Statement of Basis

Permit to Construct P-2009.0024
Project No. 60628

Cargill Environmental Finance
Dry Creek Dairy
Hansen, Idaho

Facility ID No. 083-00099

Final

March 31, 2011
Eric Clark
Permit Writer

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

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
BMP	best management practices
Btu	British thermal units
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CAS No.	Chemical Abstracts Service registry number
CBP	concrete batch plant
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CI	compression ignition
CMS	continuous monitoring systems
CO	carbon monoxide
COMS	continuous opacity monitoring systems
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
FEC	Facility Emissions Cap
gpm	gallons per minute
gph	gallons per hour
gr	grain (1 lb = 7,000 grains)
HAP	hazardous air pollutants
HMA	hot mix asphalt
hp	horsepower
hr/yr	hours per year
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
m	meters
MACT	Maximum Achievable Control Technology
mg/dscm	milligrams per dry standard cubic meter
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NAICS	North American Industry Classification System
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

PAH	polyaromatic hydrocarbons
PC	permit condition
PCB	polychlorinated biphenyl
PERF	Portable Equipment Relocation Form
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
RAP	recycled asphalt pavement
RFO	reprocessed fuel oil
Rules	Rules for the Control of Air Pollution in Idaho
scf	standard cubic feet
SCL	significant contribution limits
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_X	sulfur oxides
T/yr	tons per consecutive 12-calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
TEQ	toxicity equivalent
T-RACT	Toxic Air Pollutant Reasonably Available Control Technology
U.S.C.	United States Code
UTM	Universal Transverse Mercator
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

Cargill Environmental Finance constructed an anaerobic digester at Dry Creek Dairy. The digester was designed to produce biogas from on-site dairy cattle manure. The resulting biogas from the digester will be combusted either in a flare or in three on-site generators that are used for primary electrical production for the facility. The produced electricity will also be sold to the local utility. In addition, to better control hydrogen sulfide emissions, a bio-scrubber has been installed onsite.

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).

March 18, 2008	P-2007.0230, the initial PTC for the construction of the digester and three on-site generators, Permit status (S)
July 10, 2009	P-2009.024, PTC modification to replace H_2S limit with SO_2 limit, revise monitoring of SO_2 and to correct flare ignition description, Permit Status (A, will be superseded upon issuance of permit of associated with this Statement of Basis).

Application Scope

This PTC is for a minor modification at an existing minor facility. The applicant has proposed to increase the daily biogas production from 864,000 scf to 1.2 million scf and to install and operate a hydrogen sulfide scrubber.

Application Chronology

May 5, 2010	DEQ sent a notice of violation to the facility, which included notification that a PTC was required (Enforcement Case No. E-2010.0009).
November 10, 2010	DEQ received an application and an application fee.
December 2 – Dec. 17, 2010	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
December 10, 2010	DEQ determined that the application was incomplete.
January 7, 2011	DEQ received supplemental information from the applicant.
February 3, 2011	DEQ determined that the application was complete.
March 24, 2011	DEQ made available the draft permit and statement of basis for peer and regional office review.
March 25, 2011	DEQ made available the draft permit and statement of basis for applicant review.
March 30, 2011	DEQ received the permit processing fee.
March 31, 2011	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Devices

Table 1 EMISSIONS UNIT AND CONTROL DEVICE INFORMATION

ID No.	Source Description	Control Equipment Description	Emissions Point ID No. and Description
Anaerobic Digester	Capacity: 4.3 million gallons Throughput: 270,000 gallons per day Biogas production: 1,200,000 cubic feet per day	Three IC Engines (Engines #1-#3) and emergency flare	N/A
Engine #1	Manufacturer: Guascor Model: SFFGLD 560 Rated Power: 1,057 bhp Ignition Type: Spark Fuel: Biogas Generating Capacity: 750 kW		
Engine #2	Manufacturer: Guascor Model: SFFGLD 560 Rated Power: 1,057 bhp Ignition Type: Spark Fuel: Biogas Generating Capacity: 750 kW	C-1 H_2S Scrubber Manufacturer: Bio Gasclean Model: TH-20/1.2	Stack Height: 20.0 ft Stack Diameter: 11.8 in. Exit Temperature: 430 K Exhaust Flow rate: 3,877 cfm
Engine #3	Manufacturer: Guascor Model: SFFGLD 560 Rated Power: 1,057 bhp Ignition Type: Spark Fuel: Biogas Generating Capacity: 750 kW		
Flare	Manufacturer: N/A Model: N/A Rated Heat Input: 28.3 MMBtu/hr	C-1 H_2S Scrubber Manufacturer: Bio Gasclean Model: TH-20/1.2	Stack Height: 37.0 ft Stack Diameter: 23.6 in. Exit Temperature: 1,273 K Exhaust Flow rate: 9,099 cfm

Emissions Inventories

An emission inventory was developed for the three IC spark ignition engines and the emergency flare at the facility (see Appendix A) associated with this proposed project. Emissions estimates of criteria pollutant PTE were based on emission factors from AP-42 table 3.2-2, EPA's Webfire database, the Gas Technology Institute on the quality of biomethane from dairy waste, vendor information and source test data and operation of 8,760 hours per year. Summaries of the estimated uncontrolled and controlled emissions of criteria pollutants, TAPs, and HAPs from the facility are provided in the following tables.

__Pre-Project Potential to Emit__

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

Table 2 PRE-PROJECT POTENTIAL TO EMIT FOR CRITERIA POLLUTANTS

Emissions Unit	PM_{10}		SO_2		NO_X		CO		VOC	
	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]
Point Sources										
Engine #1	5.35E-04	2.35E-03	4.02	17.62	2.32	10.20	5.12	22.43	2.32	10.20
Engine #2	5.35E-04	2.35E-03	4.02	17.62	2.32	10.20	5.12	22.43	2.32	10.20
Engine #3	5.35E-04	2.35E-03	4.02	17.62	2.32	10.20	5.12	22.43	2.32	10.20
Pre-Project Totals	**1.61E-03**	**0.01**	**12.06**	**52.86**	**6.96**	**30.60**	**15.36**	**67.29**	**6.96**	**30.60**

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.
b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.

Post Project Potential to Emit

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

Table 3 POST PROJECT POTENTIAL TO EMIT FOR CRITERIA POLLUTANTS

Emissions Unit	PM_{10}		SO_2		NO_X		CO		VOC	
	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]
Point Sources										
Engine #1	5.22E-04	2.29E-03	1.20	4.37	4.19	18.37	4.19	18.37	2.33	10.21
Engine #2	5.22E-04	2.29E-03	1.20	4.37	4.19	18.37	4.19	18.37	2.33	10.21
Engine #3	5.22E-04	2.29E-03	1.20	4.37	4.19	18.37	4.19	18.37	2.33	10.21
Flare	0.11	0.47	1.40	5.1	1.92	2.36	2.93	12.82	1.10	5.0
Post Project Totals	**0.11**	**0.47**	**5.00**	**18.21**	**14.49**	**57.47**	**15.50**	**67.93**	**8.09**	**35.63**

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.
b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.

This facility is designated as a Synthetic Minor facility. As demonstrated in Table 3 the facility's PTE for all criteria pollutants is less than 80% of the Major Source thresholds of 100 T/yr. Therefore, this facility will not be designated as a SM-80 facility.

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 or if emissions modeling may be required, and to determine the processing fee per IDAPA 58.01.01.225. The following table presents the facility-wide change in the potential to emit for criteria pollutants.

Table 4 CHANGES IN POTENTIAL TO EMIT FOR CRITERIA POLLUTANTS

	PM_{10}		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
Point Sources										
Pre-Project Potential to Emit	0.00161	0.01	12.06	52.86	6.96	30.60	15.36	67.29	6.96	30.60
Post Project Potential to Emit	0.11	0.47	5.00	18.21	14.49	57.47	15.50	67.93	8.09	35.63
Changes in Potential to Emit	**0.11**	**0.46**	**-7.06**	**-34.65**	**7.53**	**26.87**	**0.14**	**0.64**	**1.13**	**5.03**

Non-Carcinogenic TAP Emissions

A summary of the estimated uncontrolled and controlled non-carcinogenic emissions increase of toxic air pollutants (TAP) is provided in the following table. All but one of the estimated controlled emissions increases of TAP were exceeded applicable emissions screening levels (EL). Estimated controlled TAP emissions were below the annual major source threshold.

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

Table 5 POST PROJECT NON-CARCINOGENIC TAP EMISSIONS SUMMARY POTENTIAL TO EMIT

Non-Carcinogenic Toxic Air Pollutants	Post Project 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	1.05E-01	1.07E-02	Yes
Barium	6.16E-05	3.30E-02	No
Biphenyl	4.31E-03	1.00E-01	No
2-Chlorophenol	5.28E-07	3.30E-02	No
Chromium	1.96E-05	3.30E-02	No
Cobalt	1.18E-06	3.30E-03	No
Copper	1.19E-05	6.70E-02	No
Cresols/Cresylic Acid	3.11E-05	1.47	No
Cyclopentane	4.62E-03	11.5	No
Dibuytl Phthalate	1.04E-06	3.33E-01	No
Ethyl Benzene	8.20E-04	29	No
Methanol	5.09E-02	17.3	No
Hexane	2.26E-02	12	No
Hydrogen Sulfide	7.05E-02	9.33E-01	No
Manganese	5.32E-06	3.33E-01	No
Mercury	3.64E-06	3.00E-03	No
o-Methylcyclohexanone	2.50E-02	15.3	No
Molybdenum	1.54E-05	3.33E-01	No
Napthalene	1.52E-03	3.33	No
Nitrobenzene	7.29E-07	3.33E-01	No
Nonane	2.24E-03	70	No
Octane	7.14E-03	93.3	No
Pentane	8.93E-02	118	No
Phenol	4.89E-04	1.27	No
Pyridine	7.29E-07	1	No
Styrene	7.29E-07	6.67	No
Toluene	8.35E-03	25	No
Trimethyl benzene	1.45E-03	8.2	No
2,2-4 Trimethyl-pentane	5.09E-03	23.3	No
Xylene	3.74E-03	29	No
Zinc Oxide	4.06E-04	6.67E-01	No

Therefore, modeling is required for Acrolein because the 24-hour average non-carcinogenic screening EL identified in IDAPA 58.01.01.585 was exceeded.

Carcinogenic TAP Emissions

A summary of the estimated uncontrolled and controlled carcinogenic emissions increase of toxic air pollutants (TAP) is provided in the following table. The estimated uncontrolled emissions increases of some TAP were exceeded applicable emissions screening levels (EL). Estimated controlled TAP emissions were exceeded the annual major source threshold.

Post project, as well as the change in, carcinogenic TAP emissions are presented in the following table:

Table 6 POST PROJECT CARCINOGENIC TAP EMISSIONS SUMMARY POTENTIAL TO EMIT

Carcinogenic Toxic Air Pollutants	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Aniline	8.37E-03	9.00E-04	No
Arsenic	2.80E-06	1.50E-06	Yes
Benzene	5.46E-03	8.00E-04	Yes
Bis (2-chloro-1-methyl-ethyl) ether	2.01E-06	3.30E-04	No
Bis (2-ethylhexyl) phthalate	5.21E-06	2.80E-02	No
Cadmium	1.54E-05	3.70E-06	Yes
Carbon Tetrachloride	1.14E-06	4.40E-04	No
Dichloromethane	4.07E-04	1.60E-03	No
Formaldehyde	1.05E-03	5.10E-04	Yes
Naphthalene	1.52E-03	9.10E-05	Yes
Nickel	2.94E-05	2.70E-05	Yes
1,1,2,2, -Tetrachloro-ethane	5.04E-05	1.10E-05	Yes
Tetrachloroethylene	9.48E-07	1.30E-02	No
1,1,2 - Trichloroethane	2.32E-05	4.20E-04	No
Vinyl Chloride	3.03E-04	1.20E-03	No

Therefore, modeling is required for arsenic, cadmium, napthalene, nickel and 1,1,2,2 – tetrachloro-ethane because the annual average carcinogenic screening EL identified in IDAPA 58.01.01.586 was/were exceeded. Note that the EL of benzene and formaldehyde were also exceeded. However, when determining standards for the NSPS, Subpart JJJJ, seven urban HAPs were evaluated. These seven include: 7 PAH, acetaldehyde, arsenic, benzene, beryllium, cadmium and formaldehyde. According to the final rule of the subpart promulgated in the Federal Register on January 18, 2008, if a spark-ignition meets the standards set forth in the subpart these specified urban HAPs are being controlled to a satisfactory level. Additionally, IDAPA 58.01.01.20.a states: if the owner or operator demonstrates that the toxic air pollutant from the source or modification is regulated by the Department at the time of permit issuance under 40 CFR Part 60, 40 CFR Part 61 or 40 CFR Part 63, no further procedures for demonstrating preconstruction compliance will be required under Section 210 for that toxic air pollutant as part of the application process. Therefore, although benzene and formaldehyde emissions exceed the EL, they are regulated by 40 CFR 60, Subpart JJJJ and do not need to be modeled to demonstrate compliance.

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 Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 7 HAP EMISSIONS SUMMARY POTENTIAL TO EMIT

HAP Pollutants	PTE (T/yr)
Acrolein	4.58E-01
Biphenyl	1.89E-02
Chromium	8.58E-05
Cobalt	5.15E-06
Cresols/Cresylic Acid	1.36E-04
Dibutyl phthalate	4.53E-06
Ethyl Benzene	3.59E-03
Methanol	2.23E-01
Hexane	9.89E-02
Hydrogen Sulfide	3.09E-01
Manganese	2.33E-05
Mercury	1.59E-05
Naphthalene	6.67E-03
Nitrobenzene	3.19E-06
Phenol	2.14E-03
Styrene	3.19E-06
Toluene	3.66E-02
2,2,4-Trimethyl-pentane	2.23E-02
Xylene	1.64E-02
Aniline	3.66E-05
Arsenic	1.23E-05
Benzene	2.39E-02
Bis (2-chloro-1-methyl-ethyl) ether	8.81E-06
Bis (2-ethylhexyl) phthalate	2.28E-05
Cadmium	6.75E-05
Carbon Tetrachloride	5.01E-06
Dichloromethane	1.78E-03
Formaldehyde	4.60E-03
Nickel	1.29E-04
1,1,2,2 – Tetrachloroethane	2.21E-04
Tetrachloroethylene	4.15E-06
1,1,2 – Trichloroethane	1.02E-04
Vinyl Chloride	1.33E-03
Totals	**1.23**

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix A, the estimated emission rates of PM_{10}, SO_2, NO_X, CO, and several TAPs from this project were 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 TAPs is provided in Appendix B.

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

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

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Twin Falls 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.

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.

General Rules For Odor Control (IDAPA 58.01.01.776)

IDAPA 58.01.01.776 Odor Control

The permittee shall not allow, suffer, cause, or permit the emission of odorous gasses, liquids, or solids to the atmosphere in such quantities as to cause air pollution. This requirement is assured by Permit Conditions 9 and 26.

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625 Visible Emissions

The sources of PM_{10} emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 8 and 25.

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

IDAPA 58.01.01.301 Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for any criteria pollutant or 10 tons per year for any one HAP or 25 tons per year for all HAPs 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 58.01.01.006.113 and the requirements of IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 Prevention of Significant Deterioration of Air Quality

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

NSPS Applicability (40 CFR 60)

The facility is subject to the requirements of 40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.

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

Cargill Environmental Finance – Dry Creek is proposing to operate three 1,057 horsepower, NSPS non-certified, lean-burn, SI IC engines that exclusively combust biogas that is produced from an on-site anaerobic digester.

40 CFR 60.4230 **Am I subject to this subpart?**

Cargill Environmental Finance – Dry Creek commenced construction after June 12, 2006, and the generators were manufactured after July 1, 2007 and have a capacity greater than 500 HP. Therefore, in accordance with 40 CFR 60.4230(a)(3)(i), 40 CFR 60, Subpart JJJJ is applicable to Cargill Environmental Finance – Dry Creek.

40 CFR 60.4231 **What emission standards must I meet if I am a manufacturer of stationary spark ignited internal combustion engines?**

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

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

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

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

In accordance with 40 CFR 60.4233(e), as the owner and operator of the three SI lean-burn IC engines that combust digester gas and are greater than 75KW (100 bhp), Cargill Environmental Finance – Dry Creek must comply with the emission standards in 40 CFR 60, Subpart JJJJ, Table 1 as summarized below and compliance is demonstrated in Permit Condition 12.

