



SEP 06 2011

Tudor Williams  
Cambrian Energy Woodville, LLC  
One Wilshire Building Suite 2420  
624 Grand Avenue  
Los Angeles, CA 90017

**Re: Notice of Preliminary Decision - Authority to Construct**  
**Project Number: S-1103547**

Dear Mr. Williams:

Enclosed for your review and comment is the District's analysis of Cambrian Energy Woodville, LLC's application for an Authority to Construct for installing a 1,100 bhp landfill gas-fired internal combustion engine powering an electrical generator, at the Teapot Dome Landfill in Tulare County.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. Please submit your written comments on this project within the 30-day public comment period which begins on the date of publication of the public notice.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Mr. Dan Klevann of Permit Services at (661) 392-5500.

Sincerely,

  
David Warner  
Director of Permit Services

DW: DK/cm

Enclosures

**Seyed Sadredin**  
Executive Director/Air Pollution Control Officer

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**Northern Region**  
4800 Enterprise Way  
Modesto, CA 95356-8718  
Tel: (209) 557-6400 FAX: (209) 557-6475

**Central Region (Main Office)**  
1990 E. Gettysburg Avenue  
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**Southern Region**  
34946 Flyover Court  
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SEP 06 2011

Mike Tollstrup, Chief  
Project Assessment Branch  
Stationary Source Division  
California Air Resources Board  
PO Box 2815  
Sacramento, CA 95812-2815

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**Project Number: S-1103547**

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Enclosed for your review and comment is the District's analysis of Cambrian Energy Woodville, LLC's application for an Authority to Construct for installing a 1,100 bhp landfill gas-fired internal combustion engine powering an electrical generator, at the Teapot Dome Landfill in Tulare County.

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Visalia Times-Delta  
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**NOTICE OF PRELIMINARY DECISION  
FOR THE PROPOSED ISSUANCE OF  
AN AUTHORITY TO CONSTRUCT**

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Unified Air Pollution Control District solicits public comment on the proposed issuance of Authority to Construct to Cambrian Energy Woodville, LLC for installing a 1,100 bhp landfill gas-fired internal combustion engine powering an electrical generator, at the Teapot Dome Landfill in Tulare County.

The analysis of the regulatory basis for this proposed action, Project #S-1103547, is available for public inspection at [http://www.valleyair.org/notices/public\\_notices\\_idx.htm](http://www.valleyair.org/notices/public_notices_idx.htm) and the District office at the address below. Written comments on this project must be submitted within 30 days of the publication date of this notice to **DAVID WARNER, DIRECTOR OF PERMIT SERVICES, SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT, 34946 FLYOVER COURT, BAKERSFIELD, CA 93308.**

**San Joaquin Valley Air Pollution Control District  
Authority to Construct Application Review  
Landfill Gas-Fired IC Engine**

Facility Name:	Cambrian Energy Woodville, LLC	Date:	August 5, 2011
Mailing Address:	One Wilshire Building Suite 2420 624 South Grand Avenue Los Angeles, CA 90017		
Contact Name:	Tudor Williams		
Telephone:	(213) 628-8312		
FAX:	(213) 488-9890		
Engineer:	Dan Klevann		
Lead Engineer:	Rich Karrs		
Application #s	S-7844-1-0		
Project#:	S-1103547		

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**I. Proposal:**

Cambrian Energy Woodville, LLC (Cambrian) is requesting Authority to Construct (ATC) permits to install one 1,100 bhp landfill gas-fired internal combustion (IC) engine powering an electrical generator. The engine will be served by a Noxtech, Inc. Aftertreatment System (Noxtech). The Noxtech is designed to reduce Nitrogen Oxide (NO<sub>x</sub>) emissions in the exhaust stream. In addition, testing of this system has indicated that the system will also reduce emissions of volatile organic compounds (VOCs), carbon monoxide (CO), and organic particulate matter with an aerodynamic diameter of 10 microns or less (PM<sub>10</sub>). The landfill gas will be collected by Cambrian and burned onsite. Cambrian will pay Tulare County a royalty for any energy produced onsite.

The following discussion sets forth the basis for the Districts determination that Cambrian (S-7844) and the Tulare County Teapot Dome landfill (S-3611) do not comprise a single stationary source.

Pursuant to Section 3.37 of District Rule 2201, *a Stationary Source is any building, structure, facility, or installation which emits or may emit any affected pollutant directly or as a fugitive emission. Building, structure, facility or installation includes all pollutant emitting activities including emissions units which:*

- 3.37.1 *Are under the same or common ownership or operation, or which are owned or operated by entities which are under common control; and*
- 3.37.2 *Belong to the same industrial grouping either by virtue of falling within the same two-digit standard industrial classification code or by virtue of being part of a*

*common industrial process, manufacturing process, or connected process involving a common raw material; and*

**3.37.3** *Are located on one or more contiguous or adjacent properties; or*

**3.37.4** *Are located on one or more properties wholly within either the Western Kern County Oil Fields or the Central Kern County Oil Field or Fresno County Oil Fields and are used for the production of light oil, heavy oil or gas. Notwithstanding the provisions of this definition, light oil production, heavy oil production, and gas production shall constitute separate Stationary Sources.*

**A. Section 3.37.1 Applicability:**

Pursuant to the letter from Tudor Williams of Cambrian Energy Development, LLC in Appendix E of this document, Cambrian will own and operate the proposed landfill gas-fired IC engine. The landfill, vapor collection system, and flare, are owned by Tulare County and will continue to be the responsibility of Tulare County. Tulare County will continue to maintain both ownership and regulatory responsibility of the landfill emissions itself by adding cover or additional gas collection wells. Therefore, Cambrian and Tulare County Teapot Dome Landfill do not meet the requirements of Section 3.37.1.

**B. Section 3.37.2 Applicability:**

Electric, Gas and Sanitary Services (includes landfills and electric energy generation) belong to the same two-digit standard industrial classification code. In addition, the collection of the landfill gas, and the electrical generation produced by combusting the landfill gas in the proposed IC engine are a connected process. Therefore, Cambrian and Tulare County Teapot Dome Landfill meet the requirements of Section 3.37.2 of District Rule 2201.

**C. Section 3.37.3 Applicability:**

Cambrian will be located at the Tulare County Teapot Dome Landfill. Therefore, Cambrian and Tulare County Teapot Dome Landfill meets the requirements of Section 3.37.2 of District Rule 2201.

**D. Section 3.37.4 Applicability:**

Since Cambrian will not produce light oil, heavy oil, or gas. Therefore, Cambrian does not meet the requirements of Section 3.37.4.

**E. Section 3.37 Applicability:**

Since Cambrian and Tulare County Teapot Dome Landfill do not meet the requirements of Section 3.37.1 of District Rule 2201, they are not the same stationary source.

## **II. Applicable Rules:**

Rule 2020 Exemptions (12/20/07)  
Rule 2201 New and Modified Stationary Source Review Rule (12/18/08)  
Rule 4101 Visible Emissions (2/17/05)  
Rule 4102 Nuisance (12/17/92)  
Rule 4201 Particulate Matter Concentration (12/17/92)  
Rule 4701 Stationary Internal Combustion Engines – Phase 1 (8/21/03)  
Rule 4702 Stationary Internal Combustion Engines – Phase 2 (1/18/07)  
Rule 4801 Sulfur Compounds (12/17/92)  
CH&SC 41700 Health Risk Assessment  
CH&SC 42301.6 School Notice  
40 CFR Subpart JJJJ Standards of Performance for Stationary Spark Ignited Internal  
Combustion Engines  
40 CFR Subpart ZZZZ National Emission Standards for Hazardous Air Pollutants for Stationary  
Internal Combustion Engines  
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA  
Guidelines

## **III. Project Location:**

The facility will be located at 21063 Avenue 128, Teapot Dome Landfill, in Porterville, CA. The District has verified that the equipment will not be located within 1,000 feet of a school.

## **IV. Process Description:**

Cambrian will use the landfill gas-fired IC engine to power a generator that will produce electrical power to be added to the local power grid.

Landfill gas production results from chemical reactions and microbes acting upon the landfill waste as materials in a landfill begin to break down. As the landfill gas continues to be produced, pressure in the landfill begins to grow causing the gas to migrate to the surface of the landfill and release into the atmosphere. Uncontrolled emissions of landfill gasses have resulted in explosions and fires at landfills. In addition, the migration of subsurface gasses have resulted in the contamination of ground water. As a result of these problems, landfill operations have drilled wells into landfills, captured the gas, and burned it in a flare. As an alternative, landfill operations have begun to burn the landfill gas in internal combustion (IC) engines driving electrical generators used to provide electrical power to onsite and offsite operations. Cambrian will combust the fuel in a 1,100 bhp IC engine connected to a 850 kW electrical generator.

Naturally occurring landfill gasses have a composition of 55% methane and 45% carbon dioxide. However, landfill management techniques can considerably affect the concentration

of methane and carbon dioxide in the gas. In practice, a typical landfill gas will have a composition of 45-50% methane, 35-45% carbon dioxide, 0-2 % oxygen, 1-15% nitrogen, and trace amounts of other compounds. Landfill gas collection systems are normally equipped with a pump used to pull the gas from the landfill. As a result, a negative pressure on the landfill can result in ambient air migrating into the top and perimeter of the landfill supplying the oxygen and nitrogen to the landfill gas. Typically, oxygen levels greater than 2% cause methane production to drop considerably. However, a landfill operator may use the introduction of air into the landfill to control excessive odors or keep landfill gas from migrating into areas around the landfill. With good landfill collection practices, landfill gas with a stable methane content can be obtained with a range between 50-55%.

Teapot Dome Landfill is currently permitted to burn off the landfill gas in an existing flare. During periods of high landfill gas production, low engine demand, or engine maintenance, the engine may not be capable of consuming all of the landfill gas recovered. Therefore, Teapot Dome Landfill is not proposing to remove the flare or modify its permit at this time.

