west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3268
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:	Construction
Received Date:	August 28, 2015
Engineer Assigned:	Caraline Griffith
Fee Amount:	$1000.00
Date Received:	September 1, 2015
Completeness Date:	September 16, 2015
Due Date:	December 16, 2015
Newspaper:	*The Parkersburg News and Sentinel*
Applicant Ad Date:	September 7, 2015
UTMs:	Easting: 451.92 km Northing: 4,346.38 km Zone: 17S
Description:	This construction permit application is for the installation and operation of a human crematorium at the Seventh Street Parkersburg facility.

DESCRIPTION OF PROCESS

The Facultatieve Technologies FT II Cremator is designed to burn human remains. Its automatic controls will function to cremate efficiently with the minimum of operator intervention.

The Facultative Technologies FT II Cremator is a multiple chamber design (primary and secondary) and in the case for this proposed unit will be fired with natural gas as auxiliary fuel. The cremator has a nominal burn rate of 150 – 200 pounds per hour of human cadavers. The cremator is designed with an automated loading system allowing single batch loading.

The standard process of cremating human cadavers in a Facultatieve Technologies cremator is to preheat the machine with secondary chamber (afterburner) reaching a controlled temperature of not less than 1600^0F and the primary chamber reaching a minimum temperature of 1035^0F. Once these parameters have been reached, the operator is instructed that the cremator is ready to process a cremation. At the time, the operator instructs the machine via the computerized touch screen to charge (automatically place into the primary chamber) the cadaver. The primary chamber door automatically opens and the cadaver is delivered via the automated loader into the cremation chamber. The door then closes and the cremation process begins with automatic control process of all functions via the onboard computer/Programmable Logical Controller (PLC). Typical process times average 72 minutes and the cremator has a sight glass where the operator can observe that the cremation process has 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 FT II cremator is to immediately charge the next cadaver into the primary chamber immediately after the cremated remains have been moved to the cooling area. No cool down period is required and thus less requirements for excess fuel usage (cooling and reheating the system) and reduction of emissions from the cremator. In addition, the process design of the FT cremator is to the use human cadaver as the primary fuel source and only uses natural gas to supplement the cremation process. Once the cremator refractory is super-heated, the use of natural 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 1600^0F.

SITE INSPECTION

Doug Hammell of the DAQ compliance and enforcement section inspected the site on September 21, 2015. The current building is 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 1-50 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, 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.

Table #1 Emission Units Estimated Potential to Emit				
Emission Unit ID	Emission Unit Description	Pollutant	lb/hr	TPY
1S	Facultatieve Technologies FT II Cremator	Particulate Matter (PM)	0.30	0.26
		Nitrogen Oxides (NO_x)	1.35	1.15
		Carbon Monoxide (CO)	0.27	0.23
		Sulfur Dioxide (SO_2)	0.53	0.45
		Hydrochloric Acid (HCl)	0.53	0.45
		Volatile Organic Compounds (VOC)	0.50	0.50

Table #2 Facility Potential to Emit (PTE)		
Pollutant	Emission Limitations lb/hr	Emission Limitations TPY
Particulate Matter (PM)	0.30	0.26
Nitrogen Oxides (NO_x)	1.35	1.15
Carbon Monoxide (CO)	0.27	0.23
Sulfur Dioxide (SO_2)	0.53	0.45
Hydrochloric Acid (HCl)	0.53	0.45
Volatile Organic Compounds (VOC)	0.50	0.50

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 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. 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, this particular crematory 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 September 7, 2015, paid the $1,000.00 application fee, and submitted a complete permit application.

As a result of this Construction, 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

Chromium

Chromium occurs in the environment primarily in two valence states, trivalent chromium (Cr III) and hexavalent chromium (Cr VI). Exposure may occur from natural or industrial sources of chromium. Chromium III is much less toxic than chromium (VI). The respiratory tract is also the major target organ for chromium (III) toxicity, similar to chromium (VI). Chromium (III) is an essential element in humans. The body can detoxify some amount of chromium (VI) to chromium (III).

The respiratory tract is the major target organ for chromium (VI) toxicity, for acute (short-term) and chronic (long-term) inhalation exposures. Shortness of breath, coughing, and wheezing were reported from a case of acute exposure to chromium (VI), while perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, and other respiratory effects have been noted from chronic exposure. Human studies have clearly established that inhaled chromium (VI) is a human carcinogen, resulting in an increased risk of lung cancer. Animal studies have shown chromium (VI) to cause lung tumors via inhalation exposure.

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 Modification does not meet the definition of a major source as defined in 45CSR14.

MONITORING OF OPERATIONS

The manufacturer has equipped this unit 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.

Monitoring the secondary chamber temperature 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 at a minimum temperature of 1,600^{0}F, which is suggested by the manufacturer.

An annual operational limit of 3,000 hours per year for the crematory 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 this FT II 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
Caraline Griffith
Permit Engineer

11/16/15
Date