Table 4.1 40 CFR 60, SUBPART JJJJ, TABLE 1 SUMMARY

Engine Type and Fuel	Maximum Engine Horsepower (bhp)	Manufacture Date	Emission Standards[1]					
			g/bhp-hr			ppmvd at 15% O_2		
			NO_x	CO	VOC[2]	NO_x	CO	VOC[2]
Digester Gas (except lean burn 500≥HP<1,350)	HP≥500	7/1/2007	3.0	5.0	1.0	220	610	80
Digester Gas Lean Burn	500≥HP<1,350	1/1/2008	3.0	5.0	1.0	220	610	80

[1] Owners and operators of stationary non-certified spark ignited IC engines may choose to comply with the emission standards in units of either g/bhp-hr or ppmvd at 15% O_2.

[2] When calculating emissions of volatile organic compounds, emission of formaldehyde should not be included.

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

As the owner and operator of three SI IC engines that combust digester gas, Cargill Environmental Finance – Dry Creek must operate and maintain these engines to achieve the emission standards as required in 40 CFR 60.4233 over the entire life of the engines. Permit Condition 13 ensures compliance.

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

As the owner and operator of three SI IC engines that combust digester gas, Cargill Environmental Finance – Dry Creek is not subject to this section of the rule.

40 CFR 60.4236 What is the deadline for importing or installing stationary SI ICE produced in the previous model year?

Cargill Environmental Finance – Dry Creek will be installing their SI IC engines in the year 2011. The engines that are being installed all meet the requirements of 60.4233. Therefore, this section is being met by Cargill Environmental Finance – Dry Creek.

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

The IC engines that Cargill Environmental Finance – Dry Creek will be installing will be used for primary electrical production and production of electricity that will be sold to the community electrical grid. These engines will not be used in "*emergencies*" as defined in 40 CFR 60.4248. Therefore, this section does not apply to the engines at this facility.

40 CFR 60.4238 What are my compliance requirements if I am a manufacturer of a stationary SI internal combustion engines ≤19KW (25HP).

Cargill Environmental Finance – Dry Creek is an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. This section does not apply to this facility.

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

Cargill Environmental Finance – Dry Creek will be an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

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

Cargill Environmental Finance – Dry Creek will be an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

40 CFR 60.4241 What are my compliance requirements if I am a manufacturer of stationary SI internal combustion engines participating in the voluntary certification program?

Cargill Environmental Finance – Dry Creek will be an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

40 CFR 60.4242 What other requirements must I meet if I am a manufacturer of stationary SI internal combustion engines?

Cargill Environmental Finance – Dry Creek will be an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

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

Cargill Environmental Finance – Dry Creek is the owner and operator of three SI IC engines, digester gas fired, non 40 CFR 60, Subpart JJJJ certified engines and must comply with standards specified in 40 CFR 60.4233(e). Each engine is rated at greater than 500 bhp. Therefore, Cargill Environmental Finance – Dry Creek must keep a maintenance plan and records of conducted maintenance. In addition, Cargill Environmental Finance – Dry Creek must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, in accordance with 40 CFR 60.4243(b)(2)(ii). Compliance is ensured by Permit Condition 27.

40 CFR 60.4243(g), does not apply to the three SI IC engines because the engines are not equipped with either a three-way catalyst or a non-selective catalytic reduction system. According to the preamble for 40 CFR 60, Subpart JJJJ in the Federal Register dated January 18, 2008, EPA expects that an air-to-fuel ratio controller will be operated only in the case of rich burn engines operating with a 3-way catalyst or non-selective catalytic reduction system.

Each engine is rated at greater than 500HP and was manufactured after July 1, 2007, and before July 1, 2008, but is not subject to 40 CFR 60.4233(b) or (c) because these engines are exclusively combusting digester gas and not gasoline or LPG fuels. Therefore, 40 CFR 60.4243(h) does not apply to the six SI IC engines proposed for this facility.

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

According to 40 CFR 60.4243(b)(2)(ii) by reference of 40 CFR 60.4243(c), Cargill Environmental Finance – Dry Creek is subject to conduct performance testing. This section specifies the performance test procedures that must be followed. 40 CFR 60, Subpart JJJJ, Table 2 specifies the methods and requirements for performance testing. Compliance is ensured by Permit Condition 28.

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

Cargill Environmental Finance – Dry Creek is the owner and operator of three SI IC engines, which are digester gas-fired, non 40 CFR 60, Subpart JJJJ certified engines. This section specifies the notification and recordkeeping requirements. Cargill Environmental Finance – Dry Creek shall submit all notifications and supporting documentation to EPA and DEQ in accordance with the Recordkeeping General Provision and this section of 40 CFR 60, Subpart JJJJ. Compliance is ensured by Permit Condition 29.

40 CFR 60.4246 What parts of the General Provisions apply to me?

Table 3 of 40 CFR 60, Subpart JJJJ specifies the applicable sections of 40 CFR 60, Appendix A - General Provisions. Compliance is ensured by Permit Condition 30.

40 CFR 60.4247 What parts of the mobile source provisions apply to me if I am a manufacturer of stationary SI internal combustion engines?

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

40 CFR 60.4248 What definitions apply to this subpart?

This section contains definitions that are found throughout this subpart. This section generally applies to the facility's applicability to 40 CFR 60, Subpart JJJJ.4.6.

NESHAP Applicability (40 CFR 61)

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

MACT Applicability (40 CFR 63)

Cargill Environmental Finance – Dry Creek does not emit or have the potential to emit more than 10 tons or more per year of any HAP, or 25 tons or more per year of any combination of HAPs. Major source Maximum Achievable Control Technology (MACT) requirements therefore do not apply to this facility.

Area source MACT requirements that would apply to the IC engines include Subpart ZZZZ:

40 CFR 63, Subpart ZZZZ............National Emission Standards for Hazardous Air Pollutants for 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.

All engines used with this general CBP plant are subject to 40 CFR 63, Subpart ZZZZ as they are all stationary engines operating at a HAP emissions area source. HAP emissions are defined under section 112(b) of the Clean Air Act. Diesel IC engines emit several of the pollutants listed in the section and are therefore consider HAP emissions sources.

However, a source may be exempt from Subpart ZZZZ if the engine(s) requires compliance with 40 CFR 60, Subpart JJJJ. Section 40 CFR 63.6590(c) states that an engine that is subject to Subpart JJJJ, is therefore in compliance with Subpart ZZZZ.

(c) Stationary RICE subject to Regulations under 40 CFR Part 60. An affected source that is a new or reconstructed stationary RICE located at an area source, or is a new or reconstructed stationary RICE located at a major source of HAP emissions and is a spark ignition 2 stroke lean burn (2SLB) stationary RICE with a site rating of less than 500 brake HP, a spark ignition 4 stroke lean burn (4SLB) stationary RICE with a site rating of less than 250 brake HP, or a 4 stroke rich burn (4SRB) stationary RICE with a site rating of less than or equal to 500 brake HP, a stationary RICE with a site rating of less than or equal to 500 brake HP which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, an emergency or limited use stationary RICE with a site rating of less than or equal to 500 brake HP, or a compression ignition (CI) stationary RICE with a site rating of less than or equal to 500 brake HP, must meet the requirements of this part by meeting the requirements of 40 CFR part 60 Subpart IIII, for compression ignition engines or 40 CFR part 60 Subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part

Permit Conditions Review

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

<u>Existing Permit Condition 1.4</u>

Table 1.1 lists all sources of regulated emissions in this PTC.

Table** Error! No text of specified style in document..**8 SUMMARY OF REGULATED SOURCES

Permit Section	*Source Description*	*Emissions Controls*
2	***Anaerobic Digesters and Electric Generators*** *Anaerobic Digester* *Capacity: 4.3 million gallons* *Throughput: 270,000 gallons per day*	*None during normal operations.* *(closed loop system vents directly to ~~power generators). A flare is used~~ when the generators are off-line.*

	Biogas production: 864,000 cubic feet per day	
	Generator Engine No. 1 *Manufacturer: Guascor* *Model: SFGLD 560* *Rated Power: 750 kW* *Ignition Type: Spark* *Generator Engine No. 2* *Manufacturer: Guascor* *Model: SFGLD 560* *Rated Power: 750 kW* *Ignition Type: Spark* *Generator Engine No. 3* *Manufacturer: Guascor* *Model: SFGLD 560* *Rated Power: 750 kW* *Ignition Type: Spark*	*None*

Revised Permit Condition 4

The emission sources regulated by this permit are listed in the following table.

Table 9 REGULATED SOURCES

Source Descriptions	***Emission Controls***
Anaerobic Digester *Capacity 4.3 Million gallons* *Throughput: 270,000 gallons per day* *Biogas production: 1.2 million cubic feet per day*	*None during normal operations. Closed loop system vents directly to engines. A flare is used when engines are offline.*
Biogas-fired IC Engine #1: *Manufacturer: Guascor* *Model: 560* *Rated Power: 1,057 bhp* *Ignition Type: Spark* *Biogas-fired IC Engine #2:* *Manufacturer: Guascor* *Model: 560* *Rated Power: 1,057 bhp* *Ignition Type: Spark* *Biogas-fired IC Engine #3* *Manufacturer: Guascor* *Model: 560* *Rated Power: 1,057 bhp* *Ignition Type: Spark*	H_2S *Scrubber*
Biogas-fired IC Flare #1 *Flare – Andgar flare with a heat input rating of 28.3 MMBtu/hr*	H_2S *Scrubber*

This condition was revised to include changes in emissions controls.

Existing Permit Condition 2.2

Table Error! No text of specified style in document..10 ANAEROBIC DIGESTER

Emissions Unit / Process	Emissions Control Device
Anaerobic Digester	Internal Combustion Engines and flare

Revised Permit Condition 6

Table 11 ANAEROBIC DIGESTER DESCRIPTION

Emissions Units / Processes	Emission Control Devices	Emission Points
Anaerobic digester (DIGESTER)	Bio-scrubber, three IC engines and two flares	N/A
IC Engines (IC-1 thru IC-3)	None	Exhaust stacks Engine 1-3
Emergency Flare	None	Exhaust Flare 4

This condition was revised to update emission control devices and include emission points.

Existing Permit Condition 2.3

Total emissions of SO_2 from the generator stacks and flare shall not exceed 52.9 tons per any consecutive 12 calendar month period.

In absence of any other creditable evidence, compliance with emission limits is assured by complying with this permit's operating, monitoring and record keeping requirements

Revised Permit Condition 7

The emission rate sulfur dioxide (SO_2) from the IC engines and the flare combined shall not exceed 120 lb/day.

This establishes a SO_2 concentration limit for the biogas produced in the facility's on-site anaerobic digester. The SO_2 limit has been established based on the H_2S concentration and hourly flow rate presented by the Applicant. The following calculation established the limit.

Molecular Weight of H_2S = (1.00794)*2 + 32.066 = 34.082

Molecular Weight of SO_2 = (32.066) + (15.9994)*2 = 64.065

Daily maximum flow rate = 1,200,000 scf /day

600 ppm concentration of H_2S assumed by the applicant

mg/m³ H_2S = $\frac{P}{RT} * MW * ppm$ where R = 0.08206 l * atm * mol^{-1} * k^{-1}

$$= \frac{1atm * 34.082}{0.08206 l * atm * mol^{-1} * K^{-1} * 293K} * 600ppm = 850.51 mg/m^3 H_2S$$

$$\frac{850.51mg}{m^3} * \frac{1{,}200{,}000 ft^3}{day} * \frac{(0.3048m)^3}{ft^3} * \frac{g}{1000mg} = 28{,}900.513 g/day$$

mol/hr = 28,900.513 g/day ÷ 34.082 g/mol = 847.97 mol/day

1 mol H_2S = 1 mol SO_2

Therefore, SO_2 emissions = 847.97 mol/day * 64.065 g/mol ÷ 453.59 g/lb = **119.7 lb/day ~ 120 lb/day**

New Permit Condition 8

The total annual Nitrogen oxide (NO_2) emissions from the IC engines and the flare combined shall not exceed 57.5 T/yr.

This condition was added to the permit because the modeled demonstration was 97% of the annual NO_2 standard of 100 mg/m³. The annual emissions of 57.5 T/yr were the estimated total provided in the application.

New Permit Condition 9

Biogas production from the anaerobic digester shall not exceed 1,200,000 scf per day.

Biogas production from the anaerobic digester shall not exceed 438 million scf per any consecutive 12-month period.

This condition was added to help demonstrate compliance with the NO_2 limit through operating limitations. Additionally, the recordkeeping requirements of the biogas combustion will demonstrate compliance with this condition.

New Permit Condition 15

The permittee shall maintain and operate the bio-scrubber as follows:

- *Oxygen concentration at the scrubber outlet shall operate at a range between 0.25 - 3%*

The ranges of oxygen concentration and surplus oxygen were provided in an email correspondence between DEQ and Cargill/MSE on March 16, 2011. These are consistent with manufacturer's recommendations.

New Permit Condition 16

At least once each calendar year, the bio-scrubber shall be inspected for physical degradation that could affect the performance of the bio-scrubber, including but not limited to any individual spray nozzles that are plugged, missing, or damaged to the extent that they are no longer effective.

This condition requires that general maintenance be performed on the scrubber to avoid the unit becoming faulty.

Removed Permit Condition 2.12

The permittee shall monitor and record the amount of biogas combusted by the electric generators and the flare on a monthly basis. Each monthly amount of biogas combusted shall also be summed over the previous consecutive 12-month period. The amount of biogas combusted shall be recorded in units of million standard cubic feet per month (MMscf/mo) and MMscf per consecutive 12-month period (MMscf/yr). Records of this information shall be maintained in accordance with General Provision 7.

This condition is no longer necessary as the SO_2 limit in Permit Condition 7 uses the maximum daily biogas flow rate of 1,200,000 scf and an assumed H_2S concentration of 600 ppm. Compliance with that condition indirectly demonstrates compliance with the fuel limitations.

Existing Permit Condition 2.13

To demonstrate compliance with Permit Condition 2.3, unless an alternative monitoring and recordkeeping method is approved by DEQ, the permittee shall comply with the following requirements to determine the concentration and quantity of hydrogen sulfide (H_2S) produced by the anaerobic digesters, and to calculate SO_2 emissions as specified in the following:

2.13.1 Biogas H_2S Concentration

- *Within 120 days of startup, the permittee shall install, calibrate, maintain, and operate an H_2S gas monitor that shall be placed downstream of the digester, and upstream of the electric generators and the biogas flare, to measure the H_2S concentrations in the biogas produced by the anaerobic digesters. The monitor shall be installed in accordance with the Operations and Maintenance (O&M) manual and the manufacturer specifications.*
- *Calibration of the H_2S monitor shall be performed and recorded in accordance with the O&M manual and no less frequently than semi-annually.*
- *The permittee may use colorimetric monitoring methods to measure H_2S concentrations, according to manufacturer's recommendations, in the event the H_2S gas monitoring system is inoperable or unable to maintain calibration.*

The permittee shall take appropriate corrective action on the H_2S gas monitoring system as expeditiously as practicable but no later than 90 calendar days after the initial H_2S gas monitoring system is inoperable or unable to maintain calibration.

- *The measured H_2S concentrations using the methods stated above shall be recorded at least three times per week in units of parts per million by volume (ppm_v.) The time between two measurements shall be at least 24 hours apart.*
- *Monitoring and recordkeeping of H_2S concentrations shall occur at least three times each calendar week of operations. The average of all H_2S concentration data collected during the week will be calculated. Records of this information shall be maintained on site and be made available to DEQ representatives upon request and in accordance with General Provision 7.*

2.13.2 Biogas Flow Rate Monitoring

- *Within 60 days of achieving the maximum production rate of the anaerobic digester when combusting biogas in the generators, the permittee shall install, calibrate, maintain and operate a biogas flow meter that shall be placed after the outlet of the covered anaerobic digester, to determine the quantity of biogas produced by the digester. The monitor shall be installed, operated, and maintained in accordance with the O&M manual and the manufacturer specifications.*
- *Calibration of the biogas flow meter shall be performed and recorded in accordance with the O&M manual.*
- *The permittee shall monitor and record the total biogas flow rate on a weekly basis, in units of MMscf/week. Records of this information shall be maintained in accordance with General Provision 7.*

Standard condition is defined in IDAPA 58.01.01.006.110 as at one atmosphere and 68 F°.

2.13.3 SO_2 Emissions Calculations

The permittee shall calculate the SO_2 emissions from the facility weekly, in units of pounds per week using the following methodology:

$$\frac{\text{X lb moles } H_2S}{1\text{x}10^6 \text{ lb moles biogas}} \times \frac{\text{Yscf}}{\text{week}} \times \frac{\text{1 lb mole biogas}}{\text{385 scf}} \times \frac{\text{1 lb mole } SO_2}{\text{1 lb mole } H_2S} \times \frac{\text{64 lbs } SO_2}{\text{1 lb mole } SO_2} \equiv \frac{\text{Z lb } SO_2}{\text{week}}$$

Where:

X = the weekly average ppm_v concentration of H_2S measured in according to Permit Condition 2.13.

