



December 10, 2015

Nancy Bates
At Home on the Range Pet Cemetery
8400 Amsterdam Road
Manhattan, MT 59741

Dear Ms. Bates:

Montana Air Quality Permit #3259-03 is deemed final as of December 10, 2015, by the Department of Environmental Quality (Department). This permit is for a pet crematorium. All conditions of the Department's Decision remain the same. Enclosed is a copy of your permit with the final date indicated.

For the Department,

A handwritten signature in black ink that reads "Julie A. Merkel".

Julie A. Merkel
Air Permitting Supervisor
Air Quality Bureau
(406) 444-3626

A handwritten signature in black ink that reads "John P. Proulx".

John P. Proulx
Environmental Science Specialist
Air Quality Bureau
(406) 444-1277

JM:JP
Enclosure

Montana Department of Environmental Quality
Permitting and Compliance Division

Montana Air Quality Permit #3259-03

At Home on the Range Pet Cemetery
8400 Amsterdam Road
Manhattan, MT 59741

December 10, 2015



MONTANA AIR QUALITY PERMIT

Issued to: At Home on the Range Pet Cemetery
8400 Amsterdam Road
Manhattan, MT 59741

Permit #3259-03
Application Complete: 10/06/2015
Preliminary Determination Issued:
10/22/2015
Department's Decision Issued: 11/24/2015
Permit Final: 12/10/2015
AFS #031-0019

An air quality permit, with conditions, is hereby granted to At Home on the Range Pet Cemetery (AHRPC), pursuant to Sections 75-2-204, 211, and 215, Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.740, *et seq.*, as amended, for the following:

SECTION I: Permitted Facilities

A. Plant Location

AHRPC operates a 2003 Shenandoah Model C6 animal crematory (unit #1), a 2005 Therm Tec Model G-8 animal crematory (unit #2), a 2015 American Crematory Equipment CO. Model A-250P-Quad crematory, and associated equipment. A complete description of the permitted equipment is contained in Section I.A of the permit analysis. The facility is located in Section 17, Township 1 South, Range 3 East, in Gallatin County, Montana. The physical address is 8400 Amsterdam Road, Manhattan, MT 59741.

B. Current Permit Action

On October 6, 2015, the Montana Department of Environmental Quality (Department) received a complete permit application to add unit #3 to the existing permitted equipment.

SECTION II: Limitations and Conditions

A. Operational Requirements

1. AHRPC shall not incinerate/cremate any material other than paper documents, animal remains, and any corresponding animal remains container, unless otherwise approved by the Department. AHRPC shall provide written notice to the Department and obtain approval from the Department if material other than what would normally be termed paper documents, animal remains, and/or animal remains container is to be incinerated (ARM 17.8.749).
2. Units #1, #2 and #3 shall be equipped with auxiliary fuel burners. The auxiliary fuel burners shall be used to preheat the secondary chamber of the crematoriums to the minimum required operating temperature prior to igniting the primary chamber burner. The operating temperatures shall be

maintained during operation and for one-half hour after waste feed has stopped. The secondary chamber operating temperature of the crematoriums shall be maintained above 1500°F for any one-hour averaging period with no single reading less than 1400°F (ARM 17.8.752).

3. AHRPC shall operate units #1, #2, and #3 as specified in the application for Montana Air Quality Permit #3259-03, as well as previous applications, as appropriate. Further, AHRPC shall develop crematorium operation procedures, print those procedures in a crematorium operation procedures manual and require all personnel who operate the crematorium to familiarize themselves with the operating procedures. A copy of this manual shall be supplied to the Department (ARM 17.8.752).

B. Emission Limitations

AHRPC shall not cause or authorize to be discharged into the atmosphere from units #1, #2, and #3:

1. Visible emissions that exhibit an opacity of 10% or greater averaged over six consecutive minutes (ARM 17.8.752); and
2. Any particulate emissions in excess of 0.10 gr/dscf, corrected to 12% CO₂ (ARM 17.8.752).

C. Testing Requirements

1. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).
2. The Department may require testing (ARM 17.8.105).

D. Monitoring Requirements

AHRPC shall install, calibrate, maintain, and operate continuous monitoring and recording equipment, or use another measurement/recording system as may be approved by the Department, on units #1, #2 and #3 to measure the secondary chamber exit gas temperature. AHRPC shall also record the daily quantity of material incinerated/cremated and the daily hours of operation of the crematorium (ARM 17.8.749).

E. Operational Reporting Requirement

1. AHRPC shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions covered by this permit.

Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. Information shall be in units as required by the Department (ARM 17.8.505).

2. AHRPC shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.745, that would include ***the addition of a new emissions unit***, a change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to the Department, in writing, 10 days prior to start up or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.745(1)(d) (ARM 17.8.745).
3. The records compiled in accordance with this permit shall be maintained by AHRPC as a permanent business record for at least five years following the date of the measurement, shall be submitted to the Department upon request, and shall be available at the plant site for inspection by the Department (ARM 17.8.749).

F. Notification

AHRPC shall provide the Department with written notification of the actual start-up date of unit #3, within 15 days after the actual start-up date.

SECTION III: General Conditions

- A. Inspection – AHRPC shall allow the Department’s representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (CEMS, CERMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.
- B. Waiver – The permit and the terms, conditions, and matters stated herein shall be deemed accepted if AHRPC fails to appeal as indicated below.
- C. Compliance with Statutes and Regulations – Nothing in this permit shall be construed as relieving AHRPC of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq.* (ARM 17.8.756).
- D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties or other enforcement action as specified in Section 75-2-401, *et seq.*, MCA.
- E. Appeals – Any person or persons jointly or severally adversely affected by the Department’s decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefore, a hearing before the

Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay the Department's decision, unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA.

The issuance of a stay on a permit by the Board postpones the effective date of the Department's decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, the Department's decision on the application is final 16 days after the Department's decision is made.

- F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the air quality permit shall be made available for inspection, by the Department, at the location of the source.
- G. Permit Fee – Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay the annual operation fee by AHRPC may be grounds for revocation of this permit, as required by that section and rules adopted thereunder by the Board.
- H. Construction Commencement – Construction must begin within three years of permit issuance and proceed with due diligence until the project is complete or the permit shall be revoked (ARM 17.8.762).

Montana Air Quality Permit (MAQP) Analysis
At Home on the Range Pet Cemetery
MAQP #3259-03

I. Introduction

A. Permitted Equipment

At Home on the Range Pet Cemetery (AHRPC) operates a 2003 Shenandoah Model C6 animal crematory (unit #1 - a maximum burn rate of 50 pounds per hour (lb/hr) and a maximum batch load of 200 lb), a 2005 Therm Tec Model G-8 animal crematory (unit #2 - a maximum burn rate of 50 lb/hr and a maximum batch load of 750 lb), a 2015 American Crematory Equipment CO. Model A-250P-Quad crematory (unit #3 – a maximum burn rate of 150 lb/hr and a maximum batch load of 250 pounds per chamber), and associated equipment. This facility will be used for the destruction/incineration of animal remains and/or paper documents. The facility is located in Section 17, Township 1 South, Range 3 East, Gallatin County, Montana. The physical address is 8400 Amsterdam Road, Manhattan, Montana, 59741.

B. Source Description

Units #1, Unit #2, and Unit #3 incorporate primary and secondary combustion chambers on each of the units and are fueled by liquefied petroleum gas (LPG). The units will be used to incinerate animal remains and/or paper documents.

C. Permit History

On June 6, 2003, AHRPC was issued a final Montana Air Quality **Permit #3259-00** for the operation of (unit #1) for the incineration of animal remains and any associated container.

On February 13, 2004, the Montana Department of Environmental Quality (Department) was issued an administrative permit amendment to allow for the routine incineration of paper documents, such as confidential information from banks, law offices, and other businesses. In accordance with the Administrative Rules of Montana (ARM) 17.8.745(2) a permit may be amended under the provisions of ARM 17.8.764 if the amendment does not violate any existing statute, rule, or the state implementation plan (SIP). Routine incineration of these materials would result in an increase in potential emissions of less than 15 tons per year; however, Section II.A.1 of Permit #3259-00 specifically prohibited incineration of these materials without approval from the Department. Therefore, in accordance with the provisions of ARM 17.8.745(2), AHRPC needed to obtain an administrative permit amendment prior to routine operations of this type.

Further, for all incinerator operations, Montana Code Annotated (MCA) 75-2-215 required that the Department reach a determination that the projected emissions and ambient concentrations constituted a negligible risk to public health, safety, and welfare.

Under Permit #3259-00, the Department completed a health risk assessment based on an emission inventory and ambient air quality modeling for the incineration of animal remains. Based on the results of the emission inventory, modeling, and the health risk assessment, the Department determined that AHRPC's proposal complied with this requirement. Because potential emissions from the incineration of paper documents generally resulted in lower potential emissions when compared with animal remains incineration (see Section IV, Emission Inventory, of the Permit Analysis of Permit #3259-01), the Department determined that animal remains incineration represented the worst-case risk. Therefore, because the unit #1 passed the health risk assessment when incinerating animal remains, the Department determined that a subsequent health risk assessment for paper documents incineration was unnecessary under this permit action. This permit action modified Section II.A.1 of the permit, to allow for routine incineration of paper documents. **Permit #3259-01** replaced Permit #3259-00.

