



west virginia department of environmental protection

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Jim Justice, Governor
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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2212E
Plant ID No.:	003-00023
Applicant:	Valley Pet Memorial Services, Inc. (Valley), formerly Green Lawn Cemetery Company
Facility Name:	Hedgesville (Bedington Site)
Location:	Hedgesville, Berkeley County, West Virginia
NAICS Code:	812220
Application Type:	Modification
Received Date:	September 01, 2017
Engineer Assigned:	John Legg
Fee Amount:	\$1,000.00
Date Received:	September 07, 2017
Complete Date:	September 08, 2016 (Date newspaper advertisement emailed to DAQ)
Newspaper:	<i>The Journal</i>
Applicant Ad Date:	September 05, 2017
UTMs:	Easting: 247.620 km Northing: 4,387.058 km Zone: 18N
Description:	Modification for the addition of a Matthews IEB 32-5S crematory unit to replace a Matthews IE 43-PPII crematory unit having the Emission Unit ID #7. The replacement crematory unit was given the Emission Unit ID #9.

DESCRIPTION OF PROCESS

This crematory/facility was purchased by Valley Pet Memorial Services, Inc. (Valley) on May 2, 2017 from Green Lawn Cemetery Co., Inc.

A Matthews IEB 32-5S crematory will replace the Matthews IE 43-PPII crematory (200 lb/hr capacity) currently designated as Emission Unit ID #7. The replacement crematory was given the Emission Unit ID #9. The replacement crematory is manually loaded, designed to handle up

to 250 pounds per hour per batch load. The replacement crematory has a dual chamber design and is fired with LP gas as an auxiliary fuel.

The animal remains are typically loaded into the primary chamber and then the secondary chamber is preheated to 1400-1800°F in 30 minutes using the secondary chamber's burner (afterburner). Then, the primary/cremation burner is ignited to begin the cremation cycle. A cool-down period of 30 minutes or more is recommended at the end of the cremation cycle before removing the cremated remains and loading the next set of remains.

The secondary chamber has two Eclipse TJ-150 burners rated at a maximum of 1.2 MM Btu/hr per each burner for a total secondary chamber heat input of 2.4 MM Btu/hr. The secondary chamber temperature is monitored by a digital controller which adjusts the afterburner gas input to maintain the desired temperature set point. The crematory operates best with a minimum secondary chamber temperature of 1400-1800°F.

The primary chamber has five burners [Eclipse TJ-75 (x 1) and Eclipse TJ-50 (x 4)] rated at a maximum of 0.5 MM Btu/hr [Eclipse TJ-75] and 0.4 MM Btu/hr [Eclipse TJ-50]. Total heat input to the primary chamber is 2.1 MM Btu/hr [(0.5 + 0.4 x 4) MM Btu/hr]. The primary chamber temperature ranges from 500°F at the beginning of the first cremation of the day to a maximum of 1800°F during successive cremations.

According to Matthew's calculations, the minimum residence time of the exhaust gases in the secondary chamber (retention time) is 2.79 seconds at 1400°F.

Table 1: Emission Unit Data Sheet for Replacement Crematory.	
Item of Interest	Response
Manufacturer:	Matthews Environmental Solutions
Model No.:	IEB 32-5S
Rated Capacity:	Maximum 250 lb/hr Annual 468 ton/yr
By what means is waste charged?	Batch
Projected operating schedule:	12 hr/day; 312 day/yr
Primary Combustion Chamber	
Volume	77 ft ³
Effective grate area:	14 ft ²
Maximum temperature:	1,800°F
Burning rate:	6 lb/ft ² /hr
Heat release in primary chamber:	13,000 BTU/hr/ft ³
Total heat release in cremator	15,000 BTU/hr/ft ³
Secondary Combustion Chamber	
Volume	145 ft ³
Cross sectional area:	2.77 ft ²
Volume of gas through secondary combustion chamber:	3,122 ACF @ 1400°F
Minimum gas temperature	1,400°F

Minimum retention time of gas:	2.79 sec
Location of air admission:	Draft Inducer at base of stack
Flame Port	
Flame port area:	2.95 ft ²
Velocity through flame port:	17.6 ft/sec
Combustion Air	
Type of draft:	Forced
If draft is forced describe ID fans or blowers:	Number: 2 HP rating: 5 HP Rated flow: 2,000 (each) ft ³ /min Rated speed: 3,450 (each) RPM Fan rated draft: 6 in. H ₂ O
Auxiliary Burners	
Fuel:	Propane Gas (LP)
Primary Burner	
Capacity:	Eclipse TJ-75 = 0.5 MM BTU/hr per burner Eclipse TJ-50 = 0.4 MM BTU/hr per burner (operating)
Number:	5
Manufacturer:	Eclipse
Model:	TJ-75 (x1) and TJ-50 (x4)
Fuel:	L.P. Gas
How Controlled?	Timers
Is there a temperature indicator:	No
Secondary Burner	
Capacity:	1.2 (operating) MM Btu/hr per burner
Number:	2
Manufacturer:	Eclipse
Model:	TJ-150
Fuel:	L.P. Gas
How Controlled?	Timers
Is there a temperature indicator?:	Yes
How temperature recorded?	Chart Recorder
Miscellaneous Devices and Controls	
Automatic loading device.	No
Self closing doors:	No
Sparks arrestor:	No
Flame failure protection equipment:	Yes
Method of creating turbulence for combustion gases.	Directional Changes, Baffle
Method of cleaning secondary or setting chamber:	Cleanout Door
Other interlocking devices or controls.	Yes. Door limit switch to shut off cremation burner.

