Statement of Basis

Permit to Construct P-2010.0139
Project No. 60607

EC

Kootenai Electric Cooperative
Coeur d'Alene, Idaho

Facility ID No. 055-00091

Final

January 26, 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
Bhp	brake horsepower
BMP	best management practices
Btu	British thermal units
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CAS No.	Chemical Abstracts Service registry number
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
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
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
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
LFG	landfill gas
LFGTE	landfill gas to energy
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
MW	megawatts
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
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
Rules	Rules for the Control of Air Pollution in Idaho
scf	standard cubic feet
SCL	significant contribution limits
SI	Spark Ignition
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
UTM	Universal Transverse Mercator
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

The project consists of a landfill gas to energy (LFGTE) facility which will employ two Caterpillar G3520C engine/generators (genset) each rated at 1.6 megawatt gross power output for a total gross power output of 3.2 MW. The engine brake horsepower for each engine is 2233. Power will be generated at 4160 volts before being boosted to 24.9kV for distribution. The engine/generators will be installed in a building located on the Fighting Creek Landfill (FCL), located at 22089 S. Highway 95, Coeur d'Alene, Id. 83814. The landfill has an existing landfill gas (LFG) collection system that is owned and operated by Kootenai County Solid Waste Department (KCSW Dept.) and will not be under common control with the LFGTE facility. The existing system consists of LFG collection wells and piping, a main collection header, and a blower/flare station. This system will remain in place. In normal operation, the engines will consume all, or most, of the LFG and the blower/flare station will be off line, or handle only part, of the LFG. A new transmission pipeline will be connected to the existing main collection header prior to the blower/flare station blower skid. This transmission pipeline will convey the LFG to a new LFG extraction system to be installed by KEC at the power generation facility. During normal operation, this system will be used to draw a vacuum on the LFG collection piping. Vacuum set point will be controlled solely by the County. LFG drawn from the landfill by the new LFG extraction system will be delivered to the gensets for combustion. Generated power will be delivered through a utility interconnection with KEC.

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).

January 14, 2011	T1-2010.0028, Initial Tier I Operating Permit for Kootenai County Solid Waste Department to comply with NSPS, Subpart WWW, Permit Status (A)
February 1, 2011	P-2010.0139 project 60607, Initial Permit To Construct, Permit status (A)

Application Scope

This permit is the initial PTC for this facility.

The applicant has proposed to:

- Install and operate two gas-fired internal combustion engines. These engines will use landfill gas as fuel to generate electricity. The engines are also required to comply with NESHAP, Subpart JJJJ.

Application Chronology

October 19, 2010	DEQ received an application and an application fee.
October 27 – Nov. 11, 2010	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
November 3, 2010	DEQ approved pre-permit construction.
November 19, 2010	DEQ determined that the application was complete.
January 6, 2011	DEQ made available the draft permit and statement of basis for peer and regional office review.
January 12, 2011	DEQ made available the draft permit and statement of basis for applicant review.
January 24, 2011	DEQ received the permit processing fee.
February 1, 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
Engine #1	Emissions Unit Name: Manufacturer: Caterpillar Model: G3520C Features: Stationary spark ignition; Turbo charged; After cooled; 4 stroke; "lean burn design"; Low NO_x Commission Date: 06/03/11 Max. capacity: 547 scfm Displacement: 86.3 L – 20 cylinders Sulfur content: 500 ppmv Size: 1.6 MW (2233 bhp) Fuel: landfill gas	None	Exit height: ft (8.44 m) Exit diameter: 1.34 ft (0.41m) Exit flow rate: 12,476 acfm Exit temperature: 897.8 °F (481 °C)
Engine #2	Emissions Unit Name: Manufacturer: Caterpillar Model: G3520C Features: Stationary spark ignition; Turbo charged; After cooled; 4 stroke; "lean burn design"; Low NO_x Manufacture Date: 06/03/11 Max. capacity: 547 scfm Displacement: 86.3 L – 20 cylinders Sulfur content: 500 ppmv Size: 1.6 MW (2233 bhp) Fuel: landfill gas	None	Exit height: ft (8.44 m) Exit diameter: 1.34 ft (0.41m) Exit flow rate: 12,476 acfm Exit temperature: 897.8 °F (481 °C)

Emissions Inventories

An emission inventory was developed for the two internal combustion engines at the facility (see Appendix A) associated with this proposed project. Emissions estimates of criteria pollutant PTE were based on emission factors from several locations and operation of 8,760 hours per year. Emission factors from AP-42 (PM_{10}), manufacturer guarantees (CO, NO_x), site specific data (SO_2) and BACT/NSPS (NMOC/VOC) were used to establish the inventory. Summaries of the estimated emissions of criteria pollutants, TAPs, and HAPs from the facility are in the following tables. The complete emission inventories are in Appendix A. Because there are no controls, uncontrolled emissions are the same as controlled emissions.

Uncontrolled Emissions:

The following table presents the post project uncontrolled emissions for criteria pollutants 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 POST PROJECT UNCONTROLLED EMISSIONS FOR CRITERIA POLLUTANTS

Emissions Unit	PM_{10} T/yr	SO_2 T/yr	NO_X T/yr	CO T/yr	VOC T/yr	Lead lb/quarter
Point Sources						
Internal Combustion Engine #1	3.45	11.96	12.94	77.62	3.74	0.00
Internal Combustion Engine #2	3.45	11.96	12.94	77.62	3.74	0.00
Total, Point Sources	**6.90**	**23.92**	**25.88**	**155.24**	**7.48**	**0.00**

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. However, this is a new facility; therefore there are no pre-project emissions. Although pre-project emissions are zero for this facility, a correspondent decrease in flare emissions from KCSW Dept. is expected during generator(s) operation

Table 3 PRE-PROJECT POTENTIAL TO EMIT FOR CRITERIA POLLUTANTS

Emissions Unit	PM_{10}		SO_2		NO_X		CO		VOC		Lead	
	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	T/yr
Point Sources												
IC Engine #1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
IC Engine #2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
Pre-Project Totals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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 4 POST PROJECT POTENTIAL TO EMIT FOR CRITERIA POLLUTANTS

Emissions Unit	PM_{10}		SO_2		NO_X		CO		VOC		Lead	
	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	T/yr
Point Sources												
IC Engine #1	0.79	3.45	2.73	11.96	2.95	12.94	17.72	77.62	0.85	3.74	0	0
IC Engine #2	0.79	3.45	2.73	11.96	2.95	12.94	17.72	77.62	0.85	3.74	0	0
Post Project Totals	**1.58**	**6.90**	**5.46**	**23.92**	**5.90**	**25.88**	**35.44**	**155.24**	**1.70**	**7.48**	**0.00**	**0.00**

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.

As demonstrated in Tables 2 and 4, this facility has uncontrolled potential to emit for CO emissions greater than the Major Source threshold of 100 T/yr. Therefore, this facility is designated as a Major facility for CO and will be required to obtain a Title V operating permit.

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 5 CHANGES IN POTENTIAL TO EMIT FOR CRITERIA POLLUTANTS

	PM_{10}		SO_2		NO_X		CO		VOC		Lead	
	lb/hr	T/yr	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	0.0	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	1.58	6.90	5.46	23.92	5.90	25.88	35.44	155.24	1.70	7.48	0.0	0.0
Changes in Potential to Emit	**1.58**	**6.90**	**5.46**	**23.92**	**5.90**	**25.88**	**35.44**	**155.24**	**1.70**	**7.48**	**0.00**	**0.00**

Non-Carcinogenic TAP Emissions

A summary of the estimated uncontrolled non-carcinogenic emissions increase of toxic air pollutants (TAP) is provided in the following table. The estimated controlled emissions increases of TAP were below applicable emissions screening levels (EL). Estimated controlled TAP emissions were below the annual major source threshold. However, the controlled emissions increases of hydrogen chloride did exceed the emissions screening level.

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

Table 6 PRE- AND POST PROJECT NON-CARCINOGENIC TAP EMISSIONS SUMMARY
POTENTIAL TO EMIT

Non-Carcinogenic Toxic Air Pollutants	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
1,1,1-Tricholoroethane	0.00E-03	2.67E-04	2.67E-04	127	No
Acetone	0.00E-03	8.43E-03	8.43E-03	119	No
Propylene Dichloride	0.00E-03	3.10E-05	3.10E-05	23.1	No
Carbon Disulfide	0.00E-03	5.77E-04	5.77E-04	2	No
Carbonyl Sulfide	0.00E-03	1.31E-04	1.31E-04	2.70E-02	No
Chlorobenzene	0.00E-03	3.05E-04	3.05E-04	23.3	No
Chloroethane	0.00E-03	1.84E-04	1.84E-04	176	No
Dichlorobenzene	0.00E-03	2.82E-03	2.82E-03	3	No
Ethylbenzene	0.00E-03	1.71E-02	1.71E-02	29	No
Ethanol	0.00E-03	2.97E-02	2.97E-02	125	No
Ethyl Mercaptan	0.00E-03	2.00E-03	2.00E-03	6.7E-02	No
Hexane	0.00E-03	4.75E-03	4.75E-03	12	No
Hydrogen Chloride	0.00E-03	6.68E-02	6.68E-02	5.00E-02	Yes
Hydrogen Sulfide	0.00E-03	4.04E-01	4.04E-01	9.33E-01	No
Isopropyl Alcohol	0.00E-03	5.67E-03	5.67E-03	18	No
Mercury	0.00E-03	2.00E-05	2.00E-05	1.00E-03	No
Methyl Chloride	0.00E-03	4.29E-03	4.29E-03	6.87	No
Methyl Ethyl Ketone	0.00E-03	1.80E-02	1.80E-02	39.3	No
Methyl Isobutyl Ketone	0.00E-03	8.96E-04	8.96E-04	13.7	No
Methyl Mercaptan	0.00E-03	7.42E-04	7.42E-04	3.30E-2	No
Toluene	0.00E-03	5.55E-02	5.55E-02	25	No
Xylene	0.00E-03	4.17E-02	4.17E-02	29	No

Therefore, modeling is required for hydrogen chloride 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 controlled emissions increases of TAP exceeded applicable emissions screening levels (EL) for six pollutants. The estimated controlled TAP emissions were below the annual major source threshold.

