biogas (MMBtu/hr)	2.5110	
Operation (hrs/yr)	8,760	
Hydrogen Sulfide (H_2S) Biogas Concentration (ppmv)	1,200	**Note 800 ppmv is max over last 3 years.**
H_2S Biogas Concentration (mg/m^3)	1,674	
Uncontrolled Max H_2S Mass Feedrate (lb/hr)	0.4	
Assumed H_2S Conversion for SO_2 Emissions	100%	

				Uncontrolled Potential to Emit							
				Primary Fuel - Biogas			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation	
Criteria Pollutant	**CAS No.**	**Emission Factor [1] (lb/MM Btu)**		**Emission Rate [2] (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (ton/yr)**
Total Particulate Matter (PM) [3]		0.01		0.039	345	0.2	0.025	220	0.1	0.04	0.17
Nitrogen Oxides (NOx)		0.117		0.461	4,039	2.0	0.294	2,574	1.3	0.46	2.02
Sulfur Dioxide (SO_2) [4]		0.002		0.758	6,640	3.3	0.004	37	0.0	0.76	3.32
Carbon Monoxide (CO)		0.036		0.142	1,243	0.6	0.090	792	0.4	0.14	0.62
VOC		0.004		0.016	138	0.1	0.010	88	0.0	0.02	0.07
Lead		4.90E-07		1.93E-06	1.69E-02	8.46E-06	1.23E-06	1.08E-02	5.39E-06	1.93E-06	8.46E-06

				Controlled Potential to Emit								
				Primary Fuel - Biogas			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation		
Toxic Air Pollutants - H_2S	**CAS No.**	**Emission Factor [5] (% Destruction)**		**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)**	**IDAPA 58.01.01.585/586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**
Hydrogen sulfide	7783-06-4	98%		8.07E-03	8.58E+03	4.29E+00				8.07E-03	9.33E-01	Below

				Uncontrolled Potential to Emit								
				Primary Fuel - Biogas [6]			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation		
Toxic Air Pollutants - Non-metals [8]	CAS No.	EPA AP-42 Natural Gas Emission Factor ($lb/10^6$ scf)	SCAQMD [7] Digester Gas Emission Factor ($lb/10^6$ scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	IDAPA 58.01.01.585/586 - EL (lb/hr)	PTE Emission Rate vs. EL
3-Methylchloranthrene	56-49-5	1.80E-06		1.09E-08	9.56E-05	4.78E-08	4.43E-09	3.88E-05	1.94E-08	1.09E-08	2.50E-06	Below
Ammonia	7664-41-7		3.20E+00	1.24E-02	1.08E+02	5.41E-02				1.24E-02	1.20E+00	Below
Benzene	71-43-2	2.10E-03	5.80E-03	2.24E-05	1.96E-01	9.81E-05	5.17E-06	4.53E-02	2.26E-05	2.24E-05	8.00E-04	Below
Benzo(a)pyrene*	50-32-8	1.20E-06		7.27E-09	6.37E-05	3.19E-08	2.95E-09	2.59E-05	1.29E-08	7.27E-09	2.00E-06	Below
Formaldehyde	50-00-0	7.50E-02	1.23E-02	4.55E-04	3.98E+00	1.99E-03	1.85E-04	1.62E+00	8.09E-04	4.55E-04	5.10E-04	**Below**
Hexane	110-54-3	1.80E+00		1.09E-02	9.56E+01	4.78E-02	4.43E-03	3.88E+01	1.94E-02	1.09E-02	1.20E+01	Below
Naphthalene	91-20-3	6.10E-04		3.70E-06	3.24E-02	1.62E-05	1.50E-06	1.32E-02	6.58E-06	3.70E-06	9.10E-05	Below
Total PAHs	na		4.00E-04	1.55E-06	1.35E-02	6.77E-06				1.55E-06	9.10E-05	Below
Pentane	109-66-0	2.60E+00		1.58E-02	1.38E+02	6.90E-02	6.40E-03	5.61E+01	2.80E-02	1.58E-02	1.18E+02	Below
Toluene	108-88-3	3.40E-03		2.06E-05	1.81E-01	9.03E-05	8.37E-06	7.33E-02	3.67E-05	2.06E-05	2.50E+01	Below
Benzo(a)anthracene*	56-55-3	1.80E-06					4.43E-09	3.88E-05	1.94E-08			Below
Benzo(b)fluoranthene*	205-82-3	1.80E-06					4.43E-09	3.88E-05	1.94E-08			Below
Benzo(k)fluoranthene*	205-82-3	1.80E-06					4.43E-09	3.88E-05	1.94E-08			Below
Chrysene*	218-01-9	1.80E-06					4.43E-09	3.88E-05	1.94E-08			Below
Dibenzo(a,h)anthracene*	53-70-3	1.20E-06					2.95E-09	2.59E-05	1.29E-08			Below
Indeno(1,2,3-cd)pyrene*	193-39-5	1.80E-06					4.43E-09	3.88E-05	1.94E-08			Below
POM (7-PAH)[9]							2.81E-08	2.46E-04	1.23E-07	2.81E-08	2.00E-06	Below

				Uncontrolled Potential to Emit								
				Primary Fuel - Biogas			Secondary Fuel - Natural Gas			Worst-Case Fuel Operation		
Toxic Air Pollutants-Metals [10]	CAS Number	Emission Factor ($lb/10^6$ scf)		Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	IDAPA 58.01.01.585/586 - EL (lb/hr)	PTE Emission Rate vs. EL
Arsenic	7440-38-2	2.00E-04		1.21E-06	1.06E-02	5.31E-06	4.92E-07	4.31E-03	2.16E-06	1.21E-06	1.50E-06	**Below**
Barium	7440-39-3	4.40E-03		2.67E-05	2.34E-01	1.17E-04	1.08E-05	9.49E-02	4.74E-05	2.67E-05	3.30E-02	Below
Beryllium	7440-41-7	1.20E-05		7.27E-08	6.37E-04	3.19E-07	2.95E-08	2.59E-04	1.29E-07	7.27E-08	2.80E-05	Below
Cadmium	7440-43-9	1.10E-03		6.67E-06	5.84E-02	2.92E-05	2.71E-06	2.37E-02	1.19E-05	6.67E-06	3.70E-06	**Exceeds**
Chromium	7440-47-3	1.40E-03		8.49E-06	7.43E-02	3.72E-05	3.45E-06	3.02E-02	1.51E-05	8.49E-06	3.30E-02	Below
Cobalt	7440-48-4	8.40E-05		5.09E-07	4.46E-03	2.23E-06	2.07E-07	1.81E-03	9.06E-07	5.09E-07	3.30E-03	Below
Copper	7440-50-8	8.50E-04		5.15E-06	4.51E-02	2.26E-05	2.09E-06	1.83E-02	9.17E-06	5.15E-06	1.30E-02	Below
Manganese	7439-96-5	3.80E-04		2.30E-06	2.02E-02	1.01E-05	9.35E-07	8.19E-03	4.10E-06	2.30E-06	6.70E-02	Below
Mercury	7439-97-6	2.60E-04		1.58E-06	1.38E-02	6.90E-06	6.40E-07	5.61E-03	2.80E-06	1.58E-06	1.00E-03	Below
Molybdenum	7439-98-7	1.10E-03		6.67E-06	5.84E-02	2.92E-05	2.71E-06	2.37E-02	1.19E-05	6.67E-06	3.33E-01	Below
Nickel	7440-02-0	2.10E-03		1.27E-05	1.12E-01	5.58E-05	5.17E-06	4.53E-02	2.26E-05	1.27E-05	2.75E-05	Below
Selenium	7782-49-2	2.40E-05		1.45E-07	1.27E-03	6.37E-07	5.91E-08	5.18E-04	2.59E-07	1.45E-07	1.30E-02	Below
Vanadium	1314-62-1	2.30E-03		1.39E-05	1.22E-01	6.11E-05	5.66E-06	4.96E-02	2.48E-05	1.39E-05	3.00E-03	Below
Zinc	7440-66-6	2.90E-02		1.76E-04	1.54E+00	7.70E-04	7.14E-05	6.25E-01	3.13E-04	1.76E-04	3.33E-01	Below

Notes:

[1] Criteria Pollutants emission factors supplied by Cleaver Brooks manufacturer. Except for Lead, which is from EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-2.
Because emission factor is in lb/MM Btu heat input basis, same factor applied for biogas and natural gas combustion.

[2] To convert from Natural Gas to Biogas, multiply the NG emission rate by heat value ratio (650 Biogas/1020 NG)

[3] PM emission factor is assumed to equal PM_{10}.

[4] SO_2 Emission factor for biogas assumes 100% conversion of H_2S to SO_2 ; manufacturer SO_2 emission factor not used

[5] Conservatively estimated H_2S destruction based on engineering judgement and combustion properties of H_2S

[6] Biogas toxic air pollutant emissions based on EPA AP-42 emission factors, times ratio of Biogas heat value to natural gas heat value, unless higher emisson factor available through SCAQMD.

[7] Emission factors from "General Instruction Book for the 2003 - 2004 Annual Emissions Reporting Program", Table 10 (Default Emission factors for Digester Gas Combustion) South Coast Air Quality Managment District (SCAQMD).

[8] Toxic Air Pollutants (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

[9] 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. Designated by *

[10] Metals from Natural Gas Combustion (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).

City of Meridian WRRF (Generator 1)

Generator Name	**Caterpillar**
Model No.	**Standby**
Engine Power Rating (kW)	800
Engine Power Rating (hp)	1,073
Fuel Type	Diesel
- maximum sulfur content (wt%)	0.0015%
Maximum Firing Rate (gals/hr)	58.6
Maximum Heat Input Rating (MMBtu/hr)	8.20
Maximum Hours of Operation	45
Maximum Firing Rate (gals/yr)	2,637
Annual Operation Limit (hrs/yr)	45
Annual Firing Rate (gals/yr)	2,637
Heat Value of Fuel (Btu/gal)	140,000

15 ppmv

Uncontrolled TAPs should be based on **8760** **hr/yr**

			Controlled Potential to Emit			**(DEQ) CONTROLLED EI**		**2**	**hr/day**
Pollutant	**CAS No.**	**Emission Factor[1] (lb/MMBtu)**	**Emission Rate[2] (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr) 3 hr**	**Emission Rate (lb/hr) 8 hr**	**Emission Rate (lb/hr) 24hr**	**Emission Rate (lb/hr) Annual**
Total Particulate Matter (PM_{10})[3]			0.70	32	0.02			**0.058**	**3.60E-03**
Nitrogen Oxides (NOx)			18.73	843	0.42				**0.096**
Sulfur Oxides		0.00	0.000124	0	0.00	**0.000124**		**1.04E-05**	**6.38E-07**
Carbon Monoxide (CO)			4.15	187	0.09	**4.15**	**4.15**		
HC[4]			0.68	31	0.02				

				Controlled Potential to Emit				
Pollutant[4]	**CAS Number**	**Emission Factor[5] (lb/MMBtu)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Annual Emission Rate (lb/hr)**	**IDAPA 58.01.01.585/ 586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**
Acetaldehyde	75-07-0	2.52E-05	2.07E-04	9.30E-03	4.65E-06	1.06E-06	3.00E-03	Below
Acrolein [6]	107-02-8	7.88E-06	6.46E-05	2.91E-03	1.45E-06		1.70E-02	Below
Benzene	71-43-2	7.76E-04	6.37E-03	2.86E-01	1.43E-04	3.27E-05	8.00E-04	Below
Benzo(a)pyrene	50-32-8	2.57E-07	2.11E-06	9.49E-05	4.74E-08	1.08E-08	2.00E-06	Below
Formaldehyde	50-00-0	7.89E-05	6.47E-04	2.91E-02	1.46E-05	3.32E-06	5.10E-04	Below
Naphthalene	91-20-3	1.30E-04	1.07E-03	4.80E-02	2.40E-05	5.48E-06	9.10E-05	Below
Toluene [6]	108-88-3	2.81E-04	2.30E-03	1.04E-01	5.19E-05		2.50E+01	Below
Xylenes [6]	1330-20-7	1.93E-04	1.58E-03	7.12E-02	3.56E-05		2.90E+01	Below
Total PAH		2.12E-04	1.74E-03	7.83E-02	3.91E-05	8.93E-06	9.10E-05	Below

Notes:

[1] Sulfur oxides emission factor derived from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Table 3.4-1

[2] Emission rates supplied by Western States Caterpillar, "Not to exceed data", with exception of sulfur oxides

[3] PM emission factor is assumed to equal PM_{10}.

[4] HC is assumed to equal VOC.

[5] Toxic emission factors were utilized from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Tables 3.4-3 and 3.4-4. Tables 3.4-3 and 3.4-4.

