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west virginia department of environmental protection

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## ENGINEERING EVALUATION / FACT SHEET

### BACKGROUND INFORMATION

Application No.:	R13-2371C
Plant ID No.:	039-00481
Applicant:	Cooke & Pauley Funeral Home, Inc.
Facility Name:	Nitro
Location:	Nitro
NAICS Code:	812210
Application Type:	Modification
Received Date:	July 13, 2015
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	\$1000.00
Date Received:	July 14, 2015
Completeness Date:	August 11, 2015
Due Date:	November 9, 2015
Newspaper:	<i>The Daily Mail</i>
Applicant Ad Date:	July 10, 2015
UTMs:	Easting: 426.5 km    Northing: 4,252.8 km    Zone: 17
Description:	This modification permit application is for installation of a pet crematory at the facility.

### DESCRIPTION OF PROCESS

#### **Facultatieve Technologies FT ISI Cremator (Animal Crematory)**

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

The Facultatieve Technologies FT ISI 60 Animal Cremator is a multiple chamber design (primary and secondary) and in the case of Cooke Funeral Home & Crematory will be fired with natural 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

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batch loading. The standard process of cremation for an animal cadaver in a Facultatieve Technologies cremator is to preheat the machine with the secondary chamber (afterburner) reaching a controlled temperature of not less than 1600°F and the primary chamber is set at ambient temperature. Once these parameters have been met, the operator is instructed that the cremator is ready to process a cremation. The operator then opens the primary chamber door loads the animal cadaver into the cremation chamber. The door then closes and the cremation process begins with automatic control of all functions via preset timers located on the control panel. The operator can observe the cremation process via the sight glass in the primary chamber door. 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 FT ISI 60 Animal Cremator is to cool down the primary chamber for approximately 60 minutes to a maximum temperature of 600°F prior to charging 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 machines 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°F.

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 cu. ft. with a burner located in the top of the hearth area. This burner is designed to modulate between low and high fire with a maximum capacity of 750,000 MMBTU/hr. The temperatures in the primary chamber are controlled by the use of a temperature probe.
- The Secondary Chamber is approximately 150 cu. ft. 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. The primary chamber burner modulates between low and high fire with a capacity of 1.2 MMBTU/hr. The temperatures in the primary chamber are controlled by the use of a temperature probe.

## SITE INSPECTION

On January 30, 2015, Mr. Joshua Woody, P.E., an engineer assigned to the Compliance & Enforcement Section, conducted a routine compliance inspection of the facility. Mr. Woody found the facility to be operating within compliance with Permit R13-2371B. Thus, a site inspection for this proposed modification was determined not to be necessary.

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## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Facultatieve Technologies has collected emission data on their machines over the years. Facultatieve Technologies used the emission data to develop an emission inventory for their customers or potential customers. This emissions inventory was included in the application. The data in this inventory were based on cremators operating in the United Kingdom (UK). The provided emission inventory was standardized to 0°C at 11% oxygen. To make better comparison to other cremators permitted in the United States, the writer corrected these emission rates to standard temperature and 0% oxygen content. These emission rates were projected on an operating schedule of 2,080 hours per year. The writer annualized them based on no restriction in the annual operating schedule. These estimates are presented in the following table.

Pollutant	Hourly Emissions lb/hr	Projected Annual Tons per year	Maximum Potential Tons per year
Hydrogen Chloride (HCL)	0.34	0.35	1.49
Particulate Matter (PM <sub>10</sub> )	0.34	0.36	1.49
Carbon Monoxide (CO)	0.17	0.18	0.74
Oxides of Nitrogen (NO <sub>x</sub> )	0.34	0.35	1.49
Sulfur Dioxide (SO <sub>2</sub> )	0.34	0.35	1.49
Volatile Organic Compounds (VOCs)	0.03	0.03	0.13
Carbon Dioxide Equivalent (CO <sub>2</sub> e)	263.47	274.01	1,154.00

## 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 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 0.38 pounds per hour (based on maximum design-incineration rate of 140 lb/hr). This allowable rate is higher than the

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estimated hourly potential of 0.34 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 designed and sized the secondary chamber to achieve a retention time of no less than 1-second retention time at 1,800<sup>0</sup>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 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. Cooke & Pauley 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 Daily Mail* on July 11, 2015, paid the \$1,000.00 application fee, and submitted a complete permit application.

As a result of this Modification, the Nitro 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 Nitro 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 by the afterburner (secondary chamber). The facility has been operating

## 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 chart recorder to record the temperature in the primary and secondary chambers continuously. 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<sup>0</sup>F, which is suggested by the manufacturer.

An annual operational limit of 2,080 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<sub>x</sub>, SO<sub>2</sub>, and PM on an annual basis is 1.49 tons per year (See Table #1). This annual rate without any operational restrictions is below the definition of a “stationary source” under Rule 13.

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

## CHANGES TO R13-2371A

A separate condition was added for the specific requirements for the new animal cremator. The existing permit had requirements monitoring the secondary temperature, charge weight, start/end times of each cremation, and quarterly visible emission checks. The existing monitoring conditions (4.2.1. & 4.2.2.) were revised to include the new condition for this proposed animal cremator. No other changes to the permit were proposed.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application and the conditions set forth in the permit indicates this Facultatieve Technologies FT ISI 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 Cooke & Pauley Funeral Home, Inc. for their proposed crematory at the Nitro facility.



Edward S. Andrews, P.E.  
Engineer

Date: August 24, 2015