On October 6, 2005, the Department received a complete permit application to add unit #2 to the existing permitted equipment. Additionally, AHRPC requested the permit analysis be fixed to properly reflect the size of unit #1, as a maximum burn rate of 50 lb/hr and a maximum batch load of 200 lb. Unit #1 was originally listed as having a maximum burn rate of 200 lb/hr and a maximum batch load of 200 lb. Therefore, the Department updated the permit analysis to properly reflect the equipment size and updated the permit to reflect the current permit language and rule references used by the Department. **Permit #3259-02** replaced Permit #3259-01.

D. Current Permit Action

On October 6, 2015, the Department received a complete permit application to add unit #3, a 2015 American Crematory Equipment CO. Model A-250P-Quad crematory to the existing permitted equipment inventory. **Permit #3259-03** replaces Permit #3259-02.

E. Additional Information

Additional information, such as applicable rules and regulations, Best Available Control Technology (BACT)/Reasonably Available Control Technology (RACT) determinations, air quality impacts, and environmental assessments, is included in the analysis associated with each change to the permit.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the ARM and are available, upon request, from the Department. Upon request, the Department will provide references for locations of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 - General Provisions, including, but not limited to:

1. ARM 17.8.101 Definitions. This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.
2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.
3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq.*, Montana Code Annotated (MCA).

AHRPC shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation or to continue for a period greater than four hours.
5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means that, without resulting in reduction of the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant that would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner as to create a public nuisance.

B. ARM 17.8, Subchapter 2 - Ambient Air Quality, including, but not limited to the following:

1. ARM 17.8.210, Ambient Air Quality Standards for Sulfur Dioxide
2. ARM 17.8.211, Ambient Air Quality Standards for Nitrogen Dioxide
3. ARM 17.8.212, Ambient Air Quality Standards for Carbon Monoxide
4. ARM 17.8.214, Ambient Air Quality Standard for Hydrogen Sulfide
5. ARM 17.8.220, Ambient Air Quality Standard for Settled Particulate Matter
6. ARM 17.8.223, Ambient Air Quality Standard for PM₁₀

AHRPC must maintain compliance with all applicable ambient air quality standards. As part of the risk assessment required for this project, the Department conducted Screen modeling, an EPA-approved air dispersion model. This analysis demonstrated that the proposed project would comply with all applicable ambient air quality standards as required for permit issuance.

- C. ARM 17.8, Subchapter 3 - Emission Standards, including, but not limited to:
1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.
 2. ARM 17.8.308 Particulate Matter, Airborne. (1) This rule requires an opacity limitation of less than 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, AHRPC shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.
 3. ARM 17.8.309 Particulate Matter, Fuel Burning Equipment. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.
 4. ARM 17.8.310 Particulate Matter, Industrial Process. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule.
 5. ARM 17.8.316 Incinerators. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any incinerator, particulate matter in excess of 0.10 grains per standard cubic foot (gr/dscf) of dry flue gas, adjusted to 12% carbon dioxide (CO₂) and calculated as if no auxiliary fuel had been used. Further, no person shall cause or authorize to be discharged into the outdoor atmosphere from any incinerator, emissions that exhibit an opacity of 10% or greater averaged over 6 consecutive minutes. This rule does not apply to the crematorium because AHRPC has applied for and received an air quality permit in accordance with ARM 17.8.770 and MCA 75-2-215.
 6. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. This rule requires that no person shall burn liquid, solid, or gaseous fuel in excess of the amount set forth in this rule.
 7. ARM 17.8.340 Standard of Performance for New Stationary Sources and Emission Guidelines for Existing Sources. This rule incorporates, by reference, 40 CFR 60, Standards of Performance for New Stationary Sources (NSPS).

This facility is not an NSPS affected source because it does not meet the definition of an affected facility under any NSPS subpart defined in 40 CFR 60.

D. ARM 17.8, Subchapter 5 - Air Quality Permit Application, Operation, and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. AHRPC submitted the appropriate permit application fee for the current permit action.
2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an air quality permit (excluding an open burning permit) issued by the Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions that pro-rate the required fee amount.

E. ARM 17.8, Subchapter 7 - Permit, Construction, and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.
2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an air quality permit or permit alteration to construct, alter, or use any air contaminant sources that have the Potential to Emit (PTE) greater than 25 tons per year (tpy) of any pollutant. AHRPC does not have a PTE greater than 25 tpy of any pollutant; however, in accordance with MCA 75-2-215, an air quality permit is required for all incinerators, regardless of potential incinerator emissions. Because AHRPC must obtain an air quality permit, all normally applicable requirements apply in this case.
3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit program.

4. ARM 17.8.745 Montana Air Quality Permits—Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the Montana Air Quality Permit Program. The current permit action was accomplished in accordance with the provisions of ARM 17.8.745(2).
5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, alteration, or use of a source. AHRPC submitted the required permit application for the current permit action. (7) This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. AHRPC submitted an affidavit of publication of public notice for the October 7, 2015, issue of the *Bozeman Daily Chronicle*, a newspaper of general circulation in the city of Bozeman in Gallatin County, as proof of compliance with the public notice requirements.
6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by the Department must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.
7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that Best Available Control Technology (BACT) shall be utilized. The required BACT analysis is included in Section III of this permit analysis.
8. ARM 17.8.755 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the Department at the location of the source.
9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving AHRPC of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq.*
10. ARM 17.8.759 Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.
11. ARM 17.8.762 Duration of Permit. An air quality permit shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or altered source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than 1 year after the permit is issued.

12. ARM 17.8.763 Revocation of Permit. An air quality permit may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).
13. ARM 17.8.764 Administrative Amendment to Permit. An air quality permit may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.
14. ARM 17.8.765 Transfer of Permit. This rule states that an air quality permit may be transferred from one person to another if written notice of Intent to Transfer, including the names of the transferor and the transferee, is sent to the Department.
15. ARM 17.8.770 Additional Requirements for Incinerators. This rule specifies the additional information that must be submitted to the Department for incineration facilities subject to 75-2-215, MCA.

F. ARM 17.8, Subchapter 8, Prevention of Significant Deterioration of Air Quality, including, but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.
2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through ARM 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the Federal Clean Air Act (FCAA) that it would emit, except as this subchapter would otherwise allow.

This facility is not a major stationary source since this facility is not a listed source and the facility's PTE is below 250 tons per year (tpy) of any pollutant (excluding fugitive emissions).

G. ARM 17.8, Subchapter 12, Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any stationary source having:

- a. PTE > 100 tpy of any pollutant;
 - b. PTE > 10 tpy of any one Hazardous Air Pollutant (HAP), PTE > 25 tpy of a combination of all HAPs, or lesser quantity as the Department may establish by rule; or
 - c. PTE > 70 tpy of PM₁₀ in a serious PM₁₀ nonattainment area.
2. ARM 17.8.1204 Air Quality Operating Permit Program Applicability. (1) Title V of the FCAA Amendments of 1990 requires that all sources, as defined in ARM 17.8.1204 (1), obtain a Title V Operating Permit. In reviewing and issuing Montana Air Quality Permit #3259-02 for AHRPC, the following conclusions were made:
- a. The facility's PTE is less than 100 tons/year for any criteria pollutant.
 - b. The facility's PTE is less than 10 tons/year for any one HAP and less than 25 tons/year of all HAPs.
 - c. This source is not located in a serious PM₁₀ nonattainment area.
 - d. This facility is not subject to any current NSPS.
 - e. This facility is not subject to any current NESHAP standards.
 - f. This source is not a Title IV affected source, nor a solid waste combustion unit.
 - g. This source is not an EPA designated Title V source.

Based on these facts, the Department determined that AHRPC is a minor source of emissions as defined under the Title V operating permit program.

H. MCA 75-2-103, Definitions provides, in part, as follows:

- 1. "Incinerator" means any single or multiple-chambered combustion device that burns combustible material, alone or with a supplemental fuel or catalytic combustion assistance, primarily for the purpose of removal, destruction, disposal, or volume reduction of all or any portion of the input material.
- 2. "Solid waste" means all putrescible and nonputrescible solid, semisolid, liquid, or gaseous wastes, including, but not limited to...air pollution control facilities...

I. MCA 75-2-215, Solid or hazardous waste incineration - additional permit requirements:

- 1. MCA 75-2-215 requires air quality permits for all new commercial solid waste incinerators; therefore, AHRPC must obtain an air quality permit.

2. MCA 75-2-215 requires the applicant to provide, to the Department's satisfaction, a characterization and estimate of emissions and ambient concentrations of air pollutants, including HAPs from the incineration of solid waste. The Department determined that the information submitted in this application is sufficient to fulfill this requirement.
3. MCA 75-2-215 requires that the Department reach a determination that the projected emissions and ambient concentrations constitute a negligible risk to public health, safety, and welfare. The Department completed a health risk assessment based on the emissions inventory and ambient air quality modeling for this proposal. Based on the results of the emission inventory, modeling, and the health risk assessment, the Department determined that AHRPC's proposal complies with this requirement.
4. MCA 75-2-215 requires the application of pollution control equipment or procedures that meet or exceed BACT. The Department determined that the proposed incinerator constitutes BACT.