## **V. Equipment Listing:**

S-7844-1-0: 1,100 BHP CATERPILLAR MODEL G3516 LANDFILL GAS-FIRED LEAN BURN IC ENGINE POWERING 850 KW ELECTRICAL GENERATOR AND SERVED BY A NOXTECH EMISSIONS CONTROL UNIT

## **VI. Emission Control Technology Evaluation:**

### **A. For NO<sub>x</sub>, CO and VOCs:**

The applicant is proposing to use a Noxtech, Inc. aftertreatment system to control emissions of NO<sub>x</sub>, CO, and VOCs. A Noxtech aftertreatment system is a Selective Non-Catalytic Reduction (SNCR) system. An SNCR system is similar to Selective Catalytic Reduction (SCR), but reduces NO<sub>x</sub> emissions without a catalyst. Normally, SNCR involves injecting urea or ammonia into the exhaust at an exhaust temperature between 1600 °F and 2100 °F. A Noxtech aftertreatment system is capable of reducing NO<sub>x</sub> emissions within a reactor at temperatures between 1400 °F and 1550 °F. In addition to reducing NO<sub>x</sub> emissions, source test results have indicated that the aftertreatment system also reduces emissions of VOC, CO, and hydrocarbon based PM<sub>10</sub>.

The reaction that occurs in the Noxtech aftertreatment system is autothermal and autocatalytic. An autothermal reaction is a reaction that evolves sufficient energy to cause a reaction to continue without an outside energy source. An autocatalytic reaction is a reaction where a reaction product is also the catalyst for the reaction.

The Noxtech aftertreatment reactor consists of a heat exchanger, a mixing system, a reaction area, urea injection nozzle(s), and a burner used to bring the reactor up to temperature during

startup. The reactor is cylindrically shaped and covered with insulating material used to hold heat in the reactor.

Engine exhaust gas enters at the end of the reactor into the inlet plenum. The inlet plenum directs the exhaust gas into the tubes of a tube and shell heat exchanger oriented in a radial array around the inside walls of the reactor. At the other end of the reactor, the exhaust gasses exit the heat exchanger tubes and are redirected back down the center of the reactor into the mixing area. Urea is introduced in the mixing area where turning vanes mix the influent exhaust gas and the urea into a homogeneous mixture. As the reaction mixture flows from the mixing area through the reactor core,  $\text{NO}_x$ , VOC, CO and hydrocarbon-based  $\text{PM}_{10}$  are converted to  $\text{N}_2$ ,  $\text{CO}_2$  and  $\text{H}_2\text{O}$ . The reacted exhaust gasses then reverse direction at the rear of the reactor and flow through the reactor annulus toward the front of the reactor where the exhaust gasses enter the shell side of the heat exchanger. The reacted exhaust gasses exit the heat exchanger at the rear of the reactor into the outlet plenum and then out the exhaust stack. To control the urea injection rate, a  $\text{NO}_x$  and  $\text{O}_2$  analyzer measures the outlet concentrations and sends a signal to a Programmable Logic Controller which controls the urea injection rate.

The reaction mechanism for the reduction of  $\text{NO}_x$  to  $\text{N}_2$  is the same as for an SCR system where OH radicals are formed and convert the  $\text{NO}_x$  to  $\text{N}_2$ . For this system, the OH radical is the autocatalyst that causes the  $\text{NO}_x$  to convert to  $\text{N}_2$  and is also a product of the reaction. There are a large number of reactions that take place to convert VOC, and hydrocarbon-based  $\text{PM}_{10}$  to  $\text{CO}_2$  and  $\text{H}_2\text{O}$ . However, testing on the system indicates that all of the reaction mechanisms also rely on the OH radical as a reactant. The system's design relies on a proper temperature operating range, thorough mixing, a proper urea injection rate, and a minimum residence time necessary to complete the reaction.

The reactor is equipped with a burner located at the front of the reactor, which introduces hot gasses into the mixing area of the reactor during the reactor start up. The burner can be fired on gaseous or liquid fuels. Typically, where possible, the burner will fire on the same fuel as the engine. Once the reactor is up to temperature, the burner is shut off and urea is injected into the reactor causing the emission reductions to occur.

#### **B. For $\text{SO}_x$ :**

The applicant is proposing to use a biological in-situ sulfur control system which injects water vapors populated with biological compounds to control  $\text{SO}_x$  emissions. Until actual data showing control effectiveness of sulfur emissions is developed, the sulfur component will be assumed to be uncontrolled with  $\text{H}_2\text{S}$  at 21 ppm as shown in the gas analysis.



**VII. General Calculations:**

**A. Assumptions:**

- The oxygen-based F-factor for the landfill gas is 9,604 dscf/MMBtu (similar landfill gas to Woodville Landfill)
- The landfill gas fuel heating value is 450 Btu/dscf (proposed by the applicant)
- The fuel flow rate will be 19,833 scf/hr (proposed by the applicant)
- All particulate matter emitted is PM<sub>10</sub>
- VOC emissions will be reported as methane unless specified otherwise
- All sulfur in the sulfur containing compounds of the landfill gas are converted to sulfur dioxide (SO<sub>2</sub>)

**B. Emission Factors:**

1. Pre-Project Emission Factors:

The engine is new. Therefore, there are no pre-project emissions of the proposed IC engine.

2. Post-Project Emission Factors:

NO<sub>x</sub>, CO and VOC:

The engine will be served by a Noxtech, Inc. Aftertreatment system used to control emissions of NO<sub>x</sub>, CO and VOC. Since the Noxtech, Inc. Aftertreatment system requires a start-up period, emissions will need to be determined for both startup and steady state operating periods. During start-up periods, emissions will result from the combustion of landfill gas in the engine, and from the start-up burner in the Noxtech, Inc. Aftertreatment system used to bring the reactor up to temperature. As shown in Appendix E of this document, the Noxtech, Inc. Aftertreatment start-up burners are Low Emitting units and exempt from permit requirements at this time. Therefore, emissions for the Noxtech, Inc. Aftertreatment start-up burners are not addressed here.

The startup emission factors are from the engine manufacturer's guaranteed emissions for the proposed IC engines. The steady state emission factors are from Noxtech, Inc's guaranteed emissions rates.

Pollutant	Engine Post-Project Emission Factors (EF2)	
	Startup EF2	Steady State EF2
NO <sub>x</sub>	1.0 g/bhp-hr	0.15 g/bhp-hr ( 11 ppmv @ 15% O2 )
CO	4.4 g/bhp-hr	1.37 g/bhp-hr (168 ppmv @ 15% O2)
VOC	1.1 g/bhp-hr	0.12 g/bhp-hr (26 ppmv @ 15% O2)

PM<sub>10</sub>:

An emission factor of 0.1 g/bhp-hr will be used to estimate PM<sub>10</sub> emissions from the proposed engines. This emission factor is based on a review of source test results for similar landfill gas-fired IC engines. See BACT analysis for more information.

SO<sub>x</sub>:

The SO<sub>x</sub> emissions are solely dependent on the concentrations of sulfur containing compounds<sup>(1)</sup> in the landfill gas. The applicant is proposing a maximum fuel H<sub>2</sub>S of 21 ppmv.

Ammonia (NH<sub>3</sub>):

NH<sub>3</sub> emissions will result from the reaction of urea with NO<sub>x</sub> in the Noxtech, Inc. Aftertreatment system during steady state operation. The applicant has proposed a maximum NH<sub>3</sub> emissions rate of 11 ppmv @15% O<sub>2</sub>.

3. Equations:

NO<sub>x</sub>, CO, VOC, and PM<sub>10</sub>:

$$PE2_{\text{daily}} = (\text{engine rating}) \times (\text{EF2}) \times (\text{hours of operation}) \times (\text{lb}/453.6 \text{ g})$$

SO<sub>x</sub> Emissions:

Since SO<sub>x</sub> emissions are solely dependent on the fuel organic sulfur content, the start-up and steady state emission rates will be the same and the total SO<sub>x</sub> emissions can be determined with a single calculation as follows:

$$PE2_{\text{daily}} = (\text{H}_2\text{S concentration in fuel}) \times (\text{fuel flow rate}) \times (\text{lb-mol}/379.5 \text{ ft}^3) \\ \times (34 \text{ lb-H}_2\text{S}/\text{lb-mol}) \times (32 \text{ lb-S}/34 \text{ lb-H}_2\text{S}) \times (64 \text{ lb-SO}_2/32 \text{ lb-S}) \times (24 \text{ hr}/\text{day})$$

Ammonia (NH<sub>3</sub>):

Urea is only injected during steady state operation of the Noxtech, Inc. Aftertreatment system. Therefore, the maximum NH<sub>3</sub> emissions will occur during steady state operation and can be determined with a single calculation as follows:

$$PE2_{\text{daily}} = (\text{Heat Input}) \times (\text{Emission Concentration}) \times (\text{Molecular Weight}) \times (\text{F-Factor}) \\ \times (1 \text{ lb-mol}/379.5 \text{ ft}^3) \times [20.9/(20.9 - \text{O}_2\%)] \times (\text{daily hours of operation})$$

Where:

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<sup>1</sup> The sulfur containing compounds consists of mostly of H<sub>2</sub>S and a small fraction of mercaptans. Based on testing of landfill gas samples from the facility, the fraction of mercaptans relative to the H<sub>2</sub>S fraction is insignificant and will not be included here.

F Factor: 9,604 scf/MMBtu  
Molecular Weight for NH<sub>3</sub>: 17 lb/lb-mole  
Heat input: (fuel flow rate) x (fuel heating value)

**Annual Emissions:**

$$PE2_{\text{annual}} = (PE2) \times (365 \text{ day/yr})$$

**C. Calculations:**

1. **Pre-Project Emissions (PE1):**

The engine is new. Therefore, there are no pre-project emissions from the proposed IC engine.