[6] Based on 24-hr average emission rate

City of Meridian WRRF (Generator 2)

Generator Name	**Caterpillar**
Model No.	**Standby**
Engine Power Rating (kW)	800
Engine Power Rating (hp)	1,073
Fuel Type	Diesel
- maximum sulfur content (wt%)	0.00%
Maximum Firing Rate (gals/hr)	58.6
Maximum Heat Input Rating (MMBtu/hr)	8.20
Maximum Hours of Operation	45
Maximum Firing Rate (gals/yr)	2,637
Annual Operation Limit (hrs/yr)	45
Annual Firing Rate (gals/yr)	2,637
Heat Value of Fuel (Btu/gal)	140,000

15 ppmv

Uncontrolled TAPs should be based on **8760** **hr/yr**

			Controlled Potential to Emit			**(DEQ) CONTROLLED EI**		**2**	**hr/day**
Pollutant	**CAS No.**	**Emission Factor[1] (lb/MMBtu)**	**Emission Rate[2] (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr) 3 hr**	**Emission Rate (lb/hr) 8 hr**	**Emission Rate (lb/hr) 24hr**	**Emission Rate (lb/hr) Annual**
Total Particulate Matter (PM_{10})[3]			0.70	32	0.02			**0.058**	**3.60E-03**
Nitrogen Oxides (NOx)			18.73	843	0.42				**0.096**
Sulfur Oxides		0.00	0.00	0	0.00	**0.000**		**1.04E-05**	**6.38E-07**
Carbon Monoxide (CO)			4.15	187	0.09	**4.15**	**4.15**		
HC[4]			0.68	31	0.02				

				Controlled Potential to Emit				
Pollutant[4]	**CAS Number**	**Emission Factor[5] (lb/MMBtu)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Annual Emission Rate (lb/hr)**	**IDAPA 58.01.01.585/ 586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**
Acetaldehyde	75-07-0	2.52E-05	2.07E-04	9.30E-03	4.65E-06	1.06E-06	3.00E-03	Below
Acrolein [6]	107-02-8	7.88E-06	6.46E-05	2.91E-03	1.45E-06		1.70E-02	Below
Benzene	71-43-2	7.76E-04	6.37E-03	2.86E-01	1.43E-04	3.27E-05	8.00E-04	Below
Benzo(a)pyrene	50-32-8	2.57E-07	2.11E-06	9.49E-05	4.74E-08	1.08E-08	2.00E-06	Below
Formaldehyde	50-00-0	7.89E-05	6.47E-04	2.91E-02	1.46E-05	3.32E-06	5.10E-04	Below
Naphthalene	91-20-3	1.30E-04	1.07E-03	4.80E-02	2.40E-05	5.48E-06	9.10E-05	Below
Toluene [6]	108-88-3	2.81E-04	2.30E-03	1.04E-01	5.19E-05		2.50E+01	Below
Xylenes [6]	1330-20-7	1.93E-04	1.58E-03	7.12E-02	3.56E-05		2.90E+01	Below
Total PAH		2.12E-04	1.74E-03	7.83E-02	3.91E-05	8.93E-06	9.10E-05	Below

Notes:

[1] Sulfur oxides emission factor derived from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Table 3.4-1

[2] Emission rates supplied by Western States Caterpillar, "Not to exceed data", with exception of sulfur oxides

[3] PM emission factor is assumed to equal PM_{10}.

[4] HC is assumed to equal VOC.

[5] Toxic emission factors were utilized from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Tables 3.4-3 and 3.4-4. Tables 3.4-3 and 3.4-4.

[6] Based on 24-hr average emission rate

City of Meridian WRRF (Generator 3)

Generator Name	**Caterpillar**
Model No.	**Standby**
Engine Power Rating (kW)	800
Engine Power Rating (hp)	1,073
Fuel Type	Diesel
- maximum sulfur content (wt%)	0.0015%
Maximum Firing Rate (gals/hr)	58.6
Maximum Heat Input Rating (MMBtu/hr)	8.20
Maximum Hours of Operation	45
Maximum Firing Rate (gals/yr)	2,637
Annual Operation Limit (hrs/yr)	45
Annual Firing Rate (gals/yr)	2,637
Heat Value of Fuel (Btu/gal)	140,000

15 ppmv

Uncontrolled TAPs should be based on **8760** **hr/yr**

			Controlled Potential to Emit			**(DEQ) CONTROLLED EI**		**2**	**hr/day**
Pollutant	**CAS No.**	**Emission Factor[1] (lb/MMBtu)**	**Emission Rate[2] (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr) 3 hr**	**Emission Rate (lb/hr) 8 hr**	**Emission Rate (lb/hr) 24hr**	**Emission Rate (lb/hr) Annual**
Total Particulate Matter (PM_{10})[3]			0.70	32	0.02			**0.058**	**3.60E-03**
Nitrogen Oxides (NOx)			18.73	843	0.42				**0.096**
Sulfur Oxides		0.00	0.00	0	0.00	**0.000**		**1.04E-05**	**6.38E-07**
Carbon Monoxide (CO)			4.15	187	0.09	**4.15**	**4.15**		
HC[4]			0.68	31	0.02				

				Controlled Potential to Emit				
Pollutant[4]	**CAS Number**	**Emission Factor[5] (lb/MMBtu)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Annual Emission Rate (lb/hr)**	**IDAPA 58.01.01.585/ 586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**
Acetaldehyde	75-07-0	2.52E-05	2.07E-04	9.30E-03	4.65E-06	1.06E-06	3.00E-03	Below
Acrolein [6]	107-02-8	7.88E-06	6.46E-05	2.91E-03	1.45E-06		1.70E-02	Below
Benzene	71-43-2	7.76E-04	6.37E-03	2.86E-01	1.43E-04	3.27E-05	8.00E-04	Below
Benzo(a)pyrene	50-32-8	2.57E-07	2.11E-06	9.49E-05	4.74E-08	1.08E-08	2.00E-06	Below
Formaldehyde	50-00-0	7.89E-05	6.47E-04	2.91E-02	1.46E-05	3.32E-06	5.10E-04	Below
Naphthalene	91-20-3	1.30E-04	1.07E-03	4.80E-02	2.40E-05	5.48E-06	9.10E-05	Below
Toluene [6]	108-88-3	2.81E-04	2.30E-03	1.04E-01	5.19E-05		2.50E+01	Below
Xylenes [6]	1330-20-7	1.93E-04	1.58E-03	7.12E-02	3.56E-05		2.90E+01	Below
Total PAH		2.12E-04	1.74E-03	7.83E-02	3.91E-05	8.93E-06	9.10E-05	Below

Notes:

[1] Sulfur oxides emission factor derived from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Table 3.4-1

[2] Emission rates supplied by Western States Caterpillar, "Not to exceed data", with exception of sulfur oxides

[3] PM emission factor is assumed to equal PM_{10}.

[4] HC is assumed to equal VOC.

[5] Toxic emission factors were utilized from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Tables 3.4-3 and 3.4-4. Tables 3.4-3 and 3.4-4.

[6] Based on 24-hr average emission rate

City of Meridian WRRF (Generator 4)

Generator Name	**Caterpillar**
Model No.	**Standby**
Engine Power Rating (kW)	800
Engine Power Rating (hp)	1,073
Fuel Type	Diesel
- maximum sulfur content (%)	0.0015%
Maximum Firing Rate (gals/hr)	58.6
Maximum Heat Input Rating (MMBtu/hr)	8.20
Maximum Hours of Operation	45
Maximum Firing Rate (gals/yr)	2,637
Annual Operation Limit (hrs/yr)	45
Annual Firing Rate (gals/yr)	2,637
Heat Value of Fuel (Btu/gal)	140,000

15 ppmv

Uncontrolled TAPs should be based on 8760 hr/yr

			Controlled Potential to Emit			**(DEQ) CONTROLLED E**		**2**	**hr/day**
Pollutant	**CAS No.**	**Emission Factor[1] (lb/MMBtu)**	**Emission Rate[2] (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr) 3 hr**	**Emission Rate (lb/hr) 8 hr**	**Emission Rate (lb/hr) 24hr**	**Emission Rate (lb/hr) Annual**
Total Particulate Matter (PM_{10})[3]			0.70	32	0.02			0.058	3.60E-03
Nitrogen Oxides (NOx)			18.73	843	0.42				0.096
Sulfur Oxides		0.00	0.00	0	0.00	0.000		1.04E-05	6.38E-07
Carbon Monoxide (CO)			4.15	187	0.09	4.15	4.15		
HC[4]			0.68	31	0.02				

				Controlled Potential to Emit				
Pollutant[4]	**CAS Number**	**Emission Factor[5] (lb/MMBtu)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Annual Emission Rate (lb/hr)**	**IDAPA 58.01.01.585/586 - EL (lb/hr)**	**PTE Emission Rate vs. EL**
Acetaldehyde	75-07-0	2.52E-05	2.07E-04	9.30E-03	4.65E-06	1.06E-06	3.00E-03	Below
Acrolein [6]	107-02-8	7.88E-06	6.46E-05	2.91E-03	1.45E-06		1.70E-02	Below
Benzene	71-43-2	7.76E-04	6.37E-03	2.86E-01	1.43E-04	3.27E-05	8.00E-04	Below
Benzo(a)pyrene	50-32-8	2.57E-07	2.11E-06	9.49E-05	4.74E-08	1.08E-08	2.00E-06	Below
Formaldehyde	50-00-0	7.89E-05	6.47E-04	2.91E-02	1.46E-05	3.32E-06	5.10E-04	Below
Naphthalene	91-20-3	1.30E-04	1.07E-03	4.80E-02	2.40E-05	5.48E-06	9.10E-05	Below
Toluene [6]	108-88-3	2.81E-04	2.30E-03	1.04E-01	5.19E-05		2.50E+01	Below
Xylenes [6]	1330-20-7	1.93E-04	1.58E-03	7.12E-02	3.56E-05		2.90E+01	Below
Total PAH		2.12E-04	1.74E-03	7.83E-02	3.91E-05	8.93E-06	9.10E-05	Below

Notes:

[1] Sulfur oxides emission factor derived from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Table 3.4-1

[2] Emission rates supplied by Western States Caterpillar, "Not to exceed data", with exception of sulfur oxides

[3] PM emission factor is assumed to equal PM_{10}.

[4] HC is assumed to equal VOC.

[5] Toxic emission factors were utilized from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Tables 3.4-3 and 3.4-4. Tables 3.4-3 and 3.4-4.

[6] Based on 24-hr average emission rate

City of Meridian WRRF
IDAPA Rule 677 PM Standard for Fuel Burning Equipment

Unit	Boiler No. 2	Boiler No. 2	Boiler No. 3	Boiler No. 3	Boiler No. 4	Boiler No. 4
Fuel	Natural Gas	Biogas	Natural Gas	Biogas	Natural Gas	Biogas
Rated Heat Input (MM Btu/hr)	3.31	3.25	2.51	2.51	2.51	2.51
PM Emission Rate (lb/hr)	0.02	0.04	0.03	0.04	0.03	0.04
Exit/Flue Gas Flowrate Calculation						
F_d (Table 19-2, EPA Method 19) (dscf/MM Btu) [1,2]	8,710	8,710	8,710	8,710	8,710	8,710
Exit flowrate @ 0% O_2: (dscfm)	481	472	365	365	365	365
Exit flowrate @ 3% O_2: (dscfm) [3]	562	551	426	426	426	426
Calculated Grain Loading (gr/dscf @ 3% O_2) [4]	0.005	0.008	0.007	0.011	0.007	0.011
PM Loading Standard (IDAPA 58.01.01.677) (gr/dscf @ 3% 02)	0.015	0.015	0.015	0.015	0.015	0.015
Compliance w/ PM Loading Standard	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

[1] Appendix A-7 to 40 CFR part 60, Method 19—Determination of sulfur dioxide removal efficiency and particulate, sulfur dioxide and nitrogen oxides emission rates, Table 19-2 (F Factors for Various Fuels)

[2] Fd, Volumes of combustion components per unit of heat content (scf/million Btu). Fd for natural gas and biogas is 8,710 dscf/106 Btu

[3] (Flow $_{3\%}$) = (Flow $_{0\%}$)x (20.9/(20.9 - 3)), where 20.9 = Oxygen concentration in ambient air

[4] (Flow (dscfm) x (7,000 gr/lb) x (PM lb/hr) x (60 min/ hr) = gr/dscf

City of Meridian WRRF IDAPA Rule 786 PM Standard for Incineration

	Flare 1	Flare 2
Biogas combustion rate (scfm) [1]	83	159
Biogas methane content	65%	65%
Methane density (lb/ft^3) [2]	0.0448	0.0448
Hourly methane combustion rate ("refuse" lb/hr) [3]	146	277
Flare PM emission rate (lb/hr) [1]	0.038	0.072
PM emission rate (lb PM/lb refuse)	0.00026	0.00026
PM emission rate (lb PM/ 100 lb refuse)	0.026	0.026
IDAPA 58.01.01.786.01 standard (lb PM / 100 lb refuse)	0.2	0.2
Compliance with IDAPA standard	Yes	Yes

[1] See flare emission calculations

[2] Perry's Chemical Engineers' Handbook, Sixth Edition, Table 3-20

[3] (Biogas combustion (scfm)) x (60 min/hr) x (methane %)

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

M E M O R A N D U M

DATE: June 30, 2021

TO: Aaron Hoberg, Permit Writer, Air Program

FROM: Darrin Mehr, Air Quality Dispersion Modeling Analyst, Air Program

PROJECT: P-2009.0088 PROJ 62581, Permit Modification to Add an Anaerobic Digester and an Open Flare and Increase the Landfill Gas Hydrogen Sulfide Limit at the Existing City of Meridian Water Resource Recovery Facility located in Meridian, Idaho.

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) Related 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
ARM	Ambient Ratio Method
ASOS	Automated Surface Observing System
bhp	Brake horsepower
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
DEQ	Idaho Department of Environmental Quality
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
ft	Feet
ft/sec	Feet per second
GEP	Good Engineering Practice
HAP	Hazardous Air Pollutant
hr	Hour
HVAC	Heating, Ventilation, and Air Conditioning
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
Jacobs	Jacobs (permitting and modeling consultant)
K	Kelvin
lb/hr	Pounds per hour
m	Meters
m/sec	Meters per second
MACT	Maximum Achievable Control Technology
MERPs	Modeled Emission Rates for Precursors
MMBtu	Million British Thermal Units
MMscf/year	Million standard cubic feet per year
MWRRF	City of Meridian Waste Resource Recovery Facility (permittee)
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen

NSPS	New Source Performance Standards
NSR	New Source Review
NW AIRQUEST	Northwest International Air Quality Environmental Science and Technology Consortium
NWS	National Weather Service
O_3	Ozone
OLM	Ozone Limiting Method
Pb	Lead
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
PRIME	Plume Rise Model Enhancement
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PTE	Potential to Emit
scf/day	Standard cubic feet per day
scf/hr	Standard cubic feet per hour
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TAP	Toxic Air Pollutant
tons/year	Tons per year
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOCs	Volatile Organic Compounds
wscf/MMBtu	Wet standard cubic feet per million British thermal unit
ºF	Degrees Fahrenheit
$\mu g/m^3$	Micrograms per cubic meter of air

1.0 Summary

The City of Meridian submitted a Permit to Construct (PTC) application for modifications to their existing Waste Resource Recovery Facility (MWRRF) located in Ada County, Idaho. The project modifications involve:

- Addition of one wastewater anaerobic digester (Digester 6) with a design capacity of 834,000 gallons and biogas generation of 228,480 standard cubic feet per day (scf/day).