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

Table 7 PRE- AND POST PROJECT CARCINOGENIC TAP EMISSIONS SUMMARY POTENTIAL TO EMIT

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)
1,1,2,2-Tetrachloroethane	0.00E-03	1.04E-04	1.04E-04	1.10E-05	Yes
Ethylidene Dichloride	0.00E-03	8.75E-04	8.75E-04	2.50E-04	Yes
Vinylidene Chloride	0.00E-03	1.06E-04	1.06E-04	1.30E-04	No
Ethylene Dichloride	0.00E-03	1.42E-04	1.42E-04	2.50E-04	No
Acrylonitrile	0.00E-03	4.53E-05	4.53E-05	9.80E-05	No
Benzene	0.00E-03	1.80E-03	1.80E-03	8.00E-04	Yes
Carbon Tetrachloride	0.00E-03	1.29E-05	1.29E-05	4.40E-04	No
Chloroform	0.00E-03	2.99E-05	2.99E-05	2.80E-04	No
Dichloromethane	0.00E-03	3.44E-03	3.44E-03	1.60E-03	Yes
Ethylene Dibromide	0.00E-03	1.30E-04	1.30E-04	3.00E-05	Yes
Formaldehyde	0.00E-03	1.60E-01	1.60E-01	5.10E-04	Yes
Perchloroethylene	0.00E-03	2.36E-03	2.36E-03	1.30E-02	No
Vinyl Chloride	0.00E-03	8.03E-04	8.03E-04	9.40E-04	No

Therefore, modeling is required for 1,1,2,2-Tetrachloroethane, Ethylidene Dichloride, Benzene, Dichloromethane, Ethylene Dibromide and formaldehyde because the annual average carcinogenic screening EL identified in IDAPA 58.01.01.586 were exceeded.

Post Project HAP Emissions

The following table presents the post project potential to emit for HAP pollutants from all emissions units at the facility (two IC engines) 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 HAP EMISSIONS SUMMARY POTENTIAL TO EMIT

HAP Pollutants	PTE (T/yr)	HAP Pollutants	PTE (T/yr)
1,1,1-Tricholoroethane	1.17E-03	Ethylbenzene	7.48E-02
1,1,2,2-Tetrachloroethane	6.14E-04	Ethylene Dibromide	4.52E-04
Ethylidene Dichloride	3.83E-03	Hexane	2.08E-02
Vinylidene Chloride	4.66E-04	Methyl Chloride	1.88E-02
Ethylene Dichloride	6.21E-04	Methyl Isobutyl Ketone	3.93E-03
Propylene Dichloride	1.36E-04	Perchloroethylene	1.03E-02
Acrylonitrile	1.98E-04	Toluene	2.43E-01
Benzene	7.88E-03	Trichloroethylene	4.68E-03
Carbon Disulfide	2.53E-03	Vinyl Chloride	3.52E-03
Carbon Tetrachloride	5.63E-05	Xylene	1.83E-01
Carbonyl Sulfide	5.75E-04	Chloroform	1.31E-04
Chlorobenzene	1.34E-03	Dichlorobenzene	1.23E-02
Chloroethane	8.06E-04	Dichloromethane	1.51E-02
Formaldehyde	1.60E-01		
Total	**7.71E-01**		

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of PM_{10}, SO_2, NO_X, and TAPs from this project exceeded applicable screening emission levels (EL) and published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline[1]. Refer to the Emissions Inventories section for additional information concerning the emission inventories.

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

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Kootenai 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.

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

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 Permit to Construct Required

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

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 Tier II Operating Permit

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

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625 Visible Emissions

The sources of PM_{10} emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 6 and 14.

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 have a potential to emit greater than 100 tons per year for CO as demonstrated previously in the Emissions Inventories Section of this analysis. Therefore, this facility is classified as a major facility, as defined in IDAPA 58.01.01.008.10. In accordance with IDAPA 58.01.01.313.01.b, the permittee must submit a complete application to DEQ for an initial Tier I operating permit within 12 months of becoming a Tier I source or commencing operation. This requirement is assured by Permit Condition 7.

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.

There was a determination as to whether or not KEC and the Fighting Creek landfill could be considered one facility. PSD rules state that in order for two entities to be considered one facility they must meet all of the following criteria: 1) first two digits of SIC code identical 2) contiguous or adjacent project 3) common control. The SIC code of KEC is 4911 and the landfill has a code of 4953. KEC is leasing land owned by the landfill. However, it was concluded that there is no common control between the two. KEC is an electric utility that has been in operation since 1938 based in Hayden, Idaho. The Fight Creek Landfill is a municipal solid waste facility owned by Kootenai County. The Board of Directors of KEC is in no apparent way affiliated with the county. Additionally, all treatment trains and flares are owned and operated by the landfill. KEC owns and operates only the two SI engines. They have a contractual agreement to buy and sell landfill gas, and that is the only financial connection between them. That is not enough to conclude common control.

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**

§ 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:

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

KEC will operate two SI ICE engines that are greater than 500 HP and are ordered after July 1, 2007. 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?

KEC 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?

KEC 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?

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

KEC will operate two SI engines each with a rated horsepower of 2233. Landfill gas is the only source of fuel that will be used in the engines as required by Permit Condition 13.

(f) Owners and operators of any modified or reconstructed stationary SI ICE subject to this subpart must meet the requirements as specified in paragraphs (f)(1) through (5) of this section.

(5) Owners and operators of stationary SI landfill/digester gas ICE engines with a maximum engine power greater than 19 KW (25 HP), that are modified or reconstructed after June 12, 2006, must comply with the same emission standards as those specified in paragraph (e) of this section for stationary landfill/digester gas engines

KEC will not be operating modified or reconstructed engines. This section does not apply.

(g) Owners and operators of stationary SI wellhead gas ICE engines may petition the Administrator for approval on a case-by-case basis to meet emission standards no less stringent than the emission standards that apply to stationary emergency SI engines greater than 25 HP and less than 130 HP due to the presence of high sulfur levels in the fuel, as specified in Table 1 to this subpart. The request must, at a minimum, demonstrate that the fuel has high sulfur levels that prevent the use of aftertreatment controls and also that the owner has reasonably made all attempts possible to obtain an engine that will meet the standards without the use of aftertreatment controls. The petition must request the most stringent standards reasonably applicable to the engine using the fuel.

KEC will not be operating wellhead gas engines. This section does not apply.

§ 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.

KEC acknowledges that all emissions standards must be met throughout the life of each engine. This requirement is ensured by Permit Condition 11.

§ 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.

KEC is using only landfill gas to operate the engines. Therefore, this requirement does not apply.

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

(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.

KEC acknowledges the deadlines for importing or installing engines. However, the two engines being installed are new and will meet requirements set forth in 60.4233.

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

KEC is not using the engines for emergency purposes. Therefore these monitoring requirements do not apply.

§ 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?

KEC is not the manufacturer of the engines and thus this section does not apply.

§ 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?

KEC is not the manufacturer of the engines and thus this section does not apply.

§ 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?

KEC is not the manufacturer of the engines and thus this section does not apply.

§ 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?

KEC is not the manufacturer of the engines and thus this section does not apply.

§ 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?

KEC is not the manufacturer of the engines and thus this section does not apply.

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

(a) If you are an owner or operator of a stationary SI internal combustion engine that is manufactured after July 1, 2008, and must comply with the emission standards specified in §60.4233(a) through (c), you must comply by purchasing an engine certified to the emission standards in §60.4231(a) through (c), as applicable, for the same engine class and maximum engine power. You must also meet the requirements as specified in 40 CFR part 1068, subparts A through D, as they apply to you. If you adjust engine settings according to and consistent with the manufacturer's instructions, your stationary SI internal combustion engine will not be considered out of compliance. In addition, you must meet one of the requirements specified in (a)(1) and (2) of this section.

(1) If you operate and maintain the certified stationary SI internal combustion engine and control device according to the manufacturer's emission-related written instructions, you must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required if you are an owner or operator.

These requirements do not apply to KEC because they are not subject to 60.4233 (a) through (c).

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

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

(ii) If you are an owner or operator of a stationary SI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance.

KEC will operate two non-certified engines and will maintain plans and records of conducted maintenance. The engines will be operated in a manner consistent with good air pollution control practices to minimize emissions. Performance tests will also be conducted in accordance with this section of the subpart. These requirements are ensured by Permit Conditions 9 and 16.

(c) If you are an owner or operator of a stationary SI internal combustion engine that must comply with the emission standards specified in §60.4233(f), you must demonstrate compliance according paragraph (b)(2)(i) or (ii) of this section, except that if you comply according to paragraph (b)(2)(i) of this section, you demonstrate that your non-certified engine complies with the emission standards specified in §60.4233(f).

KEC will not operate engines that are required to comply with 60.4233(f). Therefore this requirement does not apply.

(g) It is expected that air-to-fuel ratio controllers will be used with the operation of three-way catalysts/non-selective catalytic reduction. The AFR controller must be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times.

KEC will maintain and operate the AFR controller in order to ensure proper operation of the engine. This requirement is ensure by Permit Condition 12.

§ 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 NOXmass per unit output emission limitation, convert the concentration of NOXin 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 NOXin g/HP-hr.
Cd= Measured NOXconcentration in parts per million by volume (ppmv).
1.912×10−3 = Conversion constant for ppm NOXto 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:

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

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.

KEC will conduct performance tests in accordance with these sections, 60.4244(a) through (f). These requirements are ensured by Permit Condition 18.

§ 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.

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

KEC must maintain records that include notifications or maintenance performed. Note that the requirements of (a)(4) directs the permittee to 60.4243(a)(2) and the only portion that applies to the two KEC engines is (iii). However, the verbiage is identical to 60.4243(b)(2)(ii) which is already included in the permit. Therefore, 60.4245(a)(4) does not apply. The applicable requirements are ensured in Permit Condition 16.

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

(1) Name and address of the owner or operator;

(2) The address of the affected source;

(3) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;

(4) Emission control equipment; and

(5) Fuel used.

The required initial notification is ensured by Permit Condition 19.

(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 20.

§ 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.

All applicable General Provisions are identified in Permit Condition 21.

40 CFR 60, Subpart WWW.....Standards of Performance for Municipal Solid waste Landfills

§ 60.750 Applicability, designation of affected facility, and delegation of authority.

(a) The provisions of this subpart apply to each municipal solid waste landfill that commenced construction, reconstruction or modification on or after May 30, 1991.

Gas collected from Kootenai County Solid Waste Department is processed in a treatment system prior to combustion by the IC engines proposed by the applicant. This gas treatment system, owned and operated by the applicant, is subject to these standards.

§ 60.752 Standards for air emissions from municipal solid waste landfills.

b) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, shall either comply with paragraph (b)(2) of this section or calculate an NMOC emission rate for the landfill using the procedures specified in §60.754

(2) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the owner or operator shall:

(iii) Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii) (A), (B) or (C) of this section.

(A) An open flare designed and operated in accordance with §60.18 except as noted in §60.754(e);

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in §60.754(d).

(1) If a boiler or process heater is used as the control device, the landfill gas stream shall be introduced into the flame zone.

(2) The control device shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in §60.756;

(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of paragraph (b)(2)(iii) (A) or (B) of this section.