2. **Post Project PE (PE2):**

The applicant has indicated that, during normal operation, the engine will operate up to 0.5 hours per day for start-up purposes, and up to 24 hours per day for steady state operation. For NO<sub>x</sub>, CO and VOC, the worst case emissions during normal operation will occur during the start-up period when the engine's emissions will not be controlled by the Noxtech, Inc. Aftertreatment system. Therefore, the worst case daily emissions of NO<sub>x</sub>, CO and VOC will be determined by using the maximum start-up period of 0.5 hours/day and steady state operation for the remaining 23.5 hours/day. As stated in the emission factor section above, PM<sub>10</sub> and SO<sub>x</sub> emissions are only dependent on the landfill gas siloxane and H<sub>2</sub>S concentrations respectively, and worst case emission calculations will be based on the maximum of 24 hours of operation per day for these pollutants. NH<sub>3</sub> will only be emitted during steady state operation. Therefore, the worst case NH<sub>3</sub> daily emissions will be determined using the steady state emissions rate over a 24 hour period.

NO<sub>x</sub> Emissions from IC Engine:

$$\text{PE2}_{\text{daily start-up}} = (1,100 \text{ bhp}) \times (1 \text{ g-NO}_x/\text{bhp-hr}) \times (\text{lb}/453.6 \text{ g}) \times (0.5 \text{ hr/day})$$

$$\text{PE2}_{\text{daily start-up}} = \mathbf{1.2 \text{ lb-NO}_x/\text{day}}$$

$$\text{PE2}_{\text{daily steady state}} = (1,100 \text{ bhp}) \times (0.15 \text{ g-NO}_x/\text{bhp-hr}) \times (\text{lb}/453.6 \text{ g}) \times (23.5 \text{ hr/day})$$

$$\text{PE2}_{\text{daily steady state}} = \mathbf{8.5 \text{ lb-NO}_x/\text{day}}$$

$$\text{PE2}_{\text{daily total}} = (\text{PE2}_{\text{daily start-up}}) + (\text{PE2}_{\text{daily steady state}})$$

$$= 1.2 \text{ lb-NO}_x/\text{day} + 8.5 \text{ lb-NO}_x/\text{day}$$

$$\text{PE2}_{\text{daily total}} = \mathbf{9.7 \text{ lb-NO}_x/\text{day}}$$

$$\text{PE2}_{\text{annual}} = (9.7 \text{ lb-NO}_x/\text{day}) \times (365 \text{ day/yr})$$

$$\text{PE2}_{\text{annual}} = \mathbf{3,541 \text{ lb-NO}_x/\text{yr}}$$

CO Emissions from IC Engine:

$$\text{PE2}_{\text{daily start-up}} = (1,100 \text{ bhp}) \times (4.4 \text{ g-CO/bhp-hr}) \times (\text{lb}/453.6 \text{ g}) \times (0.5 \text{ hr/day})$$

$$\text{PE2}_{\text{daily start-up}} = \mathbf{5.3 \text{ lb-CO/day}}$$

$$\text{PE2}_{\text{daily steady state}} = (1,100 \text{ bhp}) \times (1.37 \text{ g-CO/bhp-hr}) \times (\text{lb}/453.6 \text{ g}) \times (23.5 \text{ hr/day})$$

$$\text{PE2}_{\text{daily steady state}} = \mathbf{78.1 \text{ lb-CO/day}}$$

$$\text{PE2}_{\text{daily total}} = (\text{PE2}_{\text{daily start-up}}) + (\text{PE2}_{\text{daily steady state}})$$

$$= 5.3 \text{ lb-CO/day} + 78.7 \text{ lb-CO/day}$$

$$\text{PE2}_{\text{daily total}} = \mathbf{83.4 \text{ lb-CO/day}}$$

$$\text{PE2}_{\text{annual}} = (83.4 \text{ lb-CO/day}) \times (365 \text{ day/yr})$$

$$\text{PE2}_{\text{annual}} = \mathbf{30,441 \text{ lb-CO/yr}}$$

VOC Emissions from each IC Engine:

$$\text{PE2}_{\text{daily start-up}} = (1,100 \text{ bhp}) \times (1.11 \text{ g-VOC/bhp-hr}) \times (\text{lb}/453.6 \text{ g}) \times (0.5 \text{ hr/day})$$

$$\text{PE2}_{\text{daily start-up}} = \mathbf{1.3 \text{ lb-VOC/day}}$$

$$\text{PE2}_{\text{daily steady state}} = (1,100 \text{ bhp}) \times (0.12 \text{ g-VOC/bhp-hr}) \times (\text{lb}/453.6 \text{ g}) \times (23.5 \text{ hr/day})$$

$$\text{PE2}_{\text{daily steady state}} = \mathbf{6.8 \text{ lb-VOC/day}}$$

$$\text{PE2}_{\text{daily total}} = (1.3 \text{ lb-VOC/day}) + (6.8 \text{ lb-VOC/day})$$

$$\text{PE2}_{\text{daily total}} = \mathbf{8.1 \text{ lb-VOC/day}}$$

$$\text{PE2}_{\text{annual}} = (8.1 \text{ lb-VOC/day}) \times (365 \text{ day/yr})$$

$$\text{PE2}_{\text{annual}} = \mathbf{2,957 \text{ lb-VOC/yr}}$$

PM<sub>10</sub> Emissions:

$$\begin{aligned} PE2_{\text{daily}} &= (1,100 \text{ bhp}) \times (0.1 \text{ g-PM}_{10}/\text{bhp-hr}) \times (\text{lb}/453.6 \text{ g}) \times (24 \text{ hr}/\text{day}) \\ PE2_{\text{daily}} &= \mathbf{5.8 \text{ lb-PM}_{10}/\text{day}} \end{aligned}$$

$$\begin{aligned} PE2_{\text{annual}} &= (5.8 \text{ lb-PM}_{10}/\text{day}) \times (365 \text{ day}/\text{yr}) \\ PE2_{\text{annual}} &= \mathbf{2,117 \text{ lb-PM}_{10}/\text{yr}} \end{aligned}$$

SO<sub>x</sub> Emissions:

$$\begin{aligned} PE2_{\text{daily}} &= (21 \text{ H}_2\text{S}/10^6) \times (19,833 \text{ scf}/\text{hr}) \times (\text{lb-mole}/379.5 \text{ ft}^3) \times (34 \text{ lb H}_2\text{S}/\text{lb-mol}) \\ &\quad \times (32 \text{ lb-S}/34 \text{ lb-H}_2\text{S}) \times (64 \text{ lb SO}_2/32 \text{ lb S}) \times (24 \text{ hr}/\text{day}) \\ PE2_{\text{daily}} &= \mathbf{1.7 \text{ lb-SO}_x/\text{day}} \end{aligned}$$

$$\begin{aligned} PE2_{\text{annual}} &= (1.7 \text{ lb-SO}_x/\text{day}) \times (365 \text{ day}/\text{yr}) \\ PE2_{\text{annual}} &= \mathbf{621 \text{ lb-SO}_x/\text{yr}} \end{aligned}$$

NH<sub>3</sub> Emissions:

$$\begin{aligned} PE2_{\text{daily steady state}} &= (19,833 \text{ scf}/\text{hr}) \times (450 \text{ Btu}/\text{scf}) \times (11 \times 10^{-6} \text{ NH}_3) \times (17 \text{ lb}/\text{lb-mol}) \\ &\quad \times (9,604 \text{ DSCF}/\text{MMBtu}) \times (\text{MMBtu}/10^6 \text{ Btu}) \times (1 \text{ lb-mol}/379.5 \text{ ft}^3) \\ &\quad \times (20.95/5.95) \times (24 \text{ hr}/\text{day}) \end{aligned}$$

$$PE2_{\text{daily steady state}} = \mathbf{3.6 \text{ lb-NH}_3/\text{day}}$$

$$PE2_{\text{annual}} = (3.6 \text{ lb-NH}_3/\text{day}) \times (365 \text{ day}/\text{yr})$$

$$PE2_{\text{annual}} = \mathbf{1,314 \text{ lb-NH}_3/\text{yr}}$$

**D. Facility Emissions:**

1. Pre-Project Stationary Source Potential to Emit (SSPE1):

Since this is a new facility, there are no valid ATCs, PTOs, or ERCs at the Stationary Source; therefore, the SSPE1 will be equal to zero.

2. Post-Project Stationary Source Potential to Emit (SSPE2):

Permit Unit	SSPE2 S-7844 (lb/yr)				
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	SO <sub>x</sub>
S-7844-1-0	3,541	30,441	2,957	2,117	621
<b>Total</b>	<b>3,541</b>	<b>30,441</b>	<b>2,957</b>	<b>2,117</b>	<b>621</b>
Major Source Thresholds	20,000	200,000	20,000	140,000	140,000
Major Source?	No	No	No	No	No
ERC	0	0	0	0	0
<b>Total</b>	<b>3,541</b>	<b>30,441</b>	<b>2,957</b>	<b>2,117</b>	<b>621</b>
Offsets Threshold	20,000	200,000	20,000	29,200	54,750
Offsets Triggered?	No	No	No	No	No

3. Stationary Source Increase in Permitted Emissions (SSIPE):

SSIPE = SSPE2 – SSPE1

SSIPE S-7844					
	NO <sub>x</sub> (lb/yr)	CO (lb/yr)	VOC (lb/yr)	PM <sub>10</sub> (lb/yr)	SO <sub>x</sub> (lb/yr)
SSPE2	3,541	30,441	2,957	2,117	621
SSPE1	0	0	0	0	0
<b>SSIPE</b>	<b>3,541</b>	<b>46,465</b>	<b>2,957</b>	<b>2,117</b>	<b>621</b>

**7. SB 288 Major Modification**

As discussed above, the facility is not a Major Source for NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>10</sub> and VOC emissions; therefore, the project does not constitute a SB 288 Major Modification for NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>10</sub> and VOC emissions.

**8. Federal Major Modification**

As shown above, this project does not constitute a Major Modification. Therefore, in accordance with District Rule 2201, Section 3.17, this project does not constitute a Federal Major Modification and no further discussion is required.

