Permit Boilerplate Procedures For HUMAN REMAIN CREMATORY UNITS and PATHOLOGICAL WASTE CREMATORY UNITS

Purpose:

The purpose of this document is to specify requirements for permit approval for crematories. This boilerplate does not apply to crematories subject to Prevention of Significant Deterioration (PSD) or Non-attainment permit review. The boilerplate is meant to provide a guideline for the minimum requirements of the Department of Environmental Quality. More stringent requirements may be imposed if necessary to demonstrate compliance with NAAQS or other special requirements.

Definitions:

The following definitions are for use in this permit boilerplate and procedure and do not necessarily have the same meaning in other portions of the regulations.

Afterburner - A burner located so that the combustion gases are made to pass through its flame in order to remove smoke and odors. It may be attached to or be separated from the crematory unit.

Burn-Down Cycle - The minimum burn-down time recommended by the manufacturer or the time required to consume all combustible material, whichever is greater.

Charge (verb) – To fill or load the crematory unit.

Crematory Unit – Any furnace or device used in the process of burning human remains or pathological waste for the primary purpose of destroying matter. This unit must be located at a funeral home, vet office, and/or county facilities (i.e. SPCA, county animal shelters, etc.). <u>It does not include agricultural units (i.e. at farms)</u>.

Hospital Waste – Discards generated at a hospital, except unused items returned to the manufacturer. The definition of hospital waste does not include human corpses, remains, and anatomical parts that are intended for interment or cremation.

Human Remains – Intact human corpses. This term does not include dismembered human remains. Caskets made of plastics, metals, or fiberglass materials shall not be incinerated; however, plastic bags can be burned.

Interlock System – A mechanical system to prevent feeding the primary chamber and/or an electrical control to prevent operation of the primary chamber burner until the secondary chamber has attained the minimum required temperature.

Medical Waste - Any waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals that is listed in subdivisions (1) through (9) of this definition. The definition of medical/infectious waste does not include hazardous waste identified or listed under the regulations in 40 CFR Part 261; household waste, as defined in 40 CFR Part 261.4(b)(1); ash from incineration of medical/infectious waste, once the incineration process has been completed; human corpses, remains, and anatomical parts that are intended for interment cremation; and domestic sewage materials identified in 40 CFR Part 261.4(a)(1).

> (1) Cultures and stocks of infectious agents and associated biologicals, including: cultures from medical and pathological laboratories; cultures and stocks of infectious agents from research and industrial laboratories; wastes from the production of biologicals; discarded live and attenuated vaccines; and culture dishes and devices used to transfer, inoculate, and mix cultures.

(2) Human pathological waste, including tissues, organs, and body parts and body fluids that are removed during surgery or autopsy, or other medical procedures, and specimens of body fluids and their containers.

(3) Human blood and blood products including:

(i) Liquid waste human blood;

(ii) Products of blood;

(iii) Items containing unabsorbed or free-flowing blood;

(iv) Items saturated and/or dripping with human blood; or

(v) Items that were saturated and/or dripping with human blood that are now caked with dried human blood; including serum, plasma, and other blood components, and their containers, which were used or intended for use in either patient care, testing and laboratory analysis or the development of pharmaceuticals. Intravenous bags are also included in this category.

(4) Regardless of the presence of infectious agents, sharps that have been used in animal or human patient care or treatment or in medical, research, or industrial laboratories, including hypodermic needles, syringes (with or without the attached needle), pasteur pipettes, scalpel blades, blood vials, needles with attached tubing, and culture dishes. Also included are other types of broken or unbroken glassware that were in contact with infectious agents, such as used slides and cover slips.

(5) Animal waste including contaminated animal carcasses, body parts, and bedding of animals that were known to have been exposed to infectious agents during research (including research in veterinary hospitals), production of biologicals or testing of pharmaceuticals.

(6) Isolation wastes including biological waste and discarded materials contaminated with blood, excretions, exudates, or secretions from humans who are isolated to protect others from certain highly communicable diseases, or isolated animals known to be infected with highly communicable diseases.

(7) Unused sharps including the following unused, discarded sharps: hypodermic needles, suture needles, syringes, and scalpel blades.