III. Best Available Control Technology Analysis

A BACT determination is required for each new or altered source. AHRPC shall install on the new or altered source the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. In addition, MCA 75-2-215 requires a BACT determination for all pollutants, not just criteria pollutants.

The Department reviewed other BACT analyses as part of this analysis. AHRPC proposes to control the emissions from the incinerator with a secondary chamber designed specifically to reduce the amount of pollutants, including HAPs, emitted from the incinerator. With the estimated particulate matter (PM) emissions being 1.78 tons per year (tpy), the incremental cost per ton of additional PM control would be very high and not in line with control costs of other similar sources. In addition, the incinerator is limited by permit to 0.10 gr/dscf for PM and to 10% opacity. Therefore, the Department determined that compliance with the PM and opacity emission limits, with no additional controls required, constitutes BACT for PM emissions from this source.

BACT for products of combustion (carbon monoxide (CO), nitrogen oxides (NO_x), Volatile Organic Compounds (VOCs)) and HAPs is good combustion including the requirement that the secondary chamber must be maintained at an operating temperature, which exceeds 1,500 degrees Fahrenheit (°F) on an hourly average with no single reading less than 1,400°F. The operating procedures and minimum temperature requirements contained in the permit will ensure good combustion and will constitute BACT for gaseous combustion emissions and HAPs from this source.

The control options that have been selected as part of this review have controls and control costs similar to other recently permitted similar sources and are capable of achieving the appropriate emission standards.

IV. Emission Inventory

An emission inventory was completed for AHRPC’s proposal to incinerate animal remains (Emission Inventory I.A and I.B) and for incineration of paper documents (Emission Inventory II.A and II.B). The Emission Inventory I.A and I.B, for criteria pollutants, is based on emission factors from the AIRS FACILITY SUBSYSTEM SOURCE CLASSIFICATION CODES (AFSSCC) manual dated March 1990 for pathological incineration (SCC 5-01-005-05). The Emission Inventory II for criteria pollutants is based on emission factors from the AIRS FACILITY SUBSYSTEM SOURCE CLASSIFICATION CODES (AFSSCC) manual dated March 1990 for multi-chamber municipal solid waste incineration (SCC 5-01-001-01). The application indicated that the fuel used to fire the incinerator is LPG; therefore, the Department also used emission factors from AP-42, Section 1.5, Liquefied Petroleum Gas Combustion, to estimate potential emissions from the combustion of LPG.

The Department developed a HAPs emission inventory for the incineration of animal remains (Emission Inventory III.A and III.B) using those emission factors contained in FIRE (the EPA emission factor repository) under SCC 5-02-005-05, pathological incineration. The Department considered only those HAPs for which an emission factor was available and that have been analyzed for other permitted similar sources.

Emission Inventory I.A – Criteria Pollutant Emissions (tons/year) – Animal Incineration #1						
Source	PM	PM₁₀	NO_x	VOC	CO	SO_x
Incinerator	0.88	0.65	0.33	0.33	0.00	0.88
LPG Combustion	0.03	0.03	1.04	0.04	0.14	0.01
Total Criteria Pollutant Potential Emissions	0.91	0.68	1.37	0.37	0.14	0.89

Emission Inventory II.A–Criteria Pollutant Emissions (tons/year)–Paper Documents Incineration #1						
Source	PM	PM₁₀	NO_x	VOC	CO	SO_x
Incinerator	0.21	0.15	0.48	0.16	0.37	0.19
LPG Combustion	0.03	0.03	1.04	0.04	0.14	0.01
Total Criteria Pollutant Potential Emissions	0.24	0.18	1.52	0.20	0.51	0.20

Emission Inventory III.A	
Crematorium Hazardous Air Pollutant Emissions: Animal Remains Incineration #1	
HAP	tons/year
Bromoform	3.00E-06
Carbon Tetrachloride	6.00E-06
Chloroform	6.00E-06
1,2-Dichloropropane	1.45E-04
Ethyl Benzene	1.76E-04
Naphthalene	1.27E-03
Tetrachloroethylene	4.00E-06
1,1,2,2-Tetrachloroethane	1.20E-05
Toluene	5.06E-04
Vinylidene Chloride	8.00E-06
Xylene	2.41E-04
Total HAP Potential Emissions	2.38E-03

CRITERIA POLLUTANT EMISSION CALCULATIONS

Emission Inventory I.A: Animal Remains Incineration (Unit #1)

Incinerator

Maximum Rated Design Capacity: 50 lb/hr
 Operating Hours: 8760 hr/yr
 Conversion: 50 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 219 ton/yr

PM Emissions

Emission Factor: 8.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 219 ton/year (Maximum Rated Design)
 Calculations: 219 ton/year * 8 lb/ton * 0.0005 ton/lb = 0.88 ton/yr

PM₁₀ Emissions:

Emission Factor: 5.92 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 219 ton/year (Maximum Rated Design)
 Calculations: 219 ton/year * 5.92 lb/ton * 0.0005 ton/lb = 0.65 ton/yr

NO_x Emissions:

Emission Factor: 3.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 219 ton/year (Maximum Rated Design)
 Calculations: 219 ton/year * 3 lb/ton * 0.0005 ton/lb = 0.33 ton/yr

VOC Emissions:

Emission Factor: 3.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 219 ton/year (Maximum Rated Design)
 Calculations: 219 ton/year * 3 lb/ton * 0.0005 ton/lb = 0.33 ton/yr

CO Emissions:

Emission Factor: 0.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
Fuel Consumption: 219 ton/year (Maximum Rated Design)
Calculations: 219 ton/year * 0 lb/ton * 0.0005 ton/lb = 0.00 ton/yr

SO_x Emissions:

Emission Factor: 8.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
Fuel Consumption: 219 ton/year (Maximum Rated Design)
Calculations: 219 ton/year * 8 lb/ton * 0.0005 ton/lb = 0.88 ton/yr

Liquefied Petroleum Gas (LPG) Combustion

Heat Input Value: 94 MBtu/hr (AP-42, Fifth Edition, Volume I,
Appendix A)
Hours of Operation: 8760 hr/yr
Operating Capacity (Heat Input Value): 1600 MBtu/hr (Company Information)
Fuel Consumption (Hourly): 1600 MBtu/hr * 1 gal/94 MBtu = 17.02 gal/hr
Fuel Consumption (Annual): 17.02 gal/hr * 8760 hr/yr = 149,106 gal/yr
PM Emissions

All LPG combustion PM emissions are assumed to be PM₁₀ emissions (AP-42, Table 1.5-1, 10/96)

PM₁₀ Emissions:

Emission Factor: 0.4 lb/10³ gal (AP-42, Table 1.5-1, Propane Factor, 10/96)
Calculations: 0.4 lb/10³ gal * 149,106 gal/yr * 0.0005 ton/lb = 0.03 ton/yr

NO_x Emissions:

Emission Factor: 14.0 lb/10³ gal (AP-42, Table 1.5-1, Propane Factor, 10/96)
Calculations: 14.0 lb/10³ gal * 149,106 gal/yr * 0.0005 ton/lb = 1.04 ton/yr

VOC Emissions:

Emission Factor: 0.5 lb/10³ gal (AP-42, Table 1.5-1, Propane Factor, 10/96)
Calculations: 0.5 lb/10³ gal * 149,106 gal/yr * 0.0005 ton/lb = 0.04 ton/yr

CO Emissions:

Emission Factor: 1.9 lb/10³ gal (AP-42, Table 1.5-1, Propane Factor, 10/96)
Calculations: 1.9 lb/10³ gal * 149,106 gal/yr * 0.0005 ton/lb = 0.14 ton/yr

SO_x Emissions:

Emission Factor: 0.1 lb/10³ gal (AP-42, Table 1.5-1, Propane Factor, 10/96)
Calculations: 0.1 lb/10³ gal * 149,106 gal/yr * 0.0005 ton/lb = 0.01 ton/yr

Emission Inventory II.A: Paper Documents Incineration (Unit #1)

Incinerator

Incinerator Operating Capacity: 50 lb/hr or 0.025 ton/hr (Manufacturers Information)
Operating Hours: 8760 hr/yr

PM Emissions

Emission Factor: 1.90 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $1.90 \text{ lb/ton} * 0.025 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.21 \text{ ton/yr}$

PM₁₀ Emissions

Emission Factor: 1.40 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $1.40 \text{ lb/ton} * 0.025 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.15 \text{ ton/yr}$

NO_x Emissions

Emission Factor: 4.40 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $4.40 \text{ lb/ton} * 0.025 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.48 \text{ ton/yr}$

VOC Emissions

Emission Factor: 1.50 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $1.50 \text{ lb/ton} * 0.025 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.16 \text{ ton/yr}$

CO Emissions

Emission Factor: 3.40 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $3.40 \text{ lb/ton} * 0.025 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.37 \text{ ton/yr}$

SO_x Emissions

Emission Factor: 1.70 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $1.70 \text{ lb/ton} * 0.025 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.19 \text{ ton/yr}$

Liquified Petroleum Gas (LPG) Combustion

See Emission Inventory I.