Y = the weekly biogas flowrate measured according to Permit Condition 2.13.

Z = the calculated pounds per week of SO_2 emissions from the source

2.13.4 Recordkeeping

The permittee shall record the following:

- *The SO_2 emissions from the facility weekly, in units of pounds per week*
- *The SO_2 emissions from the facility each calendar month, in units of tons per month and each consecutive 12-calendar month period, in the units of tons consecutive 12-month.*

Revised Permit Condition 18

Unless an alternative monitoring and recordkeeping method is approved by DEQ, the permittee shall comply with the following requirements to determine the quantity of biogas produced by the anaerobic digester:

- *Within 60 days of permit issuance of the anaerobic digester, the permittee shall install, calibrate, maintain, and operate a biogas flow meter that shall be placed at the outlet of the covered anaerobic digester, in order to determine the total quantity of biogas produced by the digester. The biogas flow* *meter shall be installed, operated, and maintained in accordance with the O&M manual and the manufacturer specifications.*

- *Calibration of the biogas flow meter shall be performed and recorded in accordance with the O&M manual.*

The permittee shall monitor and record the total biogas flow rate on a daily basis, in units of MMscf/day. Records of this information shall be maintained in accordance with Recordkeeping General Provision.

Revised Permit Condition 20

Monitoring and recordkeeping of sulfur dioxide emissions in pounds per hour from the generators and flare combined shall occur once daily. Records of this information shall be maintained on site and be made available to DEQ representatives upon request and in accordance with the Recordkeeping General Provision. Monitoring shall occur in accordance with a written and DEQ approved monitoring protocol within 60 days of startup.

The permittee may use a hydrogen sulfide CEM, Sulfur Dioxide CEM(s), or a hand held hydrogen sulfide monitor to determine sulfur dioxide emission rates. The permittee shall presume all hydrogen sulfide is oxidized to sulfur dioxide.

If the permittee elects to use a hydrogen sulfide CEM or sulfur dioxide CEM monitoring shall occur in accordance with a written and DEQ approved monitoring protocol. The monitoring protocol shall address:

- *Installation specifications*
- *Calibration requirements (i.e. zero and span checks)*
- *Details of how the combined sulfur dioxide pound per day emissions will be calculated from the CEM data and biogas flow data.*

If the permittee elects to use a hand held hydrogen sulfide monitor the device shall have a certified accuracy of plus or minus 10% and the hand held monitor shall be calibrated, maintained, and replaced in accordance with manufacturer specifications. The permittee shall maintain documentation on-site the manufacturer's specifications for the hand held monitor including documentation of the accuracy of the device, calibration and replacement requirements. Sulfur dioxide emission rate monitoring shall occur in accordance with a written and DEQ approved monitoring protocol. The monitoring protocol shall address:

- *Monitoring procedures including details regarding monitoring ports, and sampling procedures*
- *Calibration requirements*

Details of how the combined sulfur dioxide pound per hour emissions will be calculated from the hand held hydrogen sulfide monitoring data and biogas flow data.

Requires that the permittee develop an operations and maintenance (O&M) manual and submit that manual to DEQ. The manual is required to address operational procedures for the biogas flow rate monitor including the frequency of calibration, operational maintenance and procedures for upsets/breakdowns and for correcting malfunction conditions. The O&M manual requires that standard operational procedures be developed for the hydrogen sulfide monitor including operational procedures for hydrogen sulfide sampling, frequency and method of calibration, and an operational maintenance plan. The O&M manual also requires developing procedures for the pilot flame detector.

The O&M manual must be a permittee developed document but it may be based on manufacturer requirements.

SO_2 monitoring is required every day because it is assumed in the application that all H_2S is converted to SO_2 and due to there being a 24-hr SO_2 NAAQS standard compliance with it must be demonstrated. Daily monitoring is warranted because there considerable fluctuation in the concentration of H_2S. If the concentration was slightly more than doubled from 600 ppmv to approximately 1,600 ppmv, the 24-hr SO_2 standard would be exceeded. 1,600 ppmv is on the lower end of the scale as the GTI report cited by the applicant suggests that for 12 samples collected for similar projects, the minimum concentration was 1,480 ppmv.

Dry Creek may also use a hydrogen sulfide CEM, Sulfur Dioxide CEM(s), rather than the hand held hydrogen sulfide monitor to determine sulfur dioxide emission rates.

Exiting Permit Condition 2.14

Within 60 days of permit issuance, the permittee shall have developed and submitted to DEQ an O&M manual for the digester and generator engines No.1, No.2, and No.3, which describes the procedures that will be followed to comply with General Provision 2 of this permit and the manufacturer specifications. At a minimum, the following shall be included in the manual:

- *Biogas Flow-rate Monitor*
    - *Standard operational procedure for flow-rate sampling*
    - *Frequency and method of calibration*
    - *Operational maintenance plan*
    - *Procedures for upset/breakdown conditions and for correcting equipment malfunctions*
    - *Maximum flow rate*
- *H_2S Monitor*
    - *Standard operational procedure for H_2S sampling*
    - *Frequency and method of calibration*
    - *Operational maintenance plan*
    - *Procedures for upset/breakdown conditions and for correcting equipment malfunctions*
    - *Maximum H_2S concentration*
- *Pilot Flame Detector*
    - *Method of ensuring continuous operation*
    - *Operational maintenance*

Requirements to periodically monitor and record the parameters listed above shall occur no less frequently than once per calendar month.

All records shall be maintained on-site for a period of 5 years, shall be made available to DEQ representatives upon request, and shall be maintained in accordance with General Provision 7.

The contents of the O&M manual shall be based on manufacturer's specifications. A copy of the manufacturer's recommendations shall be included with the O & M manual, and both shall be made available to DEQ representatives upon request.

As an alternative to the manufacture operating parameters the permittee may establish new operating parameters by conducting a performance test that demonstrates compliance with Permit Condition 2.3 while operating at the alternative operating parameters. The performance test shall be conducted in accordance with the Test Methods and Procedures specified in the Rules (IDAPA 58.01.01.157) and in accordance with a DEQ approved source test protocol. All operating parameters specified in this permit condition shall be continuously monitored and recorded during each test run. The permittee may request to operate outside of the operating parameters specified by the manufacturer during the performance test by submitting a written source protocol to DEQ for approval and requesting to operate under alternative operating parameters during the duration of the test. The protocol shall describe how the operating parameters will be monitored during the performance test. Once the source test is completed the permittee may request in writing to operate in accordance with alternative operating parameters. The request shall include a source test report and justification for the alternative operating parameters. Upon receiving DEQ written approval of the source test and the requested alternative operating parameters, the permittee shall operate in accordance with those DEQ approved alternative operating parameters. A copy of DEQ's approval shall be maintained on site with a copy of this permit.

The O&M manual shall be submitted to DEQ within 60 days of permit issuance and shall contain a certification by a responsible official. Any changes to the O&M Manual shall be submitted within 15 days of the change.

The operation and monitoring requirements specified in the O&M manual are incorporated by reference to this permit and are enforceable permit conditions.

<u>Revised Permit Condition 21</u>

Within 60 days of permit issuance, the permittee shall have developed and submitted to DEQ an Operations and Maintenance (O&M) manual for the anaerobic digester, the IC engines No.1, No.2, No. 3, and the flare which describes the procedures that will be followed to comply with the General Compliance General Provision of this permit and the manufacturer's specifications for each piece of equipment. At a minimum, the following shall be included in the O&M manual:

- *<u>Biogas Flow Rate Meter</u>*
  - *Standard operational procedure for flow-rate sampling,*
  - *Frequency and method of calibration,*
  - *Operational maintenance plan,*
  - *Procedures for upset/breakdown conditions and for correcting equipment malfunctions, and*
  - *Maximum flow rate.*
- *<u>Bio-Scrubber</u>*
  - *Standard operational procedures for oxygen concentration and surplus monitoring at the outlet of the bio-scrubber,*
  - *Frequency and method of calibration, and*
  - *Procedures for upset/breakdown conditions and for correcting equipment malfunctions.*
- *<u>Pilot Flame Detector</u>*
  - *Method of ensuring continuous operation,*
  - *Operational maintenance, and*
  - *Procedures for upset/breakdown conditions and for correcting equipment malfunctions.*

The contents of the O&M manual shall be based on manufacturer's specifications for each piece of equipment. The manual shall be a permittee developed document independent of the manufacturer supplied operating manuals but may include summaries of procedures included in the manufacturer supplied operating manual. A copy of the manufacturer's recommendations shall be included with the O & M manual, and both shall be made available to DEQ representatives upon request.

The O&M manual shall be submitted to DEQ within 60 days of permit issuance and shall contain a certification by a responsible official. Any changes to the O&M Manual shall be submitted within 15 days of the change.

This condition was updated to include the bio-scrubber into the O&M. Also, the H_2S monitor was removed as it is the intention of the facility to use handheld sampling units.

<u>Removed Permit Condition 2.15</u>

The permittee shall operate and maintain electric generators No.1, No.2 and No.3 to manufacturer's recommendations and specifications at all times and shall make the manufacturer's recommendations and specifications available to DEQ representatives upon request. A copy of the document shall be submitted to DEQ's Twin Falls Regional Office at the address provided in Table 2.3.

This condition seemed redundant as proper operation and maintenance of the engines throughout the life the units is required by 40 CFR 60, Subpart JJJJ. Therefore, it was removed from the permit.

New Permit Condition 23

The permittee shall maintain records of all odor complaints received to demonstrate compliance with Odors Permit Condition. The permittee shall take appropriate corrective action as expeditiously as practicable. The records shall include, at a minimum, the date each complaint was received and a description of the following: the complaint, the permittee's assessment of the validity of the complaint, any corrective action taken, and the date the corrective action was taken.

This condition was added to demonstrate compliance with the odors permit condition.

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 were no comments on the application and there was not a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

APPENDIX A – EMISSIONS INVENTORIES

Emission Inventory Calculations

IC Engines PTE Emissions Calculations:

For the natural gas-fired IC engines the Applicant has supplied the fuel consumption at full rated horsepower and the full rated horsepower of each IC engine. All three of the IC engines are identical, therefore the heat input to each engine is calculated as follows:

Fuel $Use_{IC\text{-}X}$ (MMBtu/hr) = Peak input biogas capacity (cf/hr) x Biogas heating value ÷ 1,000,000 Btu/MMBtu
Fuel $Use_{IC\text{-}X}$ MMBtu/hr = 12,000 cf/hr x 565 Btu/cf ÷ 1,000,000 Btu/MMBtu
Fuel $Use_{IC\text{-}X}$ MMBtu/hr = 6.8 MMBtu/hr

PM_{10} EF = 565 Btu/cf ÷ 1,000,000 Btu/MMBtu ÷ 7.7E-5 MMBtu/lb (AP-42 Table 3.2-2) = **4.35E-08 lb/cf**

SO_2 EF = 600 ppm H_2S (requested limit) ÷ 1,000,000 scf biogas ÷ 385 scf/ lb-mole * 34 lb H_2S /lb-mole = 5.3E-05 lb H_2S/scf
5.3E-05 lb H_2S/scf * 64 lb SO_2 ÷ 34 lb H_2S = **9.97 E-05 lb SO_2/scf**

NO_x EF = 1.8 g/bhp-hr (stack test) ÷ 453.6 g/lb ÷ (12,000 cf/hr ÷ 1,057 bhp) = **3.50E-04 lb/cf**

CO EF = 1.8 g/bhp-hr (stack test) ÷ 453.6 g/lb ÷ (12,000 cf/hr ÷ 1,057 bhp) = **3.50E-04 lb/cf**

VOC EF = 1.00 g/bhp-hr (JJJJ) ÷ 453.6 g/lb ÷ (12,000 cf/hr ÷ 1,057 bhp) = **1.94E-04 lb/cf**

Table A.1 IC ENGINE IC-1 THROUGH IC-3 HOURLY AND ANNUAL PTE FOR CRITERIA POLLUTANTS

Emissions Unit	Biogas Capacity (cf/hr)	Annual Hours of Operation (hr/yr)	Criteria Pollutant	Emissions Factors (lb/cf)	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)
IC-1 through IC-3	12,000	8,760	PM_{10}	4.35E-08	5.22E-04	2.29E-03
			SO_2	0.0000997	1.20	5.24
			NO_x	0.00035	4.20	18.40
			CO	0.00035	4.20	18.40
			VOC	0.000194	2.33	10.20

Flare PTE Emissions Calculations:

For flare the Applicant has supplied the peak daily gas generation. The heat input to the flare is calculated as follows:

Total Hourly Gas Generation (cf/hr) = 336,000 ÷ 24 hr/day
336,000 cf/day ÷ 24 = 14,000 cf/hr

Total Annual Generation (cf/yr) = 14,000 cf/hr * 8760 hr/yr ÷ 1,000,000 cf/MMcf = 122.64 MMcf/yr

PM_{10} EF = 7.60E-06 lb/cf (AP-42 Table 1.4-2)

SO_2 EF = 600 ppm H_2S (requested limit) ÷ 1,000,000 scf biogas ÷ 385 scf/ lb-mole * 34 lb H_2S /lb-mole = 5.3E-05 lb H_2S/scf

5.3E-05 lb H_2S/scf * 64 lb SO_2 ÷ 34 lb H_2S =
9.97 E-05 lb SO_2/scf

NO_x EF = 6.8E-02 lb/MMBtu (AP-42 Table 13.5-1) ÷ (565 Btu/cf ÷ 1,000,000Btu/MMBtu) = **3.84E-05 lb/cf**

CO EF = 3.7E-01 lb/MMBtu (AP-42 Table 13.5-2) ÷ (565 Btu/cf ÷ 1,000,000Btu/MMBtu) = **2.09E-04 lb/cf**

VOC EF = 1.58E-07 lb/cf (sum of all non-methane VOC) * 97.7% = 1.54E-07 lb/cf

+ 0.14 (AP-42 Table 13.5-1) ÷ (565 Btu/cf ÷ 1,000,000Btu/MMBtu) = 7.60E-05 lb/cf = **7.91E-05 lb/cf**

Table A.2 FLARE FL HOURLY AND ANNUAL PTE FOR CRITERIA POLLUTANTS

Emissions Unit	Gas Generation (cf/hr)	Annual Hours of Operation (hr/yr)	Criteria Pollutant	Emissions Factors (lb/cf)	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)
Flare-1	14,000	8,760	PM_{10}	7.60E-06	0.11	0.47
			SO_2	0.0000997	1.40	6.11
			NO_x	0.0000384	0.54	2.35
			CO	0.000209	2.93	12.82
			VOC	0.0000791	1.11	4.85

Cargill Dry Creek Biogas Project
Calculation Input Assumptions

MSE
Millennium Science & Engineering, Inc.

Digester

Peak daily gas generation from digester	1,200,000	cf/day
Peak annual gas production	438	MMcf/year
Estimated annual capacity factor	100%	
Biogas heat value	565	Btu/cf
Biogas heat content	470,833	Btu/min
Peak hourly heat energy in biogas	28.3	MMBtu/hr

Emission Sources

	Emission Units (EU)				
	1	2	3	4	4
Source type	Genset	Genset	Genset	Flare	Flare (excess)
Model number	Gauscor SFGLD 560	Gauscor SFGLD 560	Gauscor SFGLD 560	NA	NA
Break Horsepower	1,057	1,057	1,057		
Hourly Equipment Peak Input Biogas capacity (cf/hr)	12,000	12,000	12,000	50,000	14,000
Peak Biogas Heat Input capacity (MMBtu/hr)	6.8	6.8	6.8	28.3	8
Daily peak biogas capacity (cf/day)	288,000	288,000	288,000	1,200,000	336,000
Annual Equipment biogas capacity (Mcf/year)	105	105	105	438	123
Annual Estimated peak biogas capacity (Mcf/year)	105	105	105	438	123
End of Stack Temperature (°F)	315	315	315		
Stack Height (ft)	20	20	20	22.9	23
Stack Diameter (in)	11.9	11.9	11.9	24.0	24.0
Exhaust flow rate at capacity (cfm)	4,000	4,000	4,000	9,099	2,548

Modeled Parameter

Stack height (m)	6.10	6.10	6.10	11.63[a]	9.50[a]
Stack inside Diameter (m)	0.30	0.30	0.30	0.61	0.61
Stack exit velocity (m/s)	26.14	26.14	26.14	14.72	4.12
Stack gas temperature (°K)	430	430	430	1273[a]	1273[a]

Notes:

[a] Stack height for flare is effective release hight calculated by SCREEN3. The stack gas temperature is the default value listed in the SCREEN3 Model User's Guide.

Cargill Dry Creek Biogas Project
Emission Total from All Sources

MSE
Millennium Science & Engineering, Inc.

