



west virginia department of environmental protection

Division of Air Quality
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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3268A
Plant ID No.:	107-00183
Applicant:	Leavitt Funeral Home, Inc.
Facility Name:	Seventh Street Parkersburg
Location:	Parkersburg, Wood County, WV
NAICS Code:	812210
Application Type:	Modification
Received Date:	March 4, 2016
Engineer Assigned:	Caraline Griffith
Fee Amount:	\$1000.00
Date Received:	March 7, 2016
Completeness Date:	March 14, 2016
Due Date:	June 13, 2016
Newspaper:	<i>The Parkersburg News and Sentinel</i>
Applicant Ad Date:	March 8, 2016
UTMs:	Easting: 451.92 km Northing: 4,346.38 km Zone: 17S
Description:	This modification permit application is for the installation and operation of an animal crematorium at the Seventh Street Parkersburg facility.

DESCRIPTION OF PROCESS

The Facultatieve Technologies ISI 60 Animal Cremator is designed to burn animal remains. Its automatic controls will function to cremate efficiently with the minimum of operator intervention. It is designed to operate in compliance within the emission legislation outlined by the West Virginia Department of Environmental Protection – Division of Air Quality.

Below you will find a basic description of the operation of a Facultatieve Technologies animal cremator.

The Facultatieve Technologies ISI 6 Animal Cremator is a multiple chamber design (primary and secondary) and in the case of Leavitt Funeral Home, Inc. will be fired with natural

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gas as auxiliary fuel. The cremator has a nominal burn rate of 140 lbs per hour with a maximum batch size of 700 lbs. of animal cadavers. The cremator is designed for manual single batch loading.

The standard process of cremation for animal cadavers in a Facultatieve Technologies cremator is to preheat the machine with the secondary chamber (afterburner) reaching a controlled temperature of not less than 1600 degrees Fahrenheit and the primary chamber is set at ambient temperature. Once these parameters have been met the computerized touch screen instructs the operator to charge the cremator with the animal cadaver into the primary chamber. The operator will then open the door via automated controls, charge the animal cadaver and then close the door of the primary chamber. All functions of the loading process are controlled by the onboard computer/PLC controller. The cremator has a sight glass where the operator can observe the cremation process and thus determine when the complete cremation process has been fully completed. Upon completion of the cremation process the operator opens the primary chamber door and moves the cremated remains into a cooling area for final disposition. The design of the Facultatieve Technologies ISI 60 Animal Cremator is to cooldown the primary chamber for approximately 60 minutes to a maximum temperature of 600 degrees Fahrenheit prior to the charging of the next animal cadaver. In addition, the process design of the Facultatieve Technologies cremator is to use the animal cadaver as the primary fuel source and only use natural gas to supplement the cremation process. Once the machine's refractory is superheated the use of gas to perform the cremation process is virtually non-existent. The only gas used is in the secondary chamber (afterburner) to maintain the regulated temperature of 1600 degrees Fahrenheit required by WV DEP – DAQ. The sum effect of this design is drastically reducing emissions.

As stated above, the Facultatieve Technologies is a multi-chamber cremator with a primary chamber where the cremation takes place and then a secondary chamber where destruction of emissions occur.

The primary chamber is approximately 70 cubic feet with a burner located in the top of the hearth area. This burner is designed to modulate between low and high fire with a capacity of 750,000 BTU/hr. The temperatures in the primary chamber are controlled by the use of a temperature probe and PLC logic.

The secondary chamber is approximately 150 cubic feet in volume with a burner located in the rear wall. The unique design of the secondary chamber uses a serpentine baffle system to ensure that emissions from the primary chamber have ample time for destruction with a minimum of 1-second retention time prior to reaching the flue stack. As in the primary chamber the burner modulates between low and high fire with a capacity of 1.5 mmBTU/hr. The temperatures in the primary chamber are controlled by the use of a temperature probe and PLC logic.

The exhaust stack is estimated to have a total overall height of 28 feet above grade level.

SITE INSPECTION

Doug Hammell of the DAQ compliance and enforcement section inspected the site on September 21, 2015. At the time of the inspection, the current building was to be torn down and replaced with a new building to house the new proposed crematory. Mr. Hammell said the site was appropriate for such a facility.

Directions to Facility:

From I-50 exit Division Street/WV-14/WV-95 toward Camden Avenue. Turn Right onto Avery Street. Turn right onto 7th Street. 414 7th Street is on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

With the submitted application for the human cremator, Facultative Technologies included a complete compliance test report of a FT II located in Providence, Rhode Island. The pollutants measured during these stack tests were filterable particulate matter and metal, Chromium being the only metal detected. This particular demonstration was conducted using U.S. EPA Methods, 1-5, 3A, 10 and 29. Over a two-day period, February 5-6, 2015, four test runs were done to calculate emissions. Average measured particulate matter rate between the four runs was 0.1508 pounds per hour. Chromium had an average of 6.74e-5 pounds per hour.

With the submitted application for the animal cremator, Facultative Technologies included firing test data conducted on January 13, 2012 for thermal NO_x with a full evaluation corrected to 3% Oxygen. Estimated normal emissions were taken from a test conducted in March of 2011 on a similar unit. All results were then normalized to 11% dry gas Oxygen. PM was calculated using a concentration of 0.0814 grains/scf. All calculations were done for the animal cremator assuming annual usage of 2,080 hours per year (running 8 hours a day, 5 days a week for 52 weeks).

