west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3329
Plant ID No.:	039-00672
Applicant:	Elk Valley Pet Crematorium, LLC
Facility Name:	Big Chimney
Location:	Big Chimney, Kanawha County, WV
NAICS Code:	812210
Application Type:	Construction
Received Date:	June 30, 2016
Engineer Assigned:	Thornton E. Martin Jr.
Fee Amount:	$1000.00
Date Received:	July 05, 2016
Completeness Date:	July 27, 2016
Newspaper:	*Charleston Gazette Mail*
Applicant Ad Date:	July 08, 2016
UTMs:	Easting: 454.494 km Northing: 4,248.5195 km Zone: 17
Description:	This construction permit application is for the construction and operation of a pet crematory.

DESCRIPTION OF PROCESS

The proposed unit is a Therm-Tec Model S-27 Small Animal Crematory. It is a dual chamber design with a primary chamber and a secondary chamber. The rated capacity of the incinerator is 85 lb/hr with a maximum of 400 lb Batch Load Capacity. 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 secondary chamber located above 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 afterburner (control chamber) consists of a vertical combustion chamber sitting on top of the primary chamber. The afterburner has two distinct auxiliary combustion air zones, each with six air injectors installed for tangential air injection, creating cyclonic air flow to assure complete mixing of the exhaust gas with the combustion air. The

auxiliary combustion air volume is controlled by modulating the air damper based on afterburner temperature. Therm-Tec, Inc. specifies a combustion efficiency of 99.995%.

SITE INSPECTION

The site was recently visited by Gene Coccari, Environmental Resource Analyst for the Division of Air Quality's Small Business Assistance Program. During his visit, he noted: I have been to the Elks Hills Memorial Park on Rt. 119, one half mile above Big Chimney. They have not started construction at this time. The location of the crematory sets just outside the cemetery (Southeast portion) on land owned by the applicant. The nearest residence is also owned by the applicant and will be approximately 50 feet away from the proposed unit. The site appears suitable for a pet crematory. The crematory is to be located in the rear portion of a garage to be constructed.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The applicant presented potential emission estimates based on emission factors from AP-42 and "FIRE 6.22" (U.S. EPA Emissions Factors Program). In addition, actual stack test results from an identical crematory conducted by an Independent Test Laboratory were submitted as emission estimates for PM_{10} and CO. The estimates are presented in the following table:

Table #1 – Potential Emissions from the Therm-Tec Model S-27 Small Animal Crematory

Pollutant	Hourly Rate	Annual Emissions
	lb/hr	TPY
Particulate Matter (PM/PM_{10})	0.07	0.07
Sulfur Dioxide (SO_2)	0.11	0.11
Oxides of Nitrogen (NO_x)	0.13	0.13
Carbon Monoxide (CO)	0.007	0.01
Volatile Organic Compounds (VOCs)	0.13	0.13

The applicant published their Class I Legal Notice conservatively with the potential to discharge the following Regulated Air Pollutants:

CO – 0.01 TPY
NOx – 0.2 TPY
PM_{10} – 0.1 TPY
SO_2 – 0.2 TPY
VOC's – 0.2 TPY
PM – 0.2 TPY

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 0.23 pounds per hour (based on maximum design-incineration rate of 85 lb/hr). This allowable rate is higher than the actual test result of 0.07 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 1.3 seconds with a secondary chamber temperature of 1,400^{0}F. 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. Elk Valley Pet Crematorium, 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 *Charleston Gazette Mail* on July 08, 2016, paid the $1,000.00 application fee, and submitted a complete permit application.

Because of this construction, the Elk Valley Pet Crematorium 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 1,400^{0}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 1,400^{0}F. Operating temperature should be maintained below 2,000^{0}F.

This unit is equipped with a digital display of temperature for the primary and secondary chambers.

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 Elk Valley Pet Crematorium, LLC for their proposed crematory at the Elk Hills Memorial Park in Big Chimney.

Thornton E. Martin Jr.
Permit Engineer

July 27, 2016
Date