



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3386
Plant ID No.:	003-00157
Applicant:	Rainbow Bridge Pet Services, LLC
Facility Name:	Inwood
Location:	Inwood, Berkeley County, WV
NAICS Code:	812210
Application Type:	Construction
Received Date:	October 16, 2017
Engineer Assigned:	Thornton E. Martin Jr.
Fee Amount:	\$1,000.00
Date Received:	October 19, 2017
Completeness Date:	November 16, 2017
Newspaper:	<i>The Journal Publishing Company</i>
Applicant Ad Date:	October 19-20, 2017
UTMs:	Easting: 754.64737 km Northing: 4,360.79074 km Zone: 17
Description:	This construction permit application is for the construction and operation of a pet crematory.

DESCRIPTION OF PROCESS *(Taken from the Application)*

This project consists of the construction of one used cremation retort. The proposed unit is a 2006 Crawford C-500 Animal Crematory supplied by B & L Cremation Systems, Inc. It is a dual chamber design with a primary chamber and a secondary chamber fired on Natural Gas. The rated capacity of the incinerator is 50 lb/hr (typical) with a maximum of 75 lb/hr Batch Load Capacity.

Deceased animal remains are manually placed into the primary chamber of the cremator. The door of the cremator is then closed. After the preheat of the afterburning chambers by the auxiliary burner, initial and supplementary combustion is provided by a natural gas fired burner located in the primary chamber of the cremator. Once material combustion is initiated, the rate of the combustion is controlled by limiting both the combustion air and fuel supplied to the primary chamber through the primary burner. This process generates a highly combustible gas mixture that flows into the secondary chamber, where more air is admitted, to ensure further oxidation of the

Promoting a healthy environment.

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gases. The auxiliary burner is installed in the secondary chamber of the cremator to facilitate complete combustion of all gaseous materials entering the chamber.

Once the cremation process is complete, the remains are removed from the primary chamber of the cremator. These remains are placed in urns and returned to the family.

SITE INSPECTION

On August 18, 2017, the Division of Air Quality, Compliance and Enforcement Section of the Eastern Panhandle Regional Office received a complaint regarding an animal crematory located at 272 True Apple Way in Inwood, West Virginia. On August 23, 2017, Inspectors Joseph Kreger and Christopher Scanlan informed the Applicant that the facility could no longer be operated until a Rule 13 Permit for an incinerator was obtained. The facility will be located within 60 feet of the nearest residence and within 100 feet from a nearby church. An application to construct and operate a Crawford C-500 Incinerator was received by the Division of Air Quality on October 16, 2017.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The applicant presented potential emission estimates supplied by B & L Cremation Systems, Inc. The estimates are based on emission factors from AP-42, Fifth Edition, Volume I Chapter 2: Solid Waste Disposal (Tables 2.3-1 and 2.3-2). In addition, actual stack test results from an identical incinerator conducted by an Independent Test Laboratory were submitted as demonstrated emissions of PM₁₀ and CO from a Crawford C-500. The facility will be limited to 8 hours/day, 5 days per week for 52 weeks/year of operation. The incinerator shall not be operated prior to 7AM (including warm-up period), nor after 7PM (including cool-down period) and shall not operate on weekends. The estimated emissions based on 2,080 hours/year of operation are presented in the following table:

Table #1 – Potential Emissions from the Crawford C-500 Animal Crematory		
Pollutant	Hourly Rate	Annual Emissions
	lb/hr	TPY
Particulate Matter (PM/PM ₁₀)	0.18	0.19
Sulfur Dioxide (SO ₂)	0.08	0.08
Oxides of Nitrogen (NO _x)	0.13	0.14
Carbon Monoxide (CO)	0.11	0.11
Volatile Organic Compounds (VOCs)	0.01	0.01

The stack test results indicate that the Crawford C-500 was found to be operating in compliance for all parameters tested.

Particulate emissions averaged 0.0291 grains per standard cubic foot (gr/SCF) of flue gas corrected to seven percent Oxygen (@ 7% O₂) or 0.087 lb/hr. Allowable particulate emissions are 0.1 gr/SCF @ 7% O₂.

Carbon Monoxide averaged 13.6 parts per million (PPM) @ 7% O₂ on a dry basis or 0.02 lb/hr. Allowable CO emissions are 100 ppm @ 7% O₂.

Visible emissions averaged 0.0 percent opacity compared to the 20 percent opacity standard.

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 0.203 pounds per hour (based on maximum design-incineration rate of 75 lb/hr). This allowable rate is higher than the actual test result of 0.087 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 residence time of this crematory to be 8.49 cubic feet @ 1600 °F or 9.0 ft³ for 1 second residence time. At 1800 °F, 9.32 ft³/sec was calculated or 10.0 ft³ for 1 second residence time. 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. Rainbow Bridge Pet Services LLC 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 Journal Publishing Company* on October 19-20, 2017, paid the \$1,000.00 application fee, and submitted a complete permit application. Therefore, the Inwood 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/m³. 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:

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Rainbow Bridge Pet Services LLC
Inwood Facility
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Date and Time each cremation starts and finishes.

Weight of each charge/batch per cremation.

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

Quarterly check to determine if visible emissions are being emitted.

Because of proximity to Church – No weekend cremations.

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 1,600 °F, which is suggested by the manufacturer. The manufacturer of this unit has programmed timers for combustion control not to start firing the primary burner until the temperature of the secondary has reached 1,600⁰F. Operating temperature should be maintained below 2,000⁰F.

This unit is equipped with a continuous temperature monitor and circular chart recorder for the secondary chamber as well as flame failure protection equipment.

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 be granted to Rainbow Bridge Pet Services LLC for their proposed crematory at the Inwood facility.

Thornton E. Martin Jr.
Permit Engineer

November 28, 2017
Date