Kootenai County Solid Waste Department operates under T1-2010.0028 to collect and combust landfill gas in enclosed flares which reduce NMOC by 98%, satisfying 60.752 (b)(2)(iii)(B).

KEC is subject to 60.752 (b)(2)(iii)(C). Landfill gas is routed to the applicant's treatment system which processes the collected gas for subsequent sale.

KEC is subject to 752 (b)(2)(iii) (A) or (B) of this section. Because the applicant must comply with 60.752 (b)(2)(iii)(C), the applicant must also comply with (A) or (B). The applicant's engine system must satisfy the conditions of (B).

Permit conditions in the Performance Test Requirement section require performance testing to demonstrate compliance with this NMOC reductions requirement.

NESHAP Applicability (40 CFR 61)

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

MACT Applicability (40 CFR 63)

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.

KEC is not subject to Subpart ZZZZ, as they are subject to JJJJ.

40 CFR 63, Subpart AAAA.....National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills

§ 63.1935 Am I subject to this subpart?

You are subject to this subpart if you meet the criteria in paragraph (a) or (b) of this section.

(a) You are subject to this subpart if you own or operate a MSW landfill that has accepted waste since November 8, 1987 or has additional capacity for waste deposition and meets any one of the three criteria in paragraphs (a)(1) through (3) of this section:

(1) Your MSW landfill is a major source as defined in 40 CFR 63.2 of subpart A.

(2) Your MSW landfill is collocated with a major source as defined in 40 CFR 63.2 of subpart A.

(3) Your MSW landfill is an area source landfill that has a design capacity equal to or greater than 2.5 million megagrams (Mg) and 2.5 million cubic meters (m3) and has estimated uncontrolled emissions equal to or greater than 50 megagrams per year (Mg/yr) NMOC as calculated according to §60.754(a) of the MSW landfills new source performance standards in 40 CFR part 60, subpart WWW, the Federal plan, or an EPA approved and effective State or tribal plan that applies to your landfill.

(b) You are subject to this subpart if you own or operate a MSW landfill that has accepted waste since November 8, 1987 or has additional capacity for waste deposition, that includes a bioreactor, as defined in §63.1990, and that meets any one of the criteria in paragraphs (b)(1) through (3) of this section:

(1) Your MSW landfill is a major source as defined in 40 CFR 63.2 of subpart A.

(2) Your MSW landfill is collocated with a major source as defined in 40 CFR 63.2 of subpart A.

(3) Your MSW landfill is an area source landfill that has a design capacity equal to our greater than 2.5 million Mg and 2.5 million m^3 and that is not permanently closed as of January 16, 2003.

KEC does not operate or own a landfill. They also do not own the treatment system. The flare used as a control are owned and operated by the landfill. Additionally, all sections of Subpart AAAA are applicable to the landfill and accounted for in their Title V operating permit. The engines are not considered a bioreactor per the definition

of 63.1990. Therefore, they are not subject to MACT, Subpart AAAA. For further details as to why KEC is not considered part of the Fighting Creek Landfill please refer to the PSD section.

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 2

This condition lays out all the regulated sources with a detailed description of each.

Initial Permit Condition 4

This condition describes the sources and control devices associated with the two internal combustion engines.

Initial Permit Condition 5

The engines are subject NSPS, Subpart JJJJ, as they are new spark ignition engines. This condition provides the applicable emissions standards that apply to each engine when operating on landfill gas.

Initial Permit Condition 6

This condition was added into the permit to comply with the state opacity standard and is accordance with IDAPA 58.01.01.625.

Initial Permit Condition 7

This condition ensures that KEC comply with all odors requirements and minimize odorous gases that may be emitted. IDAPA 58.01.01.776.01 requirements are specified in this condition.

Initial Permit Condition 8

KEC will be a new Title V major source for carbon monoxide. Therefore in accordance with IDAPA 58.01.01.313.01.b, they are required to obtain a Tier I Operating permit within 12 months of becoming major. This condition ensures that occur.

Initial Permit Condition 9

All operation of the engines is required to be conducted according to manufacturer's specifications. This condition was established to maintain that the engines are operated properly and have a better likelihood of meeting emission standards longer.

Initial Permit Condition 10

NSPS, Subpart JJJJ requires that a maintenance plan be maintained. This condition ensure that 40 CFR 60.4243(b)(2)(ii) requirements are met.

Initial Permit Condition 11

NSPS, Subpart JJJJ requires that all engines meet all emission standards throughout their entire life. This condition ensures that requirement.

Initial Permit Condition 12

NSPS, Subpart JJJJ requires that all engines operate an AFR controller to help minimize emissions. This condition ensures that requirement.

Initial Permit Condition 13

The engines operated by KEC are allowed to burn only landfill gas as requested in the application. This condition ensures the fuel that may be burned in the SI engines is landfill gas.

Initial Permit Condition 14

Maintaining records of odor complaints, and corrective action taken demonstrates compliance with IDAPA 58.01.01.776.01. To help the facility understand how merit is defined by DEQ, the following link has been added DEQ Odor Policy. There is information provided that defines what a valid compliant is and the process DEQ uses in evaluating complaints.

Initial Permit Condition 15

NSPS, Subpart JJJJ requires that recordkeeping include: all notifications and maintenance performed on the engine(s). Refer to the NSPS applicability of this Statement of Basis as to why 40 CFR 60.4245(a)(4) does not apply. This condition ensures these requirements.

Initial Permit Condition 16

NSPS, Subpart JJJJ requires all engines to perform an initial performance test and any subsequent tests every 8,760 operational hours or every three calendar years, whichever occurs first. KEC will be required to conduct a test each year on both engines as they intend to operate continuously. The first test must occur within 180 of startup or 60 days following maximum production rate.

Initial Permit Condition 17

NSPS, Subpart JJJJ requires that each performance be conducted within 10% of maximum load. No SSM (startup, shutdown or malfunction periods shall occur during the test. This condition also provides compliance calculation methods for NO_x, CO and VOC. These methods are in accordance with Subpart JJJJ. All performance testing performed on these engine assumes only the use of landfill gas.

Initial Permit Condition 18

This condition provides addresses of where to send any required correspondence between the facility and DEQ or EPA.

Initial Permit Condition 19

NSPS, Subpart JJJJ requires an initial notification of any non-certified engine. This notification requires information about the facility and the engine(s) in question. This condition ensures that KEC provide the initial notification.

Initial Permit Condition 20

NSPS, Subpart JJJJ requires that results for any performance test be submitted within 60 days following completion of the test. This condition ensures that all test results are submitted to DEQ and EPA.

Initial Permit Condition 21

This condition provides a detailed table to KEC describing what General Provisions of 40 CFR 63 are applicable to them.

Initial Permit Condition 22

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 23

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 24

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 25

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

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

Unless otherwise required by a NSPS or MACT, 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. 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

Caterpillar model G3520C IC Engines, Units 1 and 2, PTE Emissions Calculations:

For the two Caterpillar model G3520C landfill gas IC engines, KEC has supplied the emission factors from a variety of sources. The factor for PM is from AP-42, Table 4.2-5. All other emission factors are from previous BACT analyses or site-specific data. These factors were supplied to DEQ each containing different units. The following calculations were used to developed emissions estimates for the two IC engines.

NO_x emissions = EF (g/bhp-hr) * Rated horsepower of engine ÷ 453.6 grams/lbs = lb/hr
lb/hr NO_x per engine = 0.600 g/bhp-hr[1] * 2233 bhp ÷ 453.6 grams/lbs = 2.95 lb/hr
2.95 lb/hr *8760 hr/yr ÷ 2000 lb/ton = 12.94 T/yr
Two engines = **5.91 lb/hr** and **25.87 T/yr**

CO emissions = EF (g/bhp-hr) * Rated horsepower of engine ÷ 453.6 grams/lbs = lb/hr
lb/hr CO per engine = 3.6 g/bhp-hr[1] * 2233 bhp ÷ 453.6 grams/lb = 17.72 lb/hr
17.72 lb/hr * 8760 hr/yr ÷ 2000 lb/ton = 77.62 T/yr
Two engines = **35.45 lb/hr** and **155.25 T/yr**

SO_2 emissions = EF (ppmv) * M.W. SO_2 (g/mol) ÷ 453.6 grams/lb ÷ 24.04 L/mol * 547 scf/min * 60 min/hr * 28.32 L/scf ÷ 1,000,000
500 ppmv * 64.06 g/mol ÷ 453.6 grams/lb ÷ 24.04 L/mol * 547 scf/min * 60 min/hr * 28.32 L/scf ÷ 1,000,000 = 2.73 lb/hr
2.73 lb/hr * 8760 hr/yr ÷ 2000 lb/ton = 11.96 T/yr
Two engines = **5.46 lb/hr** and **23.92 T/yr**

VOC emissions = EF (ppmv) * dry gas exhaust flow rate (scf/min) * M.W. O_2 (g/mol)* (O_2% atmosphere - O_2% exhaust flow rate) ÷ (O_2% atmosphere - O_2% VOC) * 60 min/hr * specific gravity specific volume conversion factor for standard temperature
120 ppmv * 4,307 scf/min * 16 g/mol * (20.9 - 9) ÷ (20.9 - 3) * 60 min/hr ÷ 386,000,000 = 0.85 lb/hr
0.85 lb/hr * 8760 hr/yr ÷ 2000 lb/ton = 3.74 T/yr
Two engines = **1.71 lb/hr** and **7.49 T/yr**

PM_{10} emissions = EF (lb/MMscf) * Exhaust flow rate (scf/min) * methane ÷ 1e6 scf/MMscf * 60 min/hr = lb/hr
lb/hr PM_{10} per engine = 48 lb/MMscf[2] * 547 scf/min * 0.5 ÷ 1e6 scf/MMscf * 60 min/hr = 0.79 lb/hr
0.79 lb/hr *8760 ÷ 2000 lb/ton = 3.45 T/yr
Two engines = **1.58 lb/hr** and **6.90 T/yr**

Table A.1 IC ENGINE UNITS 1 and 2 HOURLY AND ANNUAL PTE FOR CRITERIA POLLUTANTS

Pollutants	Single Engine (lb/hr)	Single Engine (T/yr)	Single Engine (lb/hr)	Single Engine (T/yr)
Nitrogen Oxides (NO_x)	2.95	12.94	5.91	25.87
Carbon Monoxide (CO)	17.72	77.62	35.45	155.25
Sulfur Dioxide (SO_2)	2.73	11.96	5.46	23.92
Volatile Organic Compounds (VOC)	0.85	3.74	1.71	7.49
Particulate Matter (PM_{10})	0.79	3.45	1.58	6.90

[1] Revisiting BACT for Lean Burn Landfill Gas Fired Internal Combustion Engines, Bay Area Air Quality Management District (White Paper).
[2] AP-42, Section 2.4 – Municipal Solid Waste Landfills, Table 2.4-5 – Emission Rates for Secondary Compounds Exiting Control Devices (IC Engines) (11/98).

