Statement of Basis

Permit to Construct P-2011.0134
Project No. 60949

City of Sandpoint
Wastewater Treatment Plant
Sandpoint, Idaho

Facility ID No. 017-00061

Final

EC **March 7, 2012**
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
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
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gasses
gpm	gallons per minute
gr	grain (1 lb = 7,000 grains)
HAP	hazardous air pollutants
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
lb/hr	pounds per hour
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
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
UTM	Universal Transverse Mercator
VOC	volatile organic compounds
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

The City of Sandpoint operates a wastewater treatment plant to manage and treat municipal wastewater for the city. Methane biogas is produced as a natural part of the anaerobic digestion process of the plant. Biogas is currently combusted through a rudimentary candlestick flare, as it has been for the entire 50+ year life of the plant. The biogas has a composition of 55 to 60 percent methane (CH_4), 45 to 40 percent carbon dioxide (CO_2) and less than 1 percent hydrogen sulfide (H_2S). The biogas generated from the anaerobic digesters is collected and piped to the candlestick flare where it is mixed with atmospheric oxygen and combusted. Prior to the flare, the biogas will be diverted to an iron sponge to remove H_2S and then directed to the proposed IC engine. During cold months, the heat from the engine is required to provide process heat to the digesters which are required to maintain warm temperatures to facilitate proper wastewater disposal.

Permitting History

This is the initial PTC for an existing facility that was previously constructed and thus there is no permitting history.

Application Scope

This permit is the initial PTC for this facility. The applicant has proposed to install and operate a 91 bhp IC engine fueled by digester gas in lieu of flaring the digester gas.

Application Chronology

November 9, 2011	DEQ received an application and an application fee.
Nov. 18 – Dec. 5, 2011	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
November 21, 2011	DEQ approved pre-permit construction.
November 30, 2011	DEQ determined that the application was complete.
December 28, 2011	DEQ made available the draft permit and statement of basis for peer and regional office review.
January 18, 2012	DEQ made available the draft permit and statement of basis for applicant review.
February 28, 2012	DEQ received the permit processing fee.
March 7, 2012	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
IC1	IC Engine: Manufacturer: Man E Model: 0834 LE302 Manufacture Date: Unknown Engine Horsepower: 91 4- Stroke Engine Fuel: digester gas	Iron Sponge: Manufacturer: Varec Model: 236-08-0-0-1-1 Type: 263 Series Media: wood shavings impregnated with iron oxide Volume: 299 bushels -15 lb Fe_2O_3/bushel	Exit height: 20 ft (6.1 m) Exit diameter: 0.31 ft (0.095 m) Exit flow rate: 44.6 m/sec Exit temperature: 500 °F (533 K)

Emissions Inventories

Potential to Emit

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

Using this definition of Potential to Emit an emission inventory was developed for the internal combustion engine operations at the facility (see Appendix A) associated with this proposed project. Emissions estimates of criteria pollutant, GHG, HAP PTE were based on emission factors from AP-42, Table 3.2-2, the Gas Technology Institute on the quality of biomethane from dairy waste, vendor information and operations of 8,760 hours per year.

Uncontrolled Potential to Emit

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

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

The following table presents the uncontrolled Potential to Emit for regulated air pollutants as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this IC engine operation, uncontrolled Potential to Emit is based upon a worst-case for operation of the facility of 8,760 hrs/yr (24 hrs/day x 365 days/yr). While the results in the table suggest that the engine could be exempt based on Below Regulatory Concern criteria in IDAPA 58.01.01.220-223, this unit cannot be exempt as it is within a PM_{10} Non-Attainment area.

Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Emissions Unit	$PM_{10}/PM_{2.5}$ T/yr	SO_2 T/yr	NO_X T/yr	CO T/yr	VOC T/yr	CO_2e T/yr
Point Sources						
IC Engines	$1.99E^{-04}$	1.54	0.88	2.20	0.18	605.17
Total, Point Sources	**$1.99E^{-04}$**	**1.54**	**0.88**	**2.20**	**0.18**	**605.17**

The following table presents the uncontrolled Potential to Emit for HAP pollutants as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for the IC engine. Uncontrolled Potential to Emit is based upon a worst-case for operation of the facility of 8,760 hrs/yr (24 hrs/day x 365 days/yr).

Table 3 UNCONTROLLED POTENTIAL TO EMIT FOR HAZARDOUS AIR POLLUTANTS

Hazardous Air Pollutants	PTE (T/yr)
Acrolein	$1.33E^{-02}$
Biphenyl	$5.49E^{-04}$
Cresols/Cresylic Acid	$3.14E^{-06}$
Dibutyl phthalate	$1.05E^{-07}$
Ethyl Benzene	$1.04E^{-04}$
Methanol	$6.47E^{-03}$
Hexane	$2.87E^{-03}$
Hydrogen Sulfide	$1.66E^{-02}$
Naphthalene	$1.93E^{-04}$
Nitrobenzene	$2.49E^{-08}$
Phenol	$6.31E^{-05}$
Styrene	$4.72E^{-08}$
Toluene	$1.06E^{-03}$
2,2,4 Trimethyl-pentane	$6.47E^{-04}$
Xylene	$4.80E^{-04}$
Aniline	$7.04E^{-07}$
Benzene	$1.14E^{-03}$
Bis(2-chloro-1-methyl-ether)	$4.32E^{-02}$
Bis(2-ethylhexyl) phthalate	$1.15E^{-07}$
Carbon Tetrachloride	$7.36E^{-08}$
Dichloromethane	$5.18E^{-05}$
1,2,2,2 Tetrachloro-ethane	$6.42E^{-06}$
Tetrachloroethylene	$9.58E^{-08}$
1,1,2 Trichloroethane	$1.49E^{-06}$
Vinyl Chloride	$3.86E^{-05}$
Total	**0.09**

Pre-Project Potential to Emit

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

This is a new facility. Therefore, pre-project emissions are set to zero for all criteria pollutants.

Post Project Potential to Emit

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

The following table presents the post project Potential to Emit for criteria and GHG pollutants from the IC engine as determined by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit. This table assumes 93% capacity.

Table 4 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Emissions Unit	$PM_{10}/PM_{2.5}$		SO_2[c]		NO_X		CO		VOC		CO_2e	
	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]	lb/hr[a]	T/yr[b]
Point Sources												
IC Engine	$4.55E^{-05}$	$1.85E^{-04}$	$8.79E^{-04}$	$3.58E^{-03}$	0.20	0.82	0.50	2.04	0.04	0.16	137.76	603.39
Post Project Totals	**$4.55E^{-05}$**	**$1.85E^{-04}$**	**$8.79E^{-04}$**	**$3.58E^{-03}$**	**0.20**	**0.82**	**0.50**	**2.04**	**0.04**	**0.16**	**137.76**	**603.39**

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.
b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.
c) The SO_2 emissions are essentially zero, as when the iron sponge is functioning properly, the H_2S is non-detectable. However, based on manufacturer specifications of the iron sponge, it should get down to 5 ppm.

Change in Potential to Emit

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

Table 5 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Emissions	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC		CO_2e	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	T/yr	lb/hr	lb/hr	T/yr	lb/hr	T/yr
Point Sources												
Pre-Project Potential to Emit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Post Project Potential to Emit	$4.55E^{-05}$	$1.85E^{-04}$	$8.79E^{-04}$	$3.58E^{-03}$	0.20	0.82	0.50	2.04	0.04	0.16	137.76	603.39
Changes in Potential to Emit	**$4.55E^{-05}$**	**$1.85E^{-04}$**	**0.00**	**0.00**	**0.20**	**0.82**	**0.50**	**2.04**	**0.04**	**0.16**	**137.76**	**603.39**

As presented previously in Table 5 the pre-project facility-wide potential to emit exceeds 250 T/yr. Therefore, a PSD applicability analysis is required for this project.