Category	Pollutant	Genset +Flare [a] Emissions (lb/hr)	Genset +Flare [a] Emissions (ton/yr)	Flare [b] Emissions (lb/hr)	Flare [b] Emissions (ton/yr)	TAP EL (lb/hr)	Exceed EL?
Primary Pollutants	PM10	0.11	0.47	0.38	1.66		
Primary Pollutants	PM2.5	0.11	0.47	0.38	1.66		
Primary Pollutants	SO_2	4.99	18.20	4.99	18.20		
Primary Pollutants	NOx	9.98	57.47	1.92	8.41		
Primary Pollutants	NO_2	7.48	43.10	1.44	6.31		
Primary Pollutants	CO	15.51	67.93	10.45	45.78		
Primary Pollutants	VOC	8.10	35.48	3.96	17.36		
Primary Pollutants	Lead						
Section 585 TAP	Acrolein	1.05E-01	4.58E-01			1.70E-02	Yes
Section 585 TAP	Barium, soluble compounds, as Ba	6.16E-05	2.70E-04	2.20E-04	9.64E-04	3.30E-02	No
Section 585 TAP	Biphenyl	4.31E-03	1.89E-02			1.00E-01	No
Section 585 TAP	2-Chlorophenol (and all isomers) (ID)	5.28E-07	2.31E-06	4.56E-07	2.00E-06	3.30E-02	No
Section 585 TAP	Chromium metal - Including:	1.96E-05	8.58E-05	7.00E-05	3.07E-04	3.30E-02	No
Section 585 TAP	Cobalt metal, dust, and fume	1.18E-06	5.15E-06	4.20E-06	1.84E-05	3.30E-03	No
Section 585 TAP	Copper - Dusts & mists, as Cu	1.19E-05	5.21E-05	4.25E-05	1.86E-04	6.70E-02	No
Section 585 TAP	Cresols/Cresylic Acid (isomers and mixtures)	3.11E-05	1.36E-04	2.69E-05	1.18E-04	1.47E+00	No
Section 585 TAP	Cyclopentane	4.62E-03	2.02E-02			1.15E+02	No
Section 585 TAP	Dibutyl phthalate	1.04E-06	4.53E-06	8.95E-07	3.92E-06	3.33E-01	No
Section 585 TAP	Ethyl benzene	8.20E-04	3.59E-03	1.09E-05	4.77E-05	2.90E+01	No
Section 585 TAP	Methanol	5.09E-02	2.23E-01			1.73E+01	No
Section 585 TAP	Hexane (n-Hexane)	2.26E-02	9.89E-02			1.20E+01	No
Section 585 TAP	Hydrogen sulfide	7.05E-02	3.09E-01	6.09E-02	2.67E-01	9.33E-01	No
Section 585 TAP	Manganese as Mn Dust & compounds	5.32E-06	2.33E-05	1.90E-05	8.32E-05	3.33E-01	No
Section 585 TAP	Mercury (vapors except Alkyl as Hg)	3.64E-06	1.59E-05	1.30E-05	5.69E-05	3.00E-03	No
Section 585 TAP	o-Methylcyclohexanone	2.50E-02	1.10E-01			1.53E+01	No
Section 585 TAP	Molybdenum as Mo -Soluble compounds	1.54E-05	6.75E-05	5.50E-05	2.41E-04	3.33E-01	No
Section 585 TAP	Naphthalene	1.52E-03	6.67E-03	3.11E-05	1.36E-04	3.33E+00	No
Section 585 TAP	Nitrobenzene	2.46E-07	1.08E-06	2.13E-07	9.32E-07	3.33E-01	No
Section 585 TAP	Nonane	2.24E-03	9.80E-03			7.00E+01	No
Section 585 TAP	Octane	7.14E-03	3.13E-02			9.33E+01	No
Section 585 TAP	Pentane	8.93E-02	3.91E-01	1.30E-01	5.69E-01	1.18E+02	No
Section 585 TAP	Phenol	4.97E-04	2.18E-03	8.04E-06	3.52E-05	1.27E+00	No
Section 585 TAP	Pyridine	4.14E-07	1.81E-06	3.58E-07	1.57E-06	1.00E+00	No
Section 585 TAP	Styrene monomer (ID)	4.68E-07	2.05E-06	4.05E-07	1.77E-06	6.67E+00	No
Section 585 TAP	Toluene (toluol)	8.39E-03	3.68E-02	2.11E-04	9.25E-04	2.50E+01	No
Section 585 TAP	Trimethyl benzene (mixed and individual isomers)	1.45E-03	6.33E-03			8.20E+00	No
Section 585 TAP	2,2,4-Trimethyl-pentane	5.09E-03	2.23E-02			2.33E+01	No
Section 585 TAP	Xylene (o-, m-, p-isomers)	3.77E-03	1.65E-02	2.54E-05	1.11E-04	2.90E+01	No
Section 585 TAP	Zinc oxide dust	4.06E-04	1.78E-03	1.45E-03	6.35E-03	6.67E-01	No
Section 586 TAP	Aniline	8.37E-06	3.66E-05	7.23E-06	3.17E-05	9.0E-04	No
Section 586 TAP	Arsenic compounds	2.80E-06	1.23E-05	1.00E-05	4.38E-05	1.5E-06	Yes
Section 586 TAP	Benzene	8.98E-03	3.93E-02	1.08E-04	4.73E-04	8.0E-04	Yes
Section 586 TAP	Bis (2-chloro-1-methyl- ethyl) ether	2.01E-06	8.81E-06	1.74E-06	7.62E-06	3.3E-04	No
Section 586 TAP	Bis (2-ethylhexyl) phthalate	5.21E-06	2.28E-05	4.50E-06	1.97E-05	2.8E-02	No
Section 586 TAP	Cadmium and compounds	1.54E-05	6.75E-05	5.50E-05	2.41E-04	3.7E-06	Yes
Section 586 TAP	Carbon tetrachloride	1.14E-06	5.01E-06	9.89E-07	4.33E-06	4.4E-04	No
Section 586 TAP	Dichloromethane (Methylenechloride)	4.07E-04	1.78E-03			1.6E-03	No
Section 586 TAP	Formaldehyde	1.05E-03	4.60E-03	3.75E-03	1.64E-02	5.1E-04	Yes
Section 586 TAP	Nickel	2.94E-05	1.29E-04	1.05E-04	4.60E-04	2.7E-05	Yes
Section 586 TAP	1,1,2,2,Tetrachloro-ethane	5.04E-05	2.21E-04			1.1E-05	Yes
Section 586 TAP	Tetrachloroethylene	9.48E-07	4.15E-06	8.20E-07	3.59E-06	1.3E-02	No
Section 586 TAP	1,1,2 - trichloroethane	2.32E-05	1.02E-04	2.01E-05	8.80E-05	4.2E-04	No
Section 586 TAP	Vinyl Chloride	3.03E-04	1.33E-03			1.2E-03	No

Note:

[a] Flare lb/hr emissions for this scenario are excess biogas emissions not combusted in the gensets, calculated by subtracting genset rated input capacity from the maximum biogas generation rate of 1.2 million scf/day.

[b] Flare emissions calculated based on maximum biogas generation rate. SO_2lb/hr emission rate calculated using uncontrolled emission factor.

Cargill Dry Creek Biogas Project
Summary of Air Dispersion Modeling Results - Gensets (EU1,2,3, and Excess to EU4)

	Pollutant	2000	2001	2002	2003	2004	Max	Background	Model + Background	Standard	% of Standard
Primary Pollutants	PM10 - 24 hr	2.3	2.2	2.3	2.3	2.3	2.3	73	75.3	150	50.2%
	PM10 - Annual	0.7	0.7	0.8	0.8	0.7	0.8	27	27.8	50	55.6%
	SO_2 - 3 hr	216.5	216.2	205.2	203.9	218.4	218.4	34	252.4	1,300	19.4%
	SO_2 - 24 hr	113.7	108.5	107.7	106.7	114.1	114.1	26	140.1	365	38.4%
	SO_2 - Annual	33.6	33.7	38.8	39.3	36.0	39.3	8	47.3	80	59.2%
	NO_2 - Annual	68.0	68.3	78.3	79.5	72.9	79.5	17	96.5	100	96.5%
	CO - 1 hr	914.2	927.6	915.1	954.4	965.3	965.3	3,600	4565.3	40,000	11.4%
	CO - 8 hr	523.8	533.2	518.9	517.0	531.9	533.2	2,300	2833.2	10,000	28.3%
TAPS	Acrolein	2.90	2.47	2.72	2.51	2.72	2.90		2.9	12.5	23.2%
	Arsenic compounds	2.00E-05	2.00E-05	2.00E-05	2.00E-05	2.00E-05	2.0E-05		2.0E-05	2.30E-04	8.7%
	Benzene	6.26E-02	6.28E-02	7.21E-02	7.32E-02	6.71E-02	7.3E-02		7.3E-02	1.20E-01	61.0%
	Cadmium and compounds	9.00E-05	9.00E-05	1.10E-04	1.10E-04	1.00E-04	1.1E-04		1.1E-04	5.60E-04	19.6%
	Formaldehyde	6.78E-03	6.83E-03	7.88E-03	7.98E-03	7.28E-03	8.0E-03		8.0E-03	7.70E-02	10.4%
	Nickel	1.80E-04	1.80E-04	2.10E-04	2.10E-04	1.90E-04	2.1E-04		2.1E-04	4.20E-03	5.0%
	1,1,2,2,Tetrachloro-ethane	3.50E-04	3.50E-04	4.10E-04	4.10E-04	3.80E-04	4.1E-04		4.1E-04	1.70E-02	2.4%

Note:

All units are ug/m^3

NM = Not modeled, total emissions below modeling thresholds.

Summary of Air Dispersion Modeling Results - Flare (EU4)

MSE
Millennium Science & Engineering, Inc.

	Pollutant	Flare (EU4)	Background	Model + Background	Standard	% of Standard
Primary Pollutants	PM10 - 24 hr	4.7	73	77.7	150	51.8%
	PM10 - Annual	1.3	26	27.3	50	54.7%
	SO_2 - 3 hr	101.1	34	135.1	1,300	10.4%
	SO_2 - 24 hr	62.1	26	88.1	365	24.1%
	SO_2 - Annual	14.7	8	22.7	80	28.4%
	NO_2 - Annual	5.1	17	22.1	100	22.1%
	CO - 1 hr	232.5	3,600	3832.5	40,000	9.6%
	CO - 8 hr	194.4	2,300	2494.4	10,000	24.9%
TAPS	Acrolein				1.25E+01	0.0%
	Arsenic compounds	3.53E-05		3.53E-05	2.30E-04	15.4%
	Benzene	3.82E-04		3.82E-04	1.20E-01	0.3%
	Cadmium and compounds	1.94E-04		1.94E-04	5.60E-04	34.7%
	Formaldehyde	1.33E-02		1.33E-02	7.70E-02	17.2%
	Nickel	3.71E-04		3.71E-04	4.20E-03	8.8%
	1,1,2,2,Tetrachloro-ethane				1.70E-02	0.0%

Note:

All units are ug/m^3

Cargill Dry Creek Biogas Project
Modeling Results - Genset EU1

MSE
Millennium Science & Engineering, Inc.

Emission unit number	1	Hourly Peak Biogas capacity (scf/hr)	12,000 cf/hour
Source type	Genset	Daily peak biogas capacity (scf/day)	288,000 cf/day
Model number	Gauscor SFGLD 560	Annual peak biogas capacity (Mcf/year)	105.12 MMcf/year
Break Horsepower	1,057 bHP	Annual Estimated peak biogas capacity (Mcf/year)	105.12 MMcf/year

	Pollutant	Raw Biogas (lb/cf)	Control Factor	EF Un-Combusted Biogas (lb/cf)	EF Combust Products (lb/cf)	Comments	Emissions lbs/hr	Emissions tons/yr
Primary Pollutants	PM10				4.35E-08	AP-42 Section 3.2, Table 3.2-2 (includes filterable and	5.22E-04	2.29E-03
	PM2.5				4.35E-08	condensible)	5.22E-04	2.29E-03
	SO_2 (3 hr and 24 hr)				9.97E-05	Based on maximum uncontrolled H2S concentration	1.20	NA
	SO_2 (Annual)				8.31E-05	Based on controlled H2S concentration	1.00	4.37
	NOx				3.50E-04	Stack Test: NOx = 1.8 g/bhp-hour	4.19	18.37
	NO_2				2.62E-04	NO_2 = 75% NOx	3.15	13.78
	CO				3.50E-04	Stack Test: CO = 1.8 g/bhp-hour	4.19	18.37
	VOC				1.94E-04	Subpart JJJJ: VOC = 1 g/bhp-hour	2.33	10.21
	Lead				NA			
Section 585 TAP	Acrolein				2.90E-06	AP-42 Table 3.2-2	3.5E-02	1.53E-01
	Biphenyl				1.20E-07	AP-42 Table 3.2-2	1.4E-03	6.30E-03
	2-Chlorophenol (and all isomers) (ID)	3.97E-10	97.2%	1.11E-11		EF Uncombusted Biogas based on max concentration	1.3E-07	5.84E-07
	Cresols/Cresylic Acid (isomers and mixtures)	2.34E-08	97.2%	6.56E-10		EF Uncombusted Biogas based on max concentration	7.9E-06	3.45E-05
	Cyclopentane				1.28E-07	AP-42 Table 3.2-2	1.5E-03	6.74E-03
	Dibutyl phthalate	7.78E-10	97.2%	2.18E-11		EF Uncombusted Biogas based on max concentration	2.6E-07	1.15E-06
	Ethyl benzene	9.47E-09	97.2%	2.65E-10	2.24E-08	EF Uncombusted Biogas based on max concentration	2.7E-04	1.19E-03
	Methanol				1.41E-06	AP-42 Table 3.2-2	1.7E-02	7.42E-02
	Hexane (n-Hexane)				6.27E-07	AP-42 Table 3.2-2	7.5E-03	3.30E-02
	Hydrogen sulfide	5.30E-05	97.2%	1.48E-06		EF Uncombusted Biogas based on max concentration	1.8E-02	7.80E-02
	o-Methylcyclohexanone				6.95E-07	AP-42 Table 3.2-2	8.3E-03	3.65E-02
	Naphthalene	5.48E-10	97.2%	1.53E-11	4.20E-08	EF Uncombusted Biogas based on max concentration	5.0E-04	2.21E-03
	Nitrobenzene	1.85E-10	97.2%	5.18E-12		EF Uncombusted Biogas based on max concentration	6.2E-08	2.72E-07
	Nonane				6.22E-08	AP-42 Table 3.2-2	7.5E-04	3.27E-03
	Octane				1.98E-07	AP-42 Table 3.2-2	2.4E-03	1.04E-02
	Pentane				1.47E-06	AP-42 Table 3.2-2	1.8E-02	7.72E-02
	Phenol	6.99E-09	97.2%	1.96E-10	1.36E-08	EF Uncombusted Biogas based on max concentration	1.7E-04	7.23E-04
	Pyridine	3.11E-10	97.2%	8.71E-12		EF Uncombusted Biogas based on max concentration	1.0E-07	4.58E-07
	Styrene monomer (ID)	3.52E-10	97.2%	9.85E-12		EF Uncombusted Biogas based on max concentration	1.2E-07	5.18E-07
	Toluene (toluol)	3.58E-08	97.2%	1.00E-09	2.31E-07	EF Uncombusted Biogas based on max concentration	2.8E-03	1.22E-02
	Trimethyl benzene (mixed and individual				4.02E-08	AP-42 Table 3.2-2	4.8E-04	2.11E-03
	2,2,4-Trimethyl-pentane				1.41E-07	AP-42 Table 3.2-2	1.7E-03	7.42E-03
	Xylene (o-, m-, p-isomers)	2.21E-08	97.2%	6.19E-10	1.04E-07	EF Uncombusted Biogas based on max concentration	1.3E-03	5.50E-03
Section 586 TAP	Aniline	6.29E-09	97.2%	1.76E-10		EF Uncombusted Biogas based on average concen.	2.1E-06	9.26E-06
	Benzene	2.63E-09	97.2%	7.35E-11	2.49E-07	EF Uncombusted Biogas based on average concen.	3.0E-03	1.31E-02
	1,3-Butadiene				1.51E-07	AP-42 Table 3.2-2	1.8E-03	7.93E-03
	Bis (2-chloro-1-methyl- ethyl) ether	1.51E-09	97.2%	4.23E-11		EF Uncombusted Biogas based on average concen.	5.1E-07	2.23E-06
	Bis (2-ethylhexyl) phthalate	3.92E-09	97.2%	1.10E-10		EF Uncombusted Biogas based on average concen.	1.3E-06	5.76E-06
	Carbon tetrachloride	8.60E-10	97.2%	2.41E-11		EF Uncombusted Biogas based on average concen.	2.9E-07	1.27E-06
	Dichloromethane (Methylenechloride)				1.13E-08	AP-42 Table 3.2-2	1.4E-04	5.94E-04
	1,1,2,2,Tetrachloro-ethane				1.40E-09	EF Uncombusted Biogas based on average concen.	1.7E-05	7.36E-05
	Tetrachloroethylene	7.13E-10	97.2%	2.00E-11		EF Uncombusted Biogas based on average concen.	2.4E-07	1.05E-06
	1,1,2 - trichloroethane	1.75E-08	97.2%	4.89E-10		EF Uncombusted Biogas based on average concen.	5.9E-06	2.57E-05
	Vinyl Chloride	0.00E+00	97.2%	0.00E+00	8.42E-09	EF Uncombusted Biogas based on average concen.	1.0E-04	4.42E-04

Notes:

EF Un-Combused Biogas = Raw Biogas x (1-Control Factor)

585 TAP Emissions (lb/hr) = Hourly Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion Products)

585 TAP Emissions (ton/yr) = Annual Estimated Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion)Products) / 2000 lb/ton

586 TAP Emissions (ton/yr) = Annual Estimated Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion)Products) / 2000 lb/ton

586 TAP Emissions (lb/hr) = 586 TAP Emissions (ton/yr) / 8760 hr/yr x 2000 lb/ton

Control Efficiency (AP42 Table 2.4-3 (2008 draft) **97.2% (IC Engines)**

Cargill Dry Creek Biogas Project
Modeling Results - Genset EU2

MSE
Millennium Science & Engineering, Inc.