Caterpillar model G3520C IC Engines, Units 1 and 2, PTE Emissions TAP Calculations

The Waste Industry Air Coalition (WIAC) in association with the County Districts of Los Angeles County and SCS Engineers have reported that AP-42 landfill gas trace constituent levels are outdated and are as representative of actual levels. The WIAC obtained test results from 75 landfills that were mostly conducted between 1999 and 2001. The testing suggests that many of the AP-42 values are overestimating the contribution from particular trace constituents. Some factors that may be contributing to this decline are:

- Improvement of analytical methodologies that better identify and quantify trace constituents
- Federal introduction of waste management regulations that strictly regulate hazardous waste disposal
- Federal introduction of municipal solid waste landfill regulations that detect and prevent disposal of unacceptable hazardous waste
- Industry transition to processes and products requiring less or no hazardous materials.

In addition, the proposed updates to AP-42, section 2-4, reflect many of the updated emission factors suggested by WIAC. For example, chloromethane has a current AP-42 factor of 1.21 ppmv. The suggested WIAC value that was based on 8 tests is 0.249 ppmv. The proposed value in the 2008 AP-42 draft is 0.244 ppmv. It should be noted that not all WIAC values correlate well with proposed AP-42 factors, but 26 of the 43 of the compounds tested and analyzed by WIAC had an EPA rating of A or B . This suggests that well over half of the information gathered during the 75 source tests produced valid and acceptable data. KEC requested the use of the WIAC factor in place of many of the AP-42 values and DEQ deemed that to be an appropriate approach. The mathematical approach used by KEC for the majority of the constituents is shown below. Both hydrogen chloride and formaldehyde assumed zero engine destruction to establish a worst case scenario.

TAP M.W. (g/mol) * ppmv ÷ specific volume * exhaust flow rate (scf/min) * 60 min/hr = lb/hr
Specific volume = 28.32 L/scf ÷ 453.6 g/lb ÷ 24.04 L/mol ÷ $1e^{6}$ = $2.597e^{-9}$ ppm to lb/scf conversion (see 40 CFR 60.45)

Acetone Calculation example:
58.08 g/mol * 6.126 ppmv ÷ 385,050,000 scf/lb * 547 scf/min * 60 min/hr = 0.03 lb/hr
0.03 lb/hr * 8760 hr/yr ÷ 2000 lb/ton = 0.133 T/yr

IC Engine Destruction Efficiency - Values based on AP-42, Table 2.4-3: 98% for total NMOCs, 93% for halogenated species, and 86.1% for non-halogenated species.

0.133 T/yr * (1 - 86.1%) = 0.0185 T/yr * 2 = 0.0369 T/yr * 2000 lb/ton ÷ 8760 hr/yr = $8.43e^{-3}$ lb/hr

Compare to Screening Level: 119 lb/hr > $8.43e^{-3}$ lb/hr, ∴ modeling for acetone is not required. See the modeling memo for those TAPs that were modeled. The following table was produced by KEC and validated by DEQ. The values in the table were derived from the calculation method described above. Note that those constituents in Red were added by DEQ to verify that they did not exceed the screening levels.

Attachment B
Potential To Emit Emission Source Estimates for Proposed IC Engines
Kootenia Electric, Fighting Creek Landfill, Cour d' Alene, ID

CAS	COMPOUNDS[1]	Molecular Weight	Concentration of Compounds Found In LFG[9]	LFG Flow Rate to IC Engine[2] (Uncontrolled)	IC Engine Destruction Efficiency[3]	Hourly Emission from IC Engine (Controlled)	Daily Emission from IC Engine (Controlled)	Annual Emission from IC Engine	Annual Emission Two IC Engine	IDAPA Air Toxics Trigger Emissions Level	Hourly Emission Two IC Engine	PTE Over IDAPA Trigger Emissions Level
		g/mol	ppmv	tons/yr	%	lb/hr	lb/day	lb/yr	lb/yr	lb/hr	lb/hr	Yes/No
	Toxic air Contaminants (TACs)											
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	133.42	1.68E-01	8.37E-03	93.0%	1.34E-04	3.21E-03	1.17E+00	2.34E+00	1.27E+02	2.67E-04	No
79-34-5	1,1,2,2-Tetrachloroethane	167.85	7.00E-02	4.39E-03	93.0%	7.01E-05	1.68E-03	6.14E-01	1.23E+00	1.10E-05	1.40E-04	Yes
75-34-3	1,1-Dichloroethane (ethylidene dichloride)	98.95	7.41E-01	2.74E-02	93.0%	4.37E-04	1.05E-02	3.83E+00	7.66E+00	2.50E-04	8.75E-04	Yes
75-35-4	1,1-Dichloroethene (vinylidene chloride)	96.94	9.20E-02	3.33E-03	93.0%	5.32E-05	1.28E-03	4.66E-01	9.32E-01	1.30E-04	1.06E-04	No
107-06-2	1,2-Dichloroethane (ethylene dichloride)	98.96	1.20E-01	4.43E-03	93.0%	7.09E-05	1.70E-03	6.21E-01	1.24E+00	2.50E-04	1.42E-04	No
78-87-5	1,2-Dichloropropane (Propylene dichloride)	112.98	2.30E-02	9.70E-04	93.0%	1.55E-05	3.72E-04	1.36E-01	2.72E-01	2.31E+01	3.10E-05	No
67-63-0	2-Propanol (Isopropyl alcohol)	60.10	7.91E+00	1.77E-01	93.0%	2.84E-03	6.81E-02	2.48E+01	4.97E+01	1.80E+01	5.67E-03	No
67-64-1	Acetone	58.08	6.13E+00	1.33E-01	86.1%	4.22E-03	1.01E-01	3.69E+01	7.39E+01	1.19E+02	8.43E-03	No
107-13-1	Acrylonitrile	53.06	3.60E-02	7.13E-04	86.1%	2.26E-05	5.43E-04	1.98E-01	3.96E-01	9.80E-05	4.53E-05	No
71-43-2	Benzene	78.11	9.72E-01	2.83E-02	86.1%	9.00E-04	2.16E-02	7.88E+00	1.58E+01	8.00E-04	1.80E-03	Yes
75-15-0	Carbon disulfide	76.13	3.20E-01	9.09E-03	86.1%	2.89E-04	6.93E-03	2.53E+00	5.06E+00	2.00E+00	5.77E-04	No
56-23-5	Carbon tetrachloride	153.84	7.00E-03	4.02E-04	93.0%	6.43E-06	1.54E-04	5.63E-02	1.13E-01	4.40E-04	1.29E-05	No
463-58-1	Carbonyl sulfide	60.07	1.83E-01	4.10E-03	93.0%	6.56E-05	1.57E-03	5.75E-01	1.15E+00	2.70E-02	1.31E-04	No
108-90-7	Chlorobenzene	112.56	2.27E-01	9.54E-03	93.0%	1.52E-04	3.66E-03	1.34E+00	2.67E+00	2.33E+01	3.05E-04	No
75-45-6	Chlorodifluoromethane (Freon 22)	86.47	3.55E-01	1.15E-02	93.0%	1.83E-04	4.40E-03	1.60E+00	3.21E+00	NA	3.66E-04	No
75-00-3	Chloroethane (ethyl chloride)	64.52	2.39E-01	5.76E-03	93.0%	9.20E-05	2.21E-03	8.06E-01	1.61E+00	1.76E+02	1.84E-04	No
67-66-3	Chloroform	119.39	2.10E-02	9.36E-04	93.0%	1.50E-05	3.59E-04	1.31E-01	2.62E-01	2.80E-04	2.99E-05	No
106-46-7	Dichlorobenzene (1,4-Dichlorobenzene)	147.00	1.61E+00	8.82E-02	93.0%	1.41E-03	3.38E-02	1.23E+01	2.47E+01	3.00E+01	2.82E-03	No
75-09-2	Dichloromethane (Methylene Chloride)	84.94	3.40E+00	1.08E-01	93.0%	1.72E-03	4.13E-02	1.51E+01	3.01E+01	1.60E-03	3.44E-03	Yes
64-17-5	Ethyl Alcohol (Ethanol)	46.07	2.72E+01	4.68E-01	86.1%	1.48E-02	3.56E-01	1.30E+02	2.60E+02	1.25E+02	2.97E-02	No
75-08-1	Ethyl Mercaptan	62.10	1.36E+00	3.14E-02	86.1%	9.98E-04	2.39E-02	8.74E+00	1.75E+01	6.70E-02	2.00E-03	No
100-41-4	Ethylbenzene	106.16	6.79E+00	2.69E-01	86.1%	8.54E-03	2.05E-01	7.48E+01	1.50E+02	2.90E+01	1.71E-02	No
106-93-4	Ethylene dibromide (1,2-Dibromoethane)	187.88	4.60E-02	3.23E-03	93.0%	5.16E-05	1.24E-03	4.52E-01	9.03E-01	3.00E-05	1.03E-04	Yes
110-54-3	Hexane	86.18	2.32E+00	7.48E-02	86.1%	2.37E-03	5.69E-02	2.08E+01	4.16E+01	1.20E+01	4.75E-03	No
7783-06-4	Hydrogen sulfide	34.08	5.00E+02	6.36E+00	86.1%	2.02E-01	4.85E+00	1.77E+03	3.54E+03	9.33E-01	4.04E-01	No
7439-97-6	Mercury (total)[4]	200.61	2.92E-04	4.37E-05	-	9.99E-06	2.40E-04	8.75E-02	1.75E-01	1.00E-03	2.00E-05	No
74-87-3	Methyl chloride (chloromethane)	50.49	2.49E-01	9.39E-03	93.0%	2.14E-03	5.14E-02	1.88E+01	3.75E+01	6.87E+00	4.29E-03	No
78-93-3	Methyl ethyl ketone	72.11	1.06E+01	2.84E-01	86.1%	9.02E-03	2.16E-01	7.90E+01	1.58E+02	3.93E+01	1.80E-02	No
108-10-1	Methyl isobutyl ketone	100.16	7.50E-01	2.80E-02	93.0%	4.48E-04	1.08E-02	3.93E+00	7.85E+00	1.37E+01	8.96E-04	No
74-93-1	Methyl Mercaptan	48.10	1.29E+00	2.32E-02	93.0%	3.71E-04	8.90E-03	3.25E+00	6.50E+00	3.30E-02	7.42E-04	No
127-18-4	Perchloroethylene (tetrachloroethylene)	165.83	1.19E+00	7.39E-02	93.0%	1.18E-03	2.83E-02	1.03E+01	2.07E+01	1.30E-02	2.36E-03	No
108-88-3	Toluene	92.13	2.54E+01	8.74E-01	86.1%	2.77E-02	6.66E-01	2.43E+02	4.86E+02	2.50E+01	5.55E-02	No
79-01-6	Trichloroethylene (trichloroethene)	131.38	6.81E-01	3.34E-02	93.0%	5.34E-04	1.28E-02	4.68E+00	9.35E+00	1.79E+01	1.07E-03	No
75-01-4	Vinyl chloride	62.50	1.08E+00	2.51E-02	93.0%	4.02E-04	9.64E-03	3.52E+00	7.04E+00	9.40E-04	8.03E-04	No
1330-20-7	Xylenes	106.16	1.66E+01	6.57E-01	86.1%	2.09E-02	5.01E-01	1.83E+02	3.65E+02	2.90E+01	4.17E-02	No
Totals: TACs				9.84E+00		3.04E-01	7.298	2.66E+03	5.33E+03			