Non-Carcinogenic TAP Emissions

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

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

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

Non-Carcinogenic Toxic Air Pollutants	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Acrolein	0.00	3.04E-03	3.04E-03	1.70E-02	No
Biphenyl	0.00	1.25E-04	1.25E-04	1.00E-01	No
2-Chlorophenol	0.00	1.22E-08	1.22E-08	3.30E-02	No
Cresols/Cresylic Acid	0.00	7.18E-07	7.18E-07	1.47	No
Cyclopentane	0.00	1.34E-04	1.34E-04	115	No
Dibutyl phthalate	0.00	2.39E-08	2.39E-08	3.33E-01	No
Ethyl Benzene	0.00	2.38E-05	2.38E-05	29	No
Methanol	0.00	1.48E-03	1.48E-03	17.3	No
Hexane	0.00	6.56E-04	6.56E-04	12	No
Hydrogen Sulfide	0.00	3.79E-03	3.79E-03	9.33E-01	No
Methylcyclohexanone	0.00	7.27E-04	7.27E-04	15.3	No
Naphthalene	0.00	4.40E-05	4.40E-05	3.33	No
Nitrobenzene	0.00	5.67E-09	5.67E-09	3.33E-01	No
Nonane	0.00	6.50E-05	6.50E-05	70	No
Octane	0.00	2.08E-04	2.08E-04	93.3	No
Pentane	0.00	1.54E-03	1.54E-03	118	No
Phenol	0.00	1.44E-05	1.44E-05	1.27	No
Pyridine	0.00	9.53E-09	9.53E-09	1	No
Styrene	0.00	1.08E-08	1.08E-08	6.67	No
Toluene	0.00	2.42E-04	2.42E-04	25	No
Trimethyl Benzene	0.00	4.20E-05	4.20E-05	8.2	No
2,2,4-Trimethyl-pentane	0.00	1.48E-04	1.48E-04	23.3	No
Xylene	0.00	1.09E-04	1.09E-04	29	No

None of the PTEs for non-carcinogenic TAPs were exceeded as a result of this project. Therefore, modeling is not required for any non-carcinogenic TAP because none of the 24-hour average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Carcinogenic TAP Emissions

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

Table 7 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR CARCINOGENIC TOXIC AIR POLLUTANTS

Carcinogenic Toxic Air Pollutants	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Aniline	0.00	1.50E-07	1.50E-07	9.0E-04	No
Benzene	0.00	2.42E-04	2.42E-04	8.0E-04	No
Bis (2-chloro-1-methyl-ethyl) ether	0.00	1.47E-04	1.47E-04	3.3E-04	No
Bis (2-ethylhexyl) phthalate	0.00	4.31E-08	4.31E-08	2.8E-02	No
Carbon tetrachloride	0.00	1.56E-08	1.56E-08	4.4E-04	No
Dichloromethane	0.00	1.10E-05	1.10E-05	1.6E-03	No
Napthalene	0.00	4.09E-05	4.09E-05	9.1E-05	No
1,1,2,2-Tetrachloro-ethane	0.00	1.36E-06	1.36E-06	1.1E-05	No
Tetrachloroethylene	0.00	2.03E-08	2.03E-08	1.3E-02	No
1,1,2-trichloroethane	0.00	3.17E-07	3.17E-07	4.2E-04	No
Vinyl Chloride	0.00	8.19E-06	8.19E-06	1.2E-03	No

None of the PTEs for carcinogenic TAPs were exceeded as a result of this project. Therefore, modeling is not required for any carcinogenic TAP because none of the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Post Project HAP Emissions

The following table presents the post project potential to emit for HAP pollutants from the engine 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 8 HAZARDOUS AIR POLLUTANTS EMISSIONS POTENTIAL TO EMIT SUMMARY

Hazardous Air Pollutants	PTE (T/yr)
Acrolein	$1.24E^{-02}$
Biphenyl	$5.11E^{-04}$
Cresols/Cresylic Acid	$2.92E^{-06}$
Dibutyl phthalate	$9.72E^{-08}$
Ethyl Benzene	$9.68E^{-05}$
Methanol	$6.02E^{-03}$
Hexane	$2.67E^{-03}$
Hydrogen Sulfide	$1.54E^{-02}$
Naphthalene	$1.79E^{-04}$
Nitrobenzene	$2.31E^{-08}$
Phenol	$5.87E^{-05}$
Styrene	$4.39E^{-08}$
Toluene	$9.87E^{-04}$
2,2,4 Trimethyl-pentane	$6.02E^{-04}$
Xylene	$4.46E^{-04}$
Aniline	$6.55E^{-07}$
Benzene	$1.06E^{-03}$
Bis(2-chloro-1-methyl-ether)	$4.32E^{-02}$
Bis(2-ethylhexyl) phthalate	$1.07E^{-07}$
Carbon Tetrachloride	$6.84E^{-08}$
Dichloromethane	$4.82E^{-05}$
1,2,2,2 Tetrachloro-ethane	$5.79E^{-06}$
Tetrachloroethylene	$8.91E^{-08}$
1,1,2 Trichloroethane	$1.39E^{-06}$
Vinyl Chloride	$3.59E^{-05}$
Totals	**0.08**

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of 1-hr NO_X 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.

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

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

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Bonner County, which is designated as attainment or unclassifiable for $PM_{2.5}$, SO_2, NO_2, CO, and Ozone, and non-attainment for PM_{10}. 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 proposed IC engine. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 Tier II Operating Permit

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

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625 Visible Emissions

The sources of PM_{10} emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Condition 6.

Standards for New Sources (IDAPA 58.01.01.676)

IDAPA 58.01.01.676 Standards for New Sources

The fuel burning equipment located at this facility, with a maximum rated input of ten (10) million BTU per hour or more, are subject to a particulate matter limitation of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume when combusting gaseous fuels. Fuel-Burning Equipment is defined as any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer. This requirement is assured by Permit Conditions 5.

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 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)

Because the facility has a spark-ignited IC engines the following NSPS requirements apply to this facility:

- 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**

§ 60.4230 Am I subject to this subpart?

(a) The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified in paragraphs (a)(1) through (5) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

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

(iii) on or after July 1, 2008, for engines with a maximum engine power less than 500 HP; or

The City of Sandpoint Wastewater Treatment Plant will own and operate an engine with a maximum HP less than 500 and ordered after July 2008. Therefore, the facility is subject to the subpart.

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

The City of Sandpoint is not the manufacturer of the engines and thus this section does not apply.

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

The City of Sandpoint is not the manufacturer of the engines and thus this section does not apply.

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

(d) Owners and operators of stationary SI ICE with a maximum engine power greater than 19 KW (25 HP) and less than 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards for field testing in 40 CFR 1048.101(c) for their non-emergency stationary SI ICE and with the emission standards in Table 1 to this subpart for their emergency stationary SI ICE. Owners and operators of stationary SI ICE with a maximum engine power greater than 19 KW (25 HP) and less than 75 KW (100 HP) manufactured prior to January 1, 2011, that were certified to the standards in Table 1 to this subpart applicable to engines with a maximum engine power greater than or equal to 100 HP and less than 500 HP, may optionally choose to meet those standards.