**VIII. Compliance:**

**Rule 2020 Exemptions**

Pursuant to Section 6.19 of this rule, Low Emitting Units, except those which belong to a source category listed in Sections 6.1 through 6.18 shall not require an Authority to Construct or Permit to Operate unless uncontrolled emissions of Hazardous Air Pollutants (HAPs) may cause a significant health risk to the public. The start-up burner for each Noxtech, Inc. Aftertreatment system does not fit a source category listed in Sections 6.1 through 6.18. As shown in Appendix C of this document, the start-up burner for each Noxtech, Inc. Aftertreatment system is a Low Emitting Unit.

In addition, the District has performed a Risk Management Review for all of the equipment for this project including the Noxtech, Inc. Aftertreatment system start-up burners. Pursuant to the Risk Management Review summary presented later in this document, potential emissions from all of the equipment for this project combined resulted in a Prioritization Score of 0.05. Pursuant to District policy, projects that result in a prioritization score of less than or equal to one are considered to be insignificant sources. Since the prioritization score for all of the equipment does not exceed one, hazardous emissions from all of the proposed equipment is considered to be insignificant. Therefore, the hazardous emissions from the Noxtech, Inc. Aftertreatment start-up burners individually will be insignificant.

Since each of the Noxtech, Inc. Aftertreatment start-up burners are low emitting units and will not cause a significant health risk, the burners are exempt from permit requirements at this time.

**Rule 2201 New and Modified Stationary Source Review Rule**

**A. Best Available Control Technology (BACT):**

1. BACT Applicability:

Per Section 4.1.1 of District Rule 2201, for new emissions unit, BACT shall be required on a pollutant-by-pollutant and on an emissions unit-by-unit basis if the new emissions unit results in a PE for a pollutant that exceeds 2.0 pounds in any one day. Section 4.2.1 of this rule exempts CO from this requirement unless the SSPE2 for the source meets or exceeds 200,000 lb/yr for CO. The following table lists the daily PE for each of the proposed new landfill gas-fired IC engines and if that engine's potential emissions exceed the BACT trigger level for that pollutant.

PE2 for S-7844-1-0				
Permit Unit	Emissions Unit	Pollutant	PE2 (lb/day)	Triggers BACT?
S-7844-1-0	1,100 bhp landfill gas-fired IC Engine	NO <sub>x</sub>	9.7	Yes
		SO <sub>x</sub>	1.7	No
		PM <sub>10</sub>	5.8	Yes
		CO	83.4	No
		VOC	8.1	Yes

As shown above, the engine triggers BACT for NO<sub>x</sub>, VOC and PM<sub>10</sub> emissions.

2. BACT Requirements:

District BACT Guideline 3.3.13, which addressed waste gas-fired IC engines subject to permitting requirements, was rescinded on August 22, 2008 and has not been replaced. Therefore, no existing BACT Guideline covers the proposed LFG-fired engine.

NOx emissions:

The NO<sub>x</sub> emissions limit of 0.15 g/bhp.hr proposed in this project is the same limit identified and approved as BACT in projects S-1084435 (Bena Power Producers) and N-1103269 (Ameresco Foothill). Bean Power Producers proposed the use of a NOxTech unit and Ameresco Foothill the use of a selective catalytic reduction system. In the top down BACT analysis for project S-1103269, alternate basic equipment was also evaluated and found to be not technologically feasible (small gas turbines and Sterling engines) or not cost effective (fuel cells). Based on the above discussion, the District considers an emission limit of 0.15 g/bhp.hr to be achieved in practice, with no lower emissions level identified. As the applicant has proposed to meet the most stringent emissions level identified, BACT is satisfied and no further analysis is required.

VOC emissions:

In the previously mentioned projects, VOC controls were also investigated. The cost of fuel cells was shown to be cost prohibitive while the microturbines did not have a greater reduction in emissions than using an engine. The District considers an emission rate of 0.16 g/bhp-hr (equivalent to approximately 38 ppmvd @ 15% O<sub>2</sub>) to be BACT for landfill gas-fired engines. The applicant has proposed to meet at emission concentration of 0.12 g/bhp-hr during normal operation. Therefore, no further analysis was performed.

PM<sub>10</sub> emissions:

The facility is burning low H<sub>2</sub>S content gas. Therefore the particulate emissions will be similar to burning natural gas. The District considers an emission rate of 0.1 g/bhp-hr to be BACT for landfill gas-fired engines (project S-1084435). The proposed engines will be limited to this emission level. Therefore, no further analysis was performed.

**B. Offsets:**

Per Section 4.5.3 of this rule, Offset requirements shall be triggered on a pollutant-by-pollutant basis if the SSPE2 equals or exceeds the following offset threshold levels:

Pollutant	Offset Threshold (POUNDS/YEAR)
VOC	20,000
NO <sub>x</sub>	20,000
CO (non-attainment areas)	30,000
CO (attainment areas)	200,000
SO <sub>x</sub>	54,750
PM <sub>10</sub>	29,200

The facility is located in a CO attainment area and as seen in Section VII.D.2 of this document, the SSPE2 for all pollutants are below offset thresholds. Therefore, offsets are not required for this facility at this time.

**C. Public Notification:**

**1. Applicability:**

Section 5.4 of this rule requires a public notice for the affected pollutants from the following types of projects:

- a. New Major Sources.
- b. Major Modification.
- c. New emissions units with a PE > 100 lb/day of any one pollutant (IPE Notifications).
- d. On a pollutant by pollutant basis, modifications with an SSPE1 below an offset threshold and an SSPE2 above an offset threshold.
- e. New stationary sources with an SSPE2 exceeding offset thresholds (New Facility Offset Threshold Exceeding Notification).



- f. Any permitting action with an SSIPE exceeding 20,000 lb/yr for any one pollutant (SSIPE Notice).

**a. New Major Source Public Notice Determination:**

A new major source is a new source that exceeds the thresholds of Section 3.23.1 of this rule. As shown in Section VII.D.2 above, the facility will not be a major source for any pollutant. Therefore, a new major source public notice is not required.

**b. Major Modification Public Notice Determination:**

As shown in Section VII.D.2 of this document, the facility will not be a major source for any pollutant and a major modification public notice is not required.

**c. PE Public Notice Determination:**

A public notification is required for each new emissions unit with the potential to emit more than 100 pounds per day of any one pollutant. During normal operation, neither of the engines will have potential emissions in excess of 100 pounds per day. Therefore, a PE public notice is not required.

**d. Existing Facility Offsets Threshold Exceedence Public Notice Determination:**

A public notification is required if the SSPE1 for any pollutant is increased from a level below the offset threshold to a level exceeding the emissions offset threshold. This is a new facility. Therefore, an existing facility offsets threshold exceedence public notice is not required.

**e. New Facility Offset Threshold Exceedence Public Notice:**

A public notification is required for a new source if the SSPE2 for any pollutant exceeds the emissions offsets threshold for one or more pollutant. As shown in Section VII.D.2 of this document, the SSPE2 for all pollutants is below the offsets threshold. Therefore, a new facility offset threshold exceedence public notice is not required.

**f. SSIPE Public Notification:**

A public notification is required for any permitting action that results in an SSIPE of more than 20,000 lb/yr for any one pollutant. As shown in Section VII.D.3 of this document, the SSIPE for CO is above 20,000 lb/yr. Therefore, an SSIPE public notice is required.

**D. Daily Emissions Limits (DELs):**

DELs are required for each permit unit per Section 3.15 of this rule. DELs will be listed on the ATC and PTO for each permit unit using a combination of hp ratings and emission factors, or emissions concentrations and fuel flow rates. The following DELs will be used to limit emissions for each of the landfill gas-fired IC engines:

*During start-up periods, the NO<sub>x</sub> emissions rate shall not exceed 0.1 g/bhp-hr. [District Rules 2201 and 4702]*

*During start-up periods, the VOC emissions rate shall not exceed 1.11 g/bhp-hr. [District Rules 2201 and 4702]*

*During start-up periods, the CO emissions rate shall not exceed 4.4 g/bhp-hr. [District Rules 2201 and 4702]*

*Except during start-up periods, the NO<sub>x</sub> emissions rate shall not exceed 11 ppmv @ 15 % O<sub>2</sub>. [District Rules 2201 and 4702]*

*Except during start-up periods, the VOC emissions rate shall not exceed 26 ppmv @ 15% O<sub>2</sub>. [District Rules 2201 and 4702]*

*Except during start-up periods, the CO emissions rate shall not exceed 168 ppmv @15% O<sub>2</sub>. [District Rules 2201 and 4702]*

*The PM<sub>10</sub> emissions rate shall not exceed 0.1 g/bhp-hr. [District Rule 2201]*

*The H<sub>2</sub>S content of the landfill gas shall not exceed 21 ppmvd. [District Rule 2201]*

*The start-up periods shall not exceed a combined total of 0.5 hours in any one day. [District Rule 2201]*

*Ammonia (NH<sub>3</sub>) emissions shall not exceed 11 ppmvd @ 15% O<sub>2</sub>. [District Rule 2201]*

**E. Compliance Assurance:**

1. Source Testing:

a. Source Testing Frequency for NO<sub>x</sub>, CO and VOC:

The landfill gas-fired IC engines are subject to the requirements of Rule 4702. Section 6.3.2.1 of District Rule 4702 requires source testing of NO<sub>x</sub>, CO, and VOC at initial start-up and at least once every 24 months thereafter. However, the District's Source Test Policy (APR 1705) requires source testing at initial start-up and annually thereafter for all pollutants controlled by a catalyst if there is not a rule or regulation that specifies a source testing frequency.

NO<sub>x</sub>, CO and VOC emissions for each of the engines will be controlled by a Noxtech, Inc. Aftertreatment system which will also be the source of ammonia slip. In addition, the Noxtech, Inc. Aftertreatment system has only been used on a limited basis to control emissions from a landfill gas-fired IC engine. Therefore, the District's Source Test Policy is most appropriate for this equipment and the facility will be required to perform a source test for NO<sub>x</sub>, CO and VOC at initial start-up and annually thereafter.

2. Monitoring:

As stated above, the landfill gas-fired IC engines are subject to District Rule 4702. Section 5.6.1 of District Rule 4702 requires the installation of continuous monitoring equipment for NO<sub>x</sub>, CO, and oxygen as identified in Rule 1080 (Stack Monitoring), or install, operate, and maintain APCO approved alternative monitoring.