Installation	
Indoor installation:	Yes
Stack or Vent Data	
Inside diameter or dimensions:	1' 7"
Gas exit temperature:	1,100 °F
Height:	17 ft (estimated)
Stack serves:	This equipment only
Gas flow rate:	2,300 acfm
Estimated percent of moisture:	13%
Waste	
Composition of waste feed to the cremator:	Pet Remains
Expected BTU/lb as fired:	1,000 BTU/lb
Daily amount:	3,000 lb
Does cremator have a charge hopper?	No
Does the charge hopper have automatic control?	No
Is the secondary chamber preheated prior to charging waste?	Yes
At what secondary temperature does waste charging begin?	1,400 °F
Is the ash waste quenched?	No
Are hazardous or special waste burned?	No
Are potential infectious waste burned?	No
How will the waste material from process and control equipment be disposed of?	Ashes
Method of charging waste solids:	Manual
Fuel Usage Data	
Estimated annual fuel cost:	\$10,000.00
Firing Rate:	Maximum: 4.5 mm BTU/hr (total = primary chamber + secondary chamber) Typical: 4.3 mm BTU/hr Design: 4.5 mm BTU/hr
Fuel Type:	LP Gas
Typical heating content of fuel:	2,500 BTU/scf
Monitoring Plan:	Display of secondary chamber temperature to ensure proper operating temperature.
Testing	None.
Recordkeeping:	Chart Recorder will record secondary chamber temperature.
Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.	No maintenance procedures required to main warranty. Operating temperature should be maintained below 2,100 °F.

SITE INSPECTION

Joseph Kreger of the Division of Air Quality, Eastern Panhandle Regional Office performed a targeted full on-site inspection on January 08, 2015. The facility received a status code of 30 – In Compliance. Inspection notes state: Records were maintained. Only heat waves were coming from incinerator stacks.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The applicant presented potential emission estimates based on EPA emission factors from Table 2.3-1 and 2.3-2 of AP-42 (5th Edition) and burning 250 lb/hr of pet remains. The potential emissions are as follows:

Pollutant	New Replacement Crematory 9			Old Crematory 7		Delta (New – Old)	
	Emission Factor	Hourly Rate	Annual ⁽²⁾ Emissions	Hourly ⁽¹⁾ Rate	Annual ⁽¹⁾⁽²⁾ Emissions	Hourly Rate	Annual Emissions
	(lb/hr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
Particulate Matter (PM/PM ₁₀ /PM _{2.5})	4.67	0.584	1.093	0.7	1.31	-0.12	-0.22
Sulfur Dioxide (SO ₂)	2.17	0.271	0.508	0.43	0.47	-0.16	+0.04
Nitrogen Oxide (NO _x)	3.56	0.445	0.833	0.71	1.33	-0.27	-0.50
Carbon Monoxide (CO)	2.95	0.369	0.690	0.59	1.1	-0.22	-0.41
(1) Hourly and Annual emissions for old crematory 7 were taken from Old Permit 2212D.							
(2) Based on operating: 12 hr/day x 6 day/wk x 52 wk/yr = 3,744 hr/yr.							

The writer calculated the delta in emissions (New – Old) in replacing old crematory 7 with new crematory 9. The results are shown in the table above.

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 replace and operate one pet 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 pet 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 Pet crematory will have an allowable particulate matter emission rate of 0.678 pounds per hour (based on maximum design-incineration rate of 250 lb/hr). This allowable rate is higher than the estimated hourly potential of 0.584 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 2.79 seconds with a minimum secondary chamber temperature of 1,400⁰F. 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 new replacement 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.

Valley has proposed to install a replacement crematory unit, 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 Rule 13 by publishing a Class I Legal Advertisement in *The Journal* (on September 05, 2017), paying the \$1,000.00 application fee (on September 7, 2017), and submitting a complete permit application (deemed complete on September 8, 2017, the date the newspaper affidavit was emailed to the DAQ).

This modification is not classified as a major source of hazardous air pollutants nor does it have the potential to emit 100 tons per year or greater of any criteria pollutant, which triggers Title V major source permitting. 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.

45CSR22 - Air Quality Management Fee Program

The Hedgesville facility is classified as a "9B - Crematory Incinerator" source as defined in 45CSR22.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The information given below came from the previous permit (R13-2212D) for this facility:

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 Pet 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 Pet 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 Pets 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

No air dispersion modeling study/analysis was conducted for the facility because the proposed modification/source is not a major source of pollutants 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.

Overloading an incinerator beyond the manufacturer's rated capacity can result in incomplete incineration and excess emissions.

Maintaining the temperature of the secondary chamber above 1,400⁰F (minimum temperature suggested by the manufacturer) insures that complete combustion has taken place. The upper operating temperature should be maintained below 2,100 ⁰F.

The secondary combustion chamber's temperature is digitally displayed and is recorded on a chart recorder.

RECOMMENDATION TO DIRECTOR

Based on the information provided in the application and the resulting requirements set forth in the permit, the replacement crematory unit should meet all applicable state rules and federal regulations. Therefore, the writer recommends that this modification permit be approved for Valley Pet Memorial Services, Inc.'s Hedgesville, Berkeley County, WV pet cremation facility.

John Legg
Permit Writer

October 23, 2017
Date

ATTACHMENT 1

FILE COMPARE COMPARING R13-2212E TO R13-2212D

Valley Pet Memorial Services, Inc.
Hedgesville, Berkeley County, WV