The engine to be purchased by is 90 HP and must meet the field testing requirements as defined in 40 CFR 1048.101(c). However, because the permittee is not sure as to the exact engine they will purchase; the manufactured date is unknown. A Man E engine will be purchased; however, because the date is unknown it may be possible that the permittee could comply with Table 1 standards rather than 1048.101(c).

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

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

The City of Sandpoint must comply with the appropriate standards throughout the life of the engine. The applicable requirements are ensured in Permit Condition 10.

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

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

The engine is not allowed to operate using gasoline. Therefore, this requirement is not applicable.

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

(a) After July 1, 2010, owners and operators may not install stationary SI ICE with a maximum engine power of less than 500 HP that do not meet the applicable requirements in §60.4233.

The City of Sandpoint will need to install an engine that meets the applicable standards. The applicable requirements are ensured in Permit Condition 7.

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

The city of Sandpoint will not operate an emergency engine. Therefore, this requirement is not applicable.

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

The City of Sandpoint is not the manufacturer. Therefore, this requirement is not applicable.

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

The City of Sandpoint is not the manufacturer. Therefore, this requirement is not applicable.

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

The City of Sandpoint is not the manufacturer. Therefore, this requirement is not applicable.

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

The City of Sandpoint is not the manufacturer. Therefore, this requirement is not applicable.

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

The City of Sandpoint is not the manufacturer. Therefore, this requirement is not applicable.

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

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

(1) Purchasing an engine certified according to procedures specified in this subpart, for the same model year and demonstrating compliance according to one of the methods specified in paragraph (a) of this section.

(2) Purchasing a non-certified engine and demonstrating compliance with the emission standards specified in §60.4233(d) or (e) and according to the requirements specified in §60.4244, as applicable, and according to paragraphs (b)(2)(i) and (ii) of this section.

(i) If you are an owner or operator of a stationary SI internal combustion engine greater than 25 HP and less than or equal to 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance.

The City of Sandpoint has the option to purchase a certified engine. If the engine is certified then it must meet 40 CFR 60.4243(a) requirements. Section (a) describes that the engine must be maintained and operated in a manner consistent with the manufacturer specifications. As an alternative, a non-certified engine may also be purchased. If that occurs, a maintenance plan and records of conducted maintenance must be kept. An initial performance test and subsequent testing is required.

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

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

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

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

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

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

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 1)}$$

Where:

ER = Emission rate of NOX in g/HP-hr.
Cd= Measured NOX concentration in parts per million by volume (ppmv).
1.912×10^{-3} = Conversion constant for ppm NOX to grams per standard cubic meter at 20 degrees Celsius.
Q = Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.
T = Time of test run, in hours.
HP-hr = Brake work of the engine, horsepower-hour (HP-hr).

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

$$ER = \frac{C_d \times 1.164 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 2)}$$

Where:

ER = Emission rate of CO in g/HP-hr.
Cd= Measured CO concentration in ppmv.
1.164×10^{-3} = Conversion constant for ppm CO to grams per standard cubic meter at 20 degrees Celsius.
Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.
T = Time of test run, in hours.
HP-hr = Brake work of the engine, in HP-hr.

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

$$ER = \frac{C_d \times 1.833 \times 10^{-3} \times Q \times T}{HP - hr} \quad \text{(Eq. 3)}$$

Where:

ER = Emission rate of VOC in g/HP-hr.
Cd= VOC concentration measured as propane in ppmv.
1.833×10^{-3} = Conversion constant for ppm VOC measured as propane, to grams per standard cubic meter at 20 degrees Celsius.
Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.
T = Time of test run, in hours.
HP-hr = Brake work of the engine, in HP-hr.

If an engine is purchased that is not EPA certified, an initial Performance Test is required and the must meet all requirements as stated in 40 CFR 60.4244. The applicable requirements are ensured in Permit Condition 14.

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

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

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

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

(2) Maintenance conducted on the engine.

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

The City of Sandpoint must maintain records that include notifications or maintenance performed. The applicable requirements are ensured in Permit Condition 15.

(d) Owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test as conducted in §60.4244 within 60 days after the test has been completed.

The submittal requirement is ensured by Permit Condition 16.

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

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

The General Provisions are ensured by Permit Condition 17.

NESHAP Applicability (40 CFR 61)

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

MACT Applicability (40 CFR 63)

The facility has proposed to operate as a minor source of hazardous air pollutant (HAP) emissions, and is subject to the requirements of 40 CFR 63, Subpart ZZZZ–National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

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

§ 63.6580 What is the purpose of subpart ZZZZ?

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

§ 63.6585 Am I subject to this subpart?

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

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

The engine used by the City of Sandpoint will be operated at an area source for HAPs.

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

This subpart applies to each affected source.

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

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

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

(1) A new or reconstructed stationary RICE located at an area source;

The engine operated by the City of Sandpoint is considered new as it was constructed after June 12, 2006. Additionally, it is subject to 40 CFR Subpart JJJJ requirements. Therefore, all ZZZZ requirements are met by complying with JJJJ.

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.

Initial Permit Condition 5

The permittee shall not discharge PM to the atmosphere from any fuel-burning equipment source in excess of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume for liquid as required in IDAPA 58.01.01.677.

This condition is included in accordance with IDAPA 58.01.01.677.

Initial Permit Condition 6

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

This condition ensures that the state opacity rule is met.

Initial Permit Condition 7

In accordance with 40 CFR 60.4233(d), the engine is required to comply with all emission standards defined for field testing in 40 CFR 1048.101(c) or may elect to comply with Table 1 of Subpart JJJJ standards if the engine is certified and manufactured prior to January 1, 2011. The standards are stated in the following tables:

Table 9 ENGINE EMISSION JJJJ TABLE 1 STANDARDS

Engine Fuel	*Maximum Engine bhp*	*Manufacture Date*	*Emission Standards*					
			g/hp-hr			*ppmvd @ 15% O_2*		
			NO_x	*CO*	*VOC*	*NO_x*	*CO*	*VOC*
Landfill/Digester Gas	*< 500*	*1/1/2011*	*2.0*	*5.0*	*1.0*	*150*	*610*	*80*

Table 10 ENGINE EMISSION FIELD TESTING STANDARDS

Pollutant	*Emission Standards*
	g/kW-hr
HC+NOx	*3.8*
CO	*6.5*

The City is subject to 40 CFR 60, Subpart JJJJ and required to meet emissions standards as defined in 60.4233(d) of the subpart. It is uncertain the exact engine, namely the manufacturer date. Therefore, both Table 1 and Field Testing Standards for 40 CFR 1048.101(c) are potentially available. For flexibility both have been included in this permit condition.

Initial Permit Conditions 8 & 9

In accordance with IDAPA 58.01.01.776.01, the permittee shall not allow, suffer, cause, or permit the emission of odorous gases, liquids, or solids into the atmosphere in such quantities as to cause air pollution.

The permittee shall maintain records of all odor complaints received. The permittee shall take appropriate corrective action as expeditiously as practicable after receipt of a compliant. 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.

These two conditions are included to account for proper odor control and handling of valid complaints.

Initial Permit Condition 10

In accordance with 40 CFR 60.4234, the permittee shall operate and maintain stationary SI ICE that achieves the emission standards as required in 40 CFR 60.4233(d) over the entire life of the engine.

Subpart JJJJ requires that the engine met appropriate emission standards throughout its life. This condition ensures that requirement is met.