Potential To Emit Emission Source Estimates for Proposed IC Engines
Kootenia Electric, Fighting Creek Landfill, Cour d' Alene, ID

Secondary Emissions

	COMPOUNDS	Molecular Weight	Concentration of Compounds Found In LFG[2]	LFG Flow Rate to IC Engine[3] (Uncontrolled)	IC Engine Destruction Efficiency[4]	Hourly Emission from IC Engine (Controlled)	Daily Emission from IC Engine (Controlled)	Annual Emission from IC Engine	Annual Emission Two IC Engine	IDAPA Air Toxics Trigger Emissions Level	Hourly Emission Two IC Engine	PTE Over IDAPA Trigger Emissions Level
		g/mol	ppmv	tons/yr	%	lb/hr	lb/day	lb/yr	lb/yr	lb/hr	lb/hr	Yes/No
	Hydrogen Chloride[10]	36.50	10.74	1.46E-01	0.00%	3.34E-02	1.46E-01	2.93E+02	5.85E+02	5.00E-02	6.68E-02	Yes

	COMPOUNDS	Emission Factor	IC Engine Destruction Efficiency	Hourly Emission from IC Engine (Controlled)	Daily Emission from IC Engine (Controlled)	Annual Emission from IC Engine	Annual Emission Two IC Engine	IDAPA Air Toxics Trigger Emissions Level	Hourly Emission Two IC Engine	PTE Over IDAPA Trigger Emissions Level
		lbs/MM scf of CH_4 burned	%	lb/hr	lb/day	lb/yr	lb/yr	lb/hr	lb/hr	Yes/No
	Formaldehyde [11]	4.88E+00	0.00%	8.01E-02	1.92E+00	7.02E+02	1.40E+03	5.10E-04	1.60E-01	Yes

Criteria Air Pollutants

	Molecular Weight	Max Concentration of Compounds Found in LFG	Emission Factor	Emission Factor	Potential To Emit Emissions Single IC Engine			Potential To Emit Emissions Two IC Engines		
	g/mol	ppmv	g/bhp-hr	lb/MM dscf of methane	lbs/hr	lbs/day	tons/yr	lbs/hr	lbs/day	tons/yr
Nitrogen Oxides (NO_X)			0.600		2.95	70.89	12.94	5.91	141.78	25.87
Carbon Monoxide (CO)			3.600		17.72	425.34	77.62	35.45	850.68	155.25
Sulfur Dioxide (SO_2)[5]	64.06	500			2.73	65.52	11.96	5.46	131.05	23.92
Volatile Organic Compounds (VOC)[6,7]		120			0.85	20.51	3.74	1.71	41.02	7.49
Particulate Matter (PM_{10})[8]				48.000	0.79	18.90	3.45	1.58	37.81	6.90

Potential To Emit Emission Source Estimates for Proposed IC Engines
Kootenia Electric, Fighting Creek Landfill, Cour d' Alene, ID

Variables:

MODEL INPUT VARIABLES:	POTENTIAL TO EMIT		
Methane Concentration	50.0%		
Genset horsepower	2233	hp	
Fuel Value	504	Btu/cf	386000000
Landfill Gas Collection Rate (single IC Engine)	547	SCFM	
Dry Gas Exhaust Flow Rate	4,307	SCFM @ 9% O_2	
Engine Fuel Consumption	17.32	MMBTU/hr (HHV)	
Landfill Gas Combustion Factor	4.773	SCFM of Dry Exhaust Gas/SCFM of Methane	

Criteria pollutant emission factors used for IC Engines

Pollutant	Emission factor	Data Source
NMOCs/VOCs:	120 ppmv as methane @ 3% oxygen	BACT/NSPS
CO	3.6 g/bhp-hr	Manufacturer's Guarantee and BACT
NO_x	0.6 g/bhp-hr	Manufacturer's Guarantee and BACT
SO_2	500 ppmv	Site Specific with factor of safety
PM	48 lb/MM dscf of methane	AP-42

Notes:

[1] List of toxic air contaminants (TACs) compounds found in landfill gas, as determined from a list in AP-42 Tables 2.4-1 ("Uncontrolled Landfill Gas Concentrations") and 2.4-2.

[2] Based on a maximum flow rate into the IC Engine of 547 scfm @ 50% methane.

[3] Values based on AP-42, Table 2.4-3: 98% for total NMOCs, 93% for halogenated species, and 86.1% for non-halogenated species.

[4] Concentration of Mercury based on EPA AP-42 Section 2.4.

[5] Based on site-specific data with margin of safety for changing waste characteristics.

[6] VOC emissions are considered same as NMOC emissions, per common practice.

[7] Emissions estimated per standard dry gas exhaust flow rate of 4,307 scfm, based on exhaust data provided by the manufacturer (11,038 acfm at 9% oxygen and 898 F)

[8] PM_{10} Value based on AP-42 (48 lb/MM dscf of methane).

[9] Average concentration of compounds found in LFG based on "Waste Industry Air Coalition" (WIAC) Comparison of Recent Landfill Gas Analyses, or AP-42 if WIAC values not available.

[10] HCl is produced by combustion of halogenated compounds containing chlorine. Combustion process assumed to convert 100% of inlet halogenated concentration levels into hydrogen chloride.

[11] The formaldehyde emissions factor used is typical for this type of project.

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: January 3, 2011

TO: Eric Clark, Air Quality Engineer, Air Program

FROM: Darrin Mehr, Air Quality Analyst, Air Program

PROJECT NUMBER: P-2010.0139 Project 60607

SUBJECT: Modeling Demonstration for a 15-Day Pre-Permit to Construct Application for the Proposed Kootenai Electric Cooperative Fighting Creek Landfill Gas to Energy Project at the Kootenai County Fighting Creek Landfill near Coeur d'Alene, Idaho

1.0 Summary

Kootenai Electric Cooperative (KEC) submitted an application for a 15-Day Pre-Permit to Construct (15-Day PTC) for a facility near Coeur d'Alene, Idaho. The proposed facility will be located on a parcel of land within the existing Fighting Creek Landfill, which is owned and operated by Kootenai County and is a wholly separate entity from the KEC facility.

KEC will install a transmission pipeline and the vacuum system to tap into the existing Fighting Creek Landfill gas extraction system. The existing system delivers landfill gas to a blower system and two existing flares. The Kootenai County blower/flare system will be by bypassed and the landfill gas will be collected using vacuum provided by KEC, and delivered to a landfill gas to energy (LFGTE) system of two 3520C Caterpillar engines and generator sets rated at a production level of 1.6 megawatts (MW) each. If there is any landfill gas collected that cannot be combusted in either or both of the generator engines, the gas will be incinerated in either of the two existing enclosed flares owned and operated by Kootenai County.

This modeling analysis was based on the permit application and modeling files received on October 19, 2010. Please refer to the permit statement of basis to review a complete history for this project.

The facility is not a *designated facility*, as defined in IDAPA 58.01.01.006, Rules for the Control of Air Pollution in Idaho (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), and nitrogen oxides (NO_x) each is less than 100 tons per year (T/yr). Potential emissions of carbon monoxide (CO) are greater than 100 T/yr. Because this source is not a designated facility and potential emissions are less than 250 T/yr for each of these pollutants it is not a major facility under the New Source Review (NSR) PSD program.

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

The 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 were below national ambient air quality standards and other applicable toxic air pollutant increments at all ambient air locations; 5) showed that predicted pollutant concentrations that exceeded significant contribution levels for nitrogen dioxide, sulfur dioxide, and PM_{10}, did not exceed

any NAAQS when ambient impacts from the two existing adjacently-located landfill gas flares operating at maximum rated capacity were added to the proposed generator engines' ambient impacts.

This modeling analysis was conducted by LNM Consulting and SCS Engineers on behalf of Kootenai Electric Cooperative. Key assumptions and results that should be considered in the development of the permit are shown in Table 1.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
The application states the engines are intended to be operated above 90% of rated capacity for most of the time.	Modeling using maximum rated capacity emission rates and exhaust parameters is appropriate. A second scenario under reduced emission levels and revised exhaust parameters is not necessary.
Carbon monoxide (CO) emissions were not modeled for this project. Emissions for the two generators combined are 35.44 lb/hr. The draft secondary threshold is 70 lb/hr of CO.	A simple analysis using the combined emission CO emission rate and the 2nd high impact from the Chi/Q (unit emission rate) TAPs modeling for Engine No. 1 produced results that were close to the significant contribution levels. There are no concerns with this project complying with the CO NAAQS.
Maximum ambient impacts for the generator engines were predicted to occur along the southern property boundary approximately 30 meters from the location of the generator engines, whereas maximum ambient impacts for the flares were predicted to occur approximately 200 meters to the southwest of the flares.	Cumulative ambient impacts of the existing nearby landfill facility's emissions units do not contribute to ambient impacts of the generator engines to any significant degree.
Sulfur dioxide emissions for the IC engines and the Kootenai County Landfill's two enclosed flares were estimated assuming conversion of hydrogen sulfide with a concentration of 500 parts per million by volume (ppmv) in the landfill gas.	
The exhaust release height for each generator engine was 27.7 feet from grade with a stack diameter of 16 inches. The generator building was modeled with two tier heights—19.25 feet (eastern section) and 23.75 feet (western section). These heights were determined by KEC by averaging the wall height and the roof peak height of each tier. Building-induced plume downwash is a concern for this project. The "wall height and peak roof height average" method for estimating the tier heights is approved for this project.	The generator engine stack heights are low in relation to the nearby generator building. Construction of a building with higher peak roof heights with engine stack heights at or below the modeled 27.7 feet values may cause compliance issues for the formaldehyde TAP increment. Refer to Figure 1 of this memorandum to view formaldehyde impacts in units of $\mu g/m^3$, annual average, where peak roof heights were used for each tier in place of the average value. AERMOD results show that compliance with the formaldehyde increment may not be assured if the stack heights are reduced in relation to the building height or if a taller generator building than was modeled is constructed.

