



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2970
Plant ID No.: 061-00185
Applicant: West Virginia University
Facility Name: WVU Animal Sciences Farm
Location: Morgantown
NAICS Code: 611310
Application Type: Construction
Received Date: August 20, 2012
Engineer Assigned: Edward S. Andrews, P.E.
Fee Amount: \$1000.00
Date Received: August 21, 2012
Completeness Date: September 26, 2012
Due Date: December 25, 2012
Newspaper: *The Dominion Post*
Applicant Ad Date: August 20, 2012
UTMs: Easting: 591.3 km Northing: 4,390.7 km Zone: 17
Description: This construction permit application is for the after-the fact construction and operation of retort used for the cremation of livestock and contraband.

DESCRIPTION OF PROCESS

West Virginia University (WVU) owns and operates an animal research farm in Morgantown, West Virginia. Part of the farm operations is to operate an incinerator (retort) for the disposal of animal remains. The largest animal processed in the incinerator is a sheep. In addition to the animal remains, bedding material for research mice is processed in the retort. The West Virginia State Police incinerate illegal narcotics on a limited basis.

SITE INSPECTION

On September 5, 2012, Mr. Brain Tephabock, Supervisor of the Compliance & Enforcement Group of the NCRO, Mr. Gene Coccari from the Small Business Assistant Section, and the writer conducted a site visit of the proposed facility. Ms. Joyce Moore, EH&S Manager, was present during this visit. The cremator is between two structures on the farm. The nearest structure not associated with the farm is at the least 900 feet away.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The applicant presented potential emission estimates based on emission factors published in AP-42, Chapter 2.3 "Medical Waste Incineration". These factors were developed from sources combusting infectious and non-infectious solid waste. The incineration rate of this cremator is 26 pounds of organic waste per hour.

Table #1 – Estimated Emissions from the Cremator			
Pollutant	Emission Factor (lb/ton)	Hourly Rate	Annual Rate
		lb/hr	Tons/year
Particulate Matter (PM/PM ₁₀ /PM _{2.5})	4.67	0.06	0.26
Sulfur Dioxide (SO ₂)	2.17	0.03	0.13
Oxides of Nitrogen (NO _x)	3.56	0.05	0.22
Carbon Monoxide (CO)	2.95	0.04	0.18
Volatile Organic Compounds (VOCs)	0.299	0.01	0.04
Hydrogen chloride (HCL)	33.5	0.44	1.93

The emission factors used in the estimate were created from uncontrolled sources. This chapter of AP-42 did not provide any factors for the use of a secondary chamber burners or afterburners for incineration of this type of waste. The applicant included the heat energy (heat input) from the secondary chamber burner into the waste capacity of the cremator. This approach is considered reasonable. Actual emissions from the cremator are expected to be less for all of the pollutants listed except for oxides of nitrogen. The elevated temperatures in the secondary chamber should increase the formation of these oxides.

To account for the use of the afterburner, the writer estimated the emissions from the consumption of natural gas in the afterburner using Chapter 1.4 of AP-42, which was determined to be 0.12 lb of NO_x per hour. This would increase NO_x emission to 0.17 pounds per hour and 0.74 tons per year. Annual emission estimates were based on the maximum possible operating schedule, which is 8,760 hours per year.

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 the combustion of refuse. The permittee has installed and operates 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 through incineration. Thus, it meets this definition.

Per section 4.1, these crematories must meet the particulate matter limit by weight. The crematory will have an allowable particulate matter emission rate of 0.07 pounds per hour. This allowable rate is higher than the estimated hourly potential of 0.06 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 an afterburner, which is designed to reduce the particulate matter and other pollutants entrained in the exhaust stream into products of complete combustion. 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 cremator 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. West Virginia University has 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 Dominion Post on August 20, 2012, paid the \$1,000.00 application fee, and submitted a complete permit application.

Because of this construction, the Animal Sciences Farm will not be classified as a major source of hazardous air pollutants or Title V. In addition, the emission unit is not subject to a

New Source Performance Standard. Thus, the Animal Sciences Farm is not subject to Title V and will not be required to obtain an operating permit under 45CSR30. Therefore, the facility will be classified as a "9B - Crematory Incinerator" source as defined in 45CSR22.

40 CFR 60 Subpart EEEE Standard of Performance for Other Solid Waste Incinerator Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction Commenced on or After June 16, 2006.

This regulation excludes incinerators that burn pathological waste if it burns 90 percent or more by weight of pathological waste, low-level radioactive waste, and/or chemotherapeutic waste as defined in 40 CFR §60.2977. WVU has requested to incinerate animal remains and mice bedding, which in §60.2977 is defined as pathological waste.

WVU has requested to destroy illegal narcotics on a limited basis for the West Virginia State Police. §60.2887(p) excludes units that destroy only illegal drugs or prohibited goods confiscated by police or law enforcement agency and such incinerator is owned or operated by that agency or similar agency. To accommodate the incineration of both types of waste pathological and illegal narcotics, WVU must operate the incinerator under the exclusion of §60.2977(l), which limits the incineration of illegal narcotic drugs to 10% or less of the total amount of waste incinerated. Thus, Conditions 4.1.1.d and 4.4.4. were developed for this purpose and to demonstrate compliance.

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 be not 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. 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.
- Type of waste being cremated.

The writer would prefer to have the temperature of the secondary chamber monitored. This cremator is a dual chamber retort with very basic combustion controls. The operator sets the appropriate cremating time on a mechanical timer, which determines the length of the firing cycle of both burners. Thus, record of the actual time set by the operator needs to be maintained.

To demonstrate compliance with the visible emission limit of Rule 6, WVU will be required to conduct visible emission check once a quarter. With the secondary chamber, this cremator should be capable of operating without any visible emissions on a consistent basis. Thus, the agency's visible emission check guidance is appropriate for this cremator.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application and the conditions set forth in the permit indicates this cremator should meet all applicable state rules and federal regulations when operated. Therefore, this writer recommends that a Rule 13 Construction Permit should be granted to West Virginia University for their proposed cremator at the Animal Sciences Farm.

Edward S. Andrews, P.E.
Engineer

Date: December 21, 2012

Fact Sheet R13-2970
West Virginia University
Animal Sciences Farm
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