Initial Permit Condition 11

The Permittee shall install an iron sponge to control Hydrogen Sulfide emissions. When the engine is down for maintenance the flare must be ignited and used as backup.

This condition requires that an iron sponge be installed as a control device for H_2S emissions. Not only does it control H_2S emissions, it helps maintain the life of the engine and other equipment as the H_2S is very corrosive. Based on pre-application sampling, the H_2S concentration following the sponge is untraceable using a draeger tube. Therefore, it is assumed that the Post Project SO_2 emissions are essentially zero. However, untreated gas is approximately 2,000 ppm. When the engine is down all digester gas will be flared.

Initial Permit Condition 12

If a non-certified engine is purchased, in accordance with 40 CFR 60.4243(b)(2)(i), the permittee must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, the permittee must conduct an initial performance test to demonstrate compliance.

The City of Sandpoint wanted to include so requirements of Subpart JJJJ that allowed the flexibility to purchase a non-certified engine. This condition not only requires a maintenance plan and recordkeeping, it also mandates that performance testing also be conducted. Note that is most likely the City's intention to purchase an EPA certified engine which would cause this condition to no longer be applicable.

Initial Permit Condition 13

If a non-certified engine is purchased, in accordance with 40 CFR 60.4244, the permittee shall follow the procedures:

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

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

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

To determine compliance with the NO_x mass per unit output emission limitation for each engine, the permittee shall convert the concentration of NO_x in the engine exhaust using the following equation:

$$ER = \frac{C_d * 1.912 * 10^{-3} * Q * T}{HP - hr}$$

Where:		
ER	=	*Emission rate of NO_x in g/hp-hr.*
C_d	=	*Measured NO_x concentration in parts per million by volume (ppmv).*
1.912×10^{-3}	=	*Conversion for ppm NO_x to grams per standard cubic meter @ 20 degrees Celsius.*
Q	=	*Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.*
T	=	*Time of test run, in hours.*
$HP\text{-}hr$	=	*Brake work of the engine, horsepower-hour.*

To determine compliance with the CO mass per unit output emission limitation, the permittee shall convert the concentration of CO in the engine exhaust using the following equation:

$$ER = \frac{C_d * 1.164 * 10^{-3} * Q * T}{HP - hr}$$

Where:		
ER	=	*Emission rate of CO in g/hp-hr.*
C_d	=	*Measured CO concentration in parts per million by volume (ppmv).*
1.164×10^{-3}	=	*Conversion for ppm CO to grams per standard cubic meter @ 20 degrees Celsius.*
Q	=	*Stack gas volumetric flow rate, in standard cubic*

		meter per hour, dry basis.
T	=	*Time of test run, in hours.*
HP-hr	=	*Brake work of the engine, horsepower-hour.*

When calculating emissions of VOC, emissions of formaldehyde should not be included. To determine compliance with the VOC mass per unit output emission limitation, the permittee shall convert the concentration of VOC in the engine exhaust using the following equation:

$$ER = \frac{C_d * 1.833 * 10^{-3} * Q * T}{HP - hr}$$

Where:		
ER	=	*Emission rate of VOC in g/hp-hr.*
C_d	=	*Measured VOC concentration as propane in parts per million by volume (ppmv).*
1.833×10^{-3}	=	*Conversion for ppm VOC measured as propane to grams per standard cubic meter @ 20 degrees Celsius.*
Q	=	*Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.*
T	=	*Time of test run, in hours.*
HP-hr	=	*Brake work of the engine, horsepower-hour.*

This condition spells out the potential testing requirements. This only applies if a non-certified engine is purchased.

Initial Permit Condition 14

If an EPA certified engines is purchased, in accordance with 40 CFR 60.4243, the engine must certify compliance with the appropriate manufacturer emission standards in 40 CFR 604231(a)-(c). The certified engine and any applicable control device shall be operated according to the manufacturer's emission-related written instructions. Maintenance records must be kept to demonstrate compliance.

This condition verifies that a certified engine, should it purchased, be maintained in accordance with manufacturer specifications.

Initial Permit Condition 15

In accordance with 40 CFR 60.4245 (a)(1) through (3) of this section, the permittee shall keep records of the following information:

- *For each engine notifications submitted and all documentation supporting any notification.*
- *Maintenance conducted on each SI engine.*
- *Documentation from the manufacturer that the engine is certified to meet emission standards and information in 40 CFR parts 90, 1048, 1054 and 1060, as applicable.*

The permittee shall maintain these records on-site and be made available to DEQ representatives upon request for a period of at least five years.

This condition outlines the type of records that must be maintained in accordance with Subpart JJJJ.

Initial Permit Condition 16

If a non-certified engine is purchased, in accordance with 60.4245 (d), the permittee must submit a copy of each performance test as conducted in 40 CFR 60.4244 within 60 days after the test has been completed.

The results of the performance test, should it be conducted, must be submitted no later than 60 days following the test date. This condition was added in accordance with subpart JJJJ.

Initial Permit Condition 17

In accordance with 40 CFR 60.4246, the permittee shall comply with the applicable General Provisions of 40 CFR 60.

This condition ensures that any applicable General Provisions of part 60 are adhered to.

Initial Permit Condition 18

Hydrogen sulfide concentration shall be monitored a minimum of once a week at both the inlet and outlet of the iron sponge. The iron sponge media shall be replaced regularly to avoid corrosion to the engine from the H2S in the biogas. All maintenance performed on the iron sponge shall be done as expeditiously as possible to limit use of the flare.

This condition was included to require monitoring of H_2S concentration and subsequently iron media replacement. While there is no specific concentration that once triggered requires media replacement, the condition infers that media replacement should occur no later than when the concentration reaches between 20-30 ppm. According to JUB engineers, the engine and other components start to develop corrosion problems. Therefore, the sponge media needs replacing prior to the metal begins to corrode. There is no need for an explicit limit in this case as the 1-hr SO_2 NAAQS standard would not be exceeded until the H_2S concentration reached approximately 7,786 ppm. According to the Permittee, the untreated biogas is typically around 2,000 ppm. Adding a superficial limit is not unnecessary. Scheduled maintenance should be done in a timely manner to limit the downtime of control device.

Initial Permit Condition 19

Records shall include the results of each H_2S measurement.

The hand held H_2S monitor used to measure the H_2S concentration of the landfill gas stream shall have a certified accuracy of plus or minus 10%. The hand held monitor shall be calibrated and maintained in accordance with the manufacturer's specifications.

Records of this information shall be maintained in accordance with the Recordkeeping General Provision.

This condition identifies how the monitoring shall be conducted.

Initial Permit Condition 20

Unless expressly provided otherwise, any reference in this permit to any document identified in IDAPA 58.01.01.107.03 shall constitute the full incorporation into this permit of that document for the purposes of the reference, including any notes and appendices therein. Documents include, but are not limited to:

- *Standards of Performance of New Stationary Sources (NSPS), 40 CFR Part 60, Subpart JJJJ.*
- *National Emission Standards for Hazardous Air Pollutants (NESHAPS) 40 CFR 63, Subpart ZZZZ.*

For permit conditions referencing or cited in accordance with any document incorporated by reference (including permit conditions identified as NSPS), should there be any conflict between the requirements of the permit condition and the requirements of the document, the requirements of the document shall govern, including any amendments to that regulation.

If there is any discrepancy between this permit and the NSPS standard this condition states that the federal standards shall govern.

Initial Permit Condition 21

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

Initial Permit Condition 22

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

Initial Permit Condition 23

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

Initial Permit Condition 24

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

Initial Permit Condition 25

The permit expires if construction has not begun with two years or issuance or if construction suspended by one year, in accordance with IDAPA 58.01.01.211.