Emission Unit ID	Emission Unit Description	Pollutant	lb/hr	TPY
1S	Facultative Technologies FT II Human Cremator	Particulate Matter (PM)	0.30	0.26
		Nitrogen Oxides (NO _x)	1.35	1.15
		Carbon Monoxide (CO)	0.27	0.23

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		Sulfur Dioxide (SO ₂)	0.53	0.45
		Hydrochloric Acid (HCl)	0.53	0.45
		Volatile Organic Compounds (VOC)	0.50	0.50
2S	Facultatieve Technologies ISI 60 Animal Cremator	Particulate Matter (PM)	0.16	0.15
		Nitrogen Oxides (NO _x)	0.25	0.24
		Carbon Monoxide (CO)	0.81	0.08
		Sulfur Dioxide (SO ₂)	0.16	0.15
		Hydrochloric Acid (HCl)	0.16	0.15
		Volatile Organic Compounds (VOC)	0.02	0.02

Pollutant	Emission Limitations R13-3268 (TPY)	Emission Limitations R13-3268A (TPY)	Change in Emissions (TPY)
Particulate Matter (PM)	0.26	0.41	+0.15
Nitrogen Oxides (NO _x)	1.15	1.39	+0.24
Carbon Monoxide (CO)	0.23	0.31	+0.08

Sulfur Dioxide (SO ₂)	0.45	0.60	+0.15
Hydrochloric Acid (HCl)	0.45	0.60	+0.15
Volatile Organic Compounds (VOC)	0.50	0.52	+0.02

REGULATORY APPLICABILITY

The following state regulations apply.

45CSR4 – To Prevent and Control the Discharge of Air Pollutants Into the Open Air Which Causes or Contributes to an Objectionable Odor or Odors

The purpose of this rule is to prevent and control any discharge that may cause or contribute to objectionable odors. The Leavitt Funeral Home, Inc. Seventh Street Parkersburg Facility will not be emitting any objectionable odors now or in the future.

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 human 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 human 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 human crematory will have an allowable particulate matter emission rate of 0.87 pounds per hour (based on maximum design-incineration rate of 320 lb/hr). This allowable rate is higher than the estimated hourly potential of 0.30 lb/hr. Thus, the unit should be more than capable of meeting this PM standard.

The animal crematory has an allowable PM emission rate of 0.38 lb/hr. This allowable rate is higher than the estimate hourly potential of 0.16 lb/hr. Thus, this unit should be more than capable of meeting the PM standard.

The crematories are 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 crematories are 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. It is estimated that at any given time during the incineration process the minimum retention time will be 2.0 seconds. The rule of thumb for nearly complete combustion is 1.0-

second retention time in the secondary chamber. Thus, these particular crematories should be capable of meeting the applicable limitations of this rule.

45CSR13 - Permits for Modification, 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. Leavitt Funeral Home, Inc. 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 Parkersburg News and Sentinel* on March 8, 2016, paid the \$1,000.00 application fee, and submitted a complete permit application.

As a result of this Modification, the Seventh Street Parkersburg facility will not be classified as a major source of hazardous air pollutants or major source under Title V. 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 Seventh Street Parkersburg facility will remain classified as a "9B - Crematory Incinerator" source as defined in 45CSR22.

45CSR22 Air Quality Management Fee Program

This facility is a minor source and not subject to 45CSR30. Leavitt Funeral Home, Inc. is required to keep their Certificate to Operate current. They paid the \$1000 fee associated with a Rule 13 permit application.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

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.

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AIR QUALITY IMPACTS ANALYSIS

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

MONITORING OF OPERATIONS

The manufacturer has equipped the human cremator with a personal computer based control system which includes a data logging function. The system is capable of monitoring the oxygen content of the flue gas, and the temperatures in the both the primary and secondary chambers. Other monitoring that is needed for this type of unit is the weight of each cremation.

The manufacturer has equipped the animal cremator with a fully automatic control system that is temperature based. There are digital temperature controllers that sense the temperature in each combustion chamber and then automatically control the gas and air. Other monitoring that is needed for this type of unit is the weight of each cremation.

Monitoring the secondary chamber temperature of the human cremator and the animal cremator is an indicator that the temperature in the secondary chamber is sufficient to ensure complete combustion of the products of incomplete combustion such as particulate matter, carbon monoxide, and volatile organic compounds. The applicant proposed operating the secondary chamber of both units at a minimum temperature of 1,600⁰F, which is suggested by the manufacturer.

An annual operational limit of 3,000 hours per year for the human cremator was proposed in the application. This limit is not required. Without the limit, the maximum predicted emissions rate of NO_x on an annual basis is still below the operational restrictions definition of a “stationary source” under Rule 13.

An annual operational limit of 2,080 hours per year for the animal cremator was proposed in the application. This limit is not required. Without the limit, the maximum predicted emissions rate of NO_x on an annual basis is still below the operational restrictions definition of a “stationary source” under Rule 13.

To ensure compliance with the visible emission standard of Rule 6, the writer proposes requiring visible emission checks to be conducted once every quarter.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application and the conditions set forth in the permit indicates the ISI 60 animal cremator should meet all applicable state rules and federal regulations when operated. Therefore, this writer recommends that a Rule 13 Modification Permit should be granted to Leavitt Funeral Home, Inc. for their proposed crematory at the Seventh Street Parkersburg facility.

Caraline Griffith
Permit Engineer

Date