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 KEC LFGTE facility will be located in Kootenai 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), and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}).

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 Section 006 of IDAPA 58.01.01, Rules for the Control of Air Pollution in Idaho (Idaho Air Rules), then a cumulative—or full— impact analysis is needed to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and Idaho Air Rules Section 203.02 for Permits to Construct and Section 403.02 for Tier II Operating Permits. 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 value that must be used for comparison to the NAAQS are also listed in Table 2.

Table 2. APPLICABLE REGULATORY LIMITS				
Pollutant	**Averaging Period**	**Significant Contribution Levels[c] ($\mu g/m^3$)[d]**	**Regulatory Limit[e] ($\mu g/m^3$)**	**Modeled Value Used[h, i]**
PM_{10}[a]	Annual	1.0[j]	50[f, j]	Maximum 1st highest
	24-hour	5.0	150[g]	Maximum 6th highest[k]
$PM_{2.5}$[b]	Annual	0.3	15[f]	Use PM_{10} as a surrogate $PM_{2.5}$ –Maximum 1st high[l]
	24-hour	1.2	35	Use PM_{10} as a surrogate $PM_{2.5}$ –Maximum 1st high[l]
Carbon monoxide (CO)	8-hour	500	10,000[g]	Maximum 2nd highest
	1-hour	2,000	40,000[g]	Maximum 2nd highest
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1st highest
	24-hour	5	365[g]	Maximum 2nd highest
	3-hour	25	1,300[g]	Maximum 2nd highest
	1-hour[o]	Not established	196[o]	Maximum 6th highest[o]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1st highest
	1-hour[n]	EPA Interim: 4 ppb[n] (7.5 $\mu g/m^3$)	188[n]	Maximum 8th highest[n]
Lead (Pb)	Quarterly	NA	1.5[f]	Maximum 1st highest
	Rolling 3-month average	NA	0.15[f, m]	Maximum 1st highest

[a] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten (10) micrometers.
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
[c] SCLs are defined in Idaho Air Rules Section 006.
[d] Micrograms per cubic meter.
[e] Federal NAAQS (see 40 CFR 50) in effect as of July 1 of each year are incorporated by reference during the legislative session the following spring. See Idaho Air Rules Section 107.
[f] Never expected to be exceeded in any calendar year.
[g] Never expected to be exceeded more than once in any calendar year. The 3-hr and 24-hr standards were revoked (see 75 FR 35520, June 22, 2010) but will be in effect in Idaho until the legislature adjourns *sine die* in Spring 2011.
[h] Concentration at any modeled receptor.
[i] The maximum 1st highest modeled value is always used for significant impact analyses.
[j] 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.
[k] PM_{10} concentration at any modeled receptor when using five years of meteorological data. Use the maximum 2nd highest value for analyses with less than five years of meteorological data or one year of site-specific met data.
[l] $PM_{2.5}$ concentration at any modeled receptor when using a single year of site-specific meteorological data or a concatenated file with five years of meteorological data. EPA recommends using the high 8th high 3-year average monitored value for background, and using the highest 24-hr average and highest annual averages across five years of met data for the modeled result (Steven Page memo, Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS, March 23, 2010).
[m] Pb: The EPA's October 15, 2008 standard became effective in Idaho's NSR program when it was incorporated by reference into the Idaho Air Rules, i.e., when the Idaho Legislature adjourned *sine die* on March 29, 2010.
[n] NO_2 concentration at any modeled receptor when using complete year(s) of site-specific met data or five consecutive years of meteorological data. Compliance is based on the 3-year average of the 98th percentile of the annual distribution of 1-hour average daily maximum concentrations. The EPA's February 10, 2010 standard will not be effective in Idaho's NSR program until the Idaho Legislature adjourns *sine die* in Spring 2011. EPA Interim SIL, Page memo, dated June 29, 2010.
[o] SO_2 concentration at any modeled receptor when using five consecutive years of meteorological data. Compliance is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. EPA's 1-hour standard (75 FR 35520, June 22, 2010) of 0.075 ppm (196 $\mu g/m^3$) will not be effective in Idaho's NSR program until the Idaho Legislature adjourns *sine die* in Spring 2011.

Idaho operates the NSR program in accordance with an EPA-approved state implementation plan (SIP). EPA has asserted through a 1997 policy (Seitz) memorandum that compliance with $PM_{2.5}$ standards will

be assured through air quality analyses for the corresponding PM_{10} standard. 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. DEQ NSR program management has determined that the additional recommendations described in a March 23, 2010 EPA memorandum (Page) regarding $PM_{2.5}$ implementation do not apply to Idaho's SIP-approved NSR program. $PM_{2.5}$ standards will not be effective in Idaho until Idaho's $PM_{2.5}$ NSR SIP is approved by the EPA.

2.1.3 TAPs Analyses

The increases in emissions from the proposed project are 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 (Rules) Section 585 or 586.

The analyses submitted in the application included a TAPs compliance demonstration per the requirements of Section 210 of the Rules. A compliance demonstration was included for emission increases requested with this permitting action. Non-carcinogenic TAPs regulated by Section 585 of the Rules and carcinogenic TAPs regulated by Section 586 of the Rules were expected to increase.

2.2 Background Concentrations

Background concentrations for NO_2 and SO_2 were proposed in KEC's modeling protocol. KEC's background concentrations were based on monitoring data collected by the Idaho DEQ, which is available from the US EPA's AirData monitoring reports for criteria air pollutants. The NO_2 monitoring data was collected at the Coeur d'Alene site and the SO_2 data was collected at the Pocatello site. Pocatello and Soda Springs were the only sites in Idaho with recent SO_2 data, and Pocatello is more representative for this project.

DEQ indicated that modeling for the 24-hour average PM_{10} significant contribution level and NAAQS would be required, and provided a recommended PM_{10} background concentration of 66 $\mu g/m^3$, 24-hour average based on DEQ default background concentrations for all areas within Idaho as established by DEQ in March 2003[1]. For this implementation memorandum background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. KEC chose to use a more conservative 24-hour average PM_{10} background of 68 $\mu g/m^3$.

DEQ would have recommended slightly more conservative backgrounds based on default values for NO_2 annual average, but the SO_2 backgrounds are conservative compared to default rural agricultural area values and the other values used. Compliance with standards would be assured with either KEC's backgrounds or DEQ's default values. The background concentrations used for this project are:

- PM_{10}, 24-hour average: 68 $\mu g/m^3$,
- NO_2, annual average: 11.3 $\mu g/m^3$,
- SO_2, annual average: 15.7 $\mu g/m^3$,
  SO_2, 24-hour average: 73.3 $\mu g/m^3$, and
  SO_2, 3-hour average: 167 $\mu g/m^3$.

DEQ requested that the KEC modeling demonstration include the ambient impacts for two existing

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

enclosed flares at the Fighting Creek Landfill. The modeling demonstration reflects emissions and exhaust characteristics based on maximum rated capacity of the flares and the two proposed generator engines without regard to the quantity of landfill gas that the gas collection system at the Fighting Creek Landfill is capable of providing. Approximately 3,120 standard cubic feet per minute of landfill gas combustion is represented in the modeling demonstration—1,094 scfm from the two proposed generators and 2,025 scfm from the two landfill flares.

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

Table 3 provides a summary of the modeling parameters used in the submitted modeling analyses.

Table 3. MODELING PARAMETERS

Parameter	Description/ Values	Documentation/Additional Description
Model	AERMOD	AERMOD, Version 09292
Meteorological data	2002-2006 individual year and concatenated data files	DEQ provided a pre-processed data set of concatenated and individual year files derived from a DEQ met tower near Sandpoint, with data fill from Coeur d'Alene for surface data and Spokane, Washington airport upper air data covering the years 2002-2006.
Land Use (urban or rural)	Rural	Urban heat rise coefficients were not used. DEQ agrees with the applicant's assessment that a rural land use designation is appropriate.
Terrain	Considered	3-dimensional receptor coordinates were obtained from a National Elevation Database (NED) file for the surrounding area.
Building downwash	Downwash algorithm	AERMOD, Version 09292 uses BPIP-Prime and the PRIME algorithms to evaluate structure-induced downwash effects.
Receptor grid	Grid 1	25-meter spacing along the ambient air boundary
	Grid 2	50-meter spacing in a 1,150-meter (X) by 1,100-meter (Y) grid centered on the facility
	Grid 3	100-meter spacing in a 4,200-meter (X) by 4,200-meter (Y) grid centered on the facility and Grid 2
	Grid 4	250-meter spacing in a 15,500-meter (X) by 15,000-meter (Y) grid centered on the facility and Grid 3

3.1.1 Modeling protocol

A modeling protocol was submitted to DEQ by LNM Consulting/SCS Engineers, on behalf of Kootenai Electric Cooperative, on September 30, 2010. The modeling protocol was approved, with comments, by DEQ, on October 8, 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 a dataset that was processed using AERMET and 2002 through 2006 Sandpoint surface data, with data fill of missing data with Coeur d'Alene surface data. Upper air data was obtained from the Spokane National Weather Service (NWS) files with missing data filled with Mesoscale Meteorological

Model Version 5 (MM5) data for the 4 kilometer grid cell nearest to the Spokane NWS tower's location. The facility is located approximately 55 miles south southwest of the Sandpoint met station. KEC used the concatenated 5 year met dataset for all modeling runs.

3.1.4 Terrain Effects

The modeling analyses considered elevated terrain. The elevation of each receptor was obtained from United States Geological Survey (USGS) national elevation data (NED) files for the area surrounding the facility. Geographic coordinates were based in the North American Datum of 1983 (NAD83) system. The modeling demonstration included the geographic files used for the modeling demonstration. Elevations for the emission sources and buildings were accepted as submitted.

3.1.5 Facility Layout

DEQ checked the site plan submitted with the permit application to verify the facility's proposed layout. The site plan was created independently of the modeling demonstration's input files and generally matched the modeling file input. The facility layout and location of emission sources were accepted as submitted. Construction of all of this facility's permitted emissions units has not been completed at this time.

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.

Structure heights used in the analysis were determined by the applicant using the average of the wall height and the peak roof height for each structure. This method was described in the actual modeling report rather than the initial modeling protocol. This method is sometimes used, but is not considered as conservative an approach as using the building roof peak heights. Given that the stack exhaust release height of each generator engine is 27.7 feet from grade and that the building peak heights for the two tiers of the generator building are expected to be 23.5 and 28 feet above grade, the potential for building downwash exists.

See Figure 1 in Section 3.4.4.1 below to see the effects on ambient impacts predicted using AERMOD with peak roofline heights for each tier of the Generator Building. All other modeling inputs were unchanged.