- Addition of a second elevated open flare (Flare 2) rated at 9,520 scf/hour, or 228,480 scf/day, sized to combust all biogas produced by proposed Digester 6.

- Reduction of the permit-allowable hydrogen sulfide (H_2S) content in biogas from 3,600 parts per million by volume (ppm_v) to 1,200 ppm_v for existing anaerobic digesters. The limit of 1,200 ppm_v will also be applied to biogas produced in proposed Digester 6. SO_2 emissions due to the combustion of sulfur compounds in the biogas will decrease accordingly in all flares and existing boilers.

Project-specific air quality analyses involving atmospheric dispersion modeling of estimated emissions associated with the facility 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.

Jacobs, on behalf of MWRRF, prepared the PTC application and performed ambient air impact analyses for this project. DEQ review of submitted data and analyses (and any DEQ verification 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. Emissions of SO_2[a], were modeled for the project using cumulative NAAQS[b] impact analyses with facility-wide emissions. Emissions of CO[c], NO_x[d], PM_{10}[e], and $PM_{2.5}$[f], and lead (Pb) were below the BRC[g], ¼ SER[h], or SIL[i]-based modeling thresholds.	Compliance has not been demonstrated for emission rates greater than those used in the air impact analyses. All emissions sources were modeled at maximum requested hourly emission rates for 8,760 hours per year reflecting rated capacity for proposed Flare 2 and existing Flare 1 and Boilers 2, 3, and 4.
Anaerobic Digester Biogas H_2S[j] Content All biogas generated at the facility was limited to an H_2S[j] content of 1,200 ppm_v[k]. This H_2S concentration limitation will be applied to new Anaerobic Digester 6 and the 1,200 ppm_v limit will replace the current limit of 3,600 ppm_v for existing Anaerobic Digesters 3, 4, and 5.	The project demonstrated compliance with the H_2S non-carcinogenic TAP screening emissions level (EL) and 1-hour NAAQS and 3-hour SO_2 SIL using SO_2 combustion byproduct emission rates based on the 1,200 ppm_v H_2S concentration for existing Flare 1, proposed Flare 2, and existing Boilers 2, 3, and 4.
Air Impact Analyses for TAP[l] Emissions. The emissions increases for the project that exceeded the TAP screening emissions rate limits were limited to benzene, formaldehyde, and naphthalene (treated as carcinogen and compared to the single compound polyaromatic hydrocarbon screening emission rate limit and increment per DEQ policy). The only source of TAPs for this project is proposed Flare 2.	The design values for all modeled TAPs were far below the allowable TAP increments and no limitations are recommended based on the TAPs impact analyses.
Digester Biogas Production Limits Compared to Modeled Biogas Combustion Rates Existing Anaerobic Digesters 3, 4, and 5 are each limited to an average daily biogas production rate of 120,000 scf/day[m] for a total of 360,000 scf/day (based on the average cubic feet per day over a consecutive 12-month period). Proposed Anaerobic Digester 6 biogas production capacity will be 228,480 scf/day of biogas. Facility-wide anaerobic digester biogas production capacity will be 588,480 scf/day.	The ambient air impact analyses modeled facility-wide impacts based on 427,606 scf/day of biogas for existing emissions units (Flare 1, Boiler 2, Boiler 3, and Boiler 4) and 228,480 scf/day for the proposed emission unit (Flare 2) for a total of 656,086 scf/day. The impact analyses conservatively modeled emission rates due to biogas combustion that exceeded the requested facility wide biogas production capacity of 588,480 scf/day.

a. Sulfur dioxide.
b. National Ambient Air Quality Standards.
c. Carbon monoxide.
d. Nitrogen oxides.
e. Particulate matter with a mean aerodynamic diameter of 10 microns or less.
f. Particulate matter with a mean aerodynamic diameter of 2.5 microns or less.

[g] Below Regulatory Concern.
[h] Significant Emission Rate.
[i] Significant Impact Level.
[j] Hydrogen sulfide.
[k] Parts per million by volume.
[l] Toxic Air Pollutants.
[m] Standard cubic feet per day.

Summary of Submittals and Actions

February 11, 2021	The City of Meridian submitted a permit application for the modification project to DEQ.
February 17, 2021	Regulatory start date.
March 18, 2021	DEQ declared the permit application incomplete.
April 5, 2021	The City of Meridian submitted a response to DEQ's incompleteness determination.
May 5, 2021	DEQ declared the application complete.

2.0 Background Information

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

2.1 Project Description

The facility was issued PTC P-2009.0088, Project 61522, on August 24, 2015. This project requests several changes to the facility, including:

1) One new elevated open flare (Flare 2) capable of combusting the entire quantity (228,480 scf/day) of biogas created by a new anaerobic digester (Digester 6) will be installed. Pollutants will not be emitted directly from the digester, as all biogas generated will be captured and combusted in boilers or flares.

2) The current permit limit on H_2S content in biogas generated by the existing anaerobic digesters is 3,600 ppm_v. H_2S content in new Digester 6 and existing Digesters 3, 4, and will be reduced to 1,200 ppm_v. H_2S and combustion byproduct SO_2 emissions will be limited in the new (Flare 2), existing flare (Flare 1), and existing biogas-fired boilers (Boiler 1, Boiler 2, and Boiler 3) by the 1,200 ppm_v H_2S limitation.

2.2 Facility Location and Area Classification

The facility is located in Ada County, Idaho (Easting: 545,150 m; Northing: 4,831,900 m; UTM Zone 11) or (43.6388° latitude; -116.4402° longitude). 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 operates under the Northern Ada County limited maintenance plans for CO and PM_{10}.

2.3 Air Impact Analyses Required for All Permits to Construct

Idaho Air Rules[1] 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 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 an exceedance of NAAQS, a culpability analysis can determine if this exceedance is due to emissions from the proposed project. 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[2]; 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 facility were estimated by Jacobs 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 Protocol

Jacobs submitted a modeling protocol to DEQ on December 22, 2020, on behalf of the City of Meridian for the MWRRF. DEQ issued a conditional modeling protocol approval letter on January 28, 2021. The air impact modeling analyses were generally conducted using data and methods described in the modeling protocol and the *Idaho Air Modeling Guideline.*[3]

3.1.2 Modeling Applicability and Modeled Criteria Pollutant Emission Rates

DEQ has recently revised the methods of determining ambient impact analyses applicability for a PTC project. Modeling applicability is based on two procedures, which are reviewed in sequential order. The first method is based on the established determination that annual controlled emissions qualify for a Below Regulatory Concern (BRC) modeling exemption policy[2], which is defined as the annual level of emissions equal to 10 percent of the significant emissions rate (SER) as defined by Section 006.108 of the Idaho *Air Rules*.[1] This method was adopted in 2014 and remains unchanged.

DEQ's has developed new modeling applicability thresholds[4], which are listed in Table 3. Hourly and annual emission rate modeling thresholds for a modification project are based on controlled facility-wide potential emission rates equal to 1/4th for new facilities or existing facilities with post-project facility-wide potential emissions that are below the 1/4th SER thresholds for annual average standards and 1/4th of the SERs divided by 8,760 hours per year for short-term standards.

If the proposed project involves a modification project at an existing facility that has conducted an approved and representative facility-wide NAAQS ambient impact analysis within 5 years of the current project, modeling thresholds equal to 1/8th of the SERs for annual average NAAQS and 1/8th of the SERs divided by 8760 hours/year for short-term average NAAQS may be applied to evaluate modeling applicability. Where such facility-wide modeling has not been performed and post-project emissions exceed the 1/4th SER, emissions attributed to the modification project will be compared against new pollutant and averaging period-specific SIL thresholds created based on ambient impact analyses using a hypothetical source. The new SIL values replace the Level I presumptive minimum and Level II DEQ discretionary thresholds included in the 2013 version of the *Modeling Guideline*[3]. The *Modeling Guideline* will soon be updated to include the revised thresholds.

Table 3. REVISED MODELING APPLICABILITY THRESHOLDS

Pollutant and Averaging Period	Threshold values in Pounds/Hour[a]						
	Replaced SIL[m] Thresholds		New SIL Threshold	BRC[n]	1/8 SER[o]	1/4 SER	SER
	Level 1	Level 2					
CO[g] 1-hr	15	175	84	2.3[b] (10 ton/yr)	2.9[b]	5.7[b]	100 ton/yr
CO 8-hr	15	175	26	2.3[b] (10 ton/yr)	2.9[b]	5.7[b]	100 ton/yr
NO_2[h] 1-hr	0.20	2.4	0.38	0.91 (4.0 ton/yr)	1.14	2.3	40 ton/yr
NO_2 annual	0.27 (1.2 ton/yr)	3.2 (14 ton/yr)	0.43 (1.9 ton/yr)	4.0 ton/yr	5.0 ton/yr	10.0 ton/yr	40 ton/yr
SO_2[i] 1-hr	0.21	2.5	0.40	0.91 (4.0 ton/yr)	1.14	2.3	40 ton/yr
SO_2 annual[c]				4.0 ton/yr			40 ton/yr
PM_{10}[j] 24-hr	0.22	2.6	0.32	0.34 (1.5 ton/yr)	0.43	0.86	15 ton/yr
PM_{10} annual[c]				1.5 ton/yr			15 ton/yr
$PM_{2.5}$[k] 24-hr	0.054	0.63	0.092	0.23 (1.0 ton/yr)	0.29	0.57	10 ton/yr
$PM_{2.5}$ annual	0.080 (0.35 ton/yr)	0.94 (4.1 ton/yr)	0.085 (0.37 ton/yr)	1.0 ton/yr	1.25 ton/yr	2.5 ton/yr	10 ton/yr
Pb[l] 3-month	0.0194[d] (14 lbs/mon[f])	0.0194[d] (14 lbs/mon)	0.00102[e] (0.73 lbs/mon)	0.0137 (9.9 lbs/mon)	0.0171 (12.3 lbs/mon)	0.034 (24.7 lbs/mon)	0.6 ton/yr

a. Values in pounds/hour as averaged over the averaging period of the NAAQS, unless noted otherwise. Pound/hour values listed as a function of the significant emission rate (SER) were calculated by dividing the annual SER value by 8,760.
b. These values are more restrictive than the SIL Threshold. Therefore, the SIL Threshold may be used in place of these values.
c. There is no annual NAAQS for this pollutant. The BRC level is listed for purposes of evaluating whether the project could qualify for a BRC exemption modeling exclusion, which would apply for all averaging periods.
d. There is no Pb SIL in Idaho Air Rules. The threshold was set to assure NAAQS compliance rather than impacts below a SIL.
e. Idaho Air Rules do not provide a Pb SIL. A Pb SIL of 0.0024 $\mu g/m^3$ was calculated by DEQ using the SIL-to-NAAQS ratio for annual $PM_{2.5}$.
f. Pounds per month.
g. Carbon monoxide.
h. Nitrogen dioxide.
i. Sulfur dioxide.
j. Particulate matter with a mean aerodynamic diameter of 10 microns or less.
k. Particulate matter with a mean aerodynamic diameter of 2.5 microns or less.
l. Lead.
m. Significant Impact Level.
n. Below Regulatory Concern.
o. Significant Emission Rate.

Criteria air pollutant modeling requirements for the project do not apply if the project qualifies for an exemption under DEQ's policy for NAAQS modeling compliance demonstrations for emissions that are BRC and do not require any relaxation of a permit emission rate or throughput limitation related to that pollutant. BRC applicability is based on annual emissions only. Short-term averaging periods, such as 1-hour and 24-hour periods, do not factor into evaluation of the BRC exemption. A project does not qualify for a BRC exemption from NAAQS compliance demonstration if the potential emissions of a NAAQS pollutant exceed the BRC emission rates in the final issued permit. In other words, if the project's annual allowable emissions in the modeling protocol's emission inventory are increased above the BRC threshold in the final issued PTC, the BRC exemption no longer applies, and if that pollutant is not exempted under the SIL-derived threshold that pollutant is subject to ambient air impact analyses requirements. However, a project may be exempted from the requirement to perform modeling for a pollutant if facility-wide post-project potential emissions of that pollutant are below the BRC threshold or the new $1/4^{th}$ SER threshold regardless of changes to permit limitations for that pollutant.

The MWRRF post-project facility-wide allowable emissions may be compared against the new $1/4^{th}$ SER annual emission rates for annual average NAAQS, and hourly emission rates based on $1/4^{th}$ SER annual emissions divided by 8,760 hours/year for short-term average NAAQS. If emission rates are below those thresholds modeling is not required that pollutant and averaging period.

If facility-wide emissions are above these thresholds an additional evaluation may be performed. If an appropriate facility-wide NAAQS demonstration has been conducted within the prior 5 years, the applicant may use annual modeling thresholds based on $1/8^{th}$ SER for annual NAAQS and $1/8^{th}$ SER divided by 8,760 hours/year for short term average NAAQS. If an appropriate NAAQS analysis was not conducted within the prior 5-year period, a final set of modeling thresholds have been developed by DEQ based upon new test case SIL ambient air impact analyses. The MWRRF project falls under the latter case, with the latest NAAQS demonstration performed to support issuance of PTC P-2009.0088, issued on September 24, 2009. Additionally, the current 24-hour and annual $PM_{2.5}$, 1-hour SO_2, and 1-hour NO_2 NAAQS have been implemented after the 2009 PTC was issued, so the SIL-based modeling thresholds are applicable for all pollutants and averaging periods.