Emission unit number	2
Source type	Genset
Model number	Gauscor SFGLD 560
Break Horsepower	1,057 bHP

Hourly Peak Biogas capacity (scf/hr)	12,000 cf/hour
Daily peak biogas capacity (scf/day)	288,000 cf/day
Annual peak biogas capacity (Mcf/year)	105.12 MMcf/year
Annual Estimated peak biogas capacity (Mcf/year)	105.12 MMcf/year

	Pollutant	Raw Biogas (lb/cf)	Control Factor	EF Un-Combusted Biogas (lb/cf)	EF Combust Products (lb/cf)	Comments	Emissions lbs/hr	Emissions tons/yr
Primary Pollutants	PM10				4.35E-08	AP-42 Section 3.2, Table 3.2-2 (includes filterable and	5.22E-04	2.29E-03
	PM2.5				4.35E-08	condensible)	5.22E-04	2.29E-03
	SO2 (3 hr and 24 hr)				9.97E-05	Based on maximum uncontrolled H2S concentration	1.20	NA
	SO_2 (annual)				8.31E-05	Based on controlled H2S concentration	1.00	4.37
	NOx				3.50E-04	Stack Test: NOx = 1.8 g/bhp-hour	4.19	18.37
	NO_2				2.62E-04	NO_2 = 75% NOx	3.15	13.78
	CO				3.50E-04	Stack Test: CO = 1.8 g/bhp-hour	4.19	18.37
	VOC				1.94E-04	Subpart JJJJ: VOC = 1 g/bhp-hour	2.33	10.21
	Lead				NA			
Section 585 TAP	Acrolein				2.90E-06	AP-42 Table 3.2-2	3.5E-02	1.53E-01
	Biphenyl				1.20E-07	AP-42 Table 3.2-2	1.4E-03	6.30E-03
	2-Chlorophenol (and all isomers) (ID)	3.97E-10	97.2%	1.11E-11		EF Uncombusted Biogas based on max concentration	1.3E-07	5.84E-07
	Cresols/Cresylic Acid (isomers and mixtures)	2.34E-08	97.2%	6.56E-10		EF Uncombusted Biogas based on max concentration	7.9E-06	3.45E-05
	Cyclopentane				1.28E-07	AP-42 Table 3.2-2	1.5E-03	6.74E-03
	Dibutyl phthalate	7.78E-10	97.2%	2.18E-11		EF Uncombusted Biogas based on max concentration	2.6E-07	1.15E-06
	Ethyl benzene	9.47E-09	97.2%	2.65E-10	2.24E-08	EF Uncombusted Biogas based on max concentration	2.7E-04	1.19E-03
	Methanol				1.41E-06	AP-42 Table 3.2-2	1.7E-02	7.42E-02
	Hexane (n-Hexane)				6.27E-07	AP-42 Table 3.2-2	7.5E-03	3.30E-02
	Hydrogen sulfide	5.30E-05	97.2%	1.48E-06		EF Uncombusted Biogas based on max concentration	1.8E-02	7.80E-02
	o-Methylcyclohexanone				6.95E-07	AP-42 Table 3.2-2	8.3E-03	3.65E-02
	Naphthalene	5.48E-10	97.2%	1.53E-11	4.20E-08	EF Uncombusted Biogas based on max concentration	5.0E-04	2.21E-03
	Nitrobenzene	1.85E-10	97.2%	5.18E-12		EF Uncombusted Biogas based on max concentration	6.2E-08	2.72E-07
	Nonane				6.22E-08	AP-42 Table 3.2-2	7.5E-04	3.27E-03
	Octane				1.98E-07	AP-42 Table 3.2-2	2.4E-03	1.04E-02
	Pentane				1.47E-06	AP-42 Table 3.2-2	1.8E-02	7.72E-02
	Phenol	6.99E-09	97.2%	1.96E-10	1.36E-08	EF Uncombusted Biogas based on max concentration	1.7E-04	7.23E-04
	Pyridine	3.11E-10	97.2%	8.71E-12		EF Uncombusted Biogas based on max concentration	1.0E-07	4.58E-07
	Styrene monomer (ID)	3.52E-10	97.2%	9.85E-12		EF Uncombusted Biogas based on max concentration	1.2E-07	5.18E-07
	Toluene (toluol)	3.58E-08	97.2%	1.00E-09	2.31E-07	EF Uncombusted Biogas based on max concentration	2.8E-03	1.22E-02
	Trimethyl benzene (mixed and individual				4.02E-08	AP-42 Table 3.2-2	4.8E-04	2.11E-03
	2,2,4-Trimethyl-pentane				1.41E-07	AP-42 Table 3.2-2	1.7E-03	7.42E-03
	Xylene (o-, m-, p-isomers)	2.21E-08	97.2%	6.19E-10	1.04E-07	EF Uncombusted Biogas based on max concentration	1.3E-03	5.50E-03
Section 586 TAP	Aniline	6.29E-09	97.2%	1.76E-10		EF Uncombusted Biogas based on average concen.	2.1E-06	9.26E-06
	Benzene	2.63E-09	97.2%	7.35E-11	2.49E-07	EF Uncombusted Biogas based on average concen.	3.0E-03	1.31E-02
	1,3-Butadiene				1.51E-07	AP-42 Table 3.2-2	1.8E-03	7.93E-03
	Bis (2-chloro-1-methyl- ethyl) ether	1.51E-09	97.2%	4.23E-11		EF Uncombusted Biogas based on average concen.	5.1E-07	2.23E-06
	Bis (2-ethylhexyl) phthalate	3.92E-09	97.2%	1.10E-10		EF Uncombusted Biogas based on average concen.	1.3E-06	5.76E-06
	Carbon tetrachloride	8.60E-10	97.2%	2.41E-11		EF Uncombusted Biogas based on average concen.	2.9E-07	1.27E-06
	Dichloromethane (Methylenechloride)				1.13E-08	AP-42 Table 3.2-2	1.4E-04	5.94E-04
	1,1,2,2,Tetrachloro-ethane				1.40E-09	EF Uncombusted Biogas based on average concen.	1.7E-05	7.36E-05
	Tetrachloroethylene	7.13E-10	97.2%	2.00E-11		EF Uncombusted Biogas based on average concen.	2.4E-07	1.05E-06
	1,1,2 - trichloroethane	1.75E-08	97.2%	4.89E-10		EF Uncombusted Biogas based on average concen.	5.9E-06	2.57E-05
	Vinyl Chloride	0.00E+00	97.2%	0.00E+00	8.42E-09	EF Uncombusted Biogas based on average concen.	1.0E-04	4.42E-04

Notes:

EF Un-Combused Biogas = Raw Biogas x (1-Control Factor)

585 TAP Emissions (lb/hr) = Hourly Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion Products

585 TAP Emissions (ton/yr) = Annual Estimated Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion)Products) / 2000 lb/ton

586 TAP Emissions (ton/yr) = Annual Estimated Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion)Products) / 2000 lb/ton

586 TAP Emissions (lb/hr) = 586 TAP Emissions (ton/yr) / 8760 hr/yr x 2000 lb/ton

Control Efficiency (AP42 Table 2.4-3 (2008 draft) 97.2% (IC Engines)

Cargill Dry Creek Biogas Project
Modeling Results - Genset EU3

Emission unit number	3
Source type	Genset
Model number	Gauscor SFGLD 560
Break Horsepower	1,057 bHP

Hourly Peak Biogas capacity (scf/hr)	12,000 cf/hour
Daily peak biogas capacity (scf/day)	288,000 cf/day
Annual peak biogas capacity (Mcf/year)	105.12 MMcf/year
Annual Estimated peak biogas capacity (Mcf/year)	105.12 MMcf/year

	Pollutant	Raw Biogas (lb/cf)	Control Factor	EF Un-Combusted Biogas (lb/cf)	EF Combust Products (lb/cf)	Comments	Emissions lbs/hr	Emissions tons/yr
Primary Pollutants	PM10				4.35E-08	AP-42 Section 3.2, Table 3.2-2 (includes filterable and	5.22E-04	2.29E-03
	PM2.5				4.35E-08	condensible)	5.22E-04	2.29E-03
	SO2 (3 hr and 24 hr)				9.97E-05	Based on maximum uncontrolled H2S concentration	1.20	NA
	SO_2 (annual)				8.31E-05	Based on controlled H2S concentration	1.00	4.37
	NOx				3.50E-04	Stack Test: NOx = 1.8 g/bhp-hour	4.19	18.37
	NO_2				2.62E-04	NO_2 = 75% NOx	3.15	13.78
	CO				3.50E-04	Stack Test: CO = 1.8 g/bhp-hour	4.19	18.37
	VOC				1.94E-04	Subpart JJJJ: VOC = 1 g/bhp-hour	2.33	10.21
	Lead				NA			
Section 585 TAP	Acrolein				2.90E-06	AP-42 Table 3.2-2	3.5E-02	1.53E-01
	Biphenyl				1.20E-07	AP-42 Table 3.2-2	1.4E-03	6.30E-03
	2-Chlorophenol (and all isomers) (ID)	3.97E-10	97.2%	1.11E-11		EF Uncombusted Biogas based on max concentration	1.3E-07	5.84E-07
	Cresols/Cresylic Acid (isomers and	2.34E-08	97.2%	6.56E-10		EF Uncombusted Biogas based on max concentration	7.9E-06	3.45E-05
	Cyclopentane				1.28E-07	AP-42 Table 3.2-2	1.5E-03	6.74E-03
	Dibutyl phthalate	7.78E-10	97.2%	2.18E-11		EF Uncombusted Biogas based on max concentration	2.6E-07	1.15E-06
	Ethyl benzene	9.47E-09	97.2%	2.65E-10	2.24E-08	EF Uncombusted Biogas based on max concentration	2.7E-04	1.19E-03
	Methanol				1.41E-06	AP-42 Table 3.2-2	1.7E-02	7.42E-02
	Hexane (n-Hexane)				6.27E-07	AP-42 Table 3.2-2	7.5E-03	3.30E-02
	Hydrogen sulfide	5.30E-05	97.2%	1.48E-06		EF Uncombusted Biogas based on max concentration	1.8E-02	7.80E-02
	o-Methylcyclohexanone				6.95E-07	AP-42 Table 3.2-2	8.3E-03	3.65E-02
	Naphthalene	5.48E-10	97.2%	1.53E-11	4.20E-08	EF Uncombusted Biogas based on max concentration	5.0E-04	2.21E-03
	Nitrobenzene	1.85E-10	97.2%	5.18E-12		EF Uncombusted Biogas based on max concentration	6.2E-08	2.72E-07
	Nonane				6.22E-08	AP-42 Table 3.2-2	7.5E-04	3.27E-03
	Octane				1.98E-07	AP-42 Table 3.2-2	2.4E-03	1.04E-02
	Pentane				1.47E-06	AP-42 Table 3.2-2	1.8E-02	7.72E-02
	Phenol	6.99E-09	97.2%	1.96E-10	1.36E-08	EF Uncombusted Biogas based on max concentration	1.7E-04	7.23E-04
	Pyridine	3.11E-10	97.2%	8.71E-12		EF Uncombusted Biogas based on max concentration	1.0E-07	4.58E-07
	Styrene monomer (ID)	3.52E-10	97.2%	9.85E-12		EF Uncombusted Biogas based on max concentration	1.2E-07	5.18E-07
	Toluene (toluol)	3.58E-08	97.2%	1.00E-09	2.31E-07	EF Uncombusted Biogas based on max concentration	2.8E-03	1.22E-02
	Trimethyl benzene (mixed and individual				4.02E-08	AP-42 Table 3.2-2	4.8E-04	2.11E-03
	2,2,4-Trimethyl-pentane				1.41E-07	AP-42 Table 3.2-2	1.7E-03	7.42E-03
	Xylene (o-, m-, p-isomers)	2.21E-08	97.2%	6.19E-10	1.04E-07	EF Uncombusted Biogas based on max concentration	1.3E-03	5.50E-03
Section 586 TAP	Aniline	6.29E-09	97.2%	1.76E-10		EF Uncombusted Biogas based on average concen.	2.1E-06	9.26E-06
	Benzene	2.63E-09	97.2%	7.35E-11	2.49E-07	EF Uncombusted Biogas based on average concen.	3.0E-03	1.31E-02
	1,3-Butadiene				1.51E-07	AP-42 Table 3.2-2	1.8E-03	7.93E-03
	Bis (2-chloro-1-methyl- ethyl) ether	1.51E-09	97.2%	4.23E-11		EF Uncombusted Biogas based on average concen.	5.1E-07	2.23E-06
	Bis (2-ethylhexyl) phthalate	3.92E-09	97.2%	1.10E-10		EF Uncombusted Biogas based on average concen.	1.3E-06	5.76E-06
	Carbon tetrachloride	8.60E-10	97.2%	2.41E-11		EF Uncombusted Biogas based on average concen.	2.9E-07	1.27E-06
	Dichloromethane (Methylenechloride)				1.13E-08	AP-42 Table 3.2-2	1.4E-04	5.94E-04
	1,1,2,2,Tetrachloro-ethane				1.40E-09	EF Uncombusted Biogas based on average concen.	1.7E-05	7.36E-05
	Tetrachloroethylene	7.13E-10	97.2%	2.00E-11		EF Uncombusted Biogas based on average concen.	2.4E-07	1.05E-06
	1,1,2 - trichloroethane	1.75E-08	97.2%	4.89E-10		EF Uncombusted Biogas based on average concen.	5.9E-06	2.57E-05
	Vinyl Chloride	0.00E+00	97.2%	0.00E+00	8.42E-09	EF Uncombusted Biogas based on average concen.	1.0E-04	4.42E-04

Notes:

EF Un-Combused Biogas = Raw Biogas x (1-Control Factor)

585 TAP Emissions (lb/hr) = Hourly Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion Products)

585 TAP Emissions (ton/yr) = Annual Estimated Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion)Products) / 2000 lb/ton

586 TAP Emissions (ton/yr) = Annual Estimated Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion)Products) / 2000 lb/ton

586 TAP Emissions (lb/hr) = 586 TAP Emissions (ton/yr) / 8760 hr/yr x 2000 lb/ton

Control Efficiency (AP42 Table 2.4-3 (2008 d 97.2% (IC Engines)

Grain Loading Calculation 6.19E-05 gr/dscf

Cargill Dry Creek Biogas Project
Modeling Results - Flare EU4

MSE Millennium Science & Engineering, Inc.