3.1.7 Ambient Air Boundary

Ambient air was determined to exist for all areas immediately exterior to the facility's property boundary. The application states that the facility will be fenced and gated, and signage notifying the public that access is restricted to authorized personnel only. 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 KEC 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 KEC's modeling demonstration:

- All modeled criteria air pollutant emissions rates used in the full impact analysis for comparison against the NAAQS were equal to or greater than the requested permit allowable emissions calculated in the PTC application and the allowable emission rates listed in the air quality permit.
- Criteria air pollutant emission rates for the nearby source flares were determined by the applicant assuming continuous operation for 8,760 hours per year at maximum rated capacity. The applicant chose to demonstrate NAAQS compliance at these emission rates rather than conduct an analysis to determine flare emissions based on the Fighting Creek Landfill's gas collection system capacity after subtracting the landfill gas consumption by the two proposed generators. KEC's approach should be conservative.
- Modeled TAPs emission rates were equal to the emission rates attributed to the increase in emissions for the two proposed generator engines listed in the application submittal. The nearby landfill gas flares are not subject to TAPs compliance for this project.

3.2.1.1 Modeled Preliminary Analysis Emission Rates

The application states that a preliminary analysis was conducted to evaluate whether ambient impacts of the two proposed generator engines caused impacts that exceeded significant contribution levels. The modeled emission rates for the preliminary analysis are the same as the rates for the generator engines which are listed below in Table 4 for the full impact analysis.

3.2.1.2 Modeled Full Impact Analysis Emission Rates

The data in Table 4 represents the full impact (or facility-wide) ambient impact demonstration's emission rates.

Table 4 lists the hourly emission rates that were modeled to demonstrate compliance with the NAAQS for the full impact analysis, for pollutants with annual averaging periods. These emissions were modeled continuously for 8,760 hours per year for the annual averaging period, 3 hours for the 3-hour SO_2 standard and 24 hours for the 24-hour PM_{10} and SO_2 standards.

Table 4. MODELED SHORT-TERM AND ANNUAL AVERAGE EMISSIONS RATES FOR FULL IMPACT ANALYSIS

Source ID	Description	Emission Rates (lb/hr)[a]		
		PM_{10}[b]	NO_x[c]	SO_2[d]
KEC Facility Emissions Units				
S1	Engine No. 1, EU-01A, CAT3520C Generator Engine	0.79	2.95	2.73
S2	Engine No. 2, EU-01B, CAT3520C Generator Engine	0.79	2.95	2.73
Nearby Source Emissions Units				
F1	Kootenai County Calidus Enclosed Flare	1.20	1.51	6.08
F2	Kootenai County John Zink Enclosed Flare	0.83	1.04	4.18

[a] Pounds per hour
[b] Particulate matter with a mean aerodynamic diameter of ten microns or less
[c] Nitrogen oxides
[d] Sulfur dioxide

The carcinogenic toxic air pollutant (TAP) annual average emission rates listed below in Table 5 were modeled to demonstrate compliance with the applicable acceptable ambient concentration (AACC) increments. Non-carcinogenic TAP 24-hour average emission rates were modeled to demonstrate compliance with the acceptable ambient concentration for non-carcinogens (AAC). The emission rates were modeled continuously for 8,760 hours per year without any additional restrictions on the emission rates or hours of operation. Multiply the carcinogenic TAP hourly emission rates listed in Table 5 by 8,760 hours per year to obtain the annual emissions represented in the modeling demonstration, and multiply the non-carcinogenic TAP emission rate by 24 hours per day to obtain the daily amount of emissions represented in the modeling.

KEC's modeling demonstration used a unit emission rate from a single stack for Engine No. 1 (modeling ID S1) for all TAPs except formaldehyde. Formaldehyde emissions were modeled using the potential emission rate for each engine from two individual stacks. Using the unit emission rate and single point source approach provided more conservative results than modeling from two individual stacks with identical exhaust parameters. The unit emission rate ambient impacts used to demonstrate compliance with the increments were maximum predicted impacts, or highest 1st high values, and were:

- 183.40 micrograms per cubic meter per gram per second of emissions ($\mu g/m^3$, per gram/sec), 24-hour average, and
- 5.19 $\mu g/m^3$ per gram/sec, annual avg.

Emissions of all other TAPs were estimated to be below ELs listed in Sections 585 and 586 of the Rules, and ambient air impact analyses were not required.

Table 5. MODELED TOXIC AIR POLLUTANT EMISSIONS RATES

TAP	CAS No.[a]	Individual Generator Engine Emissions (lb/hr)[b]	Combined Generator Engines Emissions (lb/hr)[a]
Non-carcinogenic TAPs			
Hydrogen chloride	7647-01-0	0.0334	0.0668
Carcinogenic TAPs			
1,1,2,2-Tetrachloroethane	79-34-5	7.0E-05	1.4E-04
1,1-Dichloroethane	75-34-3	4.4E-04	8.8E-04
Benzene	71-43-2	9.0E-04	1.8E-03
Dichloromethane	75-09-2	1.7E-03	3.4E-03
Ethylene dibromide	106-93-4	5.0E-05	1.0E-04
Formaldehyde	50-00-0	0.08	0.16

[a] Chemical Abstract Service Number
[b] Pounds per hour

3. 3 Emission Release Parameters

3.3.1 Point Sources

Table 6 provides emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for point sources. The listed stack height was accepted as submitted. The exhaust temperature for each engine was accepted as submitted in Appendix B—Gas Engine Technical Data—in the modeling protocol. The exhaust flow rate of 12,476 actual cubic feet per minute (acfm) is valid for the 898 degree Fahrenheit (°F) exit temperature. These parameters are valid if they were obtained at the point of release of the exhaust to the atmosphere.

The Caterpillar Corporation's specification sheet provides a temperature tolerance of +63°F and -55°F and a flow tolerance of + or – 6%. These exhaust parameters may be different depending on the location in the exhaust system that they were monitored, with temperature diminishing as the distance from the exhaust manifold increases. If Caterpillar obtained them at testing ports in similar locations as depicted in the modeling protocol's Appendix B "Air Intake and Exhaust System Details" diagram rather than the exit point of the 27.7 feet high stack, the values used in the analysis may be slightly higher than actually exist at the point of release because heat loss effects on temperature and gas volumes may not be accounted for in the Caterpillar specification sheet values. Using higher exhaust flow rate and temperature values is generally less conservative for modeling.

Additional substantiation was not required, and release height, diameter, and temperature values were accepted as submitted. Values used in the analyses appeared reasonable and comparable to other projects for landfill gas-fired internal combustion engines. DEQ provided the exhaust parameters for the Kootenai County landfill gas flares based on permitting source file documentation.

Table 6. POINT SOURCE STACK PARAMETERS

Release Point	Description	Stack Height (m)[a]	Stack Gas Flow Temperature (K)[b]	Stack Gas Flow Velocity (m/sec)[c]	Stack Diameter (m)
KEC Facility Emissions Units					
S1	Engine No. 1, EU-01A, CAT3520C Generator Engine	8.44	754.3	45.4	0.41
S2	Engine No. 2, EU-01B, CAT3520C Generator Engine	8.44	754.3	45.4	0.41
Nearby Source Emissions Units					
F1	Kootenai County Calidus Enclosed Flare	12.20	1088.7	5.43	2.13
F2	Kootenai County John Zink Enclosed Flare	12.20	1088.7	5.08	1.83

[a] Meters
[b] Kelvin
[c] Meters per second

3.4 Results for Ambient Impact Analyses

3.4.1 *Preliminary Impact Analyses*

A preliminary impact analysis to determine if impacts exceed the significant contribution levels was performed for this project. Results are listed in Table 7. Emissions of PM_{10}, SO_2, and NO_2 were modeled by KEC. The same modeling files were used for both the preliminary and full impact analyses. The impacts of the two proposed generator engines were separated by source group and comprised nearly 100% of the maximum ambient impacts that are listed below in Table 8 for the full impact analyses results.

The emissions for this project were modeled and the impacts were compared to the significant contribution concentrations listed in Section 006.105 of the Idaho Air Rules. Maximum ambient impacts are required to be used to compare against the SCLs per Section 4.1.1 of the *State of Idaho Air Quality Modeling Guideline*. The results are listed in Table 11. Lead and CO emissions were expected to be below modeling thresholds and were not modeled by KEC.

Modeled impacts were above the SCLs for PM_{10} 24-hour averaging period, SO_2, 3-hour, 24-hour, and annual averaging periods, and NO_2, annual averaging period. 75% of NO_x was assumed to be emitted as NO_2. A full impact analysis was performed for these pollutants and averaging periods.

Table 7. RESULTS OF SIGNIFICANT IMPACT ANALYSES					
Pollutant	**Averaging Period**	**Modeled Impact ($\mu g/m^3$)[a]**	**Significant Contribution Level ($\mu g/m^3$)**	**Percent of Significant Contribution Level**	**Full Impact Analysis Required?**
PM_{10}[c]	24-hour	27.83505	5.0	557%	Yes
	Annual	0.70997	1.0	71%	No
NO_2[d]	Annual	1.98971[f]	1.0	199%	Yes
SO_2[e]	3-hour	130.13420	25	521%	Yes
	24-hour	96.18947	5	1924%	Yes
	Annual	2.45343	1.0	245%	Yes

[a] Micrograms per cubic meter
[b] National ambient air quality standards
[c] Particulate matter with a mean aerodynamic diameter of ten microns or less
[d] Nitrogen dioxide
[e] Sulfur dioxide
[f] A 75% NO_2 to NO_x ratio was applied to the NOx generator engine ambient impact.

3.4.2 Full Impact Analyses

A full impact analysis was performed by KEC for this project by adding the ambient impacts attributed to the proposed and existing emissions sources to the ambient background concentrations provided by DEQ for SO_2, NO_2, and PM_{10}. NO_x impacts were converted to NO_2 using the Ambient Ratio Method of 75% NO_x is emitted as NO_2. Emissions from the two proposed generators and Kootenai County's two existing enclosed flares were modeled for the full impact analyses.

The results of the full impact analysis are listed in Table 8. Facility-wide predicted ambient impacts, with background concentrations added, were well below each NAAQS. All short-term averaging periods used the maximum impacts as the design concentration, resulting in added conservatism.