The District has produced an emissions monitoring policy (SSP 1810) for IC engines that lists pre-approved monitoring procedures that can be used to comply with Section 5.6.1 of Rule 4702. The District's pre-approved monitoring procedure "A" requires the following:

- The monitoring of NO<sub>x</sub>, CO and O<sub>2</sub> emissions using a District approved portable monitor conducted at least once every calendar quarter.
- The monitoring of NO<sub>x</sub>, CO and O<sub>2</sub> emissions using a District approved portable monitor conducted at least once a month for 12 months if a deviation is observed during two consecutive quarterly monitorings.
- Report to the District NO<sub>x</sub> and CO deviations that are outside of the normal range that are not corrected within 8 hours of detection.
- Maintain records of the date and times of NO<sub>x</sub> and CO measurements (corrected to 15% O<sub>2</sub>) and the types of corrective actions taken for deviations outside of the normal range.

Considering the more stringent NSR emissions limits required for the proposed IC engines, the size of the engines, the potential variability of the landfill gas makeup, monitoring once every calendar quarter would not be sufficient to ensure compliance with the permitted emission limits. Therefore, a more frequent monitoring scheme will be required.

The applicant has proposed the following monitoring procedure:

- The monitoring of NO<sub>x</sub>, CO and O<sub>2</sub> emissions conducted in accordance with monitoring procedure "A" except on monthly instead of quarterly.

The District has determined that monitoring the stack NO<sub>x</sub>, CO and O<sub>2</sub> concentrations in accordance with monitoring procedure "A", except on a monthly basis will adequately assure compliance with the requirements of Section 5.6.1 of Rule 4702. Additionally, quarterly monitoring of ammonia slip, and landfill gas H<sub>2</sub>S concentration will be required to assure compliance with Rule 2201 emission limits.

3. Recordkeeping:

The landfill gas-fired IC engines will have specific conditions requiring records of maintenance performed, operational characteristics, and any information necessary to demonstrate compliance with District Rule 2201 and 4702. Records will be required to be kept for a minimum of 5 years and made available for District personnel upon request.

4. Reporting:

The landfill gas-fired IC engines will be required to comply with the reporting requirements of Rule 4702.

### **Rule 4001 New Source Performance Standards (NSPS)**

This rule incorporates by reference the NSPS specified in Title 40 Code of Federal Regulations, Part 60 (40 CFR 60).

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

The proposed engines are rated at over 100 bhp and per section 60.4233(e) are subject to the limits presented in Table 1 of this subpart. The Table 1 limits as well as the proposed emissions are shown on the following table. This regulation does not specify an emissions averaging period.

	<b>Table 1 Limit</b>	<b>Proposed Emissions</b>	<b>Compliant?</b>
NO <sub>x</sub>	3.0 g/bhp-hr, or 220 ppmvd @ 15% O <sub>2</sub>	Start-up = 1.0 g/bhp-hr Steady State = 0.15 g/bhp-hr	Yes
CO	5.0 g/bhp-hr, or 610 ppmvd @ 15% O <sub>2</sub>	Start-up = 4.4 g/bhp-hr Steady State = 1.37 g/bhp-hr	Yes
VOC	1.0 g/bhp-hr, or 80 ppmvd @ 15% O <sub>2</sub>	Start-up = 1.0 g/bhp-hr Steady State = 26 ppmvd @ 15% O <sub>2</sub>	Yes

**40 CFR Subpart WWW**

NSPS Subpart WWW specifies the requirements for landfills above certain size thresholds and which have the potential to emit non-methane organic compounds (NMOC) above a certain threshold. Woodville Landfill (S-3728) is subject to the requirements of Subpart WWW, but Cambrian is a separate stationary source not directly subject to this subpart. However, EPA guidance indicates that LFGTE projects such as this are still required to comply with the NMOC emission limit in this subpart. Both the engines and the flare combust LFG and are subject to the NMOC control requirements in this subpart. The following condition will be included on the ATC to ensure compliance:

- *Either the non-methane organic compound (NMOC) emissions from this landfill gas-fired engine shall not exceed 20 ppmvd (as hexane) at 3% O<sub>2</sub> or the NMOC destruction efficiency shall be at least 98%. [District Rule 2201 and 40 CFR 60.752(b)(2)(iii)(B)]*

**Rule 4101 – Visible Emissions**

As long as the engines are properly maintained and operated, the visible emissions from the engines are not expected to exceed 20% opacity for a period or periods aggregating more than 3 minutes in any one hour. Compliance with the provisions of this rule is expected.

**Rule 4102 – Nuisance**

As long as the engines are properly maintained and operated, the engines are not expected to create a public nuisance and compliance with the provisions of this rule is expected.

**California Health & Safety Code 41700 (Risk Management Review)**

District Policy APR 1905 (Risk Management Policy for Permitting New and Modified Sources) specifies that for an increase in emissions associated with a proposed new source or modification, the District perform an analysis to determine the possible impact to the nearest resident or worksite. The District performed a Risk Management Review (RMR) for this project (see Appendix C).

As shown in the following table, the landfill gas-fired IC engines and associated equipment resulted in a prioritization score of 0.0. Pursuant to District Policy APR 1905, since the prioritization score is less than 1, no further analysis is necessary and Toxic Best Available Control Technology (T-BACT) is not required.

<b>RMR SUMMARY</b>			
<b>Categories</b>	<b>LFG ICE (Unit 1-0)</b>	<b>Project Totals</b>	<b>Facility Totals</b>
<b>Prioritization Score</b>	0.00	0.0	0.0
<b>Acute Hazard Index</b>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
<b>Chronic Hazard Index</b>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
<b>Maximum Individual Cancer Risk (10<sup>-6</sup>)</b>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
<b>T-BACT Required?</b>	No		
<b>Special Permit Conditions?</b>	No		

<sup>1</sup> Cancer risk, Acute and Chronic Hazard Indices were not calculated since the prioritization score was less than 1.0.

**Rule 4201 Particulate Matter Concentration:**

This rule limits the particulate matter emissions rate to less than or equal to 0.1 grain per cubic foot of gas at dry standard conditions.

Source test results for similar lean-burn landfill gas-fired engines show PM concentrations ranging from 0.001 – 0.002 gr/dscf. Therefore, compliance with Rule 4201 is expected.

**Rule 4701 Internal Combustion Engines – Phase 1**

Pursuant to Section 7.5.2.3 of District Rule 4702, District Rule 4701 is no longer applicable to the proposed IC engines.

**Rule 4702 Internal Combustion Engines – Phase 2**

The purpose of this rule is to limit the emissions of nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and volatile organic compounds (VOC) from internal combustion engines. This rule applies to any internal combustion engine with a rated brake horsepower greater than 50 horsepower.

Requirements:

Section 5.1 requires that the owner of an internal combustion engine shall not operate it in such a manner that results in emissions exceeding the limits in the following table:

Engine Type	NO <sub>x</sub>	CO	VOC
<b>1. Rich-Burn</b>			
a. Waste gas fueled	50 ppmv or 90 % reduction	2000 ppmv	250 ppmv
b. Cyclic loaded, field gas fueled	50 ppmv	2000 ppmv	250 ppmv
c. All other engines	25 ppmv or 96 % reduction	2000 ppmv	250 ppmv
<b>2. Lean-Burn</b>			
a. Two stroke, gaseous fueled, less than 100 horsepower	75 ppmv or 85 % reduction	2000 ppmv	750 ppmv
b. All other engines	65 ppmv or 90 % reduction	2000 ppmv	750 ppmv
<b>3. Rich-Burn Engine Used Exclusively in Agricultural Operations</b>			
a. Comply by 1/1/2009, or if owner has an agreement to electrify, comply by 1/1/2010	90 ppmv or 80 % reduction	2000 ppmv	250 ppmv
<b>4. Lean-Burn Engine Used Exclusively in Agricultural Operations</b>			
a. Comply by 1/1/2009, or if owner has an agreement to electrify, comply by 1/1/2010	150 ppmv or 70 % reduction	2000 ppmv	250 ppmv
<b>5. Certified Spark-Ignited Engine Used Exclusively in AO and installed on or before June 16, 2005</b>			
a. Comply by 6/1/2006	Meet Certified Spark-Ignited Engine Standard of HC+NO <sub>x</sub> < 0.6 g/bhp-hr		

The proposed landfill gas-fired IC engines are four stroke lean-burn engines and must meet the emission limits of Section 2.b of the table above.

Normal Operation:

As discussed earlier, the applicant has proposed to meet the following emission limits during the normal operation:

NO<sub>x</sub>: 0.15 g/bhp-hr (11 ppmvd @ 15% O<sub>2</sub>)  
CO: 1.37 g/bhp-hr (168 ppmvd @ 15% O<sub>2</sub>)  
VOC: 0.12 g/bhp-hr (26 ppmvd @ 15% O<sub>2</sub>)

Therefore, the engine is expected to comply with the emission requirements of this Rule.

Monitoring:

Section 5.6.1 requires that the owner of an engine subject to the requirements of Section 5.1 shall comply with the requirements specified in Sections 5.6.1 through 5.6.11.

Section 5.6.1 requires that an engine with a rated brake horsepower of 1,000 hp or greater and which is allowed by Permit-to-Operate, or with an external emissions control device, either install, operate, and maintain continuous emissions monitoring equipment for NO<sub>x</sub>, CO, and oxygen, as identified in Rule 1080 (Stack Monitoring), or install, operate, and maintain APCO-approved alternative monitoring. The applicant has proposed monitoring of NO<sub>x</sub>, CO and O<sub>2</sub> on a monthly basis. Monitoring Scheme A of the District's alternative monitoring policy is quarterly monitoring of NO<sub>x</sub>, CO and O<sub>2</sub>. Therefore, the applicant's alternative monitoring proposal meets the requirements of this section of the rule.