Emission unit number	4		Hourly Peak Biogas capacity (scf/hr)	14,000 cf/hr
Source type	Flare		Daily peak biogas capacity (scf/day)	336,000 cf/day
Model number	NA		Annual peak biogas capacity (Mcf/year)	122.64 MMcf/year
Break Horsepower	- bHP		Annual Estimated peak biogas capacity (Mcf/year)	122.64 MMcf/year

	Pollutant	Raw Biogas (lb/cf)	Control Factor	EF Un-Combusted Biogas (lb/cf)	EF Combust Products (lb/cf)	Comments	Emissions lbs/hr	Emissions tons/yr
Primary Pollutants	PM10				7.60E-06	AP42 Table 1.4-2	0.11	0.47
	PM2.5				7.60E-06		0.11	0
	SO_2 (3 hour and 24 hour)				9.97E-05	Based on maximum uncontrolled H2S concentration	1.40	NA
	SO_2 (annual)				8.31E-05	Based on controlled H2S concentration	1.16	5.10
	NOx				3.84E-05	AP42 Table 13.5-1	0.54	2.36
	NO_2				2.88E-05	NO_2 = 75% NOx	0.40	1.77
	CO				2.09E-04	AP42 Table 13.5-2	2.93	12.82
	VOC	1.70E-07	97.7%	1.66E-07	7.91E-05	Sum of nonmethane VOCS	1.11	5
	Lead				NA			
Section 585 TAP	Barium, soluble compounds, as Ba				4.40E-09	AP42 Table 1.4-4	6.2E-05	2.70E-04
	2-Chlorophenol (and all isomers) (ID)	3.97E-10	97.7%	9.13E-12		EF Uncombusted Biogas based on max concentration	1.3E-07	5.60E-07
	Chromium metal - Including:				1.40E-09	AP42 Table 1.4-4	2.0E-05	8.58E-05
	Cobalt metal, dust, and fume				8.40E-11	AP42 Table 1.4-4	1.2E-06	5.15E-06
	Copper - Dusts & mists, as Cu				8.50E-10	AP42 Table 1.4-4	1.2E-05	5.21E-05
	Cresols/Cresylic Acid (isomers and	2.34E-08	97.7%	5.39E-10		EF Uncombusted Biogas based on max concentration	7.5E-06	3.30E-05
	Dibutyl phthalate	7.78E-10	97.7%	1.79E-11		EF Uncombusted Biogas based on max concentration	2.5E-07	1.10E-06
	Ethyl benzene	9.47E-09	97.7%	2.18E-10		EF Uncombusted Biogas based on max concentration	3.0E-06	1.34E-05
	Hydrogen sulfide	5.30E-05	97.7%	1.22E-06		EF Uncombusted Biogas based on max concentration	1.7E-02	7.47E-02
	Manganese as Mn Dust & compounds				3.80E-10	AP42 Table 1.4-4	5.3E-06	2.33E-05
	Mercury (vapors except Alkyl as Hg)				2.60E-10	AP42 Table 1.4-4	3.6E-06	1.59E-05
	Molybdenum as Mo -Soluble compounds				1.10E-09	AP42 Table 1.4-4	1.5E-05	6.75E-05
	Naphthalene	5.48E-10	97.7%	1.26E-11	6.10E-10	EF Uncombusted Biogas based on max concentration	8.7E-06	3.82E-05
	Nitrobenzene	1.85E-10	97.7%	4.26E-12		EF Uncombusted Biogas based on max concentration	6.0E-08	2.61E-07
	Pentane				2.60E-06	AP42 Table 1.4-4	3.6E-02	1.59E-01
	Phenol	6.99E-09	97.7%	1.61E-10		EF Uncombusted Biogas based on max concentration	2.2E-06	9.85E-06
	Pyridine	3.11E-10	97.7%	7.15E-12		EF Uncombusted Biogas based on max concentration	1.0E-07	4.39E-07
	Selenium				2.40E-11	AP42 Table 1.4-4	3.4E-07	1.47E-06
	Styrene monomer (ID)	3.52E-10	97.7%	8.09E-12		EF Uncombusted Biogas based on max concentration	1.1E-07	4.96E-07
	Toluene (toluol)	3.58E-08	97.7%	8.23E-10	3.40E-09	EF Uncombusted Biogas based on max concentration	5.9E-05	2.59E-04
	Xylene (o-, m-, p-isomers)	2.21E-08	97.7%	5.08E-10		EF Uncombusted Biogas based on max concentration	7.1E-06	3.12E-05
	Zinc oxide dust				2.90E-08	AP42 Table 1.4-4	4.1E-04	1.78E-03
Section 586 TAP	Aniline	6.29E-09	97.7%	1.45E-10		EF Uncombusted Biogas based on average concen.	2.0E-06	8.87E-06
	Arsenic compounds				2.00E-10	AP42 Table 1.4-4	2.8E-06	1.23E-05
	Benzene	2.63E-09	97.7%	6.04E-11	2.10E-09	EF Uncombusted Biogas based on average concen.	3.0E-05	1.32E-04
	Bis (2-chloro-1-methyl- ethyl) ether	1.51E-09	97.7%	3.48E-11		EF Uncombusted Biogas based on average concen.	4.9E-07	2.13E-06
	Bis (2-ethylhexyl) phthalate	3.92E-09	97.7%	9.01E-11		EF Uncombusted Biogas based on average concen.	1.3E-06	5.52E-06
	Cadmium and compounds				1.10E-09	AP42 Table 1.4-4	1.5E-05	6.75E-05
	Carbon tetrachloride	8.60E-10	97.7%	1.98E-11		EF Uncombusted Biogas based on average concen.	2.8E-07	1.21E-06
	Formaldehyde				7.50E-08	AP42 Table 1.4-3	1.1E-03	4.60E-03
	Nickel				2.10E-09	AP42 Table 1.4-4	2.9E-05	1.29E-04
	Tetrachloroethylene	7.13E-10	97.7%	1.64E-11		EF Uncombusted Biogas based on average concen.	2.3E-07	1.01E-06
	1,1,2 - trichloroethane	1.75E-08	97.7%	4.02E-10		EF Uncombusted Biogas based on average concen.	5.6E-06	2.46E-05

Notes:

EF Un-Combused Biogas = Raw Biogas x (1-Control Factor)

585 TAP Emissions (lb/hr) = Hourly Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion Products

585 TAP Emissions (ton/yr) = Annual Estimated Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion)Products) / 2000 lb/to

586 TAP Emissions (ton/yr) = Annual Estimated Peak Biogas Capacity x (EF Non-Combustion Biogas + EF Combustion)Products) / 2000 lb/to

586 TAP Emissions (lb/hr) = 586 TAP Emissions (ton/yr) / 8760 hr/yr x 2000 lb/tor

Control Efficiency (AP42 Table 2.4-3 (2008 (97.7% (Flare)

Grain Loading Calculation = 3.03E-03 gr/dscf

Cargill Dry Creek Biogas Project
Modeling Results - Flare EU4

MSE
Millennium Science & Engineering, Inc.

	AERMOD Model Output for Unit Rate of 1 lb/hr					
	1-hr avg (ug/m^3)	3-hr avg (ug/m^3)	8-hr avg (ug/m^3)	24-hr avg 1st high	24-hr avg, 2nd high	Annual avg (ug/m^3)
2000	22.13417	20.26553	18.59961	13.34212	12.45689	2.93893
2001	22.23925	20.14426	16.72667	13.42617	11.27552	2.94671
2002	22.13548	20.05066	17.35709	12.93626	10.53506	3.46592
2003	22.01017	20.01008	15.87869	11.99739	11.44735	3.53407
2004	22.15383	19.96435	18.05067	12.98570	11.31255	3.18353
Maximum	22.23925	20.26553	18.59961	13.42617	12.45689	3.53407

		Estimated impacts (not considering background)				
	Pollutant	1-hr avg (ug/m^3)	3-hr avg (ug/m^3)	8-hr avg (ug/m^3)	24-hr avg (ug/m^3)	Annual avg (ug/m^3)
Primary Pollutants	PM10				4.73	1.34
	SO_2 (3 hour and 24 hour)		101.1		62.1	
	SO_2 (annual)					14.69
	NO_2					5.09E+00
	CO	2.32E+02		1.94E+02		
	VOC					
	Lead					
Section 585 TAP	Barium, soluble compounds, as Ba				2.95E-03	
	2-Chlorophenol (and all isomers) (ID)				6.13E-06	
	Chromium metal - Including:				9.40E-04	
	Cobalt metal, dust, and fume				5.64E-05	
	Copper - Dusts & mists, as Cu				5.71E-04	
	Cresols/Cresylic Acid (isomers and mixtures)				3.62E-04	
	Dibutyl phthalate				1.20E-05	
	Ethyl benzene				1.46E-04	
	Hydrogen sulfide				8.18E-01	
	Manganese as Mn Dust & compounds				2.55E-04	
	Mercury (vapors except Alkyl as Hg)				1.75E-04	
	Molybdenum as Mo -Soluble compounds				7.38E-04	
	Naphthalene				4.18E-04	
	Nitrobenzene				2.86E-06	
	Pentane				1.75E+00	
	Phenol				1.08E-04	
	Pyridine				4.80E-06	
	Selenium				1.61E-05	
	Styrene monomer (ID)				5.43E-06	
	Toluene (toluol)				2.84E-03	
	Xylene (o-, m-, p-isomers)				3.41E-04	
	Zinc oxide dust				1.95E-02	
Section 586 TAP	Aniline					2.56E-05
	Arsenic compounds					3.53E-05
	Benzene					3.82E-04
	Bis (2-chloro-1-methyl- ethyl) ether					6.15E-06
	Bis (2-ethylhexyl) phthalate					1.59E-05
	Cadmium and compounds					1.94E-04
	Carbon tetrachloride					3.50E-06
	Formaldehyde					1.33E-02
	Nickel					3.71E-04
	Tetrachloroethylene					2.90E-06
	1,1,2 - trichloroethane					7.10E-05

Note:

Estimated impacts calculated by multiplying the lb/hr emission rate times the modeled output for each averaging period

Cargill Dry Creek Biogas Project
SO2 Emission Factor Calcuation

MSE
Millennium Science & Engineering, Inc.

Assumptions for gas stream entering Gensets:

- **600** ppm H2S concentration (uncontrolled)
- **500** ppm H2S concentration (controlled)
- 385 scf gas/lb-mole
- 34 Molecular weight of H2S
- 64 Molecular weight of SO2

Uncontrolled EF Calculation:

$$\frac{600 \text{ part H2S}}{1.00\text{E+06 part biogas}} \times \frac{1 \text{ lb-mole}}{385 \text{ scf}} \times \frac{34 \text{ lb}}{1 \text{ lb-mole}} = \frac{5.30\text{E-05 lb H2S}}{\text{scf of biogas}}$$

$$\frac{5.30\text{E-05 lb H2S}}{1 \text{ scf of biogas}} \times \frac{64 \text{ mole SO2}}{34 \text{ mole H2S}} = \frac{9.97\text{E-05 lb SO2}}{\text{scf of biogas}} \qquad 119.69$$

(assumes 100% conversion of H2S to SO2)

Controlled EF Calculation:

$$\frac{500 \text{ part H2S}}{1.00\text{E+06 part biogas}} \times \frac{1 \text{ lb-mole}}{385 \text{ scf}} \times \frac{34 \text{ lb}}{1 \text{ lb-mole}} = \frac{4.42\text{E-05 lb H2S}}{\text{scf of biogas}}$$

$$\frac{4.42\text{E-05 lb H2S}}{1 \text{ scf of biogas}} \times \frac{64 \text{ mole SO2}}{34 \text{ mole H2S}} = \frac{8.31\text{E-05 lb SO2}}{\text{scf of biogas}} \qquad 9.97\text{E+01}$$

(assumes 100% conversion of H2S to SO2)

Cargill Dry Creek Biogas Project
TAP EF Calcualtion

MSE

Compound	CAS	585 TAP Reference	586 TAP Reference	molecular weight	Partially Clean Biogas Avg Conc (ppbv)*	Partially Clean Biogas Max Conc (ppbv)*	Raw Biogas Avg Conc (ppbv)*	Raw Biogas Max Conc (ppbv)*	Selected Biogas Concentration (ppbv)**	Biogas Compound Mass Flow Rate (lb/scf biogas)***	AP-42 (Boiler) (lb/10^6 scf NG)	AP-42 (Boiler) lb/cf biogas	AP-42 (Engine) (lb/ MMBtu)	AP-42 (Engine) lb/cf biogas
Acrolein	107-02-8	7											5.14E-03	2.90E-08
Biphenyl	92-52-4	30											2.12E-04	1.20E-07
Chlorobenzene	108-90-7	90	#N/A	112.56	1.48E+00				1.48E+00	4.40E-10				
2-Chlorophenol	95-57-8	94	#N/A	128.56	1.05E+00		8.50E-01	1.17	1.17E+00	3.97E-10				
3,4-Methylphenol (o,p-cresol)	1319-77-3	113	#N/A	108.14	7.45E+00		1.80E+01	82.07	8.21E+01	2.34E-08				
Cyclopentane	287-92-3	126	#N/A						0.00E+00				2.27E-04	1.28E-07
Di-n-butyl phthalate	84-74-2	138	#N/A	278.34	7.40E-01		7.50E-01	1.06	1.06E+00	7.78E-10	fna			
Ethylbenzene	100-41-4	198	#N/A	106.167	9.75E+00		1.05E+01	33.61	3.36E+01	9.47E-09	fna		3.97E-05	2.24E-09
n-hexane	110-54-3	239	#N/A						0.00E+00				1.11E-03	6.27E-07
Methanol	67-56-1	265	#N/A						0.00E+00				2.50E-03	1.41E-06
Methylcyclohexane	553-50-8	307	#N/A						0.00E+00				1.23E-03	6.95E-07
Naphthalene	91-20-3	336	#N/A	128.17	9.00E-01		1.62E+00		1.62E+00	5.48E-10	6.10E-04	6.10E-10	7.44E-05	4.20E-08
Nitrobenzene	98-95-3	341	#N/A	123.06			5.50E-01	0.57	5.70E-01	1.85E-10				
Nonane	111-84-2	352	#N/A						0.00E+00				1.10E-04	6.22E-08
Octane	111-65-9	354	#N/A						0.00E+00				3.51E-04	1.98E-07
Pentane	109-66-0	367	#N/A						0.00E+00				2.60E-03	1.47E-06
Phenol	108-95-2	371	#N/A	94.11	1.05E+01		9.68E+00	26.14	2.61E+01	6.99E-09	fna		2.40E-05	1.36E-08
Pyridine	110-86-1	411	#N/A	79.1			1.49E+00	1.49	1.49E+00	3.11E-10				
Styrene	100-42-5	447	#N/A	104.15	1.28E+00		4.50E-01	0.45	1.28E+00	3.52E-10				
Toluene	108-88-3	460	#N/A	92.14	2.23E+01		4.33E+01	147.26	1.47E+02	3.56E-08	3.40E-03	3.40E-09	4.08E-04	2.31E-07
Trimethylbenzene	25551-13-7	494	#N/A						0.00E+00				7.11E-05	4.02E-08
2,2,4-Trimethylpentane	540-84-1	495	#N/A						0.00E+00				2.50E-04	1.41E-07
Xylenes (o,m,p isomers)	1330-20-7	510	#N/A	106.167	5.22E+00		1.77E+01	76.69	7.69E+01	2.21E-08	fna		1.84E-04	1.04E-07
Aniline	62-53-3	#N/A	5	93.13	1.29E+01	2.58E+01	2.13E+01		2.58E+01	6.29E-09	fna			
Benzene	71-43-2	#N/A	10	78.11	5.85E+00	1.27E+01	4.20E+00		1.27E+01	2.63E-09	2.10E-03	2.10E-09	4.40E-04	2.49E-07
1,3-Butadiene	106-99-0	#N/A	14						0.00E+00				2.67E-04	1.51E-07
Bis (2-chloro-1-methyl- ethyl) ether	108-60-1	#N/A	17	171.06	3.15E+00	3.15E+00	3.35E+00		3.35E+00	1.51E-09	fna			
bis(2-Ethylhexyl)phthalate	117-81-7	#N/A	18	390.56	8.30E-01	3.80E+00	3.90E-01		3.60E+00	3.92E-09	fna			
Carbon Tetrachloride	56-23-5	#N/A	20	153.82	1.35E+00	2.12E+00	1.30E+00		2.12E+00	8.60E-10				
Methylene Chloride	75-09-2	#N/A	31						0.00E+00				2.00E-05	1.13E-08
1,1,2,2-Tetracholoroethane	79-34-5	#N/A	76	167.85	6.20E-01	6.60E-01			6.60E-01	3.01E-10			2.48E-06	1.40E-09
Tetrachloroethylene	127-18-4	#N/A	77	167.85	1.61E+00	1.61E+00	1.20E+00		1.61E+00	7.13E-10				
1,1,2- Trichloroethane	79-00-5	#N/A	78	133.4	2.42E+01	4.96E+01	3.16E+01		4.96E+01	1.75E-08				
Vinyl Chloride	75-04-3	#N/A	83						0.00E+00				1.49E-05	8.42E-09
1,2,4-Trimethylbenzene	95-63-6	#N/A	#N/A	120.19	3.06E+00		1.20E+01		1.20E+01	3.61E-09				
1,3,5-Trimethylbenzene	108-67-8	#N/A	#N/A	120.19	1.61E+00		4.72E+00		4.72E+00	1.50E-09				
1-Methylnaphthalene	90-12-0	#N/A	#N/A	142.2			3.08E+00		3.08E+00	1.16E-09				
2-Methylnaphthalene	91-57-6	#N/A	#N/A	142.2			2.20E+00		2.20E+00	8.25E-10				
Benzyl Alcohol	100-51-6	#N/A	#N/A	108.14	4.63E+01		5.08E+00		4.63E+01	1.32E-08				
Diethylphthalate	84-66-2	#N/A	#N/A	222.24	2.30E-01		2.10E-01		2.30E-01	1.35E-10				
Fluoranthene	206-44-0	#N/A	#N/A	202.26			4.30E-01		4.30E-01	2.29E-10				
Isopropylbenzene (cumene)	98-82-8	#N/A	#N/A	120.19	1.11E+00		3.56E+00		3.56E+00	1.13E-09				
n-Butylbenzene	104-51-8	#N/A	#N/A	134.22	1.36E+00		3.55E+00		3.55E+00	1.26E-09				
N-nitroso-di-n-propylamine	621-64-7	#N/A	#N/A	130.19	6.40E-01		6.60E-01		6.60E-01	2.34E-10				
n-propylbenzene	103-65-1	#N/A	#N/A	120.19	1.42E+00		5.74E+00		5.74E+00	1.82E-09				
Phenanthrene	85-01-8	#N/A	#N/A	178.23			1.09E+00		1.09E+00	5.13E-10				
p-Isopropyltoluene	99-87-6	#N/A	#N/A	134.22	2.01E+01		3.26E+00		2.01E+01	7.13E-09				
sec-Butylbenzene	135-98-8	#N/A	#N/A	134.22	9.60E-01		3.83E+00		3.83E+00	1.36E-09				
tert-Butylbenzene	98-06-6	#N/A	#N/A	134.22	1.02E+00		3.26E+00		3.26E+00	1.15E-09				
Arsenic											2.00E-04	2.00E-10		
Barium											4.40E-03	4.40E-09		
Cadmium											1.10E-03	1.10E-09		
Chromium											1.40E-03	1.40E-09		
Cobalt											8.40E-05	8.40E-11		
Copper											8.50E-04	8.50E-10		
Formaldehyde			42								7.50E-02	7.50E-08		
Hexane											1.80E+00	1.80E-06		
Manganese											3.80E-04	3.80E-10		
Mercury											2.60E-04	2.60E-10		
Molybdenum											1.10E-03	1.10E-09		
Nickel											2.10E-03	2.10E-09		
Pentane											2.60E+00	2.60E-06		
Selenium											2.40E-05	2.40E-11		
Zinc											2.90E-02	2.90E-08		
									Sum	1.7E-07				