Initial Permit Condition 26

The construction and operation notification provision requires that the permittee notify DEQ of the dates of construction and operation, in accordance with IDAPA 58.01.01.211.

Initial Permit Condition 27

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

Initial Permit Condition 28

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

Initial Permit Condition 29

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

Initial Permit Condition 30

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

Initial Permit Condition 31

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

Initial Permit Condition 32

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

Initial Permit Condition 33

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

Initial Permit Condition 34

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

Initial Permit Condition 35

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

Initial Permit Condition 36

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

PUBLIC REVIEW

Public Comment Opportunity

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

APPENDIX A – EMISSIONS INVENTORIES

Sandpoint Wastewater Biogas Project
Calculation Input Assumptions

Digester

Peak daily gas generation from digester	26,000	cf/day	
Average daily gas generation from digester	24,180	cf/day	
Annual gas production	8.83	MMcf/year	(based on average daily gas generation)
Estimated annual capacity factor	93%		
Biogas heat value	540	Btu/cf	
Biogas heat content	9,750	Btu/min	
Hourly heat energy in biogas	0.6	MMBtu/hr	

Emission Sources

	Emission Units (EU)
	1
Source type	Genset
Model number	Man E 0834 LE 302
Break Horsepower	91
Hourly Equipment Peak Input Biogas capacity (cf/h	1,057
Peak Biogas Heat Input capacity (MMBtu/hr)	0.6
Daily peak biogas capacity (cf/day)	25,375
Annual Equipment biogas capacity (MMcf/year)	9.26
Annual Estimated peak biogas capacity (MMcf/year	8.61
End of Stack Temperature (°F)	1,004
Stack Height (ft)	18
Stack Diameter (in)	10.0
Exhaust flow rate at capacity (cfm)	453

Modeled Parameter

Stack height (m)	5.49
Stack inside Diameter (m)	0.25
Stack exit velocity (m/s)	4.22
Stack gas temperature (°K)	813

Notes:

The stack gas temperature is the default value listed in the MAN Biogas Engin Technical Data Sheet Guide.

Sandpoint Wastewater Biogas Project
Emission Total from CHP Source

	Pollutant	Genset Emissions (lb/hr)	Genset Emissions (ton/yr)	TAP EL (lb/hr)	Gensets Exceed EL?
Primary Pollutants	PM10	4.40E-05	1.79E-04		
	PM2.5	4.40E-05	1.79E-04		
	SO_2	0.35	1.43		
	NOx	0.20	0.82		
	NO_2	0.20	0.82		
	CO	0.50	2.04		
	VOC	0.04	0.16		
	Lead				
Section 585 TAP	Acrolein	2.93E-03	1.20E-02	1.70E-02	No
	Barium, soluble compounds, as Ba			3.30E-02	No
	Biphenyl	1.21E-04	4.93E-04	1.00E-01	No
	2-Chlorophenol (and all isomers) (ID)	1.17E-08	4.79E-08	3.30E-02	No
	Chromium metal - Including:			3.30E-02	No
	Cobalt metal, dust, and fume			3.30E-03	No
	Copper - Dusts & mists, as Cu			6.70E-02	No
	Cresols/Cresylic Acid (isomers and mixtures)	6.93E-07	2.82E-06	1.47E+00	No
	Cyclopentane	1.30E-04	5.28E-04	1.15E+02	No
	Dibutyl phthalate	2.30E-08	9.39E-08	3.33E-01	No
	Ethyl benzene	2.29E-05	9.35E-05	2.90E+01	No
	Methanol	1.43E-03	5.81E-03	1.73E+01	No
	Hexane (n-Hexane)	6.34E-04	2.58E-03	1.20E+01	No
	Hydrogen sulfide	5.23E-03	2.13E-02	9.33E-01	No
	Manganese as Mn Dust & compounds			3.33E-01	No
	Mercury (vapors except Alkyl as Hg)			3.00E-03	No
	o-Methylcyclohexanone	7.02E-04	2.86E-03	1.53E+01	No
	Molybdenum as Mo -Soluble compounds			3.33E-01	No
	Naphthalene	4.25E-05	1.73E-04	3.33E+00	No
	Nitrobenzene	5.48E-09	2.23E-08	3.33E-01	No
	Nonane	6.28E-05	2.56E-04	7.00E+01	No
	Octane	2.00E-04	8.16E-04	9.33E+01	No
	Pentane	1.48E-03	6.05E-03	1.18E+02	No
	Phenol	1.39E-05	5.67E-05	1.27E+00	No
	Pyridine	9.21E-09	3.75E-08	1.00E+00	No
	Styrene monomer (ID)	1.04E-08	4.24E-08	6.67E+00	No
	Toluene (toluol)	2.34E-04	9.53E-04	2.50E+01	No
	Trimethyl benzene (mixed and individual isomers)	4.06E-05	1.65E-04	8.20E+00	No
	2,2,4-Trimethyl-pentane	1.43E-04	5.81E-04	2.33E+01	No
	Xylene (o-, m-, p-isomers)	1.06E-04	4.31E-04	2.90E+01	No
	Zinc oxide dust			6.67E-01	No
Section 586 TAP	Aniline	1.44E-07	6.32E-07	9.0E-04	No
	Arsenic compounds			1.5E-06	No
	Benzene	2.34E-04	1.02E-03	8.0E-04	No
	Bis (2-chloro-1-methyl- ethyl) ether	1.42E-04	6.21E-04	3.3E-04	No
	Bis (2-ethylhexyl) phthalate	4.16E-08	1.82E-07	2.8E-02	No
	Cadmium and compounds			3.7E-06	No
	Carbon tetrachloride	1.51E-08	6.61E-08	4.4E-04	No
	Dichloromethane (Methylenechloride)	1.06E-05	4.65E-05	1.6E-03	No
	Formaldehyde			5.1E-04	No
	Naphthalene	3.95E-05	1.73E-04	9.1E-05	No
	Nickel			2.7E-05	No
	1,1,2,2,Tetrachloro-ethane	1.32E-06	5.77E-06	1.1E-05	No
	Tetrachloroethylene	1.96E-08	8.60E-08	1.3E-02	No
	1,1,2 - trichloroethane	3.06E-07	1.34E-06	4.2E-04	No
	Vinyl Chloride	7.91E-06	3.47E-05	1.2E-03	No

Sandpoint Wastewater Biogas Project
Emission Unit Calculations - Genset EU1

Emission unit number	1
Source type	Genset
Model number	Man E 0834 LE 302
Break Horsepower	91 bHP