This project will reduce the biogas H_2S content for existing Flare 1 and existing Boilers 2, 3, and 4 from 3,600 ppm_v to 1,200 ppm_v, and this reduced limit affecting combustion byproduct SO_2 emissions will be applied to proposed Flare 2. The permit condition for the biogas production rate limitation of 120,000 scf/day is applied to existing anaerobic digesters 3, 4, and 5 on an individual basis and will not be increased for this project. The proposed project will include a new anaerobic digester (Digester 6) and a new flare (Flare 2) matching the biogas production capacity of the new digester. DEQ determined the project is eligible to use BRC modeling thresholds and annual project emission increases to evaluate requirements to perform ambient impact analyses. DEQ's evaluation of modeling applicability is summarized in Tables 4 and 5 below.

Table 4. BELOW REGULATORY CONCERN CRITERIA POLLUTANT MODELING APPLICABILITY								
		Initial BRC[a] Exemption Screening			Secondary BRC Exemption Screening			
Pollutant	**Averaging Period**	**Facility-wide Annual Potential Emissions (tons/yr)**	**BRC Threshold (tons/yr)**	**Exceeds BRC Emission Rate?**	**Project-specific Increase Emissions (tons/yr)**	**BRC Thresholds (tons/yr)**	**Exceeds BRC Emission Rate?**	**Modeling Required?**
PM_{10}	24-hour	1.14	1.5	No	NA	1.5	NA	No
$PM_{2.5}$	24-hour	1.14	1.0	Yes	0.32	1.0	No	No
	Annual							
NO_2	1-hour	11.78	4.0	Yes	1.84	4.0	No	No
	Annual							
SO_2	1-hour and 3-hour	22.18	4.0	Yes	7.36	4.0	Yes	Yes
CO	1-hour and 8-hour	17.15	10.0	Yes	8.4	10.0	No	No
VOCs	As a precursor to ozone, 8-hour average	2.98	4.0	No[b]	NA	4.0	NA	No[b]
Lead (Pb)	Rolling 3-month average	3.31E-05	0.06	No	NA	0.06	NA	No

a. Below Regulatory Concern.

b. See section below for a description of ambient impact analyses requirement for secondary formation of ozone due to precursor emissions of VOCs and NO_x.

Table 5. REVISED THRESHOLDS CRITERIA POLLUTANT MODELING APPLICABILITY							
		1/4 SER[a] Exemption Criteria			New SIL[b] Criteria		
Pollutant	**Averaging Period**	**Facility-wide Requested Allowable Emission Rate**	**1/4 SER Facility-wide Thresholds (lb/hr)[c] and (tons/year)**	**Emissions Exceed 1/4 SER?**	**Project Emission Increase**	**New SIL-Based Modeling Thresholds**	**Modeling Required?**
PM_{10}	24-hour	3.05 lb/hr 1.14 tons/year	0.86 lb/hr (3.75 tons/year)	No	0.07	0.34 lb/hr[h]	No
$PM_{2.5}$	24-hour	3.05	0.57 lb/hr	Yes	0.07	0.23 lb/hr	No
	Annual	1.14	2.5 tons/year	No	0.07 lb/hr and 0.32 tons/year	0.085 lb/hr (0.37 tons/year)	No
NO_2	1-hour	2.3 lb/hr[d]	2.3 lb/hr	No	0.42 lb/hr	0.43 lb/hr	No
	Annual	11.78	10 ton/year	Yes	1.84 tons/year	1.9 tons/year	No
SO_2	1-hour	5.06 lb/hr 22.18 tons/year	2.3 lb/hr (10 tons/year)	Yes	1.68 lb/hr	0.40 lb/hr	Yes
CO	1-hour	20.43 lb/hr 17.15 tons/year	5.7 lb/hr 25 tons/year	No (tons/year basis)	1.92	84 lb/hr	No
	8-hour				1.92	26 lb/hr	No
Lead (Pb)	Rolling 3-month average	7.56E-06 lb/month	0.034 lb/hr 24.7 lb/month	No	0.0	0.00102 lb/hr or 0.73 lb/month	No

a. Significant Emission Rate.
b. Significant Impact Level.
c. Pounds per hour.
d. Emissions from the emergency generator engines do not count toward facility-wide PTE per DEQ policy.

Lead is not present in the biogas so lead emissions will not increase; therefore, lead modeling is not required for this project. Modeling is not required for 24-hour PM_{10} and rolling 3-month averaging period lead emissions based on potential facility-wide emissions which are below the annual BRC threshold.

Modeling is not required for 24-hour and annual $PM_{2.5}$, 1-hour and annual NO_2, and 1-hour and 8-hour CO based on the proposed project's emission increases remaining below BRC thresholds.

Modeling is required for 1-hour and 3-hour SO_2 based on emissions exceeding the new SIL modeling thresholds. The 24-hour and annual SO_2 NAAQS have been revoked and no ambient air impact analysis is required for these ambient standards.

Compliance demonstration requirements for secondary formation of ozone and $PM_{2.5}$ due to VOCs, NOx, and SO_2 precursor emissions are discussed below.

Secondary Formation Ambient Impacts Due to Precursor Emissions

EPA issued final Modeled Emission Rates as Precursors (MERPs) guidance[5] that may be used for Tier 1 compliance demonstrations using default minimum MERP values specific to regions within the U.S. The guidance establishes the applicability criteria and methods to evaluate secondary impacts for this project. EPA has modeled hypothetical sources for secondary formation of $PM_{2.5}$ and ozone, including two new sources in Idaho that are not included in the final MERPs guidance pointed out above. This resource can be accessed at: https://www.epa.gov/scram/merps-view-qlik.

An 8-hour ozone SIL compliance demonstration due to secondary formation of ozone due to VOCs and/or NO_x precursor emissions is triggered by an emission increase of either pollutant greater than the significant emission rate (SER) of 40 tons/year, as specified in Section 006.108 of the Idaho *Air Rules*. Only ozone precursor(s) with potential annual emissions exceeding the SER are required to be included in the SIL analysis. The project's annual emission increase of NO_x was estimated at 1.84 tons/year and annual emissions increase of VOCs was estimated at listed at 1.71 tons/year. The requested potential annual emission rates of NOx and VOCs is below the SERs of 40 tons/year for each pollutant. A compliance demonstration for the 8-hour ozone SIL is not required for this project.

Secondary formation of $PM_{2.5}$ is caused by NO_x and SO_2 precursor emissions. The project's emission increases of NO_x and SO_2 precursor emissions were listed in the emission inventory estimated at 1.84 tons/year of NO_x and 7.36 tons/year of SO_2. Annual emission rate increases of NO_x and SO_2 were below the SERs for both pollutants and a secondary $PM_{2.5}$ formation SIL analysis is not required.

Table 6 provides emission rates used in the SIL analyses and Table 7 provides the emission rates used in the cumulative NAAQS analyses. Hourly emissions were modeled 8,760 hours/year.

Table 6. SIL[a] SHORT-TERM AND ANNUAL CRITERIA POLLUTANT EMISSION RATES

Emissions Point	Description	1-hour and 3-hour SO_2 (lb/hr[b])
FLARE2	New Open Flare	1.681

Table 6. SIL[a] SHORT-TERM AND ANNUAL CRITERIA POLLUTANT EMISSION RATES		
Emissions Point	**Description**	**1-hour and 3-hour SO_2 (lb/hr[b])**

a. Significant Impact Level.
b. Pounds per hour.

Table 7. NAAQS[a] SHORT-TERM AND ANNUAL CRITERIA POLLUTANT EMISSION RATES		
Emissions Point	**Description**	**1-hour SO_2 (lb/hr[b])**
FLARE1	Existing Open Flare	0.883
FLARE2	New Open Flare	1.681
BOILER2	Kewanee Dual Fuel Boiler - existing	0.981
BOILER3	Cleaver Brooks Dual Fuel Boiler - existing	0.758
BOILER4	Cleaver Brooks Dual Fuel Boiler - existing	0.758
GEN1	Caterpillar distillate fuel-fired emergency generator engine - existing	1.24E-04
GEN2	Caterpillar distillate fuel-fired emergency generator engine - existing	1.24E-04
GEN3	Caterpillar distillate fuel-fired emergency generator engine - existing	1.24E-04
GEN4	Caterpillar distillate fuel-fired emergency generator engine - existing	1.24E-04
HEATER1	Heater 1 – existing	7.35E-05
HEATER2	Heater 2 – existing	7.35E-05
HVAC1	HVAC 1 – existing	5.88E-05
HVAC2	HVAC 2 – existing	2.94E-04
HVAC3	HVAC 3 – existing	2.94E-04
HVAC4	HVAC 4 – existing	1.47E-04
HVAC5	HVAC 5 – existing	1.47E-04
HVAC6	HVAC 6 – existing	2.94E-04

a. National ambient air quality standards.
b. Pounds per hour.

3.1.3 TAPs Modeling Applicability

TAP emissions regulated under Section 210 of the Idaho Air Rules are only applicable for new or modified sources constructed after July 1, 1995. TAP emission increases for the project, for those TAPs with an increase exceeding the ELs of Idaho Air Rules Section 585 or 586, are subject to modeling unless exempted from modeling pursuant to Section 210.20 of the Idaho Air Rules.

The project's TAPs emission increases were attributed to the new flare combusting the entire quantity of biogas produced by new Anaerobic Digester 6. The reduction in biogas H_2S content from 3,600 ppm_v to 1,200 ppm_v in existing emissions units was not taken into account in the TAPs applicability calculations using the net emissions increase TAPs compliance option. Flare 2 H_2S emissions were estimated to be 0.10 lb/hr, which is well below the 0.933 lb/hr H_2S EL specified in Section 585 of the Idaho Air Rules. Emissions of carcinogenic TAPs that exceeded the ELs specified in Section 586 included benzene, formaldehyde, and naphthalene (treated as carcinogen and compared to the polyaromatic hydrocarbon screening emission rate limit and increment per DEQ policy). The modeled TAP emission rates are listed in Table 8.

Table 8. CARCINOGENIC TOXIC AIR POLLUTANT EMISSION RATES				
Emissions Point	**Description**	**Benzene (lb/hr[a])**	**Formaldehyde (lb/hr)**	**Naphthalene (lb/hr)**
FLARE2	New Open Flare	0.0015	0.0111	1.05E-04

a. Pounds per hour.

3.1.4 Emission Release Parameters

Table 9 lists the emission release parameters, including stack height, exhaust temperature, exhaust velocity, and stack diameter for the modeled point sources. Values are listed in metric units first and in English units below in parentheses.

Table 9. POINT SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES)

Model ID	Description	UTM Coordinates NAD83 datum, Zone 11[a]		Stack Height m (ft)[c]	Stack Exhaust Temperature K[d] (°F)[e]	Stack Exhaust Velocity m/sec[f] (ft/sec)[g]	Stack Diameter m (ft)	Release Orientation
		Easting-X m[b]	Northing-Y m					
FLARE1	Existing Open Flare	545,147.6	4,831,947.0	5.01 (16.44)	1273 (1,831.7)	20.00 (65.6)	0.316 (1.04)	Default[h]
FLARE2	New Open Flare	545,152.9	4,831,996.5	6.83 (22.40)	1273 (1,831.7)	20.00 (65.6)	0.436 (1.43)	Default[h]
BOILER2	Kewanee Dual Fuel Boiler	545,220.8	4,831,920.9	6.10 (20.0)	450 (350)	11.80 (38.7)	0.254 (0.83)	Default[h]
BOILER3	Cleaver Brooks Dual Fuel Boiler	545,177.2	4,831,971.8	6.71 (22.0)	471 (388)	5.94 (19.5)	0.254 (0.83)	Raincap
BOILER4	Cleaver Brooks Dual Fuel Boiler	545,178.0	4,831,975.6	7.32 (24.0)	471 (388)	5.94 (19.5)	0.254 (0.83)	Raincap
GEN1	1,073 hp Caterpillar diesel-fired emergency generator engine	545,328.0	4,831,762.0	6.10 (20.0)	1100 (1,520)	44.60 (146.3)	0.203 (0.67)	Horizontal
GEN2	1,073 hp Caterpillar diesel-fired emergency generator engine	545,332.0	4,831,762.0	6.10 (20.0)	1100 (1,520)	44.60 (146.3)	0.204 (0.67)	Horizontal
GEN3	1,073 hp Caterpillar diesel-fired emergency generator engine	545,336.0	4,831,762.0	6.10 (20.0)	1100 (1,520)	44.60 (146.3)	0.204 (0.67)	Horizontal
GEN4	1,073 hp Caterpillar diesel-fired emergency generator engine	545,340.0	4,831,762.0	6.10 (20.0)	1100 (1,520)	44.60 (146.3)	0.204 (0.67)	Horizontal
HEATER1	Heater 1	545,337.0	4,831,877.0	3.96 (13.0)	311 (100)	1.60 (5.2)	0.102 (0.33)	Default[h]
HEATER2	Heater 2	545,279.0	4,831,838.0	4.88 (16.0)	311 (100)	1.60 (5.2)	0.102 (0.33)	Default[h]
HVAC1	HVAC 1	545,210.0	4,831,881.0	6.10 (20.0)	311 (100)	0.57 (1.9)	0.152 (0.50)	Default[h]
HVAC2	HVAC 2	545,219.3	4,831,972.8	0.91 (3.0)	311 (100)	2.49 (8.2)	0.163 (0.53)	Horizontal
HVAC3	HVAC 3	545,219.1	4,831,970.8	0.91 (16.0)	311 (100)	2.49 (8.2)	0.163 (0.53)	Horizontal
HVAC4	HVAC 4	545,183.0	4,831,928.0	4.88 (16.0)	311 (100)	2.67 (8.8)	0.972 (3.19)	Horizontal
HVAC5	HVAC 5	545,164.0	4,831,933.0	4.88 (16.0)	311 (100)	2.67 (8.8)	0.972 (3.19)	Horizontal
HVAC6	HVAC 6	545,089.0	4,831,937.0	2.44 (8.0)	311 (100)	2.38 (7.8)	1.457 (4.78)	Horizontal

a. Universal Transverse Mercator, North American Datum of 1983, Zone 11.
b. Meters.

