



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2664A
Plant ID No.: 079-00144
Applicant: Haven of Rest Memory Gardens & Crematorium, Inc.
Facility Name: Faithful Friends Memory Gardens & Crematorium
Location: Red House
NAICS Code: 812210
Application Type: Modification
Received Date: September 17, 2013
Engineer Assigned: Edward S. Andrews, P.E.
Fee Amount: \$1000.00
Date Received: September 18, 2013
Completeness Date: October 18, 2013
Due Date: January 16, 2014
Newspaper: *The Charleston Gazette*
Applicant Ad Date: September 19, 2013
UTMs: Easting: 423.9 km Northing: 4,266.6 km Zone: 17
Description: This modification permit application is for the construction and operation of a B&L BLP-500 crematory at the crematorium.

DESCRIPTION OF PROCESS

This project consists of the construction of one new cremation retort at the crematorium. This crematorium will consist of one B&L Systems Model BLP 500/150 Animal Cremator. The cremation unit will be configured to be fired with natural gas.

Deceased animal remains are manually placed into the primary chamber of the cremator. The door of the cremator is then closed. Once the auxiliary burner completes preheating of the afterburner chamber, natural gas fired burner that is located in the primary chamber of the cremator provides initial and supplementary combustion of the cremation. Once combustion of the remains is initiated, the incineration rate of the remains is controlled by limiting both the

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combustion air and natural gas fuel supplied to the primary chamber through the primary burner. The process generates a highly combustible gas mixture that flows into a secondary chamber where more air is admitted to insure further oxidation of the gases. The auxiliary burner is installed in the secondary chamber of the cremator to facilitate complete combustion of all gaseous materials entering this chamber.

Once the cremation process is complete, the remains are removed from the primary chamber of the cremator. The cremated remains are placed in an urn and returned to the family.

SITE INSPECTION

On October 16, 2013, the writer conducted an announced site visit of the facility. The writer examined the proposed location, which is directly behind the existing unit. The crematorium set by itself on the grounds of the Memory Gardens. The writer deems the site acceptable for this application.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The applicant obtained the following emission estimate for a BLP 500 from the manufacturer. Annual emissions were based on a maximum possible operating schedule of 8,760 hours per year. Included with the application was a performance test report of an identical model unit where particulate matter (PM), carbon monoxide (CO), and visible emissions were measured while the unit loaded with 487 pounds of animal remains. The average measured results were 0.031 pounds of PM per hour, and 0.007 pounds of CO per hour with no visible emissions were observed during the testing.

Table #1 – Potential Emission form a B&L BLP 500/150 Crematory		
Pollutant	Hourly Rate	Annual Emissions
	lb/hr	TPY
Particulate Matter (PM/PM ₁₀ /PM _{2.5})	0.14	0.61
Sulfur Dioxide (SO ₂)	0.11	0.48
Oxides of Nitrogen (NO _x)	0.38	1.66
Carbon Monoxide (CO)	0.012	0.05
Volatile Organic Compounds (VOCs)	0.003	0.01

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 an animal crematory. This rule defines incineration as the destruction of combustible refuse by burning in a furnace designed for that purpose. The proposed crematory is specifically designed to destroy animal remains through incineration. Thus, it meets this definition.

Per section 4.1, these crematories must meet the particulate matter limit by weight. The crematory will have an allowable particulate matter emission rate of 0.20 pounds per hour (based on maximum design-incineration rate of 150 lb/hr). This allowable rate is slightly higher than the estimated hourly potential of 0.14 lb/hr. Measured results from the provided report that the PM emissions were at a rate of 0.031 pounds per hour, which is 15% of the allowable standard. 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 writer calculated the retention time of this crematory to be 4.0 seconds with a secondary chamber temperature of 1,600⁰F. The manufacturer has selected the location of the thermocouple in the secondary chamber to be 19 cubic feet from the afterburner or 1 second at 1,800⁰F down stream of the burner. The firing rate of the secondary burner will be adjusted based on the output signal from the thermocouple, a burner controller to maintain the desired set point temperature of 1,600⁰F. Thus, this particular crematory should be capable of meeting the applicable limitations of this rule.

In addition to the design afterburner system, this particular unit will be equipped with a visible emission alarm (VEA) system. This system is designed to continuously monitor if visible emissions are at or above an undesired degree of opacity. Once detected, the system sets off a audible and visible alarm warning the operator to take action to avoid excess visible emissions.

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 crematories are 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 be required to obtain a construction or modification permit regardless of size. Haven of Rest 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 Charleston Gazette* on September 19, 2013, paid the \$1,000.00 application fee, and submitted a complete permit application.

This modification will not make the Red House facility a major source of hazardous air pollutants. In addition, the emission unit is not subject to a New Source Performance Standard. The only standard that might be applicable is Subpart EEEE, Part 60. 40 CFR§60.2887(l) of Subpart EEEE specifically excludes incinerators that consume at least 90% pathological waste. Pathological waste includes animal remains. The applicant has not indicate that the crematory will be used to destroy any other types of wastes. Therefore, this exclusion remains in effect for this emission unit. Thus, the facility is not subject to Title V and will not be required to obtain an operating permit under 45CSR30. Therefore, the Red House facility will remain 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 or destroyed by the afterburner (secondary chamber).

AIR QUALITY IMPACTS ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed modification will not make the facility 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 crematory.

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. In support of this suggested temperature, the manufacturer provided test data with the temperature of secondary chamber set at 1,600⁰F. This report indicted the PM rate was 0.03 lb per hour, which is significantly less than the allowable under Rule 7.

This unit is equipped with an opacity detector at the base of the exhaust stack. The purpose of this controller (sensor) is to notify the operator when visible emissions are detected at or above the undesired set point. The B&L recommends setting the alarm set point at 10% opacity, which is half of the allowable 20-% standard, which should allow the operator sufficient time to make the necessary adjustments to the unit to prevent excess emission from occurring. Recording the date, length of the event, and operator action if required are reasonable requirements to be incorporated into the permit. This form of monitoring is more stringent then conducting quarterly visible emission checks.

CHANGES TO PERMIT R13-2664

Permit R13-2664 covers a B&L Model N-20 Cremation retort. This permitted crematory is equipped with the same opacity controller as the proposed unit. The writer recommends adopting the requirements for these opacity alarm systems for both units and setting the system at 10% opacity, which is 50% of the allowable under Rule 6, and would ensure the unit should be operated in compliance at all times.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application and the conditions set forth in the permit indicates this proposed B&L BLP 500 crematory should meet all applicable state rules and federal regulations when operated in accordance with the manufacturer's recommendations. Therefore, this writer recommends that a Rule 13 Modification Permit should be granted to Haven of Rest Memory Gardens & Crematorium Inc. for their proposed additional crematory at the Red House facility.

Edward S. Andrews, P.E.
Engineer

Date: October 18, 2013

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