



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3199
Plant ID No.:	033-00212
Applicant:	Mountain Cremation Service LLC
Facility Name:	Clarksburg
Location:	Clarksburg
NAICS Code:	812210
Application Type:	Construction
Received Date:	July 7, 2014
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	\$1000.00
Date Received:	July 15, 2014
Completeness Date:	August 7, 2014
Due Date:	November 5, 2014
Newspaper:	<i>The Exponent-Telegram</i>
Applicant Ad Date:	June 5, 2014
UTMs:	Easting: 557.9 km Northing: 4,346.4 km Zone: 17
Description:	This construction permit application is for the construction and operation of pet crematory.

DESCRIPTION OF PROCESS

The proposed crematory retort is a dual chamber design with a primary chamber and a secondary chamber. The animal remains are placed in the primary chamber, where the remains are incinerated. The combustion gases that are released from the incineration process flow from the primary chamber into an integral U-shaped secondary chamber located beneath the primary chamber. Any products of incomplete combustion are oxidized again in the secondary chamber. To promote this oxidation process, additional excess air is added to the secondary chamber with an afterburner to maintain an atmosphere to oxidize these products of incomplete combustion. The temperature of the secondary chamber is continuously monitored and recorded via a thermocouple and controlled at a minimum temperature set point of 1,625⁰F by a closed loop digital process controller. Additional air is added to the chamber if the opacity sensor detects

Promoting a healthy environment.

Non-confidential

smoke, which is located in the exhaust stack. The unit has an interlock that only allows the burner in the primary chamber to ignite if the temperature of the secondary chamber is at or above the minimum set point of 1,625⁰F.

SITE INSPECTION

On August 27, 2014, the writer conducted a site visit of the proposed facility. Mr. Cooke, and Mr. Bolyard of the Mountain Cremation Service LLC, were present during this visit. The proposed site of the crematory is to be inside of garage bay of an existing business located on at 308 Buckhannon Pike in Nutter Fort, WV. This site is located beside an existing residential neighborhood in Clarksburg, WV. The crematory is to be located in the rear of this business, which is currently a garage, with the nearest residential dwelling being approximately 30 feet away from the proximate location of the proposed unit.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The applicant presented potential emission estimates based on emission factors based from actual measured emissions from an identical crematory.

Table #1 – Potential Emissions from an CFS2300 Crematory		
Pollutant	Hourly Rate	Annual Emissions
	lb/hr	TPY
Particulate Matter (PM/PM ₁₀ /PM _{2.5})	0.13	0.57
Sulfur Dioxide (SO ₂)	0.09	0.39
Oxides of Nitrogen (NO _x)	0.34	1.49
Carbon Monoxide (CO)	0.01	0.04
Volatile Organic Compounds (VOCs)	0.005	0.02
Carbon Dioxide Equivalent (CO ₂ e)	175.6	769.33

REGULATORY APPLICABILITY

The following state regulations apply.

45CSR6 - To Prevent and Control Air Pollution From Combustion of Refuse

The purpose of this rule is to prevent and control air pollution from combustion of refuse. The permittee has proposed to install and operate one animal remains crematory. This rule defines incineration as the destruction of combustible refuse by burning in a furnace designed for that purpose. The proposed crematory is designed to destroy animal remains and associated containers through incineration. Thus, it meets this definition.

Per section 4.1, these crematories must meet the particulate matter limit by weight. The animal crematory will have an allowable particulate matter emission rate of 0.27 pounds per hour (based on maximum design-incineration rate of 100 lb/hr). This allowable rate is higher than the estimated hourly potential of 0.13 lb/hr. Thus, the unit should be more than capable of meeting this PM standard.

The crematory is subject to the 20% opacity (visible emission) limitation in section 4.3 of this rule. The opacity and the allowable limits should be met since the crematory is equipped with a secondary chamber with the afterburner, which is designed to reduce the particulate matter and other pollutants entrained in the exhaust stream into products of complete combustion.

The manufacturer calculated the retention time of this crematory to be 1.5 seconds with a secondary chamber temperature of 1,800⁰F. At 1,625⁰F, the retention time would extend to over 2 seconds. The rule of thumb for nearly complete combustion is 1.0-second retention time in the secondary chamber. Thus, this particular crematory should be capable of meeting the applicable limitations of this rule.