Emission Inventory III.A: HAPs Emission Calculations for Animal Remains Incineration (Unit #1)

Maximum Design Capacity: 219 ton/yr

Bromoform

Emission Factor: 2.90E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)

Operating Capacity: 50 lb/hr or 0.025 ton/hr

Calculations: $2.90 \text{ E-}05 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600 \text{ sec} = 9.14\text{E-}08 \text{ g/sec}$

$9.14\text{E-}08 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 7.25\text{E-}07 \text{ lb/hr}$

$7.25\text{E-}07 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 3.18\text{E-}06 \text{ ton/yr}$

Carbon Tetrachloride

Emission Factor: 5.74E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)

Operating Capacity: 50 lb/hr or 0.025 ton/hr

Calculations: $5.74\text{E-}05 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600 \text{ sec} = 1.81\text{E-}07 \text{ g/sec}$

$1.81\text{E-}07 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 1.44\text{E-}06 \text{ lb/hr}$

$1.44\text{E-}06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 6.29\text{E-}06 \text{ ton/yr}$

Chloroform

Emission Factor: 5.45E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)

Operating Capacity: 50 lb/hr or 0.025 ton/hr

Calculations: $5.45\text{E-}05 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600 \text{ sec} = 1.72\text{E-}07 \text{ g/sec}$

$1.72\text{E-}07 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 1.36\text{E-}06 \text{ lb/hr}$

$1.36\text{E-}06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 5.97\text{E-}05 \text{ ton/yr}$

1,2-Dichloropropane

Emission Factor: 1.32E-03 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)

Operating Capacity: 50 lb/hr or 0.025 ton/hr

Calculations: $1.32\text{E-}03 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600 \text{ sec} = 4.16\text{E-}06 \text{ g/sec}$

$4.16\text{E-}06 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 3.30\text{E-}05 \text{ lb/hr}$

$3.30\text{E-}05 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 1.45\text{E-}04 \text{ ton/yr}$

Ethyl Benzene

Emission Factor: 1.61E-03 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)

Operating Capacity: 50 lb/hr or 0.025 ton/hr

Calculations: $1.61\text{E-}03 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600$
 $\text{sec} = 5.07\text{E-}06 \text{ g/sec}$
 $5.07\text{E-}06 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 4.03\text{E-}05 \text{ lb/hr}$
 $4.03\text{E-}05 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 1.76\text{E-}04 \text{ ton/yr}$

Naphthalene

Emission Factor: $1.16\text{E-}02 \text{ lb/ton}$ (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 50 lb/hr or 0.025 ton/hr
 Calculations: $1.16\text{E-}02 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600$
 $\text{sec} = 3.65\text{E-}05 \text{ g/sec}$
 $3.65\text{E-}05 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 2.90\text{E-}03 \text{ lb/hr}$
 $2.90\text{E-}03 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 1.27\text{E-}03 \text{ ton/yr}$

Tetrachloroethylene

Emission Factor: $4.03\text{E-}05 \text{ lb/ton}$ (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 50 lb/hr or 0.025 ton/hr
 Calculations: $4.03\text{E-}05 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600$
 $\text{sec} = 1.27\text{E-}07 \text{ g/sec}$
 $1.27\text{E-}07 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 1.01\text{E-}06 \text{ lb/hr}$
 $1.01\text{E-}06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 4.41\text{E-}06 \text{ ton/yr}$

1,1,2,2-Tetrachloroethane

Emission Factor: $1.10\text{E-}04 \text{ lb/ton}$ (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 50 lb/hr or 0.025 ton/hr
 Calculations: $1.10\text{E-}04 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600$
 $\text{sec} = 3.47\text{E-}07 \text{ g/sec}$
 $3.47\text{E-}07 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 2.75\text{E-}06 \text{ lb/hr}$
 $2.75\text{E-}06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 1.20\text{E-}05 \text{ ton/yr}$

Toluene

Emission Factor: $4.62\text{E-}03 \text{ lb/ton}$ (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 50 lb/hr or 0.025 ton/hr
 Calculations: $4.62\text{E-}03 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600$
 $\text{sec} = 1.46\text{E-}05 \text{ g/sec}$
 $1.46\text{E-}05 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 1.16\text{E-}04 \text{ lb/hr}$
 $1.16\text{E-}04 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 5.03\text{E-}04 \text{ ton/yr}$

Vinylidene Chloride

Emission Factor: 7.10E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)

Operating Capacity: 50 lb/hr or 0.025 ton/hr

Calculations: $7.10E-05 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600 \text{ sec} = 2.24E-07 \text{ g/sec}$

$2.24E-07 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 1.78E-06 \text{ lb/hr}$

$1.78E-06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 7.78E-05 \text{ ton/yr}$

Xylene

Emission Factor: 2.20E-03 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)

Operating Capacity: 50 lb/hr or 0.025 ton/hr

Calculations: $2.20E-03 \text{ lb/ton} * 0.025 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min}/3600 \text{ sec} = 6.93E-05 \text{ g/sec}$

$6.93E-05 \text{ g/sec} * 1 \text{ lb}/453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 5.50E-04 \text{ lb/hr}$

$5.50E-04 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 2.41E-03 \text{ ton/yr}$

Emission Inventory I.B – Criteria Pollutant Emissions (tons/year) – Animal Incineration #2						
Source	PM	PM₁₀	NO_x	VOC	CO	SO_x
Incinerator	1.75	1.30	0.66	0.66	0.00	1.75
LPG Combustion	0.03	0.03	1.04	0.04	0.14	0.01
Total Criteria Pollutant Potential Emissions	1.78	1.33	1.70	0.70	0.14	1.76

Emission Inventory II.B–Criteria Pollutant Emissions (tons/year)–Paper Documents Incineration #2						
Source	PM	PM₁₀	NO_x	VOC	CO	SO_x
Incinerator	0.42	0.31	0.96	0.33	0.74	0.37
LPG Combustion	0.03	0.03	1.04	0.04	0.14	0.01
Total Criteria Pollutant Potential Emissions	0.45	0.34	2.00	0.37	0.88	0.38

Emission Inventory III.B	
Crematorium Hazardous Air Pollutant Emissions: Animal Remains Incineration #2	
HAP	tons/year
Bromoform	6.00E-06
Carbon Tetrachloride	1.30E-05
Chloroform	1.20E-05
1,2-Dichloropropane	2.89E-04
Ethyl Benzene	3.53E-04
Naphthalene	2.54E-03
Tetrachloroethylene	9.00E-06
1,1,2,2-Tetrachloroethane	2.40E-05
Toluene	1.01E-03
Vinylidene Chloride	1.60E-05
Xylene	4.82E-04
Total HAP Potential Emissions	4.76E-03

CRITERIA POLLUTANT EMISSION CALCULATIONS

Emission Inventory I.B: Animal Remains Incineration (Unit #2)

Incinerator

Maximum Rated Design Capacity: 100 lb/hr
 Operating Hours: 8760 hr/yr
 Conversion: 100 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 438 ton/yr

PM Emissions

Emission Factor: 8.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 438 ton/year (Maximum Rated Design)
 Calculations: 438 ton/year * 8 lb/ton * 0.0005 ton/lb = 1.75 ton/yr

PM₁₀ Emissions:

Emission Factor: 5.92 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 438 ton/year (Maximum Rated Design)
 Calculations: 438 ton/year * 5.92 lb/ton * 0.0005 ton/lb = 1.16 ton/yr

NO_x Emissions:

Emission Factor: 3.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 438 ton/year (Maximum Rated Design)
 Calculations: 438 ton/year * 3 lb/ton * 0.0005 ton/lb = 0.66 ton/yr

VOC Emissions:

Emission Factor: 3.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 438 ton/year (Maximum Rated Design)
 Calculations: 438 ton/year * 3 lb/ton * 0.0005 ton/lb = 0.66 ton/yr

CO Emissions:

Emission Factor: 0.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
Fuel Consumption: 438 ton/year (Maximum Rated Design)
Calculations: 438 ton/year * 0 lb/ton * 0.0005 ton/lb = 0.00 ton/yr

SO_x Emissions:

Emission Factor: 8.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
Fuel Consumption: 438 ton/year (Maximum Rated Design)
Calculations: 438 ton/year * 8 lb/ton * 0.0005 ton/lb = 1.75 ton/yr

Liquified Petroleum Gas (LPG) Combustion

Heat Input Value: 94 MBtu/hr (AP-42, Fifth Edition, Volume I,
Appendix A)
Hours of Operation: 8760 hr/yr
Operating Capacity (Heat Input Value): 1600 MBtu/hr (Company Information)
Fuel Consumption (Hourly): 1600 MBtu/hr * 1 gal/94 MBtu = 17.02 gal/hr
Fuel Consumption (Annual): 17.02 gal/hr * 8760 hr/yr = 149,106 gal/yr
PM Emissions

All LPG combustion PM emissions are assumed to be PM₁₀ emissions (AP-42, Table 1.5-1, 10/96)

PM₁₀ Emissions:

Emission Factor: 0.4 lb/10³ gal (AP-42, Table 1.5-1, Propane Factor, 10/96)
Calculations: 0.4 lb/10³ gal * 149,106 gal/yr * 0.0005 ton/lb = 0.03 ton/yr

NO_x Emissions:

Emission Factor: 14.0 lb/10³ gal (AP-42, Table 1.5-1, Propane Factor, 10/96)
Calculations: 14.0 lb/10³ gal * 149,106 gal/yr * 0.0005 ton/lb = 1.04 ton/yr

VOC Emissions:

Emission Factor: 0.5 lb/10³ gal (AP-42, Table 1.5-1, Propane Factor, 10/96)
Calculations: 0.5 lb/10³ gal * 149,106 gal/yr * 0.0005 ton/lb = 0.04 ton/yr

CO Emissions:

Emission Factor: 1.9 lb/10³ gal (AP-42, Table 1.5-1, Propane Factor, 10/96)
Calculations: 1.9 lb/10³ gal * 149,106 gal/yr * 0.0005 ton/lb = 0.14 ton/yr

SO_x Emissions:

Emission Factor: 0.1 lb/10³ gal (AP-42, Table 1.5-1, Propane Factor, 10/96)
Calculations: 0.1 lb/10³ gal * 149,106 gal/yr * 0.0005 ton/lb = 0.01 ton/yr

Emission Inventory II.B: Paper Documents Incineration (Unit #2)

Incinerator

Incinerator Operating Capacity: 100 lb/hr or 0.025 ton/hr (Manufacturers Information)

Operating Hours: 8760 hr/yr

PM Emissions

Emission Factor: 1.90 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $1.90 \text{ lb/ton} * 0.05 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.42 \text{ ton/yr}$

PM₁₀ Emissions

Emission Factor: 1.40 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $1.40 \text{ lb/ton} * 0.05 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.31 \text{ ton/yr}$

NO_x Emissions

Emission Factor: 4.40 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $4.40 \text{ lb/ton} * 0.05 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.96 \text{ ton/yr}$

VOC Emissions

Emission Factor: 1.50 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $1.50 \text{ lb/ton} * 0.05 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.33 \text{ ton/yr}$

CO Emissions

Emission Factor: 3.40 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $3.40 \text{ lb/ton} * 0.05 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.74 \text{ ton/yr}$

SO_x Emissions

Emission Factor: 1.70 lb/ton burned (FIRE, 5-01-001-01, Municipal Waste Incineration, Multiple Chamber, 03/90)

Calculations: $1.70 \text{ lb/ton} * 0.05 \text{ ton/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.37 \text{ ton/yr}$

Liquefied Petroleum Gas (LPG) Combustion

See Emission Inventory I.

Emission Inventory III.B: HAPs Emission Calculations for Animal Remains Incineration (Unit #2)

Maximum Design Capacity: 438 ton/yr

Bromoform

Emission Factor: 2.90E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)

Operating Capacity: 100 lb/hr or 0.05 ton/hr

Calculations: $2.90 \text{ E-}05 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/3600 sec}$
 $= 1.83\text{E-}07 \text{ g/sec}$
 $1.83\text{E-}07 \text{ g/sec} * 1 \text{ lb/453.6 g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 1.45\text{E-}06 \text{ lb/hr}$
 $1.45\text{E-}06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 6.35\text{E-}06 \text{ ton/yr}$

Carbon Tetrachloride

Emission Factor: $5.74\text{E-}05 \text{ lb/ton}$ (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 100 lb/hr or 0.05 ton/hr
 Calculations: $5.74\text{E-}05 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/3600 sec}$
 $= 3.62\text{E-}07 \text{ g/sec}$
 $3.62\text{E-}07 \text{ g/sec} * 1 \text{ lb/453.6 g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 2.87\text{E-}06 \text{ lb/hr}$
 $2.87\text{E-}06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 1.26\text{E-}05 \text{ ton/yr}$

Chloroform

Emission Factor: $5.45\text{E-}05 \text{ lb/ton}$ (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 100 lb/hr or 0.05 ton/hr
 Calculations: $5.45\text{E-}05 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/3600 sec}$
 $= 3.43\text{E-}07 \text{ g/sec}$
 $3.43\text{E-}07 \text{ g/sec} * 1 \text{ lb/453.6 g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 2.73\text{E-}06 \text{ lb/hr}$
 $2.73\text{E-}06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 1.19\text{E-}05 \text{ ton/yr}$

1,2-Dichloropropane

Emission Factor: $1.32\text{E-}03 \text{ lb/ton}$ (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 100 lb/hr or 0.05 ton/hr
 Calculations: $1.32\text{E-}03 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/3600 sec}$
 $= 8.32\text{E-}05 \text{ g/sec}$
 $8.32\text{E-}05 \text{ g/sec} * 1 \text{ lb/453.6 g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 0.66\text{E-}04 \text{ lb/hr}$
 $0.66\text{E-}04 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 2.89\text{E-}04 \text{ ton/yr}$

Ethyl Benzene

Emission Factor: $1.61\text{E-}03 \text{ lb/ton}$ (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 100 lb/hr or 0.05 ton/hr
 Calculations: $1.61\text{E-}03 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/3600 sec}$
 $= 1.01\text{E-}05 \text{ g/sec}$
 $1.01\text{E-}05 \text{ g/sec} * 1 \text{ lb/453.6 g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 0.81\text{E-}04 \text{ lb/hr}$
 $0.81\text{E-}04 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 3.53\text{E-}04 \text{ ton/yr}$

Naphthalene

Emission Factor: 1.16E-02 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 100 lb/hr or 0.05 ton/hr
Calculations: $1.16\text{E-}02 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/3600 sec}$
= 7.31E-05 g/sec
 $7.31\text{E-}05 \text{ g/sec} * 1 \text{ lb/453.6 g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 5.80\text{E-}04 \text{ lb/hr}$
 $5.80\text{E-}04 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 2.54\text{E-}03 \text{ ton/yr}$

Tetrachloroethylene

Emission Factor: 4.03E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 100 lb/hr or 0.05 ton/hr
Calculations: $4.03\text{E-}05 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/3600 sec}$
= 2.53E-07 g/sec
 $2.53\text{E-}07 \text{ g/sec} * 1 \text{ lb/453.6 g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 2.01\text{E-}06 \text{ lb/hr}$
 $2.01\text{E-}06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 8.83\text{E-}06 \text{ ton/yr}$

1,1,2,2-Tetrachloroethane

Emission Factor: 1.10E-04 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 100 lb/hr or 0.05 ton/hr
Calculations: $1.10\text{E-}04 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/3600 sec}$
= 6.93E-07 g/sec
 $6.93\text{E-}07 \text{ g/sec} * 1 \text{ lb/453.6 g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 5.50\text{E-}06 \text{ lb/hr}$
 $5.50\text{E-}06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 2.41\text{E-}05 \text{ ton/yr}$

Toluene

Emission Factor: 4.62E-03 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 100 lb/hr or 0.05 ton/hr
Calculations: $4.62\text{E-}03 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/3600 sec}$
= 2.91E-05 g/sec
 $2.91\text{E-}05 \text{ g/sec} * 1 \text{ lb/453.6 g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 2.31\text{E-}04 \text{ lb/hr}$
 $2.31\text{E-}04 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 1.00\text{E-}03 \text{ ton/yr}$

Vinylidene Chloride

Emission Factor: 7.10E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 100 lb/hr or 0.05 ton/hr
Calculations: $7.10\text{E-}05 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/3600 sec}$
= 4.47E-07 g/sec

$$4.47\text{E-}07 \text{ g/sec} * 1 \text{ lb/}453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 3.55\text{E-}06 \text{ lb/hr}$$

$$3.55\text{E-}06 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 1.55\text{E-}05 \text{ ton/yr}$$

Xylene

Emission Factor: 2.20E-03 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)

Operating Capacity: 100 lb/hr or 0.05 ton/hr

Calculations: $2.20\text{E-}03 \text{ lb/ton} * 0.05 \text{ ton/hr} * 453.6 \text{ g/lb} * 1 \text{ min/}3600 \text{ sec} = 1.39\text{E-}05 \text{ g/sec}$

$$1.39\text{E-}05 \text{ g/sec} * 1 \text{ lb/}453.6 \text{ g} * 60 \text{ sec/min} * 60 \text{ min/hr} = 1.10\text{E-}04 \text{ lb/hr}$$

$$1.10\text{E-}04 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 4.82\text{E-}04 \text{ ton/yr}$$

Calculations: Unit #3

PTE from Natural Gas Combustion			
Pollutant	Emission Factor (lb/MMft ³)	Annual (lb/yr)	Annual (Ton/yr)
PM10 & PM2.5 (including condensable)	7.6	228.45	0.11
NOx	100	3005.88	1.50
CO	84	2524.94	1.26
SO2	0.6	18.04	0.01
VOC	5.5	165.32	0.08

$$\text{Annual Emission's from Natural Gas} \left(\frac{\text{ton}}{\text{yr}} \right) = \frac{\text{MMBTU/hr}}{\text{BTU/ft}^3} * \frac{\text{lb/MMft}^3}{10^6} * \frac{\text{hr}}{\text{yr}} * \frac{\text{lb}}{\text{ton}}$$

PTE from Cremation of Body (including case wrappings)			
Pollutant	Emission Factor (lb/150 lb body)	Annual (lb/yr)	Annual (Ton/yr)
PM10 & PM2.5 (including condensable)	8.50E-02	744.60	0.37
NOx	2.57E-01	2251.32	1.13
CO	2.21E-01	1935.96	0.97
SO2	1.63E-01	1427.88	0.71
VOC	2.24E-01	1962.24	0.98

$$\text{Annual Emission's from Cremation of Animal Remains} \left(\frac{\text{ton}}{\text{yr}} \right) = \frac{\text{lb}}{150 \text{ lb body}} \times \frac{\text{lb}}{\text{hr}} \times \frac{\text{hr}}{\text{yr}} \times \frac{\text{lb}}{\text{ton}}$$