Section 5.6.6 requires the owner to install and operate a nonresettable elapsed operating time meter. In lieu of installing a nonresettable time meter, the owner of an engine may use an alternative device, method, or technique, in determining operating time provided that the alternative is approved by the APCO and is allowed by Permit-to-Operate or Permit-Exempt Equipment Registration condition. The owner of the engine shall properly maintain and operate the time meter or alternative device in accordance with the manufacturer's instructions. The applicant is proposing a non-resettable time meter for each landfill gas-fired IC engine and meets the requirements of this section of the rule.

Section 5.6.7 requires that each engine, implement the Inspection and Monitoring (I&M) plan, if any, submitted to and approved by the APCO pursuant to Section 6.5. The applicant has proposed monitoring of NO<sub>x</sub>, CO and O<sub>2</sub> on a monthly basis. This proposal has previously been approved for other projects. Therefore, the applicant's I&M plan meets the requirements of this section of the rule.

Section 5.6.9 requires that for each engine use a portable NO<sub>x</sub> analyzer to take NO<sub>x</sub> emissions readings to verify compliance with the emissions requirements of Section 5.1 or Section 8.0 during each calendar quarter in which a source test is not performed and the engine is operated. The applicant is proposing to measure NO<sub>x</sub> emissions monthly. Therefore, the applicant's proposal meets the requirements of this section of the rule.



Recordkeeping:

Section 6.2 requires that except for engines subject to Section 4.0, the owner of an engine subject to the requirements of Section 5.1 shall maintain an engine operating log to demonstrate compliance with this rule. This information shall be retained for a period of at least five years, shall be readily available, and be made available to the APCO upon request. The engine-operating log shall include, on a monthly basis, the following information:

- Total hours of operation,
- Type of fuel used,
- Maintenance or modifications performed,
- Monitoring data,
- Compliance source test results, and
- Any other information necessary to demonstrate compliance with this rule.

Section 6.2.2 requires that the data collected pursuant to the requirements of Section 5.7 shall be maintained for at least five years, shall be readily available, and made available to the APCO upon request.

Compliance Testing:

Section 6.3.2.1 requires that the new landfill gas-fired IC engines be source tested at initial start-up and once every 24 months thereafter. The proposed IC engines will be required to be source tested at initial start-up and at least once every 24 months thereafter. Therefore, compliance with this section of the rule is expected.

**Rule 4801 Sulfur Compounds**

Rule 4801 requires that sulfur compound emissions (as SO<sub>2</sub>) shall not exceed 0.2% by volume. The sulfur compound emissions concentration can be determined as follows:

$$\text{concentration} = (\text{hourly SO}_2 \text{ emissions rate}) \\ + \{(\text{molecular weight}) \times (\text{F factor}) \times (\text{heat input}) \times [20.9 / (20.9 - \text{O}_2\%)]\}$$

Where:

hourly SO<sub>2</sub> emissions rate = daily SO<sub>2</sub> emissions rate ÷ (24 hr/day)  
heat input = (fuel flow rate) x (fuel heating value)

hourly SO<sub>2</sub> emissions rate = 1.8 lb/day ÷ 24 hr/day  
hourly SO<sub>2</sub> emissions rate = **0.075 lb/hr**

heat input = (19,833 scf/hr) x (455 Btu/scf) x (MMBtu/10<sup>6</sup> Btu)  
heat input = **9.0 MMBtu/hr**

$$\begin{aligned} \text{concentration} &= (0.075 \text{ lb/hr}) \\ &+ [(64) \times (9,463 \text{ scf/MMBtu}) \times (9.0 \text{ MMBtu/hr}) \times (20.95/5.95)] \\ \text{concentration} &= 3.9 \times 10^{-8} \text{ (0.0039 ppmv)} \end{aligned}$$

Since 0.0039 ppmv is  $\leq$  2,000 ppmv, the engines are expected to comply with Rule 4801.

#### **California Health & Safety Code 42301.6 (School Notice)**

The District has verified that this site is not located within 1,000 feet of a school. Therefore, pursuant to California Health and Safety Code §42301.6, a school notice is not required.

#### **Rule 4002 National Emission Standards for Hazardous Air Pollutants (NESHAP)**

This rule incorporates by reference the NESHAP from 40 CFR 61 and 40 CFR 63. Subpart ZZZZ establishes emission limits and operational limits for stationary reciprocating internal combustion engines located at major sources and area sources of HAP. Since an area source of HAP is any stationary source that is not a major source of HAP, this subpart applies to any stationary reciprocating IC engine. Pursuant to §63.6590(a)(2)(iii), Cambrian's proposal is subject to this Subpart as a new facility at an area source of HAP because they will commence construction on or after June 12, 2006. However, pursuant to §63.6590(c) a new stationary reciprocating IC engine meets the requirements of this subpart by complying with the requirements of 40 CFR 60, Subpart JJJJ for spark ignition engines. Therefore, compliance with Rule 4001 will ensure compliance with Rule 4002, and no further discussion is necessary.

#### **California Environmental Quality ACT (CEQA)**

The California Environmental Quality Act (CEQA) requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The San Joaquin Valley Unified Air Pollution Control District (District) adopted its *Environmental Review Guidelines* (ERG) in 2001. The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities.
- Identify the ways that environmental damage can be avoided or significantly reduced.
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.
- Disclose to the public the reasons why a governmental agency approved the project in

the manner the agency chose if significant environmental effects are involved.

The County of Tulare (County) is the public agency having principal responsibility for approving the Project. As such, the County served as the Lead Agency for the project. Consistent with CEQA Guidelines §15081, a Mitigated Negative Declaration was prepared and certified by the County.

The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381). As a Responsible Agency the District complies with CEQA by considering the Mitigated Negative Declaration prepared by the Lead Agency, and by reaching its own conclusion on whether and how to approve the project (CEQA Guidelines §15096). The District has considered the Mitigated Negative Declaration certified by the County.

The District's engineering evaluation of the project (this document) demonstrates that compliance with District rules and permit conditions would reduce Stationary Source emissions from the project to levels below the District's thresholds of significance for criteria pollutants. Thus, the District concludes that through a combination of project design elements and permit conditions, project specific stationary source emissions will be reduced and mitigated to less than significant levels. The District has determined that no additional findings are required (CEQA Guidelines §15096(h)).

**IX. Recommendation:**

Compliance with all applicable rules and regulations is expected. Issue Authority to Construct permit S-7844-1-0 subject to the permit conditions on the attached final draft Authority to Construct in Appendix A.

**X. Billing Information:**

<b>Billing Schedule</b>			
<b>Permit Number</b>	<b>Fee Schedule</b>	<b>Fee Description</b>	<b>Fee Amount</b>
S-7844-1-0	3020-10-F	1,100 bhp IC engine	\$749.00

**APPENDICES**

- A. Draft Authority to Construct permit (S-7844-1-0)
- B. HRA
- C. Emission Calculations for the Noxtech, Inc. Aftertreatment Start-Up Burner
- D. Letter from Cambrian Energy explaining ownership relationship

# **Appendix A**

## **Draft Authority to Construct permits**

San Joaquin Valley  
Air Pollution Control District

**AUTHORITY TO CONSTRUCT**

ISSUANCE DATE: DRAFT  
**DRAFT**

**PERMIT NO:** S-7844-1-0

**LEGAL OWNER OR OPERATOR:** CAMBRIAN ENERGY WOODVILLE, LLC  
**MAILING ADDRESS:** 624 SOUTH GRAND AVENUE  
SUITE 2420  
LOS ANGELES, CA 90017

**LOCATION:** 21063 AVENUE 128  
PORTERVILLE, CA 93257

**EQUIPMENT DESCRIPTION:**  
1,100 BHP CATERPILLAR MODEL 3516 SITA LANDFILL GAS-FIRED LEAN BURN IC ENGINE POWERING A 850 KW ELECTRICAL GENERATOR AND SERVED BY A NOXTECH EMISSIONS CONTROL UNIT

**CONDITIONS**

1. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
2. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
3. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
4. All equipment shall be maintained in good operating condition and shall be operated per the manufacturer's specifications to minimize emissions of air contaminants into the atmosphere. [District Rule 2201]
5. The engine shall be fired solely on landfill gas. [District Rules 2201 and 4801]
6. This engine shall be equipped with an operational non-resettable elapsed time meter. [District Rules 2201 and 4702]
7. The engine shall be equipped with a fuel flow meter that shall be used to accurately determine and record the fuel flow rate into the engine. [District Rule 2201]
8. The landfill gas flow rate into the engine shall not exceed 475,992 cubic feet per day (19,833 cubic feet per hour). [District Rule 2201]
9. During start-up periods the NOx emission rate shall not exceed 1.0 g/bhp-hr. [District Rules 2201 and 4702]
10. During start-up periods the VOC emission rate shall not exceed 1.1 g/bhp-hr. [District Rules 2201 and 4702]

CONDITIONS CONTINUE ON NEXT PAGE

**YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT.** This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director APCO

**DRAFT**

DAVID WARNER, Director of Permit Services  
S-7844-1-0: Sep 1 2011 11:04AM - KLEVAHND : Joint Inspection NOT Required