(8) Any waste that is contaminated or mixed with any waste listed in subdivisions (1) through (7) of this definition.

(9) Any residue or contaminated soil, waste, or other debris resulting from the cleaning of a spill of any waste listed in subdivisions (1) through (8) of this definition.

Pathological Waste – Waste material consisting only of animal remains, dismembered human remains, anatomical parts and/or tissue, the bags/containers used to collect and transport the waste material, and animal bedding. Caskets made of plastics, metals, or fiberglass materials shall not be incinerated; however, plastic bags can be burned.

Primary Combustion Chamber - The chamber in a crematory unit where the human remains or pathological waste is ignited, and from which ash is removed.

Residence Time - The time exhaust gases reside in the secondary combustion chamber prior to discharge into the stack or flue, usually expressed in seconds.

Secondary Combustion Chamber – A component of the crematory unit that receives combustion gases from the primary chamber and in which the combustion process is completed. The secondary combustion chamber may be inherent to the crematory unit or as an add-on control.

Applicability:

This boilerplate applies to construction or any project (which includes any addition or replacement of an emissions unit, any modification to an emissions unit or any combination of these changes) of a crematory unit fired by distillate oil, natural gas, LPG, and/or propane. This procedure may be used as a guideline for other fuels; however, additional conditions may be required in the boilerplate (see Generic NSR Boilerplate).

MACT – There are currently no MACT standards applicable to crematory units (including area sources).

Existing Source Rule 4-7, Emission Standards for Incinerators – The limits on the crematory unit cannot be less stringent than Rule 4-7.

Human Remains Crematory Units

State Toxics – Since human remains are not considered "waste" and there is no MACT applicable for crematory units, the state toxics rule applies. However, OAPP has calculated emissions of state toxics and found that (based on currently available emission information) all toxics are expected to be below exemption levels.

NSPS, Subpart Ce - Emission Guidelines and Compliance Times for Hospital/Medical/Infectious Waste Incinerators – The human remains crematory unit is not subject to this Subpart since it is not a hospital/medical/infectious waste incinerator (HMIWI or HMIWI) unit, which is defined as "any device that combusts any amount of hospital waste and/or medical/infectious waste." The human remains crematory units only burns human remains and are therefore not subject to this Subpart.

NSPS, Subpart E – Standards of Performance for Incinerators – The human remains crematory unit is not subject to this Subpart since it only burns human remains and does not meet the definition of an incinerator. Incinerators subject to this subpart are those burning more than 50 tons per day of solid waste, defined, per 40 CFR 60.51(b), as refuse, more than 50 percent of which is municipal type waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustibles, and noncombustible materials such as glass and rock. Human remains are not considered solid waste.

NSPS, Subpart Ec - Standards of Performance for Hospital/Medical/Infectious Waste Incinerators for Which Construction Is Commenced After June 20, 1996 – The human remains crematory unit is not subject to this Subpart since it is not a hospital/medical/infectious waste incinerator (HMIWI or HMIWI) unit, which is defined as "any device that combusts any amount of hospital waste and/or medical/infectious waste." The human remains crematory units only burns human remains and are therefore not subject to this Subpart.

NSPS, Subpart CCCC - Standards of Performance for Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001 – The human remains crematory unit is not subject to this Subpart since it does not meet the definition of a commercial and industrial solid waste incineration (CISWI) unit as stated in 40 CFR 60.2265. Human remains are not considered solid waste.

NSPS, Subpart EEEE - Standards of Performance for Other Solid Waste Incineration Units for Which Construction Is Commenced After December 9, 2004, or for Which Modification

or Reconstruction Is Commenced on or After June 16, 2006 – The human remains crematory unit is not subject to this Subpart since it does not meet the definition of a Other solid waste incineration (OSWI) unit as stated in 40 CFR 60.2977. Human remains are not considered solid waste.

<u>**Pathological Waste Crematory Units**</u>

State Toxics – Since pathological waste crematory units are considered "waste" and since the waste NSPSs were promulgated under sections 111(d)/129 of the CAAA, state toxics do not apply. Standards promulgated under these sections are considered equivalent to MACT. The exemption 9 VAC 5-60-300 C. 3 under the state toxics rule refers to 9 VAC 5-60-10 et seq. That section includes an exemption for 111(d) plans. Therefore, the facility is not subject to the state toxics rule.