PTE from Document Incineration			
Pollutant	Emission Factor (lb/ton of material)	Annual (lb/yr)	Annual (Ton/yr)
PM	1.9	1248.30	0.62
PM10	1.4	919.80	0.46
NO _x	4.4	2890.80	1.45
VOC	1.5	985.50	0.49
CO	3.4	2233.80	1.12
SOx	1.7	1116.90	0.56

$$\text{Annual Emission's from Document Incineration} \frac{\text{ton}}{\text{yr}} = \frac{\text{lb}}{\text{ton of material}} \times \frac{\text{lb}}{\text{hr}} \times \frac{\text{lb}}{\text{ton}}$$

V. Air Quality Impacts

The Department conducted SCREEN3 air dispersion modeling, an EPA-approved screening model, for both incineration units. The Department used the indicated inputs obtained from the permit application (#3259-03), including the summary emission rate of all the hazardous air pollutant emissions from the proposed crematorium incinerating animal remains, 0.684E-05 gram per second for unit #1 and 0.137E-03 gram per second for unit #2. The individual one-hour results for each pollutant were then calculated by multiplying the modeled impacts of 0.001954 µg/m³ and 0.0222 µg/m³ by the percentage of each individual HAP making up the total of the HAP emissions. The maximum 1-hour concentrations were then converted to an annual average and used in the risk assessment. The results are contained in Section VI, Health Risk Assessment, of the permit analysis.

Screen View Model Run #1 (50 lb/hr)

Simple Terrain Inputs:

Source Type	=	POINT	
Emission Rate (G/S)	=	0.684E-05	
Stack Height (M)	=	5.4864	
Stack Inside Diam (M)	=		0.2743
Stack Exit Velocity (M/S)	=	8.113	
Stack Gas Exit Temp (K)	=	1033.15	
Ambient Air Temp (K)	=		293
Receptor Height (M)	=	0.0000	
Urban/Rural Option	=	RURAL	
Building Height (M)	=	0.0000	
Minimum Horizontal Building Dimension (M)	=	0.0000	
Maximum Horizontal Building Dimension (M)	=	0.0000	

Stack exit velocity was calculated using a volumetric flow rate of 1016 ACFM.

Summary of ScreenView Model Results

Calculation Procedure	Maximum 1 Hour Concentration ($\mu\text{g}/\text{m}^3$)	Maximum 24-Hour Concentration ($\mu\text{g}/\text{m}^3$)	Maximum Annual Concentration ($\mu\text{g}/\text{m}^3$)	Distance of Maximum (M)	Terrain Height (M)
Simple Terrain	0.001954	0.000782	0.0001954	100	0

Screen View Model Run #2 (100 lb/hr)

Simple Terrain Inputs:

Source Type	=	POINT	
Emission Rate (G/S)	=	0.137E-03	
Stack Height (M)	=	7.493	
Stack Inside Diam (M)	=	0.3048	
Stack Exit Velocity (M/S)	=	9.1717	
Stack Gas Exit Temp (K)	=	1043.706	
Ambient Air Temp (K)	=	293	
Receptor Height (M)	=	0.0000	
Urban/Rural Option	=	RURAL	
Building Height (M)	=	0.0000	
Minimum Horizontal Building Dimension (M)	=	0.0000	
Maximum Horizontal Building Dimension (M)	=	0.0000	

Stack exit velocity was calculated using a volumetric flow rate of 1418 ACFM.

Summary of Screen View Model Results

Calculation Procedure	Maximum 1 Hour Concentration ($\mu\text{g}/\text{m}^3$)	Maximum 24-Hour Concentration ($\mu\text{g}/\text{m}^3$)	Maximum Annual Concentration ($\mu\text{g}/\text{m}^3$)	Distance of Maximum (M)	Terrain Height (M)
Simple Terrain	0.0222	0.00888	0.00222	140	0

Screen View Model Run #3 (150 lb/hr)

Simple Terrain Inputs:

Source Type	=	POINT
Emission Rate (G/S)	=	0.01
Stack Height (M)	=	5.486
Stack Inside Diam (M)	=	0.5081
Stack Exit Velocity (M/S)	=	6.096
Stack Gas Exit Temp (K)	=	810.93
Ambient Air Temp (K)	=	293
Receptor Height (M)	=	0.0000
Urban/Rural Option	=	RURAL
Building Height (M)	=	0.0000
Minimum Horizontal Building Dimension (M)	=	0.0000
Maximum Horizontal Building Dimension (M)	=	0.0000

Stack exit velocity was calculated using a volumetric flow rate of 1552 ACFM.

Summary of ScreenView Model Results

Calculation Procedure	Maximum 1 Hour Concentration ($\mu\text{g}/\text{m}^3$)	Distance of Maximum (M)	Terrain Height (M)
Simple Terrain	2.752	64	0

Note: The emission rate is dependent on the total list of known HAPs produced during the combustion of animal remains, liquefied petroleum gas, and paper like material. A copy of the health risk assessment can be seen in section VI. of this permit analysis.

VI. Health Risk Assessment

A health risk assessment was conducted to determine if the proposed AHRPC incinerator/crematorium complies with the negligible risk requirement of MCA 75-2-215. The emission inventory did not contain sufficient quantities of any pollutant on the Department's list of pollutants for which non-inhalation impacts must be considered; therefore, the Department determined that inhalation risk was the only necessary pathway to consider. Only those HAPs for which there were established emission factors were considered in the emission inventory.

NEGLIGIBLE RISK ASSESSMENT #1 (50 lb/hr Crematorium)					
Hazardous Air Pollutants	Speciated HAP Concentration	Cancer Factor	Cancer Value	Non-Cancer Factor	Non-Cancer Value
Bromoform	1.48E-05 ug/m3	1.10E-06	1.63E-11	ND	ND
Carbon Tetrachloride	2.93E-05 ug/m3	1.50E-05	4.39E-10	ND	ND
Chloroform	2.78E-05 ug/m3	2.30E-05	6.40E-10	ND	ND
1,2-Dichloropropane	0.000674 ug/m3	ND	ND	ND	ND
Ethyl Benzene	0.000822 ug/m3	ND	ND	1.00E+03	8.22E-07
Naphthalene	0.00592 ug/m3	ND	ND	ND	ND
Tetrachloroethylene	2.06E-05 ug/m3	5.90E-06	1.21E-10	ND	ND
1,1,2,2-Tetrachloroethane	5.61E-05 ug/m3	5.80E-05	3.26E-09	ND	ND
Toluene	0.002358 ug/m3	ND	ND	4.00E+02	5.89E-06
Vunylidine Chloride	3.62E-05 ug/m3	5.00E-05	1.81E-09	ND	ND
Xylene	0.001123 ug/m3	ND	ND	ND	ND
TOTALS			6.28E-09		6.72E-06

ELCR = Excess Lifetime Cancer Risks

ND = Not Determined, No Available Information

A copy of the Screen View modeling conducted for this project is on file with the Department.

NEGLIGIBLE RISK ASSESSMENT #2
(100 lb/hr Crematorium)

Hazardous Air Pollutants (HAPs)	Modeled Concentration (ug/m3)	Cancer Potency Factor	ELRC	Non-Cancer RFC Factor	Non-Cancer Hazard Quotient
Bromoform	1.57E-06 ug/m3	1.10E-06	1.73E-12	ND	ND
Carbon Tetrachloride	3.12E-06 ug/m3	1.50E-05	4.68E-11	ND	ND
Chloroform	2.96E-06 ug/m3	2.30E-05	6.81E-11	ND	ND
1,2-Dichloropropane	7.17E-05 ug/m3	ND	ND	ND	ND
Ethyl Benzene	8.74E-05 ug/m3	ND	ND	1.00E+03	8.74E-08
Naphthalene	0.00063 ug/m3	ND	ND	ND	ND
Tetrachloroethylene	2.19E-06 ug/m3	5.90E-06	1.29E-11	ND	ND
1,1,2,2-Tetrachloroethane	5.97E-06 ug/m3	5.80E-05	3.46E-10	ND	ND
Toluene	0.000251 ug/m3	ND	ND	4.00E+02	6.27E-07
Vunylidine Chloride	3.86E-06 ug/m3	5.00E-05	1.93E-10	ND	ND
Xylene	0.000119 ug/m3	ND	ND	ND	ND
Total Risks			6.69E-10		7.15E-07

ELCR = Excess Lifetime Cancer Risks

ND = Not Determined, No Available Information

- A copy of the Screen View modeling conducted for this project is on file with the Department.