11. During start-up periods the CO emission rate shall not exceed 4.4 g/bhp-hr. [District Rules 2201 and 4702]
12. Except during start-up periods, the NOx emission rate shall not exceed 11 ppmv @ 15% O2. [District Rules 2201 and 4702]
13. Except during start-up periods, the VOC emission rate shall not exceed 26 ppmv @15% O2. [District Rules 2201 and 4702]
14. Except during start-up periods, the CO emission rate shall not exceed 168 ppmv @15% O2. [District Rules 2201 and 4702]
15. The PM10 emission rate shall not exceed 0.1 g/bhp-hr. [District Rule 2201]
16. The H2S content of the landfill gas shall not exceed 21 ppmvd. [District Rule 2201]
17. Ammonia (NH3) emissions shall not exceed 11 ppmvd @ 15% O2. [District Rule 2201]
18. Either the non-methane organic compound (NMOC) emissions from the landfill gas-fired engine shall not exceed 20 ppmvd (as Hexane) at 3 % O2 or the NMOC destruction efficiency shall be at least 98%. [District Rule 2201 and 40 CFR 60.752(b)(2)(iii)(B)]
19. The start-up periods shall not exceed a combined total of 0.5 hours in any one day. [District Rule 2201]
20. A start-up period is the amount of time necessary to operate the 1 MMBtu/hr burner serving the Noxtech, Inc. Aftertreatment system to bring the the Noxtech, Inc. Aftertreatment system up to the minimum temperature necessary for the Noxtech, Inc. Aftertreatment system to reduce emissions of NOx to the non-start-up NOx emissions rate required by this permit. [District Rule 2201]
21. The temperature of the Noxtech, Inc Aftertreatment reactor shall be maintained within the manufacturer's suggested range. [District Rules 2201 and 4702]
22. The Noxtech, Inc. Aftertreatment system shall be maintained in accordance with the recommendations of Noxtech, Inc. Records of the Noxtech, Inc. Aftertreatment system maintenance shall be maintained. [District Rules 2201 and 4702]
23. The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]
24. Source testing to measure landfill gas-combustion NOx, CO, NH3, and VOC emissions from this unit shall be conducted within 60 days of initial start-up. [District Rules 1081, 2201, and 4702]
25. Source testing to measure landfill gas-combustion NOx, CO, NH3, and VOC emissions from this unit shall be conducted at least once every 12 months. After demonstrating compliance on two consecutive annual source tests, the unit shall be tested not less than once every 24 months. If the result of the 24-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every 12 months [District Rules 2201 and 4702]
26. {3791} Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]
27. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. VOC emissions shall be reported as methane and as hexane. NOx, and CO concentrations shall be reported in ppmv, corrected to 15% oxygen. VOC concentrations shall be reported in ppmv, corrected to 15% oxygen as methane and corrected to 3% oxygen as hexane. [District Rules 2201, 4702 and 40 CFR 60.752(b)(2)(iii)(B)]

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CONDITIONS CONTINUE ON NEXT PAGE

28. The following methods shall be used for testing: NO<sub>x</sub> (ppmv) - EPA Method 7E or ARB Method 100, CO (ppmv) - EPA Method 10 or ARB Method 100, stack gas oxygen - EPA Method 3 or 3A or ARB Method 100, VOC (ppmv) - EPA Method 18, 25A or 25B, or ARB Method 100, NMOC (ppmv) - EPA Method 18, 25, 25A, or 25C, PM<sub>10</sub> - EPA Methods 201A and 202, stack gas oxygen - EPA Method 3 or 3A or ARB Method 100, and ammonia - BAAQMD ST-1B. EPA approved alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4702 and 40 CFR 60.754(d)]
29. Compliance demonstration (source testing) shall be District witnessed, or authorized and samples shall be shipped under custody transfer and tested by a California Air Resources Board certified testing laboratory. Source testing shall be conducted using the methods and procedures approved by the District. Source testing may occur more frequently than once every 12 months at the discretion of the equipment owner or operator, if such frequency is necessary to schedule source testing during normal operating periods. Any source testing conducted more frequently than required, shall reset the 12-month testing clock. [District Rule 1081]
30. {109} Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]
31. {110} The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]
32. The sulfur compound content of the landfill gas entering this stationary source shall be monitored and recorded monthly. After four consecutive monthly tests show compliance, the monitoring frequency may be reduced to once every calendar quarter. If quarterly monitoring shows an exceedance of the limit, then monthly monitoring shall resume and continue until four consecutive months of monitoring show compliance with the limit. Once compliance with the limit is shown for four consecutive months, then the monitoring frequency may return to quarterly. Monitoring shall not be required in any month during which neither the engines nor the flare operate. Records of monitoring results shall be maintained as required elsewhere in this permit. [District Rule 2201]
33. Monitoring of the landfill gas sulfur compound content shall be performed using Draeger tubes or an alternative method approved in writing by the District. [District Rule 2201]
34. The permittee shall monitor and record the stack concentration of NO<sub>x</sub>, CO, and O<sub>2</sub> concurrently at least once every calendar month (in which a source test is not performed) using a portable emission monitor that meets District specifications. [In-stack O<sub>2</sub> monitors may be allowed if approved by the APCO.] Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within five days of restarting the engine unless monitoring has been performed within the last month. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4702]
35. The permittee shall monitor and record the stack concentration of NH<sub>3</sub> at least once every calendar quarter (in which a source test is not performed). NH<sub>3</sub> monitoring shall be conducted utilizing Draeger tubes or a District approved equivalent method. Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within five days of restarting the engine unless monitoring has been performed within the last month. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rule 2201]
36. If either the NO<sub>x</sub> or CO concentrations corrected to 15% O<sub>2</sub>, as measured by the portable analyzer, or the NH<sub>3</sub> concentrations corrected to 15% O<sub>2</sub>, as measured by District approved gas-detection tubes, exceed the allowable emissions levels, the permittee shall return the emissions to the acceptable level as soon as possible, but no longer than 8 hours of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions levels after 8 hours of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee shall then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of the performing the notification and testing required by this condition. [District Rules 2201 and 4702]

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CONDITIONS CONTINUE ON NEXT PAGE

37. All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the permit-to-operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201 and 4702]
38. The permittee shall maintain records of: (1) the date and time of NO<sub>x</sub>, CO, O<sub>2</sub> and NH<sub>3</sub> measurements, (2) the O<sub>2</sub> concentration in percent and the measured NO<sub>x</sub>, CO, and NH<sub>3</sub> concentrations corrected to 15% O<sub>2</sub>, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH<sub>3</sub> emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]
39. {3797} The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: total hours of operation, type of fuel used, maintenance or modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. [District Rule 4702]
40. {3202} This engine shall be operated and maintained in proper operating condition per the manufacturer's requirements as specified on the Inspection and Monitoring (I&M) plan submitted to the District. [District Rule 4702]
41. {3212} The permittee shall update the I&M plan for this engine prior to any planned change in operation. The permittee must notify the District no later than seven days after changing the I&M plan and must submit an updated I&M plan to the APCO for approval no later than 14 days after the change. The date and time of the change to the I&M plan shall be recorded in the engine's operating log. For modifications, the revised I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit to Operate. The permittee may request a change to the I&M plan at any time. [District Rule 4702]
42. The permittee shall maintain a daily record that includes the date, the hours the engine operated, and the total daily fuel usage in standard cubic feet. [District Rule 2201 and 4702]
43. The permittee shall maintain a record that includes the date, the time that each start-up began, the duration of each start-up, and the total time for all start-up periods for each day. [District Rule 2201]
44. The permittee shall maintain records of the cumulative total annual NO<sub>x</sub>, CO, and VOC emissions from the entire stationary source. These records shall be updated weekly. [District Rule 2201]
45. All records shall be maintained and retained on-site for a minimum of five years, and shall be made available for District inspection upon request. [District Rules 2201 and 4702]

DRAFT



Permit #: S-7844-1-0	Last Updated
Facility: CAMBRIAN ENERGY WOODVILLE, LLC	07/07/2011 KLEVANND

Equipment Pre-Baselined: NO

	<u>NOX</u>	<u>SOX</u>	<u>PM10</u>	<u>CO</u>	<u>VOC</u>
Potential to Emit (lb/Yr):	3541.0	621.0	2117.0	30441.0	2957.0
Daily Emis. Limit (lb/Day)	9.7	1.7	5.8	83.4	8.1
Quarterly Net Emissions Change (lb/Qtr)					
Q1:	885.0	155.0	529.0	7610.0	739.0
Q2:	885.0	155.0	529.0	7610.0	739.0
Q3:	885.0	155.0	529.0	7610.0	739.0
Q4:	885.0	155.0	529.0	7610.0	739.0
Check if offsets are triggered but exemption applies	N	N	N	N	N
Offset Ratio					
Quarterly Offset Amounts (lb/Qtr)					
Q1:					
Q2:					
Q3:					
Q4:					

# **Appendix B**

**HRA**

# San Joaquin Valley Air Pollution Control District Risk Management Review

To: Dan Klevann – Permit Services  
 From: Cheryl Lawler – Technical Services  
 Date: March 14, 2011  
 Facility Name: Cambrian Energy Woodville LLC  
 Location: Teapot Dome Landfill, 21063 Avenue 128, Porterville  
 Application #(s): S-7844-1-0  
 Project #: S-1103547

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 Southern Region

## A. RMR SUMMARY

RMR Summary			
Categories	Landfill Gas ICE (Unit 1-0)	Project Totals	Facility Totals
Prioritization Score	0.00*	0.00	0.00
Acute Hazard Index	N/A	N/A	N/A
Chronic Hazard Index	N/A	N/A	N/A
Maximum Individual Cancer Risk	N/A	N/A	N/A
T-BACT Required?	No		
Special Permit Conditions?	No		

\*The project passed with a prioritization score of less than 1; therefore, no further analysis was required.

### I. Project Description

Technical Services received a request on March 8, 2011, to perform a Risk Management Review for a new landfill gas fired IC engine.

### II. Analysis

Toxic emissions from the engine were calculated using District approved emission factors for landfill gas internal combustion. In accordance with the District's *Risk Management Policy for Permitting New and Modified Sources* (APR 1905-1, March 2, 2001), risks from the proposed project were prioritized using the procedures in the 1990 CAPCOA Facility Prioritization Guidelines and incorporated in the District's HEART's database. The prioritization score for the project was less than 1.0 (see RMR Summary Table). Therefore, no further analysis was necessary.

The following parameters were used for the review:

<b>Analysis Parameters</b>			
<b>Facility Location Type</b>	Rural	<b>Closest Receptor (m)</b>	914.4
<b>Landfill Gas Process Rate (mmscf/hr)</b>	0.0056	<b>Closest Receptor Type</b>	Residence & Business

### **III. Conclusion**

The prioritization score for this project is not above 1.0. In accordance with the District's Risk Management Policy, the project is approved **without** Toxic Best Available Control Technology (T-BACT).