* Source: GTI Pipeline Quality Biomethane North American Guidance Document for Introduction of Dairy Waste Derived Biomethane Into Existing Natural Gas Networks

** Selected biogas concentration based on highest of either partially clean or raw biogas maximum concentrations for IDAPA 585 TAPs and the highest of either partially clean or raw biogas average concentrations for IDAPA 586 TAPs.

*** Biogas compound mass flow rate = (Selected biogas concentration (ppbv) / 1x10^9) x (1 lb-mole / 379 scf)

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: March 10, 2011

TO: Eric Clark, Air Quality Engineer, Air Program

FROM: Darrin Mehr, Air Quality Analyst, Air Program

PROJECT NUMBER: P-2009.0024 Project 60628

SUBJECT: Modeling Demonstration for a PTC Application Modification for the Existing Anaerobic Digester Biogas System with Electrical Generation Units and a Flare at Cargill Environmental Finance's Dry Creek Dairy Facility Located near Hansen, Idaho

1.0 Summary

Cargill Environmental Finance (Cargill) submitted a Permit to Construct (PTC) application to modify PTC No. 2009.0024, issued for the existing facility which treats dairy manure and wastewater with anaerobic digesters to produce biogas. This biogas fuels internal combustion engines for generation of electricity at the Dry Creek Dairy facility located south of Hansen, Idaho. The Cargill facility operates the following emissions units:

- Three generator engines each rated at 1,057 brake horsepower and fired on biogas.
- One elevated open flare (also called a candlestick flare) for incinerating excess biogas.

Each of these emissions units is an existing emissions unit and is included in PTC No. 2009.0024, issued on March 18, 2008 and last modified and reissued on July 10, 2009.

The project timeline and associated submittals primarily reflecting the modeling demonstration are listed below:

- August 31, 2010: DEQ and representatives for Cargill met for a pre-application meeting to discuss consent order and permitting requirements for this project.
- October 4, 2010: DEQ received a modeling protocol via email from Millennium Science and Engineering on behalf of Cargill.
- October 8, 2010: DEQ issued a conditional approval for the modeling protocol via email.
- November 10, 2010: The PTC application for the modification was received by DEQ.
- December 10, 2010: The PTC application was declared incomplete.
- January 7, 2011: A response to the incompleteness determination was received by DEQ, including a revised modeling demonstration.
- February 2, 2011: The PTC application was declared complete by DEQ.

The facility is not a *designated facility*, as defined in IDAPA 58.01.01.006, Rules for the Control of Air Pollution in Idaho (Idaho Air Rules). The facility's potential to emit (PTE) of particulate matter with an aerodynamic diameter of ten microns or less (PM_{10}), sulfur dioxide (SO_2), carbon monoxide (CO), and nitrogen oxides (NO_x) each is less than 100 tons per year (T/yr). The facility is not a major facility under the New Source Review (NSR) PSD program.

The proposed project is subject to review under Section 200 of Idaho Air Rules. Idaho Air Rules Section 203.02 requires the facility to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS). Idaho Air Rules Section 210 requires the facility to demonstrate compliance with the toxic air pollutants (TAPs) increments, which are listed in Sections 585 and 586.

The submitted modeling analyses: 1) utilized appropriate methods and models; 2) were conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed that predicted pollutant concentrations from emissions associated with the facility, when combined with a reasonably conservative background concentration value appropriate for the area, were below national ambient air quality standards and other applicable increments at all ambient air locations.

The submitted modeling analyses were conducted by Millennium Science and Engineering, Inc. (MSE), on behalf of Cargill. Key assumptions and results that should be considered in the development of the permit are shown in Table 1.

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

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Sulfur dioxide (SO_2) emissions resulting from the conversion (oxidation) of hydrogen sulfide (H_2S) during the combustion process were based on reductions in the biogas' H_2S content using a scrubber system to maintain lower levels of H_2S in the biogas supplied to all emissions units. The lower H_2S concentrations in the biogas creates lower emissions of SO_2. The scrubber system will provide biogas with 500 parts per million (ppm) or less during normal service. During maintenance with one scrubber chamber out of service the biogas H_2S content should be less than 600 ppm or less.	Under the facility's normal potential to emit operating scenario of 3 generators operating concurrently and a flare combusting the rest of the excess biogas, scrubber-controlled ambient impacts of SO_2 were well below the applicable 3-hour, 24-hour, and annual SO_2 NAAQS. Hydrogen sulfide content in the biogas and SO_2 emissions are directly related. Assuming a linear correlation between SO_2 emissions (and thereby H_2S content) and ambient impacts presented for the normal operating scenario provided the following H_2S concentrations that are the thresholds for SO_2 NAAQS compliance: • 3,480 ppm H_2S for SO_2, 3-hour average, • 1,780 ppm H_2S for SO_2, 24-hour average, and • 1,100 ppm H_2S for SO_2, annual average. Actual monitored H_2S concentrations in the facility's biogas exceed 2,000 ppm untreated. Operation of the scrubber is necessary for the facility to demonstrate compliance under the requested operating scenario.
Biogas Production and Assumptions: • Total capacity 1.2 million cubic feet per day (cu ft/day) or 50,000 cu ft per hour. • Biogas heat content of 565 British thermal units per cu ft biogas (Btu/cu ft).	Emission rates for generator engines and the flare, and exhaust parameters for the flare, are based in part on the quantities and heat content of the biogas produced and combusted. Ambient impacts for all NAAQS pollutants and TAPs were below the standards and allowable increments for worst case flaring and the normal requested potential scenarios under the proposed cap on biogas production rates.
NO_2 impacts were predicted to be 96.5 $\mu g/m^3$, annual average, or 97% of the NO_2 NAAQS.	Increases in annual NO_2 emissions or changes in exhaust parameters that affect the dispersion of the generator engine exhaust plumes could cause a violation of the NO_2 annual NAAQS.
Generator engine exhaust plumes are strongly influenced by building-induced downwash. The modeling setup presented a Generator Building base elevation 4219 feet. Each of the generator stacks and the flare base elevations were set at 4222 feet above sea level. Generator stack release heights were set at 20 feet above grade and the building height was 25 feet, which actually places the release point of the generator stacks at 2 feet below the roof height. This is not considered Good Engineering Practice (GEP) for exhaust stacks on or near buildings.	Generator engine release parameters modeled under the actual constructed facility layout were critical in establishing compliance with the NO_2 annual NAAQS.

2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

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

2.1.1 Area Classification

The Cargill Dry Creek facility is located in Twin Falls County, which 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 ($PM_{2.5}$).

There are no Class I areas within 10 kilometers of the facility.

2.1.2 Significant and Full Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources associated with the project exceed the significant contribution levels (SCLs) of Idaho Air Rules Section 006, then a cumulative—or full— impact analysis is needed to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02 for PTCs. A cumulative NAAQS impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions, and emissions from any nearby co-contributing sources, to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The cumulative pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. The SCLs and the modeled values that must be used for comparison to the NAAQS are also listed in Table 2.

Cargill was required to submit a complete facility-wide NAAQS compliance demonstration that included all emissions sources at the facility reflecting multiple operating scenarios, as appropriate, using an ambient air boundary based on EPA policy for a facility located on leased property within a separate independent facility and DEQ's Air Quality Modeling Guideline.

New source review requirements for assuring compliance with $PM_{2.5}$ standards have not yet been completed and promulgated into Idaho regulation. EPA has asserted through a policy memorandum (October 23, 1997) that compliance with $PM_{2.5}$ standards will be assured through an air quality analysis for the corresponding PM_{10} standard. DEQ allows a direct surrogate use of PM_{10} modeling results and does not require the adjustments and justifications for surrogate use as suggested by the EPA March 23, 2010, Stephen Page Memo (Memorandum from Stephan Page, Director of Office of Air Quality Planning and Standards, EPA, *Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS*, March 23, 2010). Although the PM_{10} annual standard was revoked in 2006, compliance with the revoked PM_{10} annual standard must be demonstrated as a surrogate to the annual $PM_{2.5}$ standard. State Implementation Plans (SIPs) for implementing $PM_{2.5}$ are due to EPA by May 2011 and permits issued after that date are required to address $PM_{2.5}$ emissions and impacts to ambient air.

New NO_2 and SO_2 short-term standards have recently been promulgated by EPA. The standards will not be applicable for permitting purposes in Idaho until they are incorporated by reference *sine die* into Idaho Air Rules (Spring 2011).

Table 2. APPLICABLE REGULATORY LIMITS				
Pollutant	Averaging Period	Significant Impact Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual[f]	1.0	50[g]	Maximum 1[st] highest[h]
	24-hour	5.0	150[i]	Maximum 6[th] highest[j]
$PM_{2.5}$[k]	Annual	0.3	15[l]	Use PM_{10} as surrogate
	24-hour	1.2	35[m]	Use PM_{10} as surrogate
Carbon monoxide (CO)	8-hour	500	10,000[n]	Maximum 2[nd] highest[h]
	1-hour	2,000	40,000[n]	Maximum 2[nd] highest[h]
Sulfur Dioxide (SO_2)	Annual	1.0	80[g]	Maximum 1[st] highest[h]
	24-hour	5	365[n]	Maximum 2[nd] highest[h]
	3-hour	25	1,300[n]	Maximum 2[nd] highest[h]
	1-hour	3 ppb[o] (7.8 $\mu g/m^3$)	75 ppb[p] (196 $\mu g/m^3$)	Mean of maximum 4[th] highest[q]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[g]	Maximum 1[st] highest[h]
	1-hour	4 ppb[o] (7.5 $\mu g/m^3$)	100 ppb[r] (188 $\mu g/m^3$)	Mean of maximum 8[th] highest[s]
Lead (Pb)	Quarterly	NA	1.5[g]	Maximum 1[st] highest[h]
	3-month[t]	NA	0.15[g]	Maximum 1[st] highest[h]

a. Idaho Air Rules Section 006.
b. Micrograms per cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107. Federal NAAQS (see 40 CFR 50) in effect as of July 1 of each year are incorporated by reference in to Idaho Air Rules when the legislature adjourns sine die (the following spring).
d. The maximum 1[st] highest modeled value is always used for the significant impact analysis.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers.
f. The annual PM_{10} standard was revoked in 2006. The standard is still listed because compliance with the annual $PM_{2.5}$ standard is demonstrated by a PM_{10} analysis that demonstrates compliance with the revoked PM_{10} standard.
g. Not to be exceeded in any calendar year.
h. Concentration at any modeled receptor.
i. Never expected to be exceeded more than once in any calendar year.
j. Concentration at any modeled receptor when using five years of meteorological data.
k. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
l. 3-year average of annual concentration.
m. 3-year average of the upper 98[th] percentile of 24-hour concentrations.
n. Not to be exceeded more than once per year.
o. Interim SIL established by EPA policy memorandum.
p. 3-year average of the upper 99[th] percentile of the distribution of maximum daily 1-hour concentrations.
q. Mean (of 5 years of data) of the maximum of 4[th] highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled.
r. 3-year average of the upper 98[th] percentile of the distribution of maximum daily 1-hour concentrations.
s. Mean (of 5 years of data) of the maximum of 8[th] highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled.
t. 3-month rolling average.

2.1.3 TAPs Analyses

The increase in emissions from this project were required to demonstrate compliance with the toxic air pollutant (TAP) increments, with an ambient impact dispersion analysis required for any TAP having a requested potential emission rate that exceeds the screening emission rate limit (EL) specified by Idaho Air Rules Section 585 or 586.

This project is for a modification to an existing and operating facility that was issued a PTC. Due to potential technical issues with the original modeling demonstration DEQ requested that Cargill submit a modeling demonstration for all pollutants—including TAPs that had already been subjected to DEQ review under prior permitting projects. This means that TAPs were applied to the existing facility as if the entire facility's requested emissions were proposed to be emitted by a Greenfield facility. The emissions units being permitted in this project have combustion by-products from operation of three generator engines on biogas and an exposed flare which incinerates excess biogas. These combustion by-products are predicted to cause emissions of several TAPs.

2.2 Background Concentrations

Background concentration values were provided by DEQ for this project. Background concentrations for PM_{10}, CO, SO_2, and NO_2 were based on default rural agricultural areas from a background concentration study performed by DEQ in March 2003[1]. The provided background values are listed in Table 3.

Table 3. BACKGROUND CONCENTRATIONS		
Pollutant	**Averaging Period**	**Concentration ($\mu g/m^3$)[a]**
PM_{10}[b]	Annual	27
	24-hour	73
CO[c]	8-hour	2,300
	1-hour	3,600
SO_2[d]	Annual	8
	24-hour	26
	3-hour	34
NO_2[e]	Annual	17

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

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

Table 4 provides a summary of the modeling parameters used in the submitted modeling analyses.

Table 4. MODELING PARAMETERS		
Parameter	**Description/ Values**	**Documentation/Additional Description**
Model	AERMOD	AERMOD, Version 09292.
Meteorological data	2000-2004	DEQ provided a pre-processed data set of individual year files of Twin Falls airport surface data and Boise airport upper air data covering the years 2000-2004.
Terrain	Considered	3-dimensional receptor coordinates were obtained by MSE from Digital Elevation Model (DEM) files for the surrounding area. The receptor grid was run through AERMAP Version 06341.
Building downwash	Downwash algorithm	AERMOD, Version 09292 uses BPIP-Prime and the PRIME algorithms to evaluate structure-induced downwash effects.
Receptor grid	Grid 1	10-meter spacing around the facility's ambient air boundary (leased property boundary) extending 20 meters in all directions.
	Grid 2	100-meter spacing in a 2,900-meter (X) by 2,900-meter (Y) grid centered on Grid 1 and the facility.

1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

3.1.1 Modeling Protocol

A modeling protocol was submitted to DEQ by MSE, on behalf of Cargill, on October 4, 2010. The modeling protocol was conditionally approved, with comments, by DEQ on October 10, 2010.

Modeling was conducted using methods documented in the modeling protocol and the *State of Idaho Air Quality Modeling Guideline*.

3.1.2 Model Selection

AERMOD, Version 09292 was used to conduct the ambient air analyses for NAAQS and TAPs compliance demonstrations.

3.1.3 Meteorological Data

DEQ supplied an AERMOD-ready meteorological dataset that spans the years 2000 through 2004. Surface data were obtained from Twin Falls' Joslin Field airport. Upper air data were obtained for the corresponding years at the Boise airport.