Table 8. 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	27.837	68	95.8	150	64%
NO_2[d]	Annual	1.995	11.3	13.3	100	13%
SO_2[e]	3-hour	130.135	167	297.1	1300	23%
	24-hour	96.200	73.3	169.5	365	46%
	Annual	2.480	15.7	18.2	80	23%

[a] Micrograms per cubic meter
[b] National ambient air quality standards
[c] Particulate matter with a mean aerodynamic diameter of ten microns or less
[d] Nitrogen dioxide
[e] Sulfur dioxide

3.4.3 Verification of CO NAAQS Compliance

Additional validation for the exemption of CO emissions from modeling was requested during review of this project. The combined emission rate for CO is above major source thresholds but below PSD major source thresholds, and is approximately one half of the 70 lb/hr secondary DEQ modeling threshold. DEQ modeling staff derived ambient impacts for CO based on using the 2nd high 24-hour average ambient impact for the TAPs unit emission rate modeling. This impact was scaled to the combined 35.44 lb/hr CO emission rate for the two generator engines and was converted from a 24-hour averaging period to 1-hour and 8-hour averaging periods using standard SCREEN3 persistence factors provided in the DEQ *Air Quality Modeling Guideline*. Design concentrations for carbon monoxide impacts were estimated using

the following calculation:

(165.39 μg/m^3 per gram / sec emission) * (1 hr avg / 0.4, 24-hr persistence factor) * (4.47 gram CO sec)

CO impact = 2,047 μg/m^3, 1-hour average.

where: sec = second,
μg/m^3 = micrograms per cubic meter,
hr avg = hour average, and
0.4 = the unit less persistence factor for converting a 1-hr average impact to a 24-hr impact in simple terrain.

Table 9 lists the parameters and the verification results for the CO impacts.

Table 9. CARBON MONOXIDE NAAQS COMPLIANCE VERIFICATION

Pollutant	Averaging Period and Terrain	Modeled Design Concentration (μg/m^3 per gram/sec, 24-hour avg)[a]	Persistence Factor	Emission Rate (gram/sec)[c]	Ambient Impact (μg/m^3)	Ambient Background (μg/m^3)	Total Impact (μg/m^3)	NAAQS[d] (μg/m^3)
CO	1-hour, simple terrain	165.39[b]	0.4	4.465	1,846	3,600	5,446	40,000
CO	1-hour, complex terrain	165.39[b]	0.15	4.465	4,924	3,600	8,524	40,000
CO	8-hour, simple terrain	165.39[b]	0.7	4.465	1,055	2,300	3,355	10,000

[a] Micrograms per cubic meter per gram per second of emissions, 24-hour averaging period
[b] 2nd high impact from TAPs output file. CO uses the high 2nd high value as a design concentration.
[c] Grams per second. Note that 35.44 pounds per hour equals 4.465 gram/sec
[d] National ambient air quality standards

Impacts were well below the NAAQS when default rural agricultural backgrounds were included. CO impacts from the flares are not predicted to cause any substantial increase in total ambient impacts and have been disregarded for this discussion.

3.4.4 Toxic Air Pollutant Impact Analyses

Dispersion modeling for TAPs was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Sections 585 and 586. This project caused emission increases that exceeded the screening emission rate limits. The requested emission increases were modeled to demonstrate compliance with the allowable TAP increments. The results of the TAPs analyses are listed in Table 10. The predicted ambient TAPs impacts were below allowable increments.

Table 10. RESULTS OF TAPs ANALYSES				
Toxic Air Pollutant	**CAS No.[a]**	**Maximum Modeled Concentration ($\mu g/m^3$)[b]**	**AAC/AACC[c] ($\mu g/m^3$)**	**Percent of AAC/AACC**
Non-Carcinogenic TAPs				
Hydrogen chloride	7647-01-0	1.54	375	0.4%
Carcinogenic TAPs				
1,1,2,2-Tetrachloroethane	79-34-5	9.16E-05	1.7E-02	0.5%
1,1-Dichloroethane	75-34-3	5.72E-04	3.8E-02	1.5%
Benzene	71-43-2	1.18E-03	1.2E-01	1.0%
Dichloromethane	75-09-2	2.25E-03	2.4E-01	0.9%
Ethylene dibromide	106-93-4	6.74E-05	4.5E-03	1.5%
Formaldehyde	50-00-0	7.1E-02	7.7E-02	92.2%

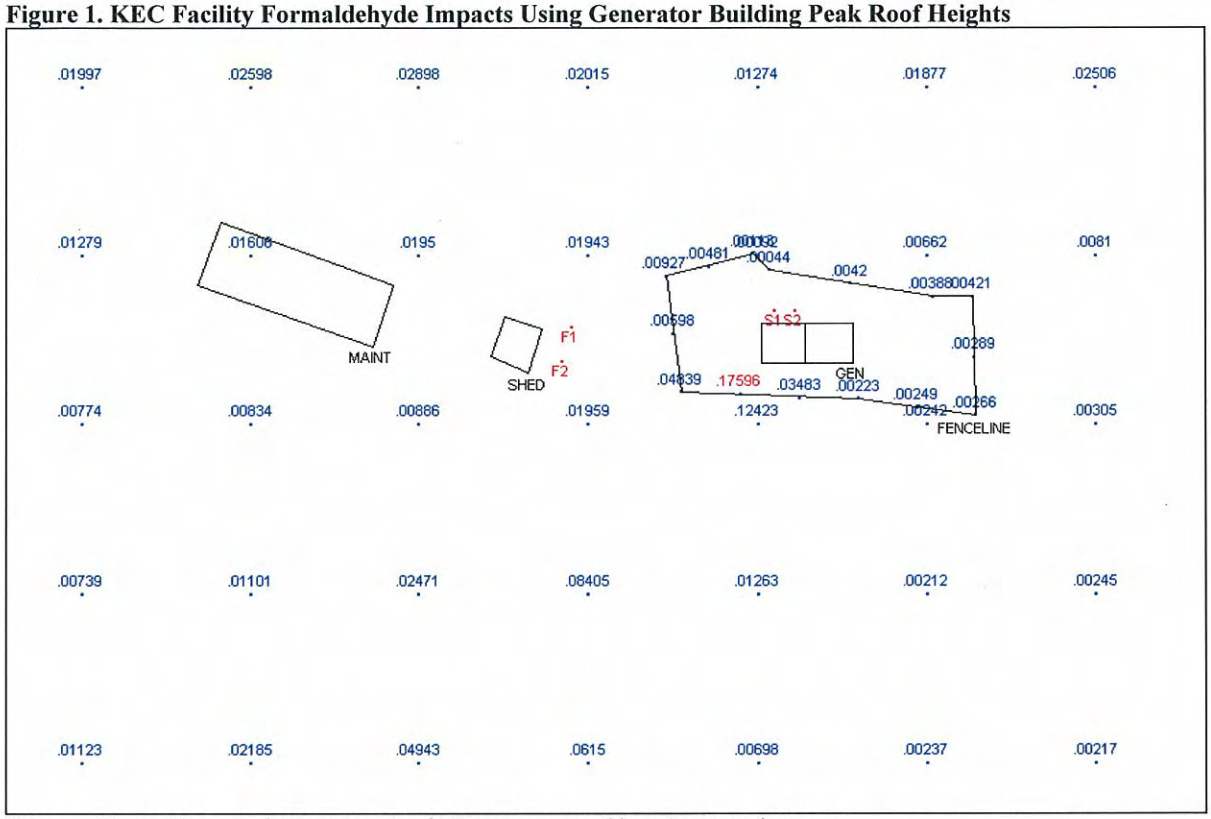
[a] Chemical Abstract Service Number
[b] Micrograms per cubic meter
[c] Acceptable ambient concentration for non-carcinogens (Section 585)/acceptable ambient concentration for carcinogens (Section 586)

3.4.4.1 Downwash Sensitivity of Formaldehyde Ambient Impacts

Figure 1 below depicts AERMOD results using the same 27.7 feet stack release height for generator engines No. 1 and No. 2 (Model IDs S1 and S2) with the adjacent generator building tier heights at the 28 feet height for the western section of the building and 23.5 feet height for the eastern section of the building.

The only pollutant with impacts near an ambient standard was formaldehyde. All other TAPs and NAAQS pollutant impacts were not close to any increments or standards.

Figure 1. KEC Facility Formaldehyde Impacts Using Generator Building Peak Roof Heights



Note: Figure 1 impact values are in units of micrograms per cubic meter, annual average.
Image created courtesy of Oris Solutions/Bee-Line Software's BEEST for Windows Graphic User Interface package

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 January 21, 2011:

Facility Comment #1: Condition 3 contains a typo. It currently reads "... a landfill gas-to-energy facility utilizing landfill gas for the Fighting Creek Landfill ..." It should read "...a landfill gas-to-energy facility utilizing landfill gas **from** the Fighting Creek Landfill ...".

DEQ Response #1: The requested editorial change was made.

Facility Comment #2: Condition 14 states that the permittee shall take appropriate corrective action if an odor complaint has merit. Please define how to determine if an odor complaint has merit or not.

DEQ Response #2: To help the facility understand how merit is defined by DEQ, the following link has been added DEQ Odor Policy. There is information provided that defines what a valid compliant is and the process DEQ uses in evaluating complaints. All future inquiries KEC may have following issuance of the permit shall be directed to the DEQ Coeur d'Alene Regional Office.

Facility Comment #3: Condition 17 VOC emission calculation equation states that the Cd equals the measured VOC concentration in parts per million by volume. This should be changed to state the Cd equals the measured VOC concentration as propane in parts per million by volume. Similarly the conversion constant should state that it is for conversion for ppm VOC measured as propane... This will make the Condition 17 consistent with 40 CFR 60.4244(f).

DEQ Response #3: The requested changes were made as consistency with 40 CFR 60.4244(f) is necessary.

Facility Comment #4: Condition 29 states that the performance test results are to be submitted to DEQ within 30 days from the date of the test. This timeframe is not consistent with Condition 20 which states within 60 days. We request a change to Condition 29 to extend the submittal date of performance test results to 60 days from the date of the performance test. This will allow for enough time to obtain results from the laboratory analysis and preparation of the performance test report. We request this be updated in the Statement of Basis as well.

DEQ Response #4: It was determined that NSPS, Subpart JJJJ, allows for submittal of test results within 60 days as stated in Condition 20. Permit Condition 29 references IDAPA 58.01.01.157, which requires only 30 days for submittal. However, DEQ has regularly allowed for 60 days and because the federal requirement provides 60 days it is reasonable to allow the extra time in this case. Permit Condition 29 has been modified to allow 60 days submittal time as requested by KEC.

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: Kootenai Electric Cooperative
Address: 2451 W. Dakota Ave
City: Hayden
State: Idaho
Zip Code: 83835
Facility Contact: Shawn Dolan
Title: Manager of Engineering
AIRS No.: 055-00091

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	25.9	0	25.9
SO_2	23.9	0	23.9
CO	155.2	0	155.2
PM10	6.9	0	6.9
VOC	7.5	0	7.5
TAPS/HAPS	3.7	0	3.7
Total:	0.0	0	**223.1**
Fee Due	**$ 7,500.00**		

Comments: The processing of $7500 is in accordance with IDAPA 58.01.01.225 as the increase is greater than 100 total T/yr