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

# **Appendix C**

## **Emission Calculations for the Noxtech, Inc. Aftertreatment Start-Up Burner**

## Emission Calculations for the Noxtech, Inc. Aftertreatment Start-Up Burner

The following calculations are used to show that the 1.3 MMBtu/hr start-up burner for the Noxtech, Inc. Aftertreatment system is a low emitting unit as defined in District Rule 2020, Exemptions. Section 3.7 defines a Low Emitting Unit as an emissions unit with an uncontrolled emissions rate of each air contaminant less than or equal to two pounds per day, or less than 75 pounds per year if greater than two pounds per day.

### A. Assumptions:

- The maximum operating time will not exceed 0.5 hour per day
- The F-factor, adjusted to 60 °F is 9,604 DSCF/MMBtu
- The fuel heating value is 450 Btu/dscf (as proposed by the applicant)
- All silicon from the from the siloxanes in the fuel will be converted to silicon dioxide (SiO<sub>2</sub>)
- All particulate matter emissions will be from SiO<sub>2</sub>
- All particulate matter emitted is PM<sub>10</sub>
- All sulfur in the sulfur containing compounds of the landfill gas are converted to sulfur dioxide (SO<sub>2</sub>)

### B. Emission Factors:

Noxtech, Inc. Aftertreatment System Post-Project Emission Factors (EF2)	
Pollutant	EF2
NO <sub>x</sub>	90 ppmv @ 15% O <sub>2</sub>
CO	70 ppmv @ 15% O <sub>2</sub>
VOC	5 ppmv @ 15% O <sub>2</sub>

The particulate matter and SO<sub>x</sub> emissions are solely dependent on the landfill gas concentrations of siloxanes and sulfur containing compounds<sup>(2)</sup> respectively. From similar landfill gas projects a reasonable fuel organic silicon content would be 16 ppmv. The applicant states the facility LFG fuel H<sub>2</sub>S content is 21 ppmv.

### C. Equations:

#### 1. For NO<sub>x</sub>, CO and VOC Emissions:

$$PE = (\text{Heat Input}) \times (\text{Emission Concentration}) \times (\text{Molecular Weight}) \times (\text{F Factor}) \\ \times (1 \text{ lb-mol}/379.5 \text{ ft}^3) \times [20.95/(20.95 - \text{O}_2\%)] \times (\text{daily hours of operation})$$

<sup>2</sup> The sulfur containing compounds consists of mostly of H<sub>2</sub>S and a small fraction of mercaptans.

Where:

F Factor:	9,604 scf/MMBtu
Molecular Weight for NO <sub>x</sub> :	46 lb/lb-mole
Molecular Weight for CO:	28 lb/lb-mole
Molecular Weight for VOC:	16 lb/lb-mole

2. For PM<sub>10</sub> Emissions:

Since PM<sub>10</sub> emissions are solely dependent on the fuel organic silicon content, the start-up and steady state emission rates will be the same and the total PM<sub>10</sub> emissions can be determined with a single calculation as follows:

$$PE = (\text{Si concentration in fuel}) \times (\text{fuel flow rate}) \times (\text{lb-mol}/379.5 \text{ ft}^3) \\ \times (28 \text{ lb-Si/lb-mol}) \times (60 \text{ lb-SiO}_2/28 \text{ lb-Si}) \times (24 \text{ hr/day})$$

Where:

$$\text{fuel flow rate} = (\text{heat input}) \div (\text{fuel heating value})$$

3. For SO<sub>x</sub> Emissions:

Since SO<sub>x</sub> emissions are solely dependent on the fuel organic sulfur content, the start-up and steady state emission rates will be the same and the total SO<sub>x</sub> emissions can be determined with a single calculation as follows:

$$PE = (\text{H}_2\text{S concentration in fuel}) \times (\text{fuel flow rate}) \times (\text{lb-mol}/379.5 \text{ ft}^3) \\ \times (34 \text{ lb-H}_2\text{S/lb-mol}) \times (32 \text{ lb-S}/34 \text{ lb-H}_2\text{S}) \times (64 \text{ lb SO}_2/32 \text{ lb S}) \times (24 \text{ hr/day})$$

Where:

$$\text{fuel flow rate} = (\text{heat input}) \div (\text{fuel heating value})$$

**D. Calculations:**

1. For NO<sub>x</sub> Emissions:

$$PE = (1.3 \text{ MMBtu/hr}) \times (90 \text{ ppmv NO}_x) \times (46 \text{ lb/lb-mol}) \times (9,604 \text{ scf/MMBtu}) \\ \times (1 \text{ lb-mol}/379.5 \text{ ft}^3) \times [20.95/(20.95 - 15.0)] \times (0.5 \text{ hours/day})$$

$$PE = 0.2 \text{ lb-NO}_x/\text{day}$$

2. For CO Emissions:

$$\text{PE} = (1.3 \text{ MMBtu/hr}) \times (70 \text{ ppmv CO}) \times (28 \text{ lb/lb-mol}) \times (9,604 \text{ scf/MMBtu}) \\ \times (1 \text{ lb-mol}/379.5 \text{ ft}^3) \times [20.95/(20.95 - 15.0)] \times (0.5 \text{ hours/day})$$

**PE = 0.1 lb-CO/day**

3. For VOC Emissions:

$$\text{PE} = (1.3 \text{ MMBtu/hr}) \times (5 \text{ ppmv VOC}) \times (16 \text{ lb/lb-mol}) \times (9,604 \text{ scf/MMBtu}) \\ \times (1 \text{ lb-mol}/379.5 \text{ ft}^3) \times [20.95/(20.95 - 15.0)] \times (0.3 \text{ hours/day})$$

**PE = 0.005 lb-VOC/day**

4. For PM<sub>10</sub> Emissions:

$$\text{PE}_2 = (16 \text{ Si}/10^6) \times [(1 \times 10^6 \text{ Btu/hr})/(450 \text{ Btu/scf})] \times (\text{lb-mole}/379.5 \text{ ft}^3) \\ \times (60 \text{ lb-SiO}_2/28 \text{ lb-Si}) \times (0.5 \text{ hr/day}) \times (28 \text{ lb-Si/lb-mol})$$

**PE = 0.003 lb-PM<sub>10</sub>/day**

5. For SO<sub>x</sub> Emissions:

$$\text{PE}_2 = (21 \text{ H}_2\text{S}/10^6) \times [(1 \times 10^6 \text{ Btu/hr})/(450 \text{ Btu/scf})] \times (\text{lb-mole}/379.5 \text{ ft}^3) \times (34 \text{ lb-H}_2\text{S/lb-mol}) \\ \times (32 \text{ lb-S}/34 \text{ lb-H}_2\text{S}) \times (64 \text{ lb-SO}_2/32 \text{ lb-S}) \times (0.5 \text{ hr/day})$$

**PE<sub>2</sub> = 0.004 lb-SO<sub>x</sub>/day**

**E. Conclusion:**

As shown in the calculations section above, the uncontrolled emissions rate for each air contaminant does not exceed two pounds per day. Therefore, the Noxtech, Inc. Aftertreatment system's start-up burners are Low Emitting Units



# **Appendix D**

**Letter from Cambrian Energy explaining ownership**

# CAMBRIAN ENERGY DEVELOPMENT, LLC

One Wilshire Building, Suite 2420  
624 South Grand Avenue • Los Angeles, California 90017-3325  
Phone: (213) 628-8312 • Fax: (213) 488-9890

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SEP 29 2010

SJVAPCD  
Southern Region

September 28, 2010

Mr. Dan Klevann  
San Joaquin Valley Air Pollution Control District  
34946 Flyover Court  
Bakersfield, CA 93308-9725

Project Number: S-1103547 – Teapot Dome Landfill

Dear Mr. Klevann:

In response to your question regarding the Teapot Dome Landfill power project ownership control, and responsibilities, this letter has been prepared which addresses: (1) landfill ownership operation and VOC control and monitoring responsibilities; (2) flare control, operation, and monitoring; and (3) engine control, operation, and monitoring. Each section below addresses one of the above-components of the project as it is today. A revised lease has been prepared which would make the ownership arrangements similar to the Woodville Landfill.

## **Teapot Dome Landfill**

The Teapot Dome Landfill (a non-NSPS site) is owned and operated by the County of Tulare and its staff. The collection system is now owned and operated by Tulare County. The teapot Dome lease defines the responsibility of Tulare County to retain environmental compliance for the landfill emissions (landfill gas, VOC emissions, etc.), and the County has the necessary provisions within the landfill gas lease to facilitate this responsibility via the addition of landfill gas wells on the site once the landfill gas enters the landfill, collection systems pipe. Tulare County has the responsibility for the collection and conveyance of landfill gas. Tulare County performs the site monitoring even though the landfill is a non-NSPS site. Tulare County has landfill surface repair and maintenance responsibilities. The facility on which the flare and power equipment are located is separately leased from the County.

## **Teapot Dome**

The Teapot Dome Flare is permitted, owned, operated, and maintained by Tulare County. It is located within a site that has been leased from the County. The flare ownership and permit will probably stay with Tulare County under the new lease.

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### **Teapot Dome Power Plant and Other Facilities**

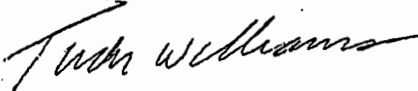
The Cambrian Energy Teapot Dome power plant and other facilities are located within the same site leased by Cambrian Energy Teapot Dome on which the flare is located. Cambrian Energy Teapot Dome pays Tulare County a royalty from energy products created and sold within the leased site.

### **Summary**

Tulare County has maintained landfill control along with fugitive emission (landfill gas, VOCs, etc.) responsibility for the landfill site itself. Cambrian Energy Woodville LLC which will operate the Teapot Dome power project is responsible for the engine operation and emissions within the site it has leased from Tulare County and pays Tulare County a royalty in products generated on the lease site. A revised lease, when approved, will make the site operational conditions similar to the Woodville site with the exception that the flare ownership and permit will probably remain with Tulare County.

Please give me a call if you have any further questions.

Sincerely,



Tudor Williams

TW:lm