Listed Hazardous Air Pollutants (HAPs)	Cancer URF (2)	Cancer Risk (3)	CNCREL (4) (ug/m3)	CNCREL Quotient (5)
Antimony (less than)	N/A	N/A	N/A	N/A
Arsenic (less than)	0.0043	1.38E-07	0.015	2.14E-03
Beryllium	0.0024	7.02E-09	0.02	1.46E-04
Cadmium	0.0018	4.23E-08	0.01	2.35E-03
Chromium	N/A	N/A	N/A	N/A
Chromium, hx	0.012	3.46E-07	0.1	2.88E-04
Cobalt (less than)	N/A	N/A	0.1	1.87E-05
Lead	N/A	N/A	0.15	9.42E-04
Nickel	N/A	N/A	0.09	9.06E-04
Selenium	N/A	N/A	20	4.65E-06
2-methylnaphthalene	N/A	N/A	N/A	N/A
3-methylchloranthrene (less than)	0.0063	4.15E-11	N/A	N/A
7,12 Dibenz(a)anthracene (less than)	0.071	4.16E-09	N/A	N/A
Anthracene (less than)	N/A	N/A	N/A	N/A
Benzene	7.8E-06	1.20E-10	30	5.13E-07
Dichlorobenzene	0.000011	9.67E-11	800	1.10E-08
Hexane	N/A	N/A	700	1.88E-05
Napthalene	0.000034	N/A	3	1.49E-06
Phenanathrene	N/A	N/A	N/A	N/A
Toluene	N/A	N/A	5000	4.98E-09
Acenaphthene	N/A	N/A	N/A	N/A
Acenaphthylene	N/A	N/A	N/A	N/A

Benzo(a)anthracene (less than)	N/A	N/A	N/A	N/A
Benzo(a)pyrene (less than)	0.0011	3.42E-11	N/A	N/A
Benzo(b)fluoranthene (less than)	0.00011	1.87E-12	N/A	N/A
Benzo(g,h,i)perylene (less than)	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene (less than)	0.00011	1.67E-12	N/A	N/A
Chrysene (less than)	0.000011	6.34E-13	N/A	N/A
Dibenzo(a,h)anthracene (less than)	0.00011	1.49E-12	N/A	N/A
Fluorene	N/A	N/A	N/A	N/A
Fluoranthene	N/A	N/A	N/A	N/A
Indeno(1,2,3-cd)pyrene (less than)	0.00011	1.81E-12	N/A	N/A
Phenanthrene	N/A	N/A	N/A	N/A
Pyrene	N/A	N/A	N/A	N/A
Acetaldehyde	N/A	N/A	9	3.08E-05
Formaldehyde	0.000013	9.44E-10	9.8	7.41E-06
<u>Listed Acids</u>				
Hydrogen chloride (hydrochloric acid)	N/A	N/A	20	7.69E-03
Hydrogen fluoride	N/A	N/A	14	1.01E-04
2,3,7,8-tetrachlorodibenzo-p-dioxin	33	5.59E-09	0.00004	4.24E-06
SUM of Hexachlorodibenzo-p-dioxin	1.3	3.23E-09	N/A	N/A
SUM --->		5.47E-07		0.014641

The Department determined that the risks estimated in the risk assessment are in compliance with the requirement to demonstrate negligible risk to human health and the environment. As demonstrated in the above tables, and in accordance with the negligible risk requirement, no single HAP concentration results in an excess lifetime cancer risk (ELCR) greater than 1.00E-06 and the sum of all HAPs results in an ELCR of less than 1.00E-05. Further, the sum of the non-cancer hazard quotient for the three crematoriums is 1.465E-2, which is less than 1.0 as required to demonstrate compliance with the negligible risk requirement.

Because potential emissions from the incineration of paper documents generally results in lower potential emissions when compared with animal remains incineration (see Section IV, Emission Inventory, of the Permit Analysis), the Department determined that animal remains incineration represents the worst-case risk. Therefore, because the crematorium passes the health risk assessment when incinerating animal remains, the Department determined that a subsequent health risk assessment for paper documents incineration is unnecessary under the current permit action.

VII. Taking or Damaging Implication Analysis

As required by 2-10-101 through 105, MCA, the Department conducted a private property taking and damaging assessment and determined there are no taking or damaging implications.

YES	NO	
	X	1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
	X	2. Does the action result in either a permanent or indefinite physical occupation of private property?
	X	3. Does the action deny a fundamental attribute of ownership? (ex.: right to exclude others, disposal of property)
	X	4. Does the action deprive the owner of all economically viable uses of the property?
	X	5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If no, go to (6)].
		5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
		5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
	X	6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action)
	X	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally?
	X	7a. Is the impact of government action direct, peculiar, and significant?
	X	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded?
	X	7c. Has government action lowered property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?
	X	Takings or damaging implications? (Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b; the shaded areas)

Based on this analysis, the Department determined there are no taking or damaging implications associated with this permit action.

VIII. Environmental Assessment

An Environmental Assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Air Resources Management Bureau
1520 East Sixth Avenue
P.O. Box 200901, Helena, Montana 59620-0901
(406) 444-3490

FINAL ENVIRONMENTAL ASSESSMENT (EA)

Issued For: At Home On the Range Pet Cemetery

Permit Number: 3259-03

Preliminary Determination Issued: 10/22/2015

Department Decision Issued: 11/24/2015

Permit Final: 12/10/2015

1. *Legal Description of Site:* The facility is located in Section 17, Township 1 South, Range 3 East, Gallatin County, Montana. The physical address is 8400 Amsterdam Road, Manhattan, MT 59741.
2. *Description of Project:* At Home on the Range Pet Cemetery (AHRPC) proposed to install and operate a 2015 American Crematory Equipment CO. Model A-250P-Quad crematory to run in conjunction with two existing animal crematory units, and associated equipment.
3. *Objectives of Project:* The project would allow AHRPC to safely dispose of animal remains and/or paper documents while maintaining compliance with negligible risk requirements as discussed in Section VI of the permit analysis. Further, the project would result in business and revenue for the company.
4. *Alternatives Considered:* In addition to the proposed action, the Department also considered the “no-action” alternative. The “no-action” alternative considers what would happen if there were no action taken by the permittee. If At Home On the Range Pet Cemetery (AHRPC) did not complete the proposed project, the total emissions would not increase from that of the two incineration units previously installed. However, AHRPC would be limited to the amount of remains or paper material that they would be permitted to incinerate which could possibly result in a loss of revenue and backlog of remains and paper material that would need to be reduced or destroyed. The Department did not pursue the “no-action” alternative because AHRPC demonstrated compliance with all applicable rules and regulations as required for permit issuance.
5. *A Listing of Mitigation, Stipulations, and Other Controls:* A list of enforceable conditions, including a BACT analysis, would be included in Permit #3259-03.
6. *Regulatory Effects on Private Property:* The Department considered alternatives to the conditions imposed in this permit as part of the permit development. The Department determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

7. The following table summarizes the potential physical and biological effects of the proposed project on the human environment. The “no-action” alternative was discussed previously.

		Major	Moderate	Minor	None	Unknown	Comments Included
A	Terrestrial and Aquatic Life and Habitats			X			Yes
B	Water Quality, Quantity, and Distribution			X			Yes
C	Geology and Soil Quality, Stability, and Moisture			X			Yes
D	Vegetation Cover, Quantity, and Quality			X			Yes
E	Aesthetics			X			Yes
F	Air Quality			X			Yes
G	Unique Endangered, Fragile, or Limited Environmental Resources			X			Yes
H	Demands on Environmental Resource of Water, Air, and Energy			X			Yes
I	Historical and Archaeological Sites				X		Yes
J	Cumulative and Secondary Impacts			X			Yes

SUMMARY OF COMMENTS ON POTENTIAL PHYSICAL AND BIOLOGICAL EFFECTS:
The following comments have been prepared by the Department.

A. Terrestrial and Aquatic life and Habitats:

Emissions from the proposed project would impact terrestrial and aquatic life and habitats in the proposed project area. However, as detailed in Section V and Section VI of the permit analysis and Section 7.F of this EA, any emissions and resulting impacts from the project would be minor due to the low concentration of those pollutants emitted.

Further, the crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required. Overall, any impact to the terrestrial and aquatic life and habitats of the proposed project area would be minor.

B. Water Quality, Quantity, and Distribution:

The proposed project would not affect water quantity or distribution in the proposed project area. The crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required. Further, the project would not discharge or use water as part of normal operations.

Emissions from the proposed project would impact water quality in the proposed project area. However, as detailed in Section V and Section VI of the permit analysis and Section 7.F of this EA, any emissions and resulting deposition impacts from the project would be minor due to the low concentration of those pollutants emitted.

C. Geology and Soil Quality, Stability, and Moisture:

The proposed project would not impact the geology, soil quality, stability, and moisture of the proposed project area. The crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required.

Further, as described in Section V and Section VI of the permit analysis, and Section 7.F of this EA, the crematorium would result in minor air pollution emissions to the outside ambient environment. These pollutants would deposit on the soils in the surrounding area. Any impact from deposition of these pollutants would be minor due to dispersion characteristics and the low concentration of those pollutants emitted.

D. Vegetation Cover, Quantity, and Quality:

Emissions from the proposed project would impact vegetation cover, quantity, and quality in the proposed project area. However, as detailed in Section V and Section VI of the permit analysis and 7.F of this EA, any emissions and resulting impacts from the project would be minor due to dispersion characteristics of pollutants and the atmosphere, and the low concentration and magnitude of those pollutants emitted.

Further, the crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required. Overall, any impact to the vegetation cover, quantity, and quality of the proposed project area would be minor.

E. Aesthetics:

The proposed project would result in only minor impacts to the aesthetic nature of the proposed project area because the crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required. Further, the overall land use in the area would not change as a result of the proposed project; therefore, the project would not change the aesthetic nature of the area. Further, visible emissions from the source would be limited to 10% opacity and the permit would include emission control requirements. Also, because the crematorium would be located within an existing building, the project would not result in excess noise from normal operations. Overall, any impact to the aesthetic nature of the project area would be minor.