3.1.4 Terrain Effects

The modeling analyses considered elevated terrain. Cargill's report states that site drawings were used to obtain elevations for rooftops, base elevations, and release heights in the immediate location surrounding the structures and sources at Dry Creek Dairy. The modeling report states that receptor elevations were obtained from the USGS DEM files. DEM files are based on the NAD27 coordinate system. AERMAP output files were based on the WGS84 system, as confirmed by MSE.

3.1.5 Facility Layout

Google Earth imagery dates back to June 30, 2004 for this site. The facility location was open agricultural field at that time. DEQ checked the site plan submitted with the permit application to verify the facility's layout. Historical photographs taken October 2008 during generator engine performance testing depicted the Generator Building and the layout of all four emission unit stacks, and identified the correct location of the candlestick flare. This documentation was provided to Cargill/MSE for consideration. The final site plan was created independently of the modeling demonstration's input files and matched the modeling files. The facility layout and location of emission sources were accepted as submitted.

3.1.6 Building Downwash

Plume downwash effects caused by structures at the facility were accounted for in the modeling analyses. The Building Profile Input Program-Plume Rise and Building Downwash Model (BPIP-PRIME) was used by the applicant to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emissions release parameters. The output from BPIP-PRIME was used as input to AERMOD, Version 09292, to account for building-induced downwash effects.

Buildings and other structures may cause plume downwash of nearby emissions points. Modeling guidance indicates that emissions points located within "5L" of a building, where "L" is the lesser dimension of building height or projected width, may be affected by downwash. The applicant's BPIP building analysis included all buildings in the area that could reasonably be expected to cause plume downwash.

3.1.7 Ambient Air Boundary

Ambient air was determined to exist for all areas immediately exterior to the facility's property boundary. The Cargill facility is independent of the Dry Creek Dairy facility and is located on a leased parcel of property that is entirely enclosed within the Dry Creek Dairy facility's property. EPA policy is to treat the Dry Creek Dairy property and the land surrounding Dry Creek Dairy as ambient air for this situation. Cargill's application states that there will be a daily presence by Cargill staff who will monitor the area and prohibit access. Additional signage will be posted to inform any member of the public (including Dry Creek Dairy staff) that access is not allowed in the area behind the signs. This approach follows the methods of determining the ambient air boundary as specified in the *State of Idaho Air Quality Modeling Guideline.*

3.1.8 Receptor Network

The receptor grid used by the Cargill met the minimum recommendations specified in the *State of Idaho Air Quality Modeling Guideline*. DEQ determined the receptor grid was adequate to reasonably resolve the maximum modeled ambient impacts.

3.2 Emission Rates

3.2.1 Modeled Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application. The following approach was used for Cargill's modeling demonstration:

- All modeled criteria air pollutant and TAP emissions rates were equal to or greater than the facility's emissions calculated in the PTC application and the permit allowable emission rates listed in the proposed air quality permit.

Table 5 lists the hourly emission rates that were modeled to evaluate whether ambient impacts demonstrate compliance with NAAQS for pollutants with short term averaging periods of 24 hours or less. The emission rates listed in Table 5 were modeled continuously for 24 hours per day.

Two operating scenarios were modeled by Cargill. The first represents normal operations at maximum requested biogas production at 50,000 cu ft/hr being split at 12,000 cu ft/hr for each of the three individual generator engines with the balance of 14,000 cu ft/hr being incinerated by the flare. The second scenario represents a worst-case situation where the maximum quantity of biogas is being generated, but all three generator engines are not operating, and the entire 50,000 cu ft/hr of biogas is incinerated by the flare.

There were no lead emissions predicted to be emitted by any of the sources at this facility. Modeling was not performed or required for lead.

Table 5. MODELED SHORT-TERM EMISSIONS RATES				
Source ID	Description	PM_{10}[b], 24-hour avg (lb/hr)[a]	SO_2[c] 3-hr avg and 24-hr avg (lb/hr)	CO[d] 1-hr avg and 8-hr avg (lb/hr)
EU1	Generator #1	5.2E-04	1.20	4.19
EU2	Generator #2	5.2E-04	1.20	4.19
EU3	Generator #3	5.2E-04	1.20	4.19
EU4	Candlestick Flare operating at 14,000 cu ft/hr biogas	0.11	1.40	2.93
EU4[e]	Candlestick flare operating at 50,000 cu ft/hr biogas	0.38	4.99	10.45

a. Pounds per hour
b. Particulate matter with a mean aerodynamic diameter of ten microns or less
c. Sulfur dioxide
d. Carbon monoxide
e. Flare operation at 50,000 cu ft/hr biogas represents a flare-only scenario—or worst-case flaring.

Table 6 lists the hourly emission rates that were modeled to demonstrate compliance with the NAAQS with an annual averaging period in the full impact analysis for PM_{10}, SO_2, and NO_2. The emission rates listed in Table 6 were modeled continuously for 8,760 hours per year. The modeled NO_2 emission rates in Table 6 accounted for a 75% NO_2 to NO_x ratio.

Table 6. MODELED ANNUAL AVERAGE EMISSIONS RATES				
Source ID	Description	PM_{10}[a] (lb/hr)[b]	NO_2[c] (lb/hr)	SO_2[d] (lb/hr)
EU1	Generator #1	5.2E-04	3.15	1.20
EU2	Generator #2	5.2E-04	3.15	1.20
EU3	Generator #3	5.2E-04	3.15	1.20
EU4	Candlestick Flare (14,000 cu ft/hr biogas)	0.11	0.40	1.40
EU4	Candlestick Flare (50,000 cu ft/hr biogas)	0.38	1.44	4.15[e]

a. Particulate matter with a mean aerodynamic diameter of ten microns or less
b. Pounds per hour
c. Nitrogen dioxide
d. Sulfur dioxide
e. Accounts for 18.2 tons per year of SO_2 and continuous operation with 500 ppm H_2S in biogas

Emissions of acrolein, a non-carcinogenic TAP, were expected to exceed the emissions screening level (EL), and modeling was required. The hourly emissions of the non-carcinogenic TAP listed in Table 7 were modeled for 24 hours per day to demonstrate compliance with the applicable acceptable ambient concentration for non-carcinogens (AAC). The carcinogenic TAP annual average emission rates listed in Table 7 were modeled to demonstrate compliance with the applicable acceptable ambient concentration for carcinogens (AACC) increments. The emission rates were modeled continuously for 8,760 hours per year without any additional restrictions on the emission rates or hours of operation. Emissions of all other TAPs were estimated to be below listed ELs in Idaho Air Rules Sections 585 and 586, and air impact analyses were not required.

Table 7. MODELED TOXIC AIR POLLUTANTS EMISSIONS RATES							
Pollutant	CAS No.	Type	Generator 1	Generator 2	Generator 3	Flare[b] at 12,000 cu ft/hr	Flare[c] at 50,000 cu ft/hr
Acrolein (lb/hr)[a]	107-02-8	Non-carcinogenic	3.5E-02	3.5E-02	3.5E-02	--	--
Arsenic (lb/hr)	7440-38-2	Carcinogenic	--	--	--	2.8E-06	1.0E-05
Benzene (lb/hr)	71-43-2	Carcinogenic	3.0E-03	3.0E-03	3.0E-03	3.0E-05	--[d]
Cadmium (lb/hr)	7440-43-9	Carcinogenic	--	--	--	1.5E-05	5.5E-05
Formaldehyde (lb/hr)	50-00-0	Carcinogenic	--	--	--	1.1E-03	3.8E-03
Nickel (lb/hr)	7440-02-0	Carcinogenic	--	--	--	2.9E-05	1.1E-04
1,1,2,2-Tetra-Chloroethane (lb/hr)	79-34-5	Carcinogenic	1.7E-05	1.7E-05	1.7E-05	--	--

a. Pounds per hour

b. Typical operating scenario with full capacity biogas production, all 3 generators operating, and the flare operating at a reduced capacity of 8 MMBtu/hr.

c. Non-typical operations with full capacity biogas production, none of the 3 generators operating, and only the flare operating to incinerate all biogas.

d. Benzene emissions for the flare-only scenario are below the Section 586 screening emission rate limit of 8.0E-04 lb/hr.

3. 3 Emission Release Parameters

3.3.1 Point Sources

Table 8 provides emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for point sources. Cargill is an existing facility and all stacks and equipment are in place and all emission units are operational.

The generator engines were modeled as point sources with a vertical uninterrupted release.

The flare was modeled as a point source with an effective release height that was specifically calculated for each of the two operating scenarios. The effective height is based on the physical height being added to the additional height caused by the high heat release rates for incineration of the biogas. Cargill/MSE estimated the effective height using the EPA SCREEN3 model for flare sources. This is an appropriate method for modeling an open flare as a point source. Flare exhaust temperature used the standard SCREEN3 value of 1273 Kelvin (or 1832 degrees Fahrenheit). The flare diameter modeled was a set diameter based on the flare design rather than an effective diameter based on the heat release rate. Flare exhaust flow rates were described as being estimated using US EPA Reference Method 19 F_d factors. The F_d factor used was for natural gas combustion.

Exhaust parameters for the three biogas-fired generator engines appear to be based in part on performance test data for October 2008 tests. The supporting information for the generator engine exhaust flow velocity was not found in the permit application. It was obtained from DEQ's document storage system and was based on corrected October 2008 performance test results for Generator Engine No. 1, which was received by DEQ on February 9, 2009. The exit temperature used in the modeling demonstration used the highest of three values recorded in the performance test and was obtained at a sampling port that appears to be located at least 20 feet from the point of exhaust release according to photo documentation of the exhaust system. The exit temperature is based on a good source of information but the value used may be higher than would be expected at the at the point of release to the atmosphere after the exhaust flows through exhaust an outdoor muffler system and an additional length of stack.

DEQ accepted the modeled exit temperatures, stack release heights, and diameters as submitted.

Table 8. POINT SOURCE STACK PARAMETERS

Release Point	Description	Release Orientation	Stack Height (m)[a]	Stack Gas Flow Temperature (K)[b]	Stack Gas Flow Velocity (m/sec)[c]	Stack Diameter (m)
EU1	Generator #1	Vertical and uninterrupted	6.1	430	26.1	0.30
EU2	Generator #2	Vertical and uninterrupted	6.1	430	26.1	0.30
EU3	Generator #3	Vertical and uninterrupted	6.1	430	26.1	0.30
EU4	Candlestick Flare (flaring excess capacity)	Open Flare / Equivalent Point Source Derived Parameters	9.5	1273	4.1	0.61
EU4	Candlestick Flare (flaring all 50,000 cu ft / hr of biogas)	Open Flare / Equivalent Point Source Derived Parameters	11.6	1273	14.7	0.61

a. Meters
b. Kelvin
c. Meters per second

3.4 Results for Ambient Impact Analyses

3.4.1 Significant Impact Analyses

A significant impact analysis was not performed for this project. Facility-wide modeling was required by DEQ for this project.

3.4.2 Full Impact Analyses

The modeling demonstration modeled requested emission rates for all emissions units at the facility under two scenarios for the maximum requested level of biogas production. The first scenario addressed the typical planned operations of the facility with all generator engines operating at capacity and the flare incinerating the remaining portion of biogas. The other modeled scenario assumed the flare incinerates all of the biogas, and this is only expected to occur for short periods of time. Flaring of all biogas is not a desired situation.

A full impact analysis was performed by adding the ambient background concentrations provided by DEQ to the facility's ambient impacts predicted to occur due to the facility's potential emissions for PM_{10}, CO, SO_2, and NO_2. The results of the full impact analysis submitted by Cargill are listed in Table 9.

Of note are the relatively low ambient impacts for both normal and flare-only operating scenarios. For normal operations at the requested capacities, the ambient impacts are below the significant contribution levels for 24-hour average PM_{10}, annual average PM_{10}, and 1-hour average CO. The flare-only scenario ambient impacts were below the significant contribution levels for 24-hour average PM_{10}, 1-hour average CO, and 8-hour average CO. Ambient impacts of SO_2 for both operating scenarios for all averaging periods for the SO_2 NAAQS have been kept low after accounting for the hydrogen sulfide scrubber control to reduce SO_2 emissions. NO_2 ambient impacts are close to the limitation imposed by the annual ambient standard.

Table 9. RESULTS OF FULL IMPACT ANALYSES

Pollutant	Averaging Period	Modeled Design 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
PM_{10}[c]	24-hour	2.3 (4.7)[g]	73	75.3 (77.7)[g]	150	50% (52%)[g]
	Annual	0.8 (1.3)	27	27.8 (28.3)	50	56% (57%)
NO_2[d]	Annual	79.5 (5.1)	17	96.5 (22.1)	100	97% (22%)
CO[e]	1-hour	965 (232.5)	3,600	4,565 (3,832.5)	40,000	11% (10%)
	8-hour	533 (232.5)	2,300	2,833 (2,532.5)	10,000	28% (25%)
SO_2[f]	3-hour	218.4 (101.1)	34	252.4 (135.1)	1,300	19% (10%)
	24-hour	114.1 (62.1)	26	140.1 (88.1)	365	38% (24%)
	Annual	39.3 (14.7)	8	47.3 (22.7)	80	59% (28%)

a. Micrograms per cubic meter
b. National ambient air quality standards
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
d. Nitrogen dioxide
e. Carbon monoxide
f. Sulfur dioxide
g. All values in parentheses in this table represent the ambient impacts for the flare-only scenario.

3.4.3 Toxic Air Pollutant Impact Analyses

Dispersion modeling for TAPs was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 585 for non-carcinogenic TAPs and Section 586 for carcinogenic TAPs. This project involves an existing facility. The predicted ambient TAPs impacts are listed in Table 10 and were below allowable increments.

Table 10. RESULTS OF TAPs ANALYSES

Toxic Air Pollutant	CAS[a]	Maximum Modeled Concentration ($\mu g/m^3$)[b]	AAC/AACC[c] ($\mu g/m^3$)	Percent of AACC
Acrolein	107-02-8	2.9	12.5	23%
Arsenic	7440-38-2	2.0E-05 (3.5E-05)[d]	2.3E-04	9% (15%)[d]
Benzene	71-43-2	0.073	0.12	61%
Cadmium	7440-43-9	1.1E-04 (1.9E-04)	5.6E-04	20% (34%)
Formaldehyde	50-00-0	0.008 (0.013)	0.077	10% (17%)
Nickel	7440-02-0	2.1E-04 (3.7E-04)	4.2E-03	5% (9%)
1,1,2,2- Tetrachloroethane	79-34-5	4.1E-04	0.017	2%

a. Chemical Abstract Service Number
b. Micrograms per cubic meter
c. Acceptable ambient concentration for non-carcinogens/Acceptable ambient concentration for carcinogens
d. All values listed in parentheses in this table represent the predicted impacts for flare-only operation at unrestricted capacity and hours of operation.

4.0 Conclusions

The ambient air impact analysis submitted demonstrated to DEQ's satisfaction that emissions from the facility, as represented by the applicant in the permit application, will not cause or significantly contribute to a violation of any air quality standard.

APPENDIX C – FACILITY DRAFT COMMENTS

The following comments were received from the facility on March 28, 2011:

Facility Comment #1: Condition #7 - We would like to remove reference to "maximum hourly" SO2 limit, the limit presented in the permit is a daily limit (120 lb/dy).

DEQ Response #1: This change was made as it was a typographical error by DEQ.

Facility Comment #2: Condition # 15 - Please delete first bulleted condition referring to surplus oxygen range of 0.5 to 1%. The second bulleted condition with range of 0.25 to 3% is appropriate. The two bulleted requirements as written are redundant/conflicting.

DEQ Response #2: This change was made as requested.

Facility Comment #3: Condition # 21 - We would like to change H2S gas monitor accuracy to +/- 10%. The existing H2S gas meter used for this project has rated accuracy of 10%. The accuracy of Draegger tubes and also the CEM we previously attempted to use were also 10%. I'm not aware of a meter on the market that will guarantee accuracy tolerances of less than 10% for use in this application.

DEQ Response #3: This change was made as requested.

APPENDIX D – PROCESSING FEE

PTC Fee Calculation

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

Company:	**Cargill Environmental Finance - Dry Creek**
Address:	**138 River Vista Place, Suite 106E**
City:	**Twin Falls**
State:	**Idaho**
Zip Code:	**83301**
Facility Contact:	**Ryan Coleman**
Title:	**Project Manager**
AIRS No.:	**083-00099**

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	26.9	0	26.9
SO_2	0.0	34.65	-34.7
CO	0.6	0	0.6
PM10	0.5	0	0.5
VOC	5.0	0	5.0
TAPS/HAPS	1.2	0	1.2
Total:	0.0	34.65	**-0.4**
Fee Due	**$ 1,000.00**		

Comments: There is an overall reduction of emissions and by rule is less than 1 T/yr increase. Therefore, a processing fee of $1,000 is required in accordance with IDAPA 58.01.01.225.