Table 9. POINT SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES)								
Model ID	Description	UTM Coordinates NAD83 datum, Zone 11[a]		Stack Height m (ft)[c]	Stack Exhaust Temperature K[d] (°F)[e]	Stack Exhaust Velocity m/sec[f] (ft/sec)[g]	Stack Diameter m (ft)	Release Orientation
		Easting-X m[b]	Northing-Y m					

c. Feet.
d. Kelvin.
e. Degrees Fahrenheit.
f. Meters per second
g. Feet per second.
h. Default = uninterrupted vertical release orientation.

3.1.5 Emission Release Parameter Justification

DEQ review of release parameter justification materials focused on the primary sources of SO_2 emissions—namely Flares 1 and 2 and Boilers 3, 4, and 5, which emit 99.96% of the facility-wide SO_2 emissions. Emergency generators 1 through 4, fired on ultra-low sulfur diesel, and natural gas-fired Heaters 1 and 2, and HVAC units 1 through 6 emit 0.04% of the facility-wide SO_2 emissions. Flare 2 is the only source of modeled TAPs.

Flares 1 and 2 (Model IDs FLARE1 and FLARE2)
The flares are elevated open flares which were modeled as point sources with uninterrupted vertical release orientations. Jacobs used the default SCREEN3[6] values for exit velocity of 20 m/sec (65.6 ft/sec) and exit temperature of 1,273 Kelvin (1,832°F) for each flare. Jacobs calculated the modeled release heights—referred to as the effective release heights—and modeled stack diameters—referred to as the effective stack diameters for each of the elevated open flares using the SCREEN3 methods. Effective release heights and effective diameters are modeled for flares in place of physical release heights to account for considerable heat release effects of the combusted gases within the exhaust plume that increase dispersion.

Effective diameter and effective release height values were calculated using the net heat release for both flares, assuming a conservative level of radiation of heat loss of the flare plume of 55% and 100% capacity of biogas throughput. The following equations were used to calculate each flare's modeled values for effective release height and effective release diameter:

Effective diameter:

$$q_n = (1 - 0.55 \text{ radiation heat loss}) * q \qquad (1)$$

Where: q_n = net heat release from flare (calories/sec)

q = gross heat release from flare (calories/sec)

Note: 1 calorie/sec = 14.2860 Btu/hr

Using the net heat release rate for the flare, the effective diameter is calculated using the following equation:

$$d_{eff} = 9.88E\text{-}04 * (q_n)^{0.5} \quad (2)$$

Where: d_{eff} = effective diameter

q_n = net heat release calculated in Equation 1

Effective release height:

$$H_{eff} = H_s + [(4.56E\text{-}03) * (q^{0.478})] \quad (3)$$

Where: H_{eff} = Effective release height (meters)

H_s = Physical release height at top of flare burner shroud (meters)

q = gross heat release (calories/sec) converted from Btu/hr.

Flare 1
Flare 1 is an existing flare manufactured by Varec Biogas, model number VB86042, capable of combusting 5,000 scf/hr of biogas with an estimated heat content of 650 Btu/scf, for an equivalent capacity of 3.25 MMBtu/hr (227,495 calories/sec).

The flare's physical release height of 11 feet (3.35 meters) was determined by field survey.

The effective diameter was calculated to be 0.32 meters (1.0 feet).

The effective release height was calculated to be 5.0 meters (16.4 feet).

Flare 2
Flare 2 is a new open flare with the rated capacity of 9,520 scf/hr (228,480 scf/day at 24 hours/day) with on-site biogas heat content of 650 Btu/scf for a rated heat input of 6.19 MMBtu/hr (433,291 calories/sec). A Varec manufacturer's specification sheet listed the maximum biogas throughput capacity of 9,520 scf/hr. The physical release height of 15 feet (4.57 meters) from ground level to the top of the burner shroud was listed on the Varec specification sheet and flare schematic diagram.

The effective diameter was calculated to be 0.44 meters (1.44 feet).

The effective release height was calculated to be 6.83 meters (22.4 feet).

Boiler 2 (Model ID BOILER2)
This is an existing boiler. A project specification sheet from a vendor named Selkirk Metalbestos was submitted for Boiler 2 release parameter justification. The specification sheet for Boiler 2 identified Kewanee Boiler as the manufacturer and listed a rated heat input capacity of 3.313 MMBtu/hr fired on natural gas or equivalent. Biogas is the primary fuel type for this project.

The stack has a release height of 20 feet (6.09 meters) which is field measured value. The modeled exit diameter of 10 inches was described as field measured value and matches the specification sheet listing

for the appliance outlet diameter where the exhaust stack is joined to the boiler exhaust flange. The modeled flow rate of 1,266 ACFM matches the specification sheet's listed value. The modeled exit temperature of 350°F is supported based on the specification sheet listing of a 280°F temperature rise above an ambient temperature of 70°F.

Boiler 3 and Boiler 4 (Model IDs BOILER3 and BOILER4)
These are existing boilers. A Cleaver Brooks exhaust and emission performance specification sheet for the Meridian facility site location was submitted for release parameter substantiation. The two Cleaver Brooks Model CB-60-125HW boilers are identical and each is rated at 2.511 MMBtu/hr heat input, fired on natural gas. Biogas is the primary fuel type for this project.

Modeled volumetric flow rate of 638 ACFM and exit temperature of 388°F matched the 75% load values listed on the specification sheet. These values are viewed as conservative given Jacobs modeled 100% load SO_2 emission rates.

The stack termination for each stack is equipped with a raincap and the AERMOD POINTCAP option was applied to both stacks.

The modeled 22 feet stack release height for Boiler 3 and 24 feet for Boiler 4 were described as being field measured values. The modeled exit diameters of 0.83 feet for both stacks were described as being field measured values.

Diesel-fired Internal Combustion (IC) Engines (Model IDs GEN1 – GEN4)
Natural Gas-fired Heaters & HVAC Units (Model IDs HEATER1, HEATER2, HVAC1 – HVAC6)
The modeled release parameters for the diesel-fired emergency electrical generator engines, natural gas-fired heaters, and natural gas-fired HVAC units were accepted as submitted for this project. Detailed review of the release parameter substantiation was not performed based on the minimal emission rates and contribution of these sources to the facility-wide ambient impacts. Modeled release parameters appeared reasonable.

DEQ concluded that the release parameters used in the air impact modeling analyses were adequately substantiated and applied appropriately.

3.2 Background Concentrations

The DEQ-recommended ambient backgrounds for the criteria pollutants modeled for this project were provided to Jacobs in the January 28, 2021, conditional modeling protocol. The background values presented are listed in Table 10 were obtained from the current Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST) background lookup tool, which are based on updated 2014-2017 monitoring and photochemical modeling data with refined interpolation methods to establish values for the Pacific Northwest states. The background lookup tool may be accessed at: https://arcg.is/1jXmHH. As shown in Figure 1, the facility is located near the intersection of four background grid cells. The average value for the values for the four adjoining grid cells was used to establish the DEQ-recommended background values.

Figure 1. 2014-2017 NW AIRQUEST Grid Centroids and Facility Location

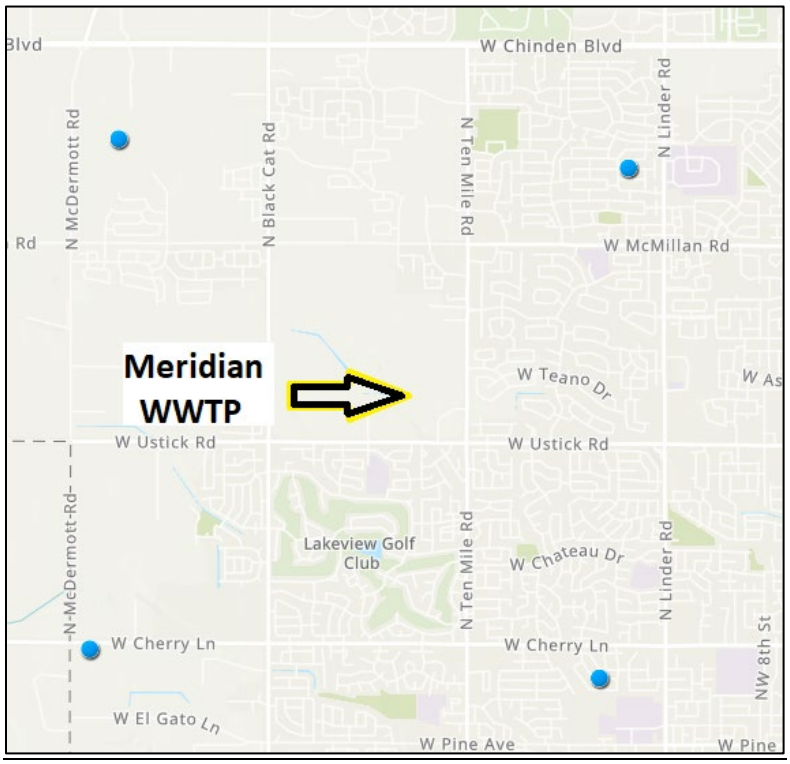


Table 10. DEQ-RECOMMENDED CRITERIA POLLUTANT AMBIENT BACKGROUNDS[a]		
Pollutant	**Averaging Period**	**Background Concentration ($\mu g/m^3$)[b]**
SO_2	1-hour	11.63 (4.44 ppb[c])
	3-hour	13.23 (5.05 ppb)

a. Average of the four adjoining grid cell ambient background values.
b. Micrograms per cubic meter.
c. Parts per billion.

3.3 Impact Modeling Methodology

This section describes the modeling methods used by the applicant to demonstrate preconstruction compliance with applicable air quality standards.

3.3.1 General Overview of Impact Analyses

Jacobs performed the project-specific air pollutant emission inventory and air impact analyses that were submitted with the application. The submitted information/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**

Table 11. MODELING PARAMETERS.		
Parameter	**Description/Values**	**Documentation/Addition Description**
General Facility Location	Meridian, Idaho	The area is an attainment or unclassified area for all criteria pollutants. The area operates under maintenance plans for PM_{10} and CO.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 19191.
Meteorological Data	Boise airport surface data with Boise upper air data	This is a five-year data set covering 2014-2018. See Section 3.3.4 of this memorandum for additional details of the meteorological data.
Terrain	Considered	8.8-meter resolution National Elevation Dataset (NED) files were acquired from the USGS for the surrounding area. AERMAP version 18081 was used to process terrain elevation data for all emission points and receptors. See Section 3.3.5 for more details.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD. See Section 3.3.6.
Receptor Grid	**NAAQS Analyses Grid**	
	Grid 1	10-meter spacing along the ambient air boundary.
	Grid 2	10-meter spacing in a 1,000-meter (x) by 660-meter (y) rectangular grid centered on the facility.
	Grid 3	100-meter spacing in a 3,000-meter (x) by 2,500-meter (y) rectangular grid centered on Grid 2.
	Grid 4	500-meter spacing in an 11,500-meter (x) by 11,000-meter (y) rectangular grid centered on Grid 3.

3.3.2 Modeling Methodology

Project-specific modeling and other required impact analyses were generally conducted using data and methods described in the modeling protocol and the *Idaho Air Quality Modeling Guideline*[3].

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 19191 was used by Jacobs 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.

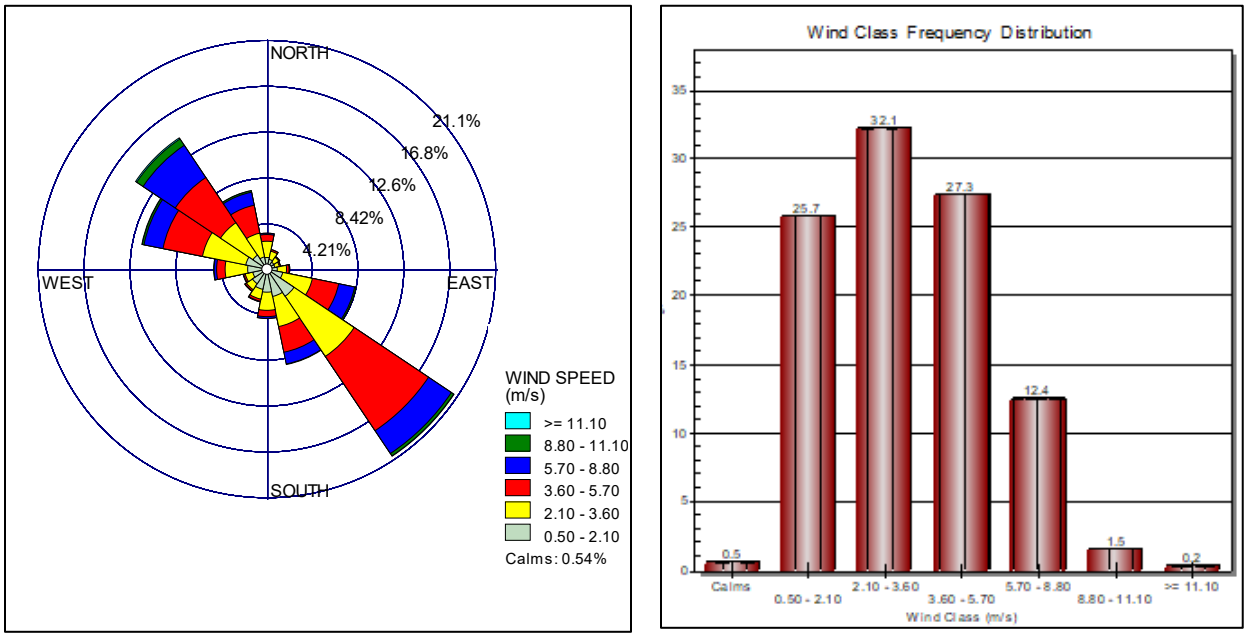
3.3.4 Meteorological Data

DEQ processed a meteorological dataset from data collected at the Boise airport (KBOI) for a five-year data period covering the years 2014-2018. National Weather Service (Station ID 726810-24131) data and one-minute ASOS data from the Boise NCDC site for 2014-2018 were used for surface meteorological data. 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 the last thirty years of Boise precipitation data. Conditions were determined to be "wet" for 2014 and 2017, and "average" for 2015, 2016, and 2018. Average moisture content is defined as within a 30 percentile of the 30-year mean of 11.3 inches of precipitation. Continuous snow cover was determined to exist only during 2016. Calms were 0.54% of the data, and 0.72 % of the data were missing from the 5-year record. The

average wind speed was 3.6 meters/sec.

