ADDITIONAL TECHNICAL INFORMATION FOR INCINERATORS - MEDICAL WASTE

The following information will be used for the technical review of a permit to install application for a **medical waste incinerator.** This information is in addition to the general requirements outlined in the AQD document "Information for an Administratively Complete Permit to Install Application", Part 2 - Additional Supporting Information, Items A through F. All of the information may not be needed for each application. Also, this document may not be all inclusive. Additional information beyond that identified may be necessary to complete the technical review of any individual application. In the event a determination is made that new additional information is needed for a technical review, this document will be updated.

All referenced guidance documents are available at http://www.deq.state.mi.us/aps or you may contact the Permit Section at 517-373-7023.

A. Process Description

1. A detailed description of the incinerator, including a copy of any available literature. Indicate the internal dimensions (length, width, and height, or length and diameter) of each chamber in feet.
2. Describe the amount, type, and source of each medical waste stream which will be burned. Include the higher and lower heat values of the overall waste stream in Btu per pound, the ultimate analysis for the medical waste, and how the waste will be packaged and handled. Provide all assumptions, calculations, and other documentation used to derive this information.
3. Describe the medical waste incineration design capacity, in pounds of waste per hour, and the heat value of the waste on which this is based. NOTE: If wastes containing cytotoxic materials will be charged to the incinerator, more stringent combustion conditions will be required.[1]
4. Describe the combustion controls (flame out sensors, air and fuel controls, chamber temperature monitors). Indicate if carbon monoxide (CO), oxygen (O_2), opacity, or other pollutant monitors will be installed. If so, describe how these monitors are tied into the combustion controls. Provide the set points of combustion controls or monitors for normal operation and for triggering an alarm, the method of alerting the operator of abnormal operations (lights, alarms, etc.), and the exact location in the system to be monitored. Also describe the combustion control strategy and how all the air supply fans and combustion controls are integrated.
5. Provide the temperature profile and the retention time in seconds (at 1,800°F) in the final combustion chamber for the normal and "worst case" waste conditions. If wastes containing cytotoxic or anti-neoplastic materials will be charged, provide this information for the temperature chosen to provide complete destruction of these wastes.[1] Provide all assumptions, calculations, and other documentation used to derive these profiles and times.
6. Describe in detail the procedures and methods used to ensure that 1,800°F (or the chosen temperature for wastes containing cytotoxic materials) in the final combustion chamber is achieved and maintained during incinerator start-up and shutdown and during periods when high moisture/low Btu waste is charged into the incinerator. Include the type of auxiliary fuel and the maximum auxiliary fuel firing rate used for start-up. Provide all supporting assumptions, calculations, and other documentation.
7. Describe the temperature monitoring and recording system that will be used to ensure that the selected minimum temperature and minimum gas retention time will be achieved and maintained. NOTE: The system must provide for immediately ceasing waste feed if the temperature drops below the selected minimum.
8. Describe the ash handling system, including the amount of ash collected, in pounds per hour or pounds per batch, the methods used to prevent air emissions of collected ash, the method of transport, and the disposal

[1] Currently available data suggest that minimum combustion conditions of two (2) seconds at 1,800°F or one (1) second at 2,000°F are needed to adequately destroy cytotoxic materials. However, the AQD will consider a proposal using less stringent conditions if the applicant is able to demonstrate that adequate destruction of these materials occurs at the proposed conditions.

location. If any other waste is generated such as scrubbing system or boiler water overflow, provide the same information for this waste stream. Also describe the medical waste and ash truck routes, number of trucks, and clean-up procedures for spillage.

B. Regulatory Discussion

The following state air pollution control regulations may be applicable. Please review these regulations carefully to determine if they apply to your process and summarize the results in the application. The Air Pollution Control Rules may be viewed and downloaded from the AQD website at: www.michigan.gov/deqair.

1. State of Michigan, Department of Environmental Quality, Act 451 of 1994, Natural Resources and Environmental Protection Act, Part 55 Air Pollution Control and the following promulgated rules:

   a) Rules 215 and 216 apply to an existing facility which has a current Renewable Operating Permit (ROP). A Permit to Install issued for the installation of new equipment or modifications to existing equipment is incorporated into an ROP pursuant to Rules 215 and 216.

   b) Rule 220 applies to a major source and/or a major modification at a source which is located in a non-attainment area. A non-attainment area is one where the National Ambient Air Quality Standards (NAAQS) are not being met. Rule 220 requires compliance with the lowest achievable emission rate (LAER) and an emission reduction (offset) for each non-attainment air contaminant emitted in significant quantities as defined by Rule 119(e). However, a source may choose to "net out" of the requirements of Rule 220. Refer to "Guidelines for a Netting Demonstration" for additional detailed information.