Hourly Peak Biogas capacity (scf/hr)	1,057 cf/hour
Daily peak biogas capacity (scf/day)	25,375 cf/day
Annual estimated biogas capacity (MMcf/year)	8.81 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				4.16E-08	AP-42 Section 3.2, Table 3.2-2 (includes filterable and	4.40E-05	1.79E-04
	PM2.5				4.16E-08	condensible)	4.40E-05	1.79E-04
	SO_2 (3 hr and 24 hr)				3.32E-04	Based on maximum uncontrolled H2S concentration	0.35	1.43
	SO_2 (Annual)				8.31E-07	Based on controlled H2S concentration	8.79E-04	3.58E-03
	NOx				1.90E-04	MANTech Data: NOx = 1 g/bhp-hour as NO_2	0.20	0.82
	NO_2				1.90E-04	NO_2 = NOx	0.20	0.82
	CO				4.74E-04	MAN Tech Data: CO = 2.5 g/bhp-hour	0.50	2.04
	VOC				3.80E-05	Man Tech Data: NMHC = VOC = 0.2 g/bhp-hour	0.04	0.16
	Lead				NA			
Section 585 TAP	Acrolein				2.78E-06	AP-42 Table 3.2-2	2.9E-03	1.20E-02
	Biphenyl				1.14E-07	AP-42 Table 3.2-2	1.2E-04	4.93E-04
	2-Chlorophenol (and all isomers) (ID)	3.97E-10	97.2%	1.11E-11		EF Uncombusted Biogas based on max concentration	1.2E-08	4.79E-08
	Cresols/Cresylic Acid (isomers and	2.34E-08	97.2%	6.56E-10		EF Uncombusted Biogas based on max concentration	6.9E-07	2.82E-06
	Cyclopentane				1.23E-07	AP-42 Table 3.2-2	1.3E-04	5.28E-04
	Dibutyl phthalate	7.78E-10	97.2%	2.18E-11		EF Uncombusted Biogas based on max concentration	2.3E-08	9.39E-08
	Ethyl benzene	9.47E-09	97.2%	2.65E-10	2.14E-08	EF Uncombusted Biogas based on max concentration	2.3E-05	9.35E-05
	Methanol				1.35E-06	AP-42 Table 3.2-2	1.4E-03	5.81E-03
	Hexane (n-Hexane)				5.98E-07	AP-42 Table 3.2-2	6.3E-04	2.58E-03
	Hydrogen sulfide	1.77E-04	97.2%	4.95E-06		EF Uncombusted Biogas based on max concentration	5.2E-03	2.13E-02
	o-Methylcyclohexanone				6.64E-07	AP-42 Table 3.2-2	7.0E-04	2.86E-03
	Naphthalene	5.48E-10	97.2%	1.53E-11	4.02E-08	EF Uncombusted Biogas based on max concentration	4.2E-05	1.73E-04
	Nitrobenzene	1.85E-10	97.2%	5.18E-12		EF Uncombusted Biogas based on max concentration	5.5E-09	2.23E-06
	Nonane				5.94E-08	AP-42 Table 3.2-2	6.3E-05	2.56E-04
	Octane				1.90E-07	AP-42 Table 3.2-2	2.0E-04	8.16E-04
	Pentane				1.40E-06	AP-42 Table 3.2-2	1.5E-03	6.05E-03
	Phenol	6.99E-09	97.2%	1.96E-10	1.30E-08	EF Uncombusted Biogas based on max concentration	1.4E-05	5.67E-05
	Pyridine	3.11E-10	97.2%	8.71E-12		EF Uncombusted Biogas based on max concentration	9.2E-09	3.75E-08
	Styrene monomer (ID)	3.52E-10	97.2%	9.85E-12		EF Uncombusted Biogas based on max concentration	1.0E-08	4.24E-08
	Toluene (toluol)	3.56E-08	97.2%	1.00E-09	2.20E-07	EF Uncombusted Biogas based on max concentration	2.3E-04	9.53E-04
	Trimethyl benzene (mixed and individual				3.84E-08	AP-42 Table 3.2-2	4.1E-05	1.65E-04
	2,2,4-Trimethyl-pentane				1.35E-07	AP-42 Table 3.2-2	1.4E-04	5.81E-04
	Xylene (o-, m-, p-isomers)	2.21E-08	97.2%	6.19E-10	9.94E-08	EF Uncombusted Biogas based on max concentration	1.1E-04	4.31E-04
Section 586 TAP	Aniline	5.24E-09	97.2%	1.47E-10		EF Uncombusted Biogas based on average concen.	1.4E-07	6.32E-07
	Benzene	1.21E-09	97.2%	3.38E-11	2.38E-07	EF Uncombusted Biogas based on average concen.	2.3E-04	1.02E-03
	1,3-Butadiene				1.44E-07	AP-42 Table 3.2-2	1.4E-04	6.21E-04
	Bis (2-chloro-1-methyl- ethyl) ether	1.51E-09	97.2%	4.23E-11		EF Uncombusted Biogas based on average concen.	4.2E-08	1.82E-07
	Bis (2-ethylhexyl) phthalate	8.55E-10	97.2%	2.39E-11		EF Uncombusted Biogas based on average concen.	2.4E-08	1.03E-07
	Carbon tetrachloride	5.48E-10	97.2%	1.53E-11		EF Uncombusted Biogas based on average concen.	1.5E-08	6.61E-08
	Dichloromethane (Methylenechloride)				1.08E-08	AP-42 Table 3.2-2	1.1E-05	4.65E-05
	Naphthalene (PAH)	5.48E-10	97.2%	1.53E-11	4.02E-08	potential carcinogen per DEQ	4.0E-05	1.73E-04
	1,1,2,2,Tetrachloro-ethane				1.34E-09	EF Uncombusted Biogas based on average concen.	1.3E-06	5.77E-06
	Tetrachloroethylene	7.13E-10	97.2%	2.00E-11		EF Uncombusted Biogas based on average concen.	2.0E-08	8.60E-08
	1,1,2 - trichloroethane	1.11E-08	97.2%	3.12E-10		EF Uncombusted Biogas based on average concen.	3.1E-07	1.34E-06
	Vinyl Chloride				8.05E-09	EF Uncombusted Biogas based on average concen.	7.9E-06	3.47E-05

Emission Factor Calculation Details

7.70E-05 lb/Mmbtu * 0.00054 MMbtu/cf = 4.16E-08 lb/ of biogas

Assumes all PM10 is PM2.5

Refer to Stoichiometric conversion of H2S to SO2 following worksheet

15310.601

33.333333 (31.29)

1 gr/ bhp-hour / 453.59 gr/lb / 11.82 cf biogas/bhp-hr = 1.90E-04 lb/cf biogas

2.50 gr/ bhp-hour / 453.59 gr/lb / 11.82 cf biogas/bhp-hr = 4.74E-04 lb/cf biogas

0.20 gr/ bhp-hour / 453.59 gr/lb / 11.82 cf biogas/bhp-hr = 3.80E-05 lb/cf biogas

10.99799754

48.03982924

144.1194877

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) / 2000 lb/ton

585 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 drar 97.2% (IC Engines)

Grain Loading Calculation 6.19E-05 gr/dscf

Sandpoint Wastewater Biogas Project
SO2 Emission Factor Calcuation

Assumptions for gas stream entering Gensets:

2,000 ppm H2S concentration (uncontrolled) *
5 ppm H2S concentration (controlled) *
385 scf gas/lb-mole
34 Molecular weight of H2S
64 Molecular weight of SO2

Uncontrolled EF Calculation:

$$\frac{2{,}000 \text{ part H2S}}{1.00\text{E+06 part biogas}} \times \frac{1 \text{ lb-mole}}{385 \text{ scf}} \times \frac{34 \text{ lb}}{1 \text{ lb-mole}} = \frac{1.77\text{E-04 lb H2S}}{\text{scf of biogas}}$$

$$\frac{1.77\text{E-04 lb H2S}}{1 \text{ scf of biogas}} \times \frac{64 \text{ mole SO2}}{34 \text{ mole H2S}} = \frac{3.32\text{E-04 lb SO2}}{\text{scf of biogas}}$$

(assumes 100% conversion of H2S to SO2)