NSPS, Subpart Ce - Emission Guidelines and Compliance Times for Hospital/Medical/Infectious Waste Incinerators – The pathological waste crematory unit is not subject to this Subpart since it is not a hospital/medical/infectious waste incinerator (HMIWI or HMIWI) unit, which is defined as "any device that combusts any amount of hospital waste and/or medical/infectious waste." Human pathological waste is included in the definition of medical/infection waste, but "human remains and anatomical parts that are intended for interment cremation" is excluded from this definition. Therefore, pathological waste crematory units are not subject to this Subpart.

NSPS, Subpart E – Standards of Performance for Incinerators – The pathological waste crematory unit is not subject to this Subpart since it burns pathological waste and does not meet the definition of an incinerator. Incinerators subject to this subpart are those burning more than 50 tons per day of solid waste, defined, per 40 CFR 60.51(b), as refuse, more than 50 percent of which is municipal type waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustibles, and noncombustible materials such as glass and rock.

NSPS, Subpart Ec - Standards of Performance for Hospital/Medical/Infectious Waste Incinerators for Which Construction Is Commenced After June 20, 1996 – The pathological waste crematory unit is not subject to this Subpart since it is not a hospital/medical/infectious waste incinerator (HMIWI or HMIWI) unit, which is defined as "any device that combusts any amount of hospital waste and/or medical/infectious waste." Human pathological waste is included in the definition of medical/infection waste, but "human remains and anatomical parts that are intended for interment cremation" is excluded from this definition. Therefore, pathological waste crematory units are not subject to this Subpart.

NSPS, Subpart CCCC - Standards of Performance for Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001 – The pathological waste crematory unit is not subject to this Subpart as stated in 40 CFR 60.2020(a) if it burns 90% or more by weight (on a calendar quarter basis and excluding the weight of auxiliary fuel and combustion air) of pathological waste. Since the crematory unit is **<u>only</u>** allowed to burn pathological waste, this is satisfied. The facility must:

1. Notify the Administrator of an exemption claim; and
2. Keep records on a calendar quarter basis of the periods of time when only pathological waste is burned.

NSPS, Subpart EEEE - Standards of Performance for Other Solid Waste Incineration Units for Which Construction Is Commenced After December 9, 2004, or for Which Modification or Reconstruction Is Commenced on or After June 16, 2006 – The pathological waste

crematory unit is not subject to this Subpart as stated in 40 CFR 60.2887(l) if it burns 90% or more by weight (on a calendar quarter basis and excluding the weight of auxiliary fuel and combustion air) of pathological waste. Since the crematory unit is only allowed to burn pathological waste, this is satisfied. The facility must:

1. Notify the Administrator of an exemption claim; and
2. Keep records on a calendar quarter basis of the periods of time when only pathological waste is burned.

Emission Controls and BACT under Article 6:

Listed below are the conditions/emission limits that are considered BACT for crematory units. Please note that BACT may not apply if there is a secondary chamber which is inherent in the design, i.e. if it is inherent in the design, it can be included in permit applicability uncontrolled emission calculations. Even if BACT is not triggered, the requirements are the same; they are either required for BACT or to ensure that the unit operates at the level of performance for which it is designed. The citation included in the specific condition of the permit should either be BACT (9 VAC 5-50-260) or the generic citation for Article 6 (9 VAC 5-80-1180), depending on applicability.

a. Particulate emissions, carbon monoxide emissions, and opacity from the crematory unit shall be controlled by a secondary combustion chamber (inherent).

   ****Note:** "Add-on combustion controls" (for example, an afterburner) can be used at the facility instead of a secondary chamber, but the *Generic Boilerplate* should be used since add-on combustion controls can differ from each other and secondary chambers.

b. Particulate (PM) emissions = 0.10 gr/dscf corrected to 12% CO_2

   OR

   = 0.10 gr/dscf corrected to 7% O_2

   The permit shall contain only **one** of the limits stated above, i.e. both limits are not to be put in the permit. Facilities are not required to show compliance both ways. The limit to be placed in the permit should be based on what the facility submits in their stack test data, i.e. some stack tests make corrections one way and some make corrections the other way.