F. Air Quality:

The proposed project would result in the emission of various criteria pollutants and HAPs to the ambient air in the proposed project area. However, as detailed in Section V and Section VI of the permit analysis, AHRPC demonstrated, through ScreenView air dispersion modeling, that any air quality impacts from the proposed project would be minor.

The Department conducted air dispersion modeling to determine the ambient air quality impacts from HAPs that would be generated by the crematorium. The ScreenView model was selected for the air dispersion modeling. The full meteorology option was selected to provide a conservative result. Receptors were placed from 1 to 5000 meters in a simple terrain array. Simple terrain receptors were used to represent the topography of the project area. The model predicted a cumulative modeled impact of $0.001954 \mu\text{g}/\text{m}^3$, 0.0222

$\mu\text{g}/\text{m}^3$, and $2.752 \mu\text{g}/\text{m}^3$ which the Department used to conduct a risk assessment. The health risk assessment demonstrated that the risks associated with the crematorium are in compliance with the negligible risk requirement contained in MCA 75-2-215. It should be noted that the HAPs list for Unit #3 has considerable more air pollutants listed than the HAPs list for Units #1 and #2.

Stack parameters and emission rates used in the ScreenView model are contained in Section V of the permit analysis and are on file with the Department. Stack velocity and gas temperature were taken from data provided by the manufacturer of the crematorium. The health risk assessment is contained in Section VI of the permit analysis. Due to the dispersion characteristics of the proposed area of operation and low levels of pollutants that would be emitted from the proposed project, and the corresponding minor deposition of those pollutants, the Department determined that any impacts to air quality would be minor.

G. Unique Endangered, Fragile, or Limited Environmental Resources:

Emissions from the proposed project would impact unique, endangered, fragile, or limited environmental resources located in the proposed project area because the proposed project would result in increased emissions in the proposed project area. However, as detailed in Section 7.F of this EA and Section V and Section VI of the permit analysis, any emissions and resulting impacts from the project would be minor due to the low concentration and low magnitude of those pollutants emitted.

Further, the crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required, thus, the project would not change the typical character of the area. Overall, any impact to any existing unique, endangered, fragile, or limited environmental resources in the proposed project area would be minor.

H. Demands on Environmental Resource of Water, Air, and Energy:

The proposed project would result in minor demands on environmental resources of water and air as discussed in Section 7.B and 7.F of this EA, respectively. Further, as detailed in Section V and Section VI of the permit analysis, project impacts on air resources in the proposed project area would be minor due to dispersion characteristics of the area, the types of pollutants emitted, and the low concentration of those pollutants emitted. Finally, because the crematorium would be operated on natural gas, the crematorium would impact the nonrenewable natural gas resource. However, because the project is small by industrial standards and small amounts of natural gas would be required for operation; hence, the resulting impact on energy resources would be minor.

I. Historical and Archaeological Sites:

The proposed project would not result in any impact to any existing historical and archaeological sites in the proposed project area because the crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required.

According to previous correspondence from the Montana State Historic Preservation Office, there is low likelihood of any disturbance to any known archaeological or historic site, given previous industrial disturbance within the area and instillation of the new crematorium would be within the existing building. Therefore, the operation would have no new effect on any known historic or archaeological site that may be located within or near the proposed operating site.

J. Cumulative and Secondary Impacts:

Overall, the cumulative and secondary impacts from this project on the physical and biological environment in the immediate area would be minor because the facility is relatively small by industrial standards, would operate within an existing building, and would result in only minor emissions. Further, no additional industrial sources/impacts would result from the crematorium operation. The Department believes that this facility could be expected to operate in compliance with all applicable rules and regulations as outlined in Permit #3259-03.

8. The following table summarizes the potential economic and social effects of the proposed project on the human environment. The “no-action” alternative was discussed previously.

		Major	Moderate	Minor	None	Unknown	Comments Included
A	Social Structures and Mores				X		Yes
B	Cultural Uniqueness and Diversity				X		Yes
C	Local and State Tax Base and Tax Revenue				X		Yes
D	Agricultural or Industrial Production				X		Yes
E	Human Health			X			Yes
F	Access to and Quality of Recreational and Wilderness Activities				X		Yes
G	Quantity and Distribution of Employment				X		Yes
H	Distribution of Population				X		Yes
I	Demands for Government Services			X			Yes
J	Industrial and Commercial Activity				X		Yes
K	Locally Adopted Environmental Plans and Goals				X		Yes
L	Cumulative and Secondary Impacts			X			Yes

SUMMARY OF COMMENTS ON POTENTIAL ECONOMIC AND SOCIAL EFFECTS: The Department has prepared the following comments.

A. Social Structures and Mores:

The proposed project would not have any impact on social structures and mores of the proposed area of operation because the project is small by industrial standards and operations would take place within an existing building and no new construction or ground disturbance would be required. Further, the predominant use of the surrounding area would not change as a result of the proposed project.

B. Cultural Uniqueness and Diversity:

The proposed project would not have any impact on cultural uniqueness and diversity of the proposed area of operation because the project is small by industrial standards and operations would take place within an existing building and no new construction or ground disturbance would be required. Further, the predominant use of the surrounding area would not change as a result of the proposed project.

C. Local and State Tax Base and Tax Revenue:

The proposed project would have a minor impact on the local and state tax base and tax revenue because the project is small by industrial standards and would not result in any increased commercial activity beyond the proposed project. Further, the crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required and no new employees would be hired as a result of the proposed project.

D. Agricultural or Industrial Production:

Because the crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required, the project would not impact or displace any land used for agricultural production. Further, the project would not result in any increased commercial/industrial activity beyond the proposed project.

E. Human Health:

As detailed in Section VI of the permit analysis, a health risk assessment was conducted to determine if the proposed crematorium would comply with the negligible risk requirement of MCA 75-2-215 and ARM 17.8.770. As defined in ARM 17.8.740(10), negligible risk is *“an increase in excess lifetime cancer risk of less than 1.0×10^{-6} for any individual pollutant, and 1.0×10^{-5} for the aggregate of all pollutants, and an increase in the sum of the non-cancer hazard quotients for all pollutants with similar toxic effects of less than 1.0 in order to determine negligible risk.”* For the purposes of determining negligible risk for the crematorium operations, all pollutants were included in the human health risk assessment.

All of the individual pollutant concentrations for the ELCR meet the acceptable risk limit because they are less than 1.00E-06 for each pollutant and less than 1.00E-05 for the aggregate of all pollutants. Further, the sums of the chronic and acute non-cancer hazard quotients are less than 1.0. Therefore, the crematorium proposed for the AHRPC facility

meets the criteria of ARM 17.8.770 and operation of the incinerator would be considered a negligible risk to public health, safety, welfare, and to the environment. Overall, any impacts to human health in the proposed project area would be minor.

F. Access to and Quality of Recreational and Wilderness Activities:

Because the crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required, the project would not affect any access to or quality of any recreation or wilderness activities in the area. In addition, the minimal noise created by the crematorium operations would not impact the area due to the source being located within the existing building structure.

G. Quantity and Distribution of Employment:

The proposed project would impact the quantity and distribution of employment of the proposed project area because the project would not require any new employees. The proposed project would require only a single operator and possibly a support employee, both of which would be accommodated by existing company staff.

H. Distribution of Population:

The proposed project would impact the distribution of population of the proposed project area because the project would not provide any permanent employment opportunities. The proposed project would require only a single operator and possibly a support employee, both of which would be accommodated by existing company staff.

I. Demands for Government Services:

Government services would be required for acquiring the appropriate permits from government agencies. In addition, the permitted source of emissions would be subject to periodic inspections by government personnel. Demands for government services would be minor.

J. Industrial and Commercial Activity:

The proposed project would result in only a minor impact on local industrial and commercial activity because the crematorium would operate within an existing building and no new construction or ground disturbance to the area would be required. Therefore, the proposed project would not result in additional industrial production beyond the proposed operations.

K. Locally Adopted Environmental Plans and Goals:

The Department is not aware of any locally adopted environmental plans or goals in the immediate area affected by the proposed project. The state standards would be to protect the proposed project site and the environment surrounding the area of operations.

L. Cumulative and Secondary Impacts:

Overall, cumulative and secondary impacts from this project would result in minor impacts to the economic and social environment in the immediate area because the facility is relatively small by industrial standards, would operate within an existing building, and would result in only minor emissions. In addition, the facility would not contribute to any secondary commercial or industrial activity. The Department believes that this facility could be expected to operate in compliance with all applicable rules and regulations as would be outlined in Permit #3259-03.

Recommendation: No EIS is required.

If an EIS is not required, explain why the EA is an appropriate level of analysis: The current permit action is for the construction and operation of a crematorium. Permit #3259-03 includes conditions and limitations to ensure the facility would operate in compliance with all applicable rules and regulations. In addition, as detailed in the above EA, there are no significant impacts associated with the proposed project.

Other groups or agencies contacted or which may have overlapping jurisdiction: Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program.

Individuals or groups contributing to this EA: Department of Environmental Quality – Air Quality Bureau, Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program.

EA prepared by: John P. Proulx
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