Controlled EF Calculation:

$$\frac{5 \text{ part H2S}}{1.00\text{E+06 part biogas}} \times \frac{1 \text{ lb-mole}}{385 \text{ scf}} \times \frac{34 \text{ lb}}{1 \text{ lb-mole}} = \frac{4.42\text{E-07 lb H2S}}{\text{scf of biogas}}$$

$$\frac{4.42\text{E-07 lb H2S}}{1 \text{ scf of biogas}} \times \frac{64 \text{ mole SO2}}{34 \text{ mole H2S}} = \frac{8.31\text{E-07 lb SO2}}{\text{scf of biogas}}$$

(assumes 100% conversion of H2S to SO2)

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: January 4, 2011

TO: Eric Clark, Air Program

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

PROJECT: P-2011.0134 PROJ60949 PTC Application for a Biogas Engine at the City of Sandpoint Wastewater Treatment Plant

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

1.0 Summary

The City of Sandpoint submitted a Permit to Construct (PTC) application for an engine powering an electrical generator, fueled by biogas from an on-site digester, to be operated at the Wastewater Treatment Plant (WWTP) located in Sandpoint, Idaho. Site-specific air quality impact analyses involving atmospheric dispersion modeling of emissions associated with the project were performed by DEQ to demonstrate that operation of the engine would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02 and 203.03 [Idaho Air Rules Section 203.02 and 203.03]). The City of Sandpoint submitted applicable information and data enabling DEQ to perform site-specific ambient air impact analyses.

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

Table 1 presents key assumptions and results to be considered in the development of the permit.

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

Table 1. KEY CONDITIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Emissions rates for applicable averaging periods are not greater than those used in the modeling analyses, as listed in this memorandum.	Compliance with NAAQS has not been demonstrated for larger emissions rates.
Stack heights for the engine are as listed in this memorandum or higher.	NAAQS compliance is still assured if actual stack heights are greater than those listed in this memo.
The engine will be operated at the location specified by the City of Sandpoint in materials submitted to DEQ.	The engine location will be E 532,532 m, N 5,345,694 m, WGS84. Compliance with NAAQS has not been demonstrated at alternate locations.

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 Sandpoint WWTP an existing, stationary facility. Sandpoint is designated as attainment or unclassifiable for all pollutants except PM_{10}. The area is currently classified as non-attainment for PM_{10}, but has not recorded PM_{10} violations in recent years and is in the process of reclassification.

2.1.2 Significant and Cumulative NAAQS Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources associated with the proposed project exceed the significant impact levels (SILs) of Idaho Air Rules Section 006 (referred to as a significant contribution in Idaho Air Rules), then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02. A cumulative NAAQS impact analysis for attainment area pollutants involves evaluating ambient impacts from facility-wide emissions and emissions from any nearby co-contributing sources, and adding to those impacts 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 resulting maximum pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. A cumulative NAAQS analysis is only performed for those specific receptors where impacts from the permitted facility exceed SILs. Table 2 also lists SILs and specifies the modeled value that must be used for comparison to the NAAQS.

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

DEQ used site-specific full impact analyses to demonstrate compliance with Idaho Air Rules Section 203.02 for all ambient air receptors.

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]	24-hour	5.0	150[f]	Maximum 6th highest[g]

$PM_{2.5}$[h]	Annual	0.3	15[i]	Mean of maximum 1st highest[j]
	24-hour	1.2	35[k]	Mean of maximum 1st highest[j]
Carbon monoxide (CO)	8-hour	500	10,000[l]	Maximum 2nd highest[m]
	1-hour	2,000	40,000[l]	Maximum 2nd highest[m]
Sulfur Dioxide (SO_2)	Annual	1.0	80[n]	Maximum 1st highest[m]
	24-hour	5	365[l]	Maximum 2nd highest[m]
	3-hour	25	1,300[l]	Maximum 2nd highest[m]
	1-hour	3 ppb[o] (7.8 µg/m^3)	75 ppb[p] (196 µg/m^3)	Mean of maximum 4th highest[q]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[n]	Maximum 1st highest[m]
	1-hour	4 ppb[o] (7.5 µg/m^3)	100 ppb[r] (188 µg/m^3)	Mean of maximum 8th highest[s]
Lead (Pb)	Quarterly	NA	1.5[n]	Maximum 1st highest[m]
	3-month[t]	NA	0.15[n]	Maximum 1st highest[m]

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

2.1.3 Toxic Air Pollutant Analyses

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

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

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

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed*

in Sections 585 and 586.

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

2.2 Background Concentrations

Background concentrations are used in the cumulative NAAQS impact analyses to account for impacts from sources not explicitly modeled. Emissions of PM_{10}, $PM_{2.5}$, SO_2, CO, and annual NOx were below modeling thresholds generated to assure impacts don't exceed SILs. Therefore, background values were not needed for these pollutants.

Background concentrations for 1-hour NO_2 were based on monitoring data collected between June 2009 and June 2010, in Meridian, Idaho. A separate background value was used for each hour of the day, based on the 2nd highest value monitored for that hour. Hourly 1-hour NO_2 background concentrations are given in Table 3.

Table 3. BACKGROUND 1-HOUR NO_2 CONCENTRATIONS

Hour	Concentration ($\mu g/m^3$)[a]	Hour	Concentration ($\mu g/m^3$)[a]	Hour	Concentration ($\mu g/m^3$)[a]
1	50.0	9	54.9	17	49.8
2	48.1	10	48.1	18	61.8
3	45.7	11	39.5	19	70.4
4	46.2	12	32.6	20	85.9
5	46.7	13	34.3	21	79.0
6	54.9	14	34.3	22	75.5
7	56.7	15	37.8	23	63.5
8	60.1	16	46.4	24	49.8

a. micrograms per cubic meter.

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

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

3.1.1 Overview of Analyses

The project is addition of an internal combustion engine powering an electrical generator, fueled on biogas from an on-site digester, at the City of Sandpoint WWTP.

DEQ performed site-specific modeling to evaluate compliance with 1-hour NO_2 NAAQS. Emissions of other criteria pollutants from the proposed project were below DEQ-established thresholds for modeling applicability that reasonably assure impacts will remain below SILs. DEQ's site-specific analyses were determined to be reasonably representative of the proposed project and co-contributing sources, and the results demonstrated that emissions from the biogas engine will not cause or significantly contribute to a violation of the 1-hour NO_2 NAAQS.

Table 4 provides a brief description of parameters used in the DEQ modeling analyses.

Table 4. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description[a]
General Facility Location	Sandpoint	Non-attainment area for PM_{10}
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 11103.
Meteorological Data	Sandpoint	Sandpoint surface data and Spokane upper air data for 2002-2006.
Terrain	Considered	Receptor, building, and emissions source elevations were determined using National Elevation Dataset (NED) files.
Building Downwash	Considered	Downwash was accounted for the structures associated with the WWTP.
Receptor Grid	Grid 1	5-meter spacing out to 20 meters from the fenseline
	Grid 2	10-meter spacing out to 50 meters
	Grid 3	50-meter spacing out to 500 meters
	Grid 4	100-meter spacing out to 1,000 meters
	Grid 5	250-meter spacing out to 5,000 meters

3.1.2 Modeling protocol and Methodology

A modeling protocol was not submitted to DEQ prior to the application because DEQ staff performed site-specific air quality impact analyses rather than the applicant. DEQ obtained information on facility layout, equipment, and the property boundary to perform site-specific impact analyses. Modeling was generally conducted using data and methods described in the *State of Idaho Air Quality Modeling Guideline.*

3.1.3 Model Selection

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

AERMOD was used for the DEQ analyses to evaluate impacts of the proposed biogas engine and co-contributing sources.