   ****Note:** The BACT standard is stricter than the existing source rule limit of 0.14 gr/dscf corrected to 12% CO_2 since most crematories can achieve this standard. In previous discussions within DEQ, the BACT standard was initially set at 0.08 gr/dscf, but stack tests of new two chamber starved air/controlled air incinerators and vendor stack tests showed (1) many operated at about the 0.08 gr/dscf value (2) roughly half operated a little over the 0.08 gr/dscf value (3) none were over 0.10 gr/dscf. In addition, the 0.10 gr/dscf standard is comparable with other states, if not more restrictive.

c. Carbon Monoxide (CO) emissions = 100 ppmvd CO corrected to 12% CO_2

   OR

   = 100 ppmdv CO corrected to 7% O_2

   The permit shall contain only **one** of the limits stated above, i.e. both limits are not to be put in the permit. Facilities are not required to show compliance both ways. The limit to be placed in the permit should be based on what the facility submits in their stack test

data, i.e. some stack tests make corrections one way and some make corrections the other way.

d. The minimum secondary chamber temperature shall be at least 1600 ^{o}F or the manufacturer's recommendation if higher.

e. The minimum secondary chamber residence time shall be maintained for at least 1.0 second or the manufacturer's recommendation if greater.

   ****Note**: If the unit is designed with a shorter residence time and is able to meet the standard, the manufacturer must submit that data to support this.

f. The crematory unit shall be equipped with automatic thermostats to maintain the minimum secondary chamber temperatures

g. An interlock system to prevent combustion in the primary chamber prior to attaining the minimum secondary chamber temperature.

h. The burn-down cycle: The crematory unit shall remain in operation until such time that no combustible materials are left on the hearth.

Emission Limits/Calculations:

a. Stack test data: To verify that the facility will be in compliance with the PM and CO limits, the facility shall submit stack test data, whether it is for the new crematory unit or for a similar unit, given in the units of gr/dscf @ 12% CO_2 or gr/dscf @ 7% O_2 for PM and ppmdv for CO. The stack test data should be a Method 5 (for PM) or equivalent and should be conducted within the last five years. The PM limit of 0.1 gr/dscf and the CO limit of 100 ppmdv shall be used to calculate uncontrolled emissions for emission limit calculations and BACT applicability.

   If the stack test data is not corrected at 12% CO_2, then the following formula can be used to calculate that value:

$$C_{adj} = \frac{12 * C_{meas}}{\%CO_2}$$

   Where: C_{adj} = concentration of particulate matter corrected to 12% CO_2 (gr/dscf)
   C_{meas} = measured concentration of particulate matter from stack test (gr/dscf)
   $\%CO_2$ = carbon dioxide measured on a dry basis from stack test (%)

   If the stack test data is not corrected at 7% O_2, then the following formula can be used to calculate that value:

$$C_{adj} = C_{meas}\left(\frac{20.9 - 7}{20.9 - \%O_2}\right)$$

   Where: C_{adj} = concentration of particulate matter corrected to 7% O_2 (gr/dscf)
   C_{meas} = measured concentration of particulate matter from stack test (gr/dscf)
   $\%O_2$ = oxygen concentration measured on a dry basis from stack test (%)

b. Burner Calculations: The permit writer may also calculate combustion emissions for NO_X, VOC, and SO_2 for each burner using AP-42 (or manufacturer data if submitted). The AP-42 sections to be used should be: (1) Section 1.3 for distillate oil; (2) Section 1.4 for natural gas; and (3) Section 1.5 for LPG and propane. Most of the time, these burners are smaller units (~ 1 MMBtu/hr or less) so emissions are estimated to be very low and under 0.5 tons/yr.

Visible Emissions:

Visible emissions from the incinerator shall not exceed 5 percent opacity as determined by EPA Method 9 (reference 40 CFR 60, Appendix A). This condition applies at all times except during malfunction.