Figure 2 shows a wind rose and wind speed histogram of the Boise 2014-2018 data. AERMINUTE version 15272 was used to process Automated Surface Observing Systems (ASOS) wind data for use in AERMET. AERMET version 19191 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 Jacobs for a previous project, with and without the ADJ_U* option enabled. Jacobs used the meteorological data with the ADJ_U* option enabled. DEQ determined that these data are adequately representative of the meteorology at the MBL facility site in Boise, Idaho, for minor source permitting.

Figure 2. BOISE AIRPORT WIND ROSE AND WIND SPEED HISTOGRAM (2014-2018)



3.3.5 Effects of Terrain on Modeled Impacts

The ambient air impact analyses used terrain data extracted from a United States Geological Survey (USGS) National Elevation Dataset (NED) file with 8.83 meter resolution. The terrain preprocessor AERMAP version 18081 was used by Jacobs to extract the elevations from the NED file 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 emission plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain. Figure 3 shows the coverage of the full receptor grid coverage overlaid on a Google Earth terrain image.

DEQ determined the treatment of terrain was appropriate for the ambient air impact analyses.

3.3.6 Facility Layout and Building Downwash

DEQ verified proper identification of the site location, emission point locations, and the ambient air boundary by comparing a graphical representation of the modeling input file to a site plan diagram submitted with the permit application. Aerial photographic images and measurement tools on Google Earth (available at https://www.google.com/earth) were also used to assure that horizontal coordinates were reasonably accurately represented for existing structures dimensions, sources, and ambient air boundary locations. Emission points and structure layout are shown in Figures 3 and 4.

Potential downwash effects on emission plumes were accounted for in the model by using building dimensions and locations. Dimensions and orientation of the structures 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. DEQ determined Jacobs properly evaluated building downwash effects in the ambient impact analyses.

Figure 3. MODEL SETUP FACILITY LAYOUT-FIGURE 3 OF THE MERIDIAN WRRF MODELING REPORT

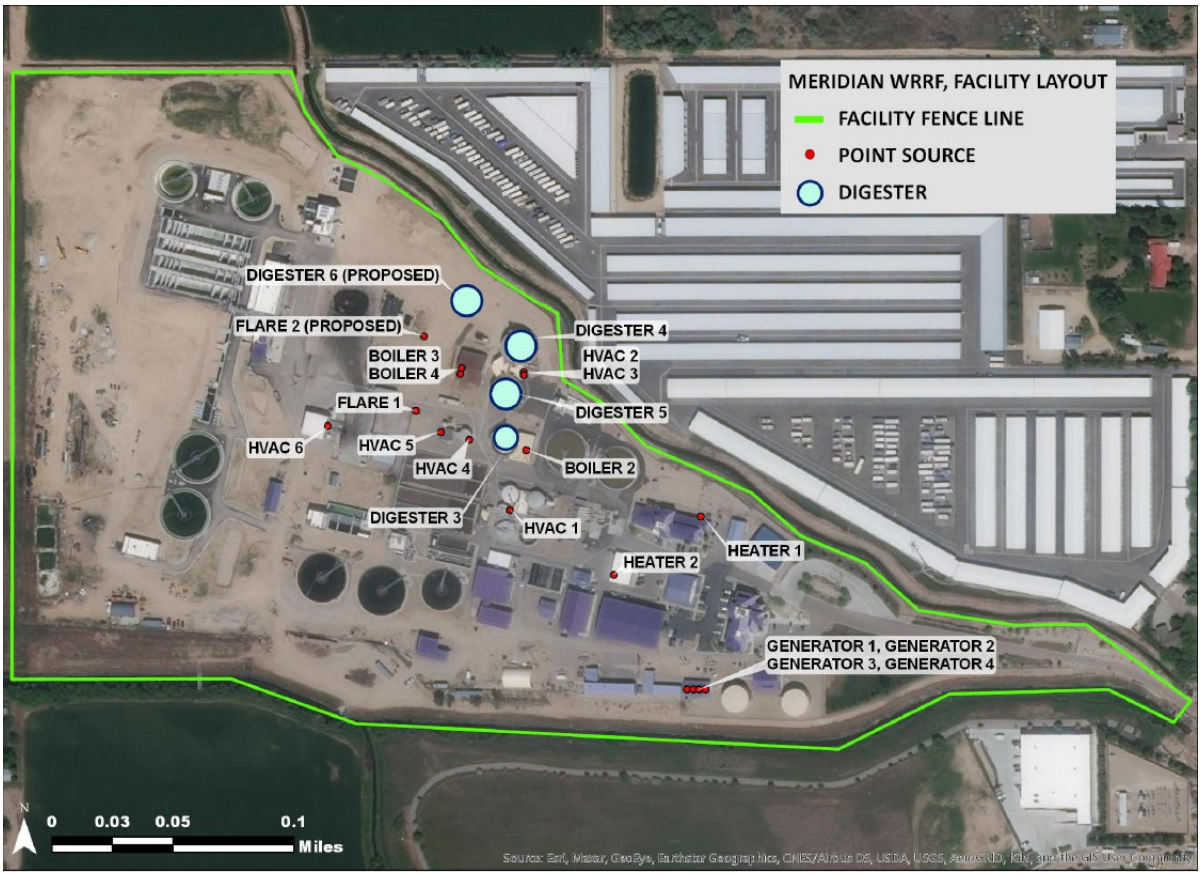
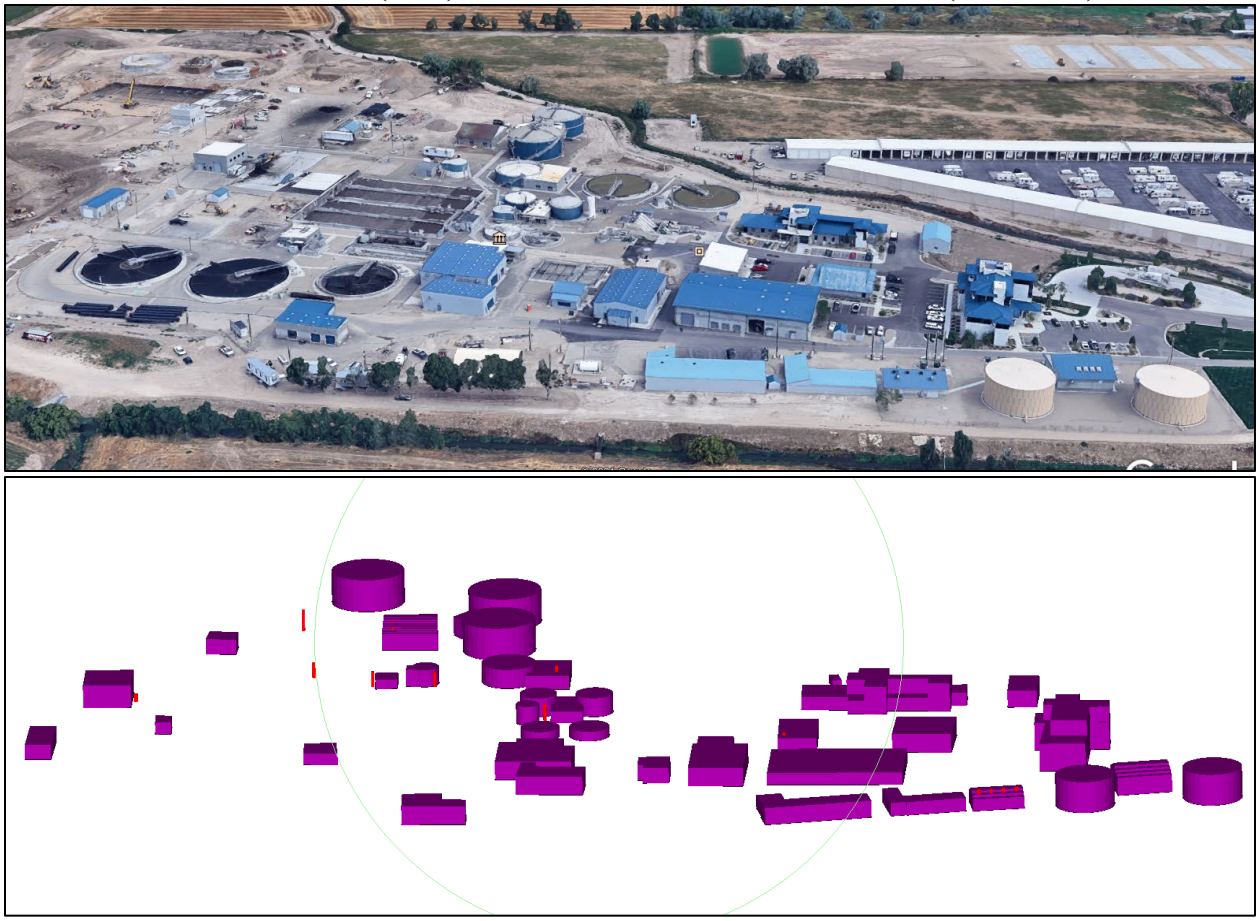


Figure 4. MERIDIAN WRRF STRUCTURES VIEWED FROM THE SOUTH – GOOGLE EARTH IMAGE (TOP) AND 3-D VIEW OF MODEL SETUP (BOTTOM)



3.3.7 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 justification using the facility's perimeter fencing and security gate as the method used to preclude public access. DEQ noted that the modeled ambient air boundary did not match the physical fence line along the southern portion of the facility. The ambient air boundary followed the property line along the canal as depicted above in Figure 3.

DEQ determined the methods used to preclude public access to the areas not treated as ambient air are acceptable, per Section 6.5 of the DEQ *Modeling Guideline*[3].

3.3.8 Receptor Network

SIL and cumulative NAAQS analyses used the same full receptor grid. Table 11 describes the receptor network used in the submitted modeling analyses. The receptor grid contained 6,394 receptors and provided coverage of an 11.5-kilometer (X) by 11-kilometer (Y) area, or 126.5 square kilometers. Figures 5 and 6 depict the receptor grid applied in the modeling analyses.

The receptor grids provided good resolution of the maximum design concentrations for the project and provided extensive coverage to verify that maximum impacts were captured within the 10-meter high density receptor grid. A refinement of the receptor grid density was not necessary. The receptor grids used met the minimum recommendations specified in the *Idaho Air Quality Modeling Guideline*[3] and were effective in reasonably assuring compliance with applicable air quality standards at all ambient air locations.