3.1.4 Data and Parameters used for Modeling 1-Hour NO_2 with PVMRM

PVMRM was used with AERMOD to provide a more refined estimate of 1-hour NO_2 concentrations at specific receptors. Table 5 lists the data and parameters used for PVMRM. Hourly ozone data were used

in PVMRM to estimate the conversion of NO to NO_2. Ozone data from the 2007 study, *Ozone and its Precursors in the Treasure Valley, Idaho*, were used for modeling (Final Report, May 2008, Desert Research Institute). Hourly data from Parma, Idaho, were collected from June 27, 2007 through October 12, 2007. These data were sorted by hour and then the mean and standard deviation was calculated for each hour across all days. For each hour modeled, a background ozone value equal to the mean plus one standard deviation was used as input to PVMRM. This method is reasonably conservative because it does not account for seasonal variation in ozone concentrations, and the Parma data were collected during the time of year when maximum ozone concentrations are expected. Also, Parma ozone concentrations are expected to be considerably higher than ozone concentrations in Sandpoint, given the emissions of ozone precursors in the area and the meteorology of the area.

An NO_2/NOx ratio for NOx emissions is also used in PVMRM. The NO_2/NOx ratio for the generator engine was calculated using a method established in Texas Natural Resource Conservation Commission (TNRCC) rules for Permits by Rule for Turbines and Engines (Chapter 106, subchapter W, §106.511, §106.512).

Table 5. PARAMETERS AND DATA FOR PVMRM

Parameter	Value	Source/Comments
NO_2/NOx ratio for Emissions	0.179 for the generator	Based on method specified by TNRCC
Ambient Equilibrium for NO_2/NOx	0.90	Default value.
Ozone Concentrations	Value specified for each hour modeled	Based on values from Parma, Idaho, during a 2007 ozone study.

3.1.5 Meteorological Data

DEQ used Sandpoint surface meteorological data with Spokane upper air data for the analyses. DEQ determined these data were reasonably representative for the proposed site.

3.1.6 Terrain Effects

DEQ staff downloaded National Elevation Dataset (NED) data, based on the WGS84 datum, for the modeled domain and used these data to calculate elevations of buildings, sources, and receptors.

3.1.7 Facility Layout

The City of Sandpoint provided DEQ with detailed information on the property boundary, building locations and dimensions, and emissions source locations for the WWTP.

3.1.8 Building Downwash

Potential downwash effects were accounted for in the model by using building parameters as described by the City of Sandpoint. Building parameters were input to the building profile input program (BPIP), and BPIP output were used in AERMOD to assess plume downwash caused by structures at the WWTP.

3.1.9 Ambient Air Boundary

The City of Sandpoing provided DEQ with a detailed figure defining the property boundary of the WWTP. All areas external to the fenced boundary were considered as ambient air and receptors were placed accordingly.

3.1.10 Receptor Network and Generation of Setback Distances

DEQ generated the receptor grid described in Table 4. Given the low stack height, maximum concentrations were anticipated to be located along the ambient air boundary. Model results verified that maximum modeled impacts occurred within this area, and DEQ contends that the receptor grid was adequate to reasonably resolve maximum modeled concentrations.

3.2 Emission Rates

Emissions rates of criteria pollutants and TAPs were calculated for the engine based on power rating of the engine.

3.2.1 Criteria Pollutant Emissions Rates

Table 6 lists criteria pollutant emissions rates used in the DEQ site-specific modeling analyses for the biogas engine proposed for the Sandpoint WWTP for all applicable averaging periods.

Co-contributing sources must be modeled in a cumulative impact analysis if emissions from the proposed modification (addition of the biogas engine) result in impacts exceeding the SIL. The primary co-contributing sources are small boilers on site that are also fired on biogas. The engine was sized, and emissions calculated accordingly, to accommodate all biogas potentially generated at the WWTP. Therefore, the worst-case impact scenario for the project involves all biogas combusted in the engine and none combusted in the boilers.

Space heaters fueled by natural gas are also present in various locations at the WWTP. These small sources were not specifically modeled as co-contributing sources. The background NO_2 values used in the analyses are sufficiently conservative to account for any impacts from space heaters, considering the location of such heaters and the magnitude of emissions in comparison to emissions from the engine.

Table 6. EMISSIONS USED IN DEQ ANALYSES

Emissions Point in Model	Pollutant	Averaging Period	Emissions Rate (lb/hr)
ENGINE - 91 hp internal combustion engine	NOx	1-hour	0.1986

3.2.2 TAP Emissions Rates

Operation of the proposed engine will result in an increase in allowable emissions of TAPs. The TAP emissions inventory generated by the permit writer indicated that emissions of all TAPs were below applicable ELs and ambient impact assessment was not required.

3.3 Emission Release Parameters and Plant Criteria

Table 7 provides emissions release parameters for the analyses including stack height, stack diameter, exhaust temperature, and exhaust velocity. DEQ modeled engine emissions at an exit gas temperature of 500° F. Exhaust flows were calculated using the following formula from the State of Washington Department of Ecology (Washington State Department of Ecology. *Suitability of Diesel-Powered Emergency Generators for Air Quality General Order of Approval: Evaluation of Control Technology,*

Ambient Impacts, and Potential Approval Criteria. June 23, 2006):

$$\text{Flow} = 0.284\ m^3/(sec \cdot 100\ hp)$$

The stack diameter was set such that the flow velocity was 44.6 meters/second (as per WA guidance).

Table 7. EMISSIONS RELEASE PARAMETERS

Release Point /Location	Source Type	Stack Height (m)[a]	Modeled Diameter (m)	Stack Gas Temp. (K)[b]	Stack Gas Flow Velocity (m/sec)[c]
ENGINE	Point	6.1 (20 ft)	0.0945 (0.31 ft)	533 (500° F)	44.6

a. Meters
b. Kelvin
c. Meters per second

3.4 Results for Cumulative NAAQS Impact Analyses

DEQ initially performed a cumulative impact analysis for 1-hour NO_2 rather than first modeling a significant impact analysis, followed by a cumulative impact analysis for those receptors where the project had a significant impact.

Table 8 provides modeling results for the impact analyses.

Table 8. MODELED IMPACTS

Pollutant	Averaging Period	Maximum Impact from Engine ($\mu g/m^3$)	Maximum Cumulative Impact[a] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
NO_2	1-hour	16.6	97.9	188

a. Includes engine impacts plus background for the applicable hour.

4.0 Conclusions

The ambient air impact analyses performed by DEQ satisfactorily demonstrated that emissions from operation of the proposed biogas engine will not cause or significantly contribute to a violation of any ambient air quality standard.

APPENDIX C – FACILITY DRAFT COMMENTS

No comments were received from the facility.

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:	**City of Sandpoint WWTP**
Address:	**1123 Lake Street**
City:	**Sandpoint**
State:	**Idaho**
Zip Code:	**83864**
Facility Contact:	**Jeremy Grimm**
Title:	**Planning & Community Development Coordinator**
AIRS No.:	**017-00061**

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	0.8	0	0.8
SO_2	0.0	0	0.0
CO	2.0	0	2.0
PM10	0.0	0	0.0
VOC	0.2	0	0.2
TAPS/HAPS	0.1	0	0.1
Total:	3.1	0	**3.1**
Fee Due	$ 2,500.00		

Comments: The processing fee of $2500 is in accordance with IDAPA 58.01.01.224 because the overall increase of emissions is between 1 and 10 T/yr.