45CSR13 - Permits for Construction, Modification, Relocation and Operation of Stationary sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

The potential-to-emit from the proposed crematory is below 6 pounds per hour and 10 tons per year for all of the criteria pollutants, which is less than the permit trigger level as defined in 45CSR§13-2.24.b. However, Rule 6 requires all incinerators to obtain a construction or modification permit regardless of size. Mountain Cremation Service has proposed to install a crematory, which is subject to Rule 6. Therefore, the facility is required to obtain a permit as required in 45CSR§6-6.1. and 45CSR§13-2.24.a. The facility has met the applicable requirements of this rule by publishing a Class I Legal Advertisement in *The Exponent-Telegram* on June 5, 2014, paid the \$1,000.00 application fee, and submitted a complete permit application.

Because of this construction, the Pet Cremation Center will not be classified as a major source of hazardous air pollutants or have the potential to emit 100 tons per year or greater of

any criteria pollutants, which is the Title V major source trigger level. In addition, the emission unit is not subject to a New Source Performance Standard. Thus, the facility is not subject to Title V and will not be required to obtain an operating permit under 45CSR30. Therefore, the Clarksburg facility will be classified as a "9B - Crematory Incinerator" source as defined in 45CSR22.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Only trace amounts of non-criteria regulated pollutants will be emitted from this facility. These are acetaldehyde, arsenic, antimony, beryllium, cadmium, chromium, copper, formaldehyde, hydrogen chloride, lead, and mercury. Only the metals, (i.e. cadmium, chromium, mercury, etc.) and hydrogen chloride would not be controlled by the afterburner (secondary chamber).

Under EPA's IRIS program, hydrogen chloride (hydrochloric acid) has undergone a complete evaluation and determination for evidence of human carcinogenic potential. Reference concentration for chronic inhalation exposure to HCl was determined to be 0.02 mg/cu.m. In general, the reference concentration is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily inhalation exposure of the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. The file contains summaries of the IRIS database information on hydrogen chloride and mercury. For a complete discussion of the known health effects, refer to the IRIS database located at www.epa.gov/iris.

AIR QUALITY IMPACTS ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed construction does not meet the definition of a major source as defined in 45CSR14.

MONITORING OF OPERATIONS

For the purposes of ensuring compliance with the proposed emissions limits and applicable rules, the facility should be required to monitor and keep records of the following:

Weight of each charge/batch per cremation.

Temperature of the secondary chamber on a continuous basis for each crematory.

Proper operation of a crematory or any other incinerator begins with not over loading the unit. Overloading an incinerator beyond the manufacturer's rated capacity usually results in incomplete incineration and/or excess emissions.

Monitoring the secondary chamber temperature is an indicator that the temperature in the secondary chamber is sufficient to ensure complete combustion of products of incomplete combustion such as particulate matter, carbon monoxide, and volatile organic compounds. The applicant proposed operating the secondary chamber at a minimum temperature of 1,600⁰F, which is suggested by the manufacturer. The manufacturer of this unit has program the combustion control not to start firing the primary burner until the temperature of the secondary has reached 1,625⁰F.

This unit is equipped with an opacity controller at the base of the exhaust stack. The purpose of this controller (sensor) is to provide an input to the controller regulating the unit when visible emissions are detected. Then, a signal is sent to the controller to which opens the damper on the combustion air for the afterburner. These actions increase the amount of free oxygen in the secondary chamber, which is need to complete combustion of the unburned particulate in the exhaust. After that, the unit should resume back to normal operations. Setting this opacity controller to 15%, opacity should ensure that the visible emission limit for Rule 6 is not exceeded.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application and the conditions set forth in the permit indicates this pet crematory should meet all applicable state rules and federal regulations when operated. Therefore, this writer recommends that a Rule 13 Construction Permit should be granted to Mountain Cremation Service LLC for their proposed crematory at the Pet Cremation Center in Nutter Fort.

Edward S. Andrews, P.E.
Engineer

Date: September 12, 2014