Figure 5. SIL AND NAAQS RECEPTOR GRID COVERAGE FOR THE MERIDIAN WRRF

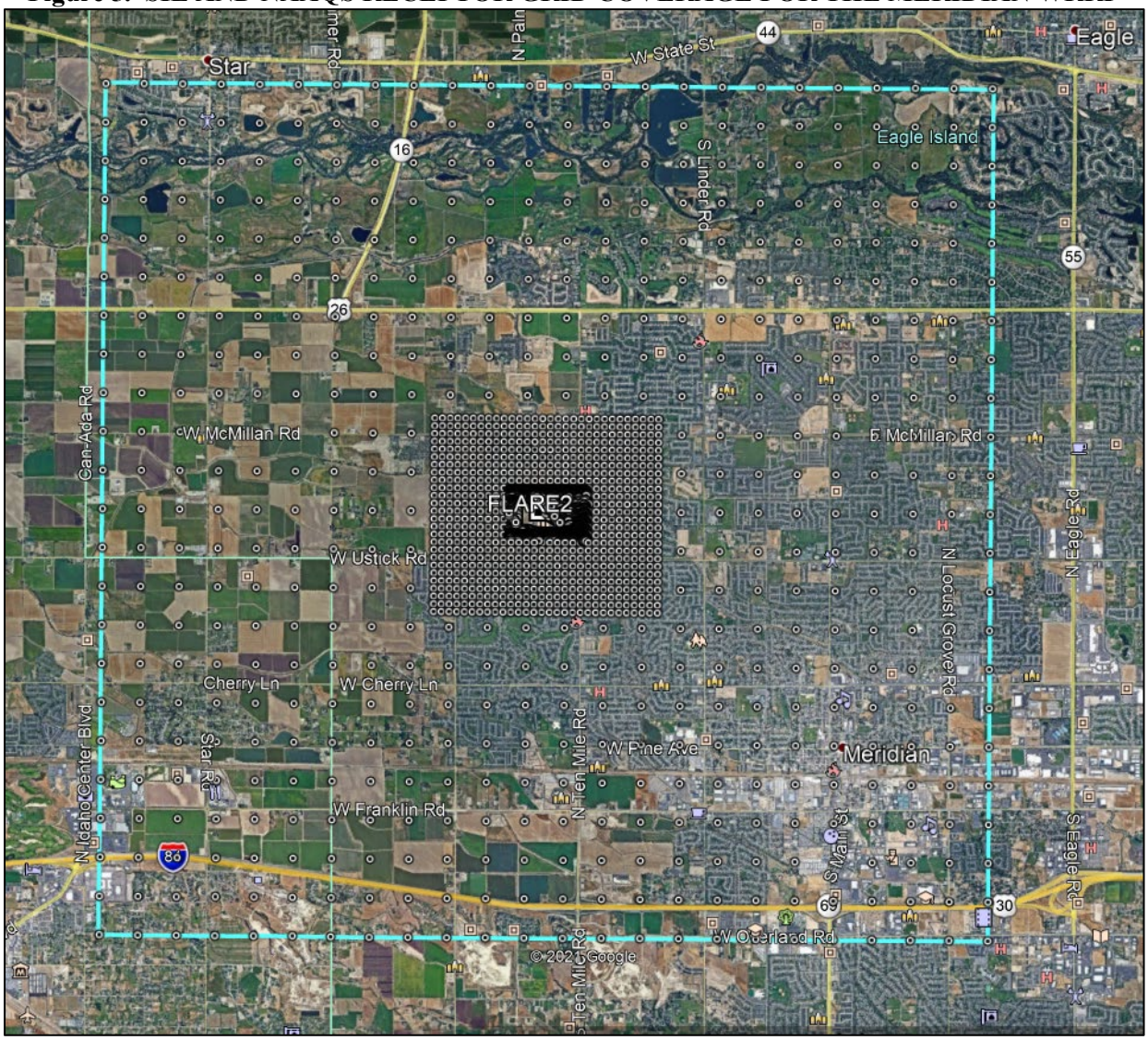
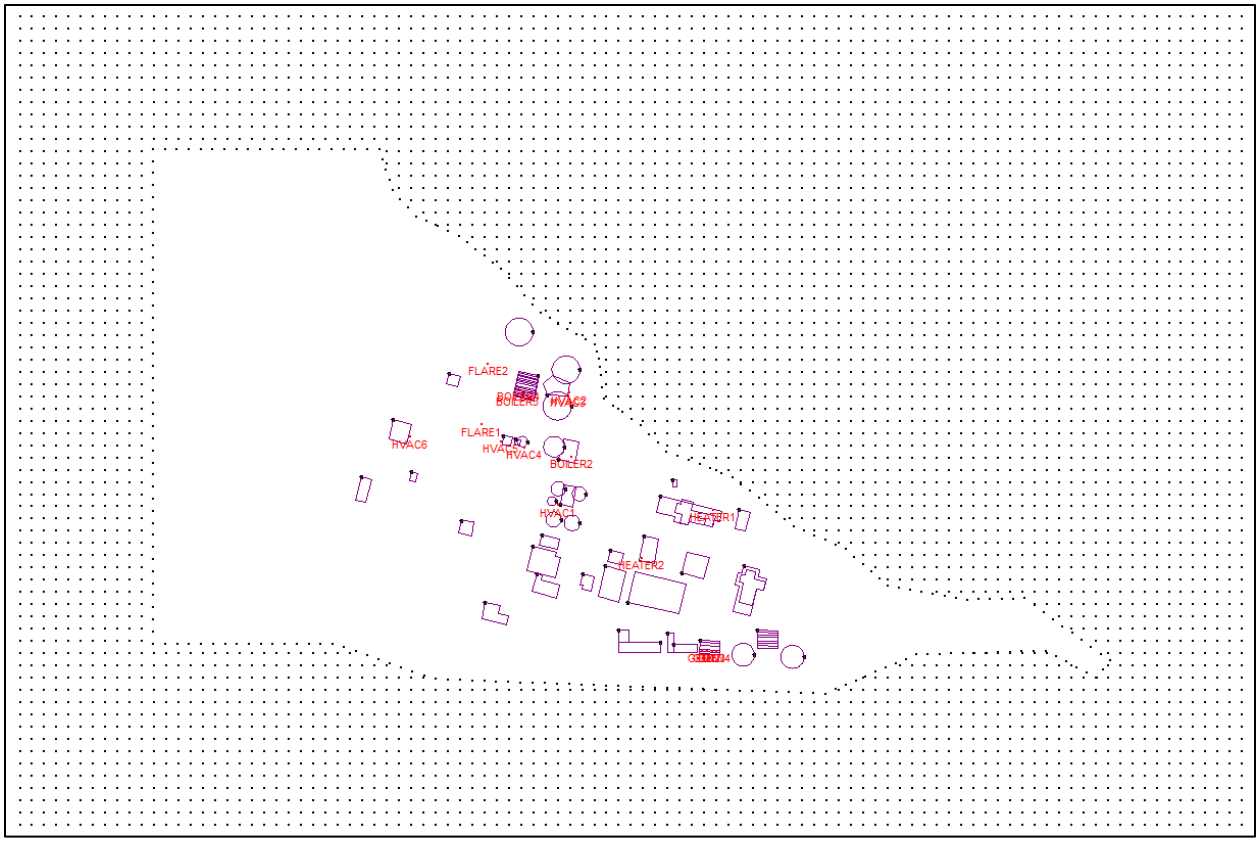


Figure 6. HIGH DENSITY RECEPTORS FOR AMBIENT AIR BOUNDARY AND NEAR FACILITY



3.3.9 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 sources modeled at the facility are below GEP stack height. Consideration of downwash caused by nearby buildings was required and Jacobs included all buildings in the model setup that were located near the emission sources.

4.0 SIL, NAAQS, and TAPs Impact Modeling Results

4.1 Results for SIL and NAAQS Analyses

4.1.1 Significant Impact Level Analysis

SIL analyses were performed for the 1-hour and 3-hour SO_2 standards for this project. The SO_2 emission increases for the new open flare were modeled to evaluate compliance with the significant contribution concentrations established in Section 006.109.a. The project's SIL design values and compliance evaluations are listed in Table 12.

Table 12. RESULTS FOR SIGNIFICANT IMPACT ANALYSES

Pollutant	Averaging Period	Modeled Design Value Concentration ($\mu g/m^3$)[a, b]	SIL[c] ($\mu g/m^3$)	Percent of SIL	Cumulative NAAQS[d] Analyses Required?
SO_2	1-hour	23.54	7.8	302%	Yes
	3-hour	22.25	25	89%	No

a. Micrograms per cubic meter.
b. Maximum 1st highest impact.
c. Significant Impact Level (also referred to as "significant contribution") specified in Section 006.109 of the Idaho *Air Rules*.
d. National Ambient Impact Analyses.

The maximum 3-hour SO_2 impact was below the SIL and cumulative impact analyses were not required for this pollutant and averaging period. The maximum 1-hour SO_2 impact exceeded the SIL and cumulative impact analyses were required for this pollutant and averaging period.

4.1.2 Cumulative NAAQS Impact Analysis

Table 13 provides results for the cumulative NAAQS impact analyses performed for the 1-hour SO_2 standard. The full receptor grid described in Table 11 of this modeling memo was used for all pollutants and averaging periods. For each modeled pollutant, the total impact was calculated by adding the design value (DV) of the impact to the DEQ-approved ambient background value. The sum was then compared to the NAAQS. Ambient impacts for the MWRRF facility, when combined with approved ambient backgrounds, were greater than the NAAQS at 57 receptors for the 1-hour SO_2 NAAQS. Receptor spacing was 10 meters in this area and DEQ determined that maximum impacts were adequately resolved by Jacobs for the NAAQS and culpability analyses. All exceedances of the 1-hour SO_2 NAAQS were predicted to occur in a confined region along the eastern ambient air boundary of the facility and extended from the ambient air boundary out to a distance of approximately 45 meters (146 feet). See Figure 9 to see the receptor locations and magnitudes of the SO_2 impacts based the 5-year average of 4th highest maximum daily 1-hour average concentrations. All receptors with a facility-wide ambient impact greater than 184.37 $\mu g/m^3$ (196 $\mu g/m^3$ NAAQS – 11.63 $\mu g/m^3$ Ambient Background) were required to be included in a culpability analysis to demonstrate the proposed project (Flare 2 emission unit) did not cause or contribute to a violation of the 1-hour SO_2 NAAQS.

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[b] ($\mu g/m^3$)**	**Percent of NAAQS**
SO_2	1-hour	269.0[c]	11.6	280.6	196	143%

a. Micrograms per cubic meter.
b. National Ambient Air Quality Standards.
c. Maximum of 5-year means of 4th high maximum daily1-hour modeled concentrations at each receptor.

The region of the predicted exceedances for the cumulative 1-hour SO_2 NAAQS analyses is shown in Figures 7 and 8. The area of exceedances is located on the eastern portion of the ambient air boundary which is east and northeast of the locations of the highest-emitting SO_2 emissions units.

Figure 7. REGION OF 1-HOUR SO_2 EXCEEDANCES FOR FACILITY-WIDE EMISSIONS

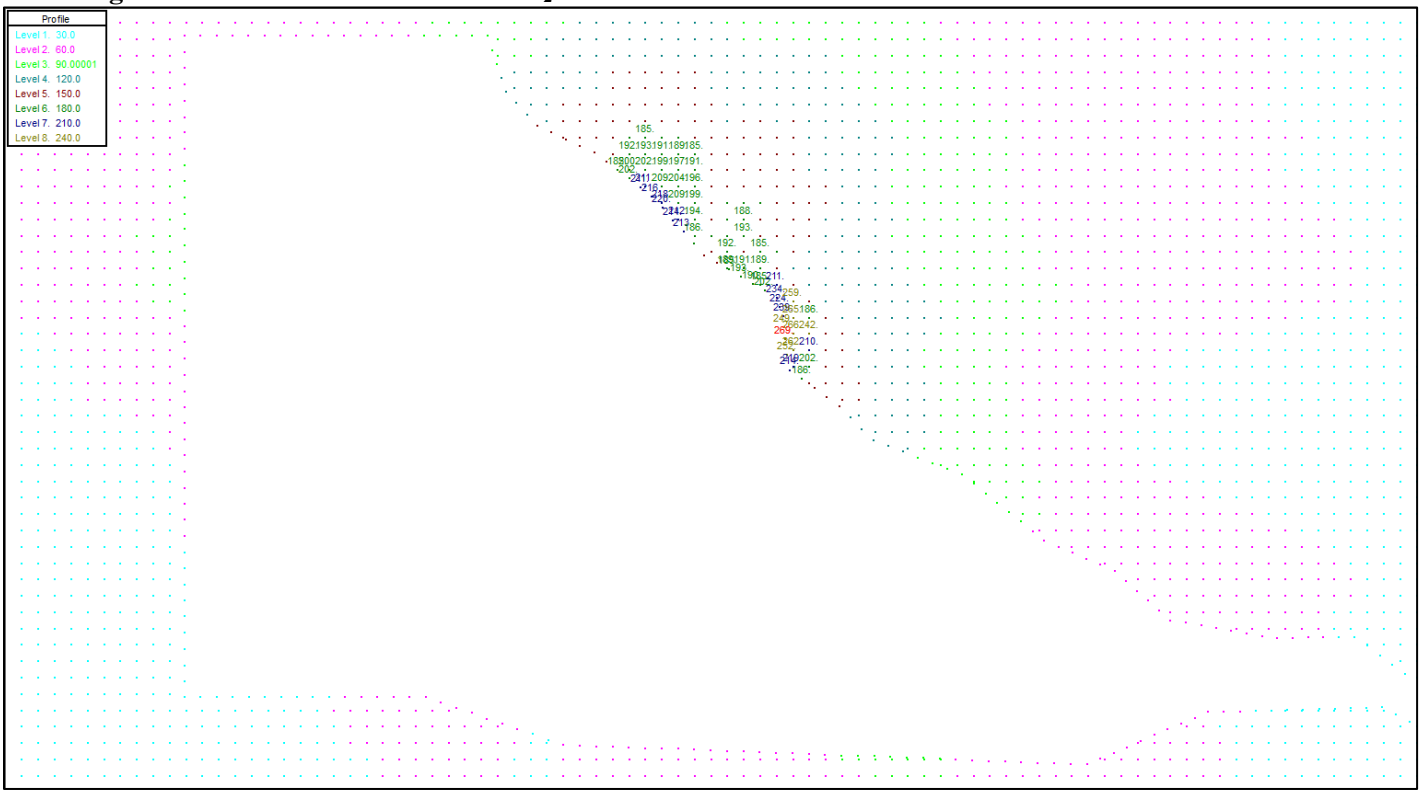
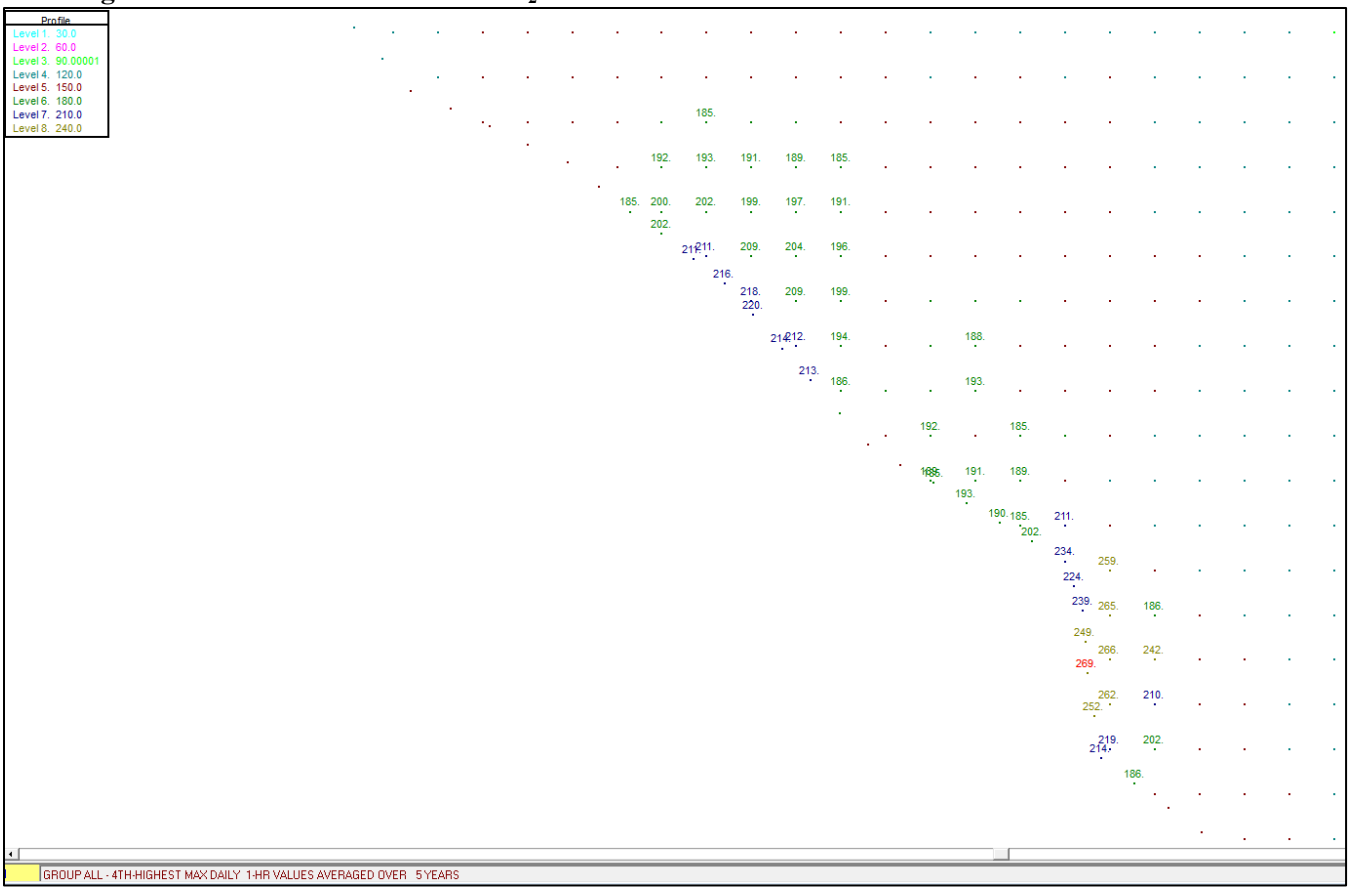