****Note:** The "startup and shutdown" wording was deleted from this condition. Since we are requiring secondary chamber at temperature before firing waste and keeping it that way until there are not combustibles left on the hearth, there should be no need for the startup shutdown exceptions.

Recordkeeping:

On site records should contain:

a. An operating log for the crematory unit, which shall include:

   i. Date of each cremation;

   ii. Weight of {human remains} {pathological waste}, including the bags/containers used to collect and transport the material for each cremation;

   iii. Type of containers for each cremation;

   iv. Start and end times for each cremation;

   v. Name of operator performing each cremation.

   vi. **[O] [**If the facility has more than one crematory unit on-site**]** Individual records shall be maintained for each unit using separate logs.

   The permittee may use a copy of the crematory unit run log form, which is attached to this permit, or a diary or computer record that contains the same information.

b. Annual throughput of {human remains} {pathological waste}, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.

c. Annual throughput of {fuel}, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.

d. **[O]** The weight percent of the pathological waste (including the bags, caskets or containers and animal bedding, if applicable) cremated on a calendar quarterly basis.

   ****Note:** Item d is only for a pathological waste crematory unit. This was placed in the recordkeeping condition to show that the facility is only burning 100% pathological waste and therefore is not subject to any NSPS.

e. Crematory unit secondary chamber temperatures as required in Condition 12.

f. Scheduled and unscheduled maintenance and operator training.

g. Results of all stack test data and visible emissions evaluations.

These records shall be available for inspection by the DEQ and shall be current for the most recent five years.

Initial Notifications:

These initial notifications shall be included in the permit:

a. The actual date on which {construction, modification, replacement, **or** relocation} of the crematory unit commenced within 30 days after such date.

b. The anticipated start-up date of the crematory unit postmarked not more than 60 days nor less than 30 days prior to such date.

c. **[O]** The actual start-up date of the crematory unit within 15 days after such date. The start-up notification shall include a statement that the crematory unit is not subject to 40 CFR 60, Subparts CCCC (Standards of Performance for Commercial and Industrial Solid Waste Incineration Units) and EEEE (Standards of Performance for Other Solid Waste Incineration Units) as described in §60.2020(a), and §60.2887(1), respectively.

d. The anticipated date of the visible emission evaluation of the crematory unit postmarked at least 30 days prior to such date.

[O] A copy of the written notification referenced in item c above is to be sent to:

Associate Director
Office of Air Enforcement (3AP10)
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

****Note:** Item c is only for pathological waste crematory units. This was placed in this condition since it is an exempt stipulation as stated in NSPS, Subparts CCCC and EEEE (as stated above in the *Applicability Section*). The facility must show that it burns 90% or more by weight (on a calendar quarter basis and excluding the weight of auxiliary fuel and combustion air) of pathological waste or just that they only burn pathological waste.

Testing Requirements:

The crematory unit boilerplate does include a condition for an initial Visible Emissions Evaluation (VEE) to be performed on the crematory unit in accordance with 40 CFR Part 60, Appendix A, Method 9 to show that the unit is in compliance with the 5% opacity standard. In addition, there is also a condition for continued compliance (the permittee would conduct additional visible emission evaluations on the crematory unit) if requested by DEQ. "Upon request by the DEQ, the permittee shall conduct additional visible emission evaluations on the crematory unit to demonstrate compliance with the visible emission limits contained in this permit."

The boilerplate permit does not contain a requirement for stack testing. 9 VAC 5-80-1200 generally requires a stack test for initial compliance but a waiver is allowed under 9 VAC 5-80-1200 E.4 when, based on a technical evaluation of the past performance of similar source types,

using similar control methods, the Board reasonably expects the new or modified source to perform in compliance with applicable standards.

Crematories meeting the operational and opacity requirements contained in the boilerplate permit should be able to comply with the emission rate requirements of Condition 18; therefore the boilerplate does not contain a mandatory requirement for an initial performance test. Regional permitting staff may include a stack testing requirement for particulate matter and carbon monoxide if the emissions data provided by the applicant is incomplete or the stack test provided by the applicant was not conducted within the last five years. In the event that the installed unit has difficulty meeting the operational and/or opacity requirements, this will facilitate testing for continuing compliance.