   c) If the process or equipment was installed or modified after April 17, 1992, Rules 224 – 230 apply. Rule 224 requires the application of Best Available Control Technology for toxics (T-BACT) for all non VOC toxic air contaminants (TACs). T-BACT does not apply to emissions of VOCs. Rule 225 limits the emission impacts of TACs and requires a demonstration that the proposed emission of each TAC complies with a health-based screening level. Compliance can be demonstrated using any of three methods described in Rule 227(1) including the use of computerized dispersion modeling. Refer to "Guidelines for Conducting a Rule 224 T-BACT Analysis," "TACs-Demonstrating Compliance with Rule 225," and "Dispersion Modeling Guidance" for additional detailed information.

   d) Rule 301 specifies a process or process equipment shall not discharge visible emissions of a density greater than the most stringent of a 6-minute average of 20% opacity, or a limit specified by an applicable federal NSPS or as a condition of a Permit to Install.

   e) Rule 331 specifies a maximum allowable particulate emission rate for incinerators, if no federal limit applies.

   f) Rule 901 prohibits emissions of an air contaminant in quantities that cause either a) injurious effects to human health or safety, animal life, plant life of significant economic value, or property; or b) unreasonable interference with the comfortable enjoyment of life and property. Submit the following to address this rule:

      A detailed description of all odor prevention methods for all odor points, including but not limited to, roof vents for each building, waste tipping area, ash conveyor area, ash disposal area, boiler flue, trucks, truck entrances and exits, and doors and windows. Include a detailed air mass balance addressing the air flow into and out of the building from exhaust stack(s) and any other vents, and include the minimum negative pressure maintained inside the building and the number of air changes per hour. This demonstration should address how negative pressure will be maintained under all operating conditions including when the receiving doors are open, when the unit(s) is inoperable, and during high winds. Provide all assumptions, calculations, and other documentation used to develop the above.

   g) Rule 911 allows the Department to request a person to submit preventative maintenance and malfunction abatement program(s) for the process, emission control system(s), and monitoring system(s).

   h) Rule 912 requires the process to operate in a manner consistent with good air pollution control practices for minimizing emissions during start-up and shutdown. Please submit the following to address this rule:

      A detailed description of the procedures and the methods used to insure that the necessary temperature in the final combustion chamber is achieved and maintained during incinerator start-up and

shutdown and during periods when high moisture/low Btu waste is charged into the incinerator. Include the type of auxiliary fuel and the maximum auxiliary fuel firing rate used for start-up. Provide all supporting assumptions, calculations, and other documentation.

2. Federal Prevention of Significant Deterioration (PSD), 40 CFR Part 52.21. The federal PSD regulations apply to a major source and/or a major modification at a source which is located in an attainment area. An attainment area is one where all the NAAQS are being met. However, as with the non-attainment permitting, a source subject to the PSD regulations may choose to "net out" of the requirements. Refer to "Federal PSD Requirements," "Instructions for Conducting a BACT Analysis," and "Guidelines for a Netting Demonstration" for additional detailed information.
   - The Clean Unit test is an alternate method for determining PSD applicability. It encourages industries to invest in control equipment by providing greater operational flexibility after the control equipment is installed. Refer to "Federal PSD Requirements" and the "PSD Workbook" which is available on the Internet at http://www.deq.state.mi.us/aps/downloads/permits/PSD%20Workbook.pdf.

3. The PSD increments (40 CFR 52.21 (c)) and the NAAQS (40 CFR 52.21(d)) apply to all sources throughout the United States, regardless of size. Compliance with these air quality standards can be demonstrated using computerized dispersion modeling. An applicant for a PSD permit is required to submit PSD increment modeling for PM-10, SO_2 and NOx, and NAAQS modeling for PM-10, SO_2, NOx, CO, Ozone, and Lead as part of the application. Modeling for sources not subject to PSD may be done by the AQD. Refer to "Dispersion Modeling Guidance" for additional detailed information.

4. Federal Standards of Performance for New Stationary Sources (NSPS), 40 CFR Part 60;
   a) Subpart Db, Industrial-Commercial Institutional Steam Generating Units with a heat input capacity between 100 and 250 MMBtu per hour.
   b) Subpart Dc, Small Industrial-Commercial Institutional Steam Generating Units with a heat input capacity between 10 and 100 MMBtu per hour.
   c) Subpart E, Incinerators for new and modified units greater than 50 tons per day.
   d) Subpart Ec, Hospital/Medical/Infectious Waste Incinerators, for new and modified unit(s). Reporting requirements apply to co-fired units that burn 10 percent or less of hospital waste and/or medical infectious waste on a calendar quarter basis.