Figure 8. DETAIL OF 1-HOUR SO_2 EXCEEDANCES FOR FACILITY-WIDE EMISSIONS



4.1.3 Project 1-hour SO_2 Culpability Analysis

The modification project is identified as new Anaerobic Digester 6 and new Flare 2, with Flare 2 being the only source emitting regulated air pollutants to the atmosphere. All other emissions units that emit SO_2 are existing emissions units. Potential SO_2 emissions for the new Flare 2 and existing sources reflecting this project's 1,200 ppm_v limit on H_2S were predicted to exceed the 1-hour SO_2 NAAQS. In order for the project to be eligible to be issued a PTC, the applicant must show that the new project itself does not cause or contribute to a violation of the 1-hour SO_2 NAAQS. All rankings of ambient impacts that exceed the NAAQS with the inclusion of the DEQ-approved ambient background concentration must be analyzed to verify that the project does not cause or contribute to a modeled violation of the 1-hour SO_2 NAAQS. AERMOD's MAXDCONT output option identifies ambient impacts for specific user-defined source groups to be paired in space and time. Jacobs used this method to identify the project's (Flare 2) modeled impact separately from the impact attributed to the existing facility emission units that include the three existing biogas-fired boiler, existing biogas flare, emergency generators, and HVAC units.

All ranks of impacts between the design value impact (4th rank) and the rank where the facility-wide impact plus the ambient background concentration provides a NAAQS-compliant impact must be evaluated to verify Flare 2's impact does not exceed the 1-hour SO_2 SIL at all affected receptors where facility-wide emissions were predicted to exceed the 1-hour SO_2 NAAQS.

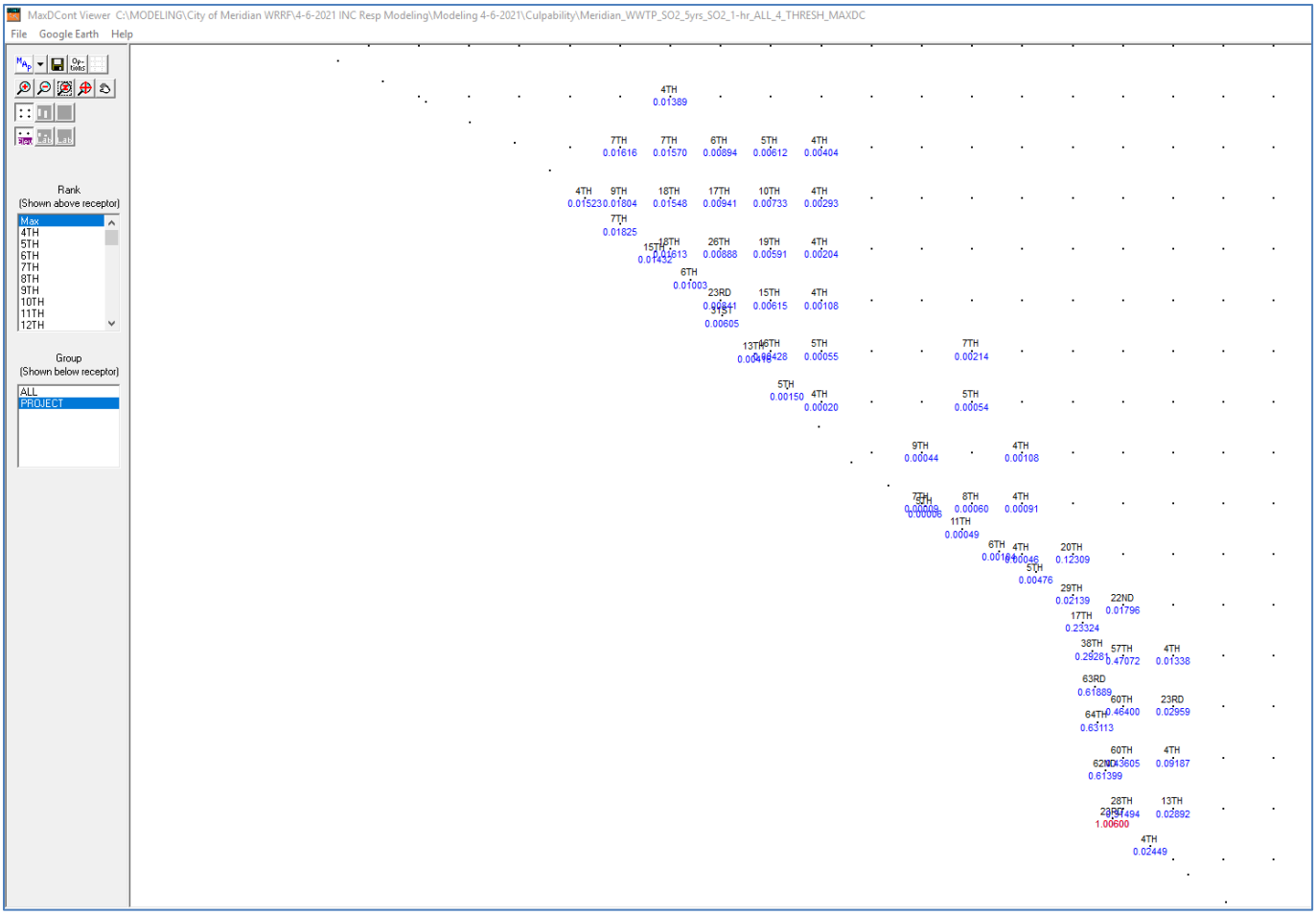
The facility-wide impact threshold to demonstrate NAAQS compliance is:

(196 $\mu g/m^3$, 1-hour SO_2 NAAQS – 11.63 $\mu g/m^3$, 1-hour SO_2 Ambient Background) = 184.37 $\mu g/m^3$

Facility-wide impacts with Ranks 4 through 64 were determined to have an ambient impact of above the 184.37 $\mu g/m^3$ for at least one receptor location. The 4th rank is the design value rank for the 1-hour SO_2 NAAQS. Provided the impact attributed to the proposed project (Flare 2) is below the 7.8 $\mu g/m^3$, 1-hour average SO_2 SIL at each receptor for each rank where the facility-wide impact plus ambient background exceeded the 1-hour SO_2 NAAQS, the project does not cause or contribute to a violation of the NAAQS. Jacobs submitted MAXDCONT AERMOD output files demonstrating that all ambient impacts for the project (Flare 2) were substantially below the 1-hour SO_2 SIL for all ranks and all receptors where facility-wide 1-hour SO_2 impacts exceeded the NAAQS. Figure 9 depicts the maximum impact of the 4th through 64th ranks of impacts of the proposed project (Flare 2) at all receptors where an exceedance was predicted to occur. The maximum 1-hour SO_2 culpability impact for the modification project's Flare 2 was predicted to be 1.0060 $\mu g/m^3$, from the 23rd rank of facility-wide impacts above the NAAQS. This maximum Flare 2 impacts, paired in space and time, is does not exceed the 7.8 $\mu g/m^3$, 1-hour SO_2 SIL. DEQ determined Jacobs adequately demonstrated that the proposed project will not cause or contribute to a violation of the 1-hour SO_2 NAAQS.

The 1-hour SO_2 NAAQS analyses performed by Jacobs predicted modeled NAAQS violations would occur at a group of receptors located in a confined region along the ambient air boundary. The ambient impact analyses modeled violations cannot be assumed to result in real-world monitored violations at each of the receptors where a modeled exceedance was predicted to occur for several reasons. Jacobs used worst-case maximum emission rates from existing Flare 1 and the three existing boilers for 8,760 hours/year, and incorporated the permit-allowable 1,200 ppm_v H_2S limit for SO_2 combustion by-product emissions, as well at the full rated heat input capacity for each emissions unit, which exceeded the permit allowable biogas production of 360,000 scf/day for the three existing anaerobic digesters. Actual ambient impacts are likely to be lower considering the actual historical biogas production rate is less than the permit allowable production rate; actual historical H_2S content of the biogas was approximately 800 ppm_v rather than 1,200 ppm_v; and, boiler utilization to supply heat to the digesters would be lower during warmer periods, which introduces a seasonal effect to actual ambient impacts. Further refinements to the analyses could show that a modeled violation would not be predicted to occur.

Figure 9. MAGNITUDE AND RANK OF THE PROJECT (FLARE 2) AT ALL RECEPTORS WITH PREDICTED 1-HOUR SO_2 EXCEEDANCES FOR FACILITY-WIDE EMISSIONS



4.2 Results for TAPs Impact Analyses

Emissions of non-carcinogenic TAPs did not exceed the ELs of Section 585 of the Idaho Air Rules. Emissions of carcinogenic TAPs benzene, formaldehyde, and naphthalene—which is treated as a carcinogenic TAP equivalent to an individual polyaromatic hydrocarbon—exceeded the ELs specified in Section 586 of the Idaho Air Rules. These TAPs are emitted by the new flare (Flare 2) and are not exempt from modeling requirements pursuant to Section 210.20 of the Idaho Air Rules. Modeling was performed for these TAPs. Table 14 provides a summary of TAP impacts for the project for those TAPs with emission increases exceeding the ELs. Impacts for all modeled TAPs were well below the allowable increments.

Table 14. TAP IMPACT ANALYSES RESULTS				
TAP	**Averaging Period**	**Maximum Modeled Impact ($\mu g/m^3$)[a]**	**AACC[b] ($\mu g/m^3$)**	**Percent of AACC**
Benzene	Annual	8.2E-04	0.12	0.7%
Formaldehyde	Annual	6.1E-03	7.7E-02	8%
Naphthalene	Annual	6E-05	1.4E-02	0.4%

a. Micrograms per cubic meter.
b. Acceptable ambient concentration for carcinogens. Modeled impact and AACC represent an 8,760-hour averaged concentration.

5.0 Conclusions

The information submitted with the PTC application demonstrated to DEQ's satisfaction that emissions from the City of Meridian WRRF, located in Meridian, will not cause or significantly contribute to a violation of any applicable ambient air quality standard or TAP increment.

References

1. IDAPA 58.01.01 et. al., Rules for the Control of Air Pollution in Idaho. Available at https://adminrules.idaho.gov/rules/current/58/580101.pdf.

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

3. *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.

4. Justification of Revised Modeling Thresholds. Idaho Department of Environmental Quality Memorandum. Kevin Schilling, Air Quality Dispersion Modeling Supervisor, Air Program. January 14, 2020 (sic 2021).

5. *Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program.* United States Environmental Protection Agency, Office of Air Quality Planning and Standards. April 30, 2019. EPA-454_R-19-003. Available at https://www3.epa.gov/ttn/scram/guidance/guide/EPA-454_R-19-003.pdf.

6. *SCREEN3 Model User's Guide*, United States Environmental Protection Agency, EPA-454/B-95-004, September 1995.

APPENDIX C – FACILITY DRAFT COMMENTS

No comments from the facility.

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:	**City of Meridian Water Resource**
Address:	**3401 N. Ten Mile Road**
City:	**Meridian**
State:	**Idaho**
Zip Code:	**83646**
Facility Contact:	**Laurelei McVey**
Title:	**Deputy Director of Utility Operations**
AIRS No.:	**001-00228**

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	1.9	0	1.9
SO_2	0.0	22.24	-22.2
CO	7.5	0	7.5
PM10	0.3	0	0.3
VOC	1.7	0	1.7
Total:			**-10.8**
Fee Due	**$ 1,000.00**		

Comments: The facility is requesting to add a new anaerobic digester, a new flare, and reduce the H2S concentration on the biogas combustion in the boilers and flares.