5. Section 112(g) regulations of the federal Clean Air Act require any constructed or reconstructed major source of Hazardous Air Pollutants (HAPs) be equipped with Maximum Achievable Control Technology (MACT) for individual and total HAPs greater than 10 and 25 tons per year, respectively. Refer to "Guidelines for Conducting a 112(g) Analysis" for additional detailed information.

6. Federal Plan Requirements for Hospital/Medical/Infectious Waste Incinerators, 40 CFR Part 62, Subpart HHH.

C. Control Technology Analysis

1. If the proposal does not include an acid gas scrubbing system and a high efficiency particulate matter collector, discuss the physical and economic feasibility of installing and operating an acid gas scrubbing system and a high efficiency particulate matter collector on the incinerator. (Economic feasibility means the annualized capital and operating costs.) Provide all assumptions, calculations, and other documentation for your conclusions.
2. Describe any other emission control equipment for the incinerator, including both the expected efficiency and the guaranteed efficiency for each pollutant controlled, in percent.
3. Indicate whether a bypass of the air pollution control equipment and/or the main stack is provided. If a bypass exists, include a complete description of the circumstances and duration for which the process would operate in the bypass mode. NOTE: The waste feed must cease immediately in the event of a bypass.

4. Describe the material separation plan (i.e., the methods used to ensure unacceptable waste materials do not enter the waste stream), mercury recycling and education programs, and fuel cleaning plan (recycling, education, pollution prevention through reuse and reduction, and hazardous waste collection).

5. Best Available Control Technology for Toxics (T-BACT) means the maximum degree of emission reduction which the Department determines is reasonably achievable for each process that emits toxic air contaminants (TACs) taking into account energy, environmental and economic impacts, and other costs. T-BACT does not apply to VOCs. The analysis must be specific to the process and the TACs subject to a T-BACT review. T-BACT limits can be expressed as an emission limit, control equipment requirements, and/or work practice standards. Refer to "Guidelines for Conducting a Rule 224 T-BACT Analysis" for additional detailed information.

6. Lowest achievable emission rate (LAER) applies to a major source and/or a major modification at a source located in a non-attainment area. Currently the only two pollutants which may be subject to LAER in Michigan are VOCs and NOx. LAER is defined as the lowest emission limitation contained in any State Implementation Plan (SIP) or the lowest emission limitation achieved in practice. Such an emission limit is presumed to be LAER for that source class and category. If an applicant proposes to meet this presumptive LAER, no site-specific control technology determination will be necessary. When an applicant believes the presumptive LAER limit is not achievable, a site-specific determination is required. This determination should include consideration of raw material changes, process changes, and add-on control equipment. The cost of these changes is not considered. Raw material and process changes should be evaluated through technology transfer (i.e., the likelihood that such a change will transfer from one industry to another), based on the manufacture of similar products or use of similar raw materials or fuels. Add-on controls should be evaluated based on the physical and chemical characteristics of the pollutant-bearing exhaust stream.

D. Emissions Summary and Calculations

Estimate the maximum uncontrolled and controlled emission rates of each of the following pollutants, in pounds per hour and tons per year. Provide all assumptions, calculations, stack tests, and other documentation used to derive these estimates.[2]

a) Particulate matter as total suspended particulate
b) Particulate matter as PM10 (particulate diameter less than 10 microns)
c) Sulfur dioxide
d) Nitrogen oxides, expressed as NO_2
e) Carbon monoxide
f) VOCs
g) Lead
h) Mercury
i) Cadmium
k) Total polychlorinated dibenzo-p-dioxins (PCDDs), tetrachloro- through octachloro- isomers
l) Total polychlorinated dibenzofurans (PCDFs), tetrachloro- through octachloro- isomers
m) Hydrogen chloride

E. Stack Parameters

Provide all assumptions, calculations, and other documentation used to derive the following:

1. The volumetric flow rate of the exhaust gases for each stack exit point in actual cubic feet per minute and in dry standard cubic feet per minute at 70°F, corrected to 7% oxygen.

2. The expected temperature of the exhaust gases at the stack exit point, in °F, and the waste feed rate and heat value on which these values are based.

[2] Upon request, the AQD may be able to supply statistical emission rate data which has been compiled from actual test data. These statistically derived emission rates may be used for some of the requested uncontrolled emission rates.

3. The percentages of carbon dioxide, moisture, excess air, and oxygen in the exhaust gases when operating at maximum design conditions and under normal operating conditions.