

Air Quality Permit

Issued to: At Home on the Range Pet Cemetery Permit #3259-01
8400 Amsterdam Road Administrative Amendment Request Received: 12/17/03
Manhattan, MT 59741 Department Decision on Administrative
Amendment: 01/28/04
Permit Final: 02/13/04
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 (crematorium) and associated equipment. A description of the permitted equipment is contained in the permit analysis. 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.

B. Current Permit Action

On December 17, 2003, the Montana Department of Environmental Quality (Department) received a request for 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 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 results in an increase in potential emissions of less than 15 tons per year; however, Section II.A.1 of **Permit #3259-00** specifically prohibits incineration of these materials without approval from the Department. Therefore, in accordance with the provisions of ARM 17.8.745(2), AHRPC must obtain an administrative permit amendment prior to routine operations of this type.

Further, for all incinerator operations, 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. 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 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. The current permit action modifies Section II.A.1 of the permit to allow for routine incineration of paper documents.

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. The crematorium shall be equipped with auxiliary fuel burners. The auxiliary fuel burners shall be used to preheat the secondary chamber of the crematorium 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 crematorium 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 the crematorium as specified in the application for Montana Air Quality Permit #3259-00. 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 the crematorium:

1. Visible emissions that exhibit an opacity of 10% or greater averaged over 6 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 on the crematorium 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(1) that would include 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 or the addition of a new emissions unit. 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 5 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).

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 Department's decision on the application is not final unless 15 days have elapsed and there is no request for a hearing under this section. The filing of a request for a hearing postpones the effective date of the Department's decision until conclusion of the hearing and issuance of a final decision by the Board.

- 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 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall be revoked (ARM 17.8.762).

Permit Analysis
At Home on the Range Pet Cemetery
Permit #3259-01

I. Introduction

A. Permitted Equipment

At Home on the Range Pet Cemetery (AHRPC) operates a 2003 Shenandoah Model C6 animal crematory (crematorium) 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

The crematorium incorporates primary and secondary combustion chambers and is fueled by liquefied petroleum gas (LPG). The crematorium is capable of incinerating a maximum of 200 pounds per hour (lb/hr) of animal remains and/or paper documents.

C. Permit History

On June 6, 2003, AHRPC was issued final Montana Air Quality **Permit #3259-00** for the operation of a 2003 Shenandoah Model C6 animal crematory (crematorium) for the incineration of animal remains and any associated container.

D. Current Permit Action

On December 17, 2003, the Montana Department of Environmental Quality (Department) received a request for 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 results in an increase in potential emissions of less than 15 tons per year; however, Section II.A.1 of Permit #3259-00 specifically prohibits incineration of these materials without approval from the Department. Therefore, in accordance with the provisions of ARM 17.8.745(2), AHRPC must obtain an administrative permit amendment prior to routine operations of this type.

Further, for all incinerator operations, Montana Code Annotated (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. 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 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. The current permit action modifies Section II.A.1 of the permit to allow for routine incineration of paper documents. **Permit #3259-01** replaces Permit #3259-00.

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 ARMs 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 4 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:

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 comply with all applicable ambient air quality standards. As part of the risk assessment required for this project, the Department conducted Screen View 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. 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.
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 of dry flue gas, adjusted to 12% carbon dioxide and calculated as if no auxiliary fuel had been used. Also, 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 17.8.706(5) 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 New Source Performance Standards. 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. AHRPC shall 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. Then current permit action is an administrative amendment and does not require a permit application or application fee.
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; and the air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

The annual assessment and collection of the air quality operation fee, as 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 which 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 facility to obtain an air quality permit or permit alteration if they 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. (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. The current permit action was accomplished under the provisions of ARM 17.8.745(2) and ARM 17.8.764 and is an administrative permit amendment that does not require a permit application or public notice.
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 current permit action does not require a BACT analysis and determination.
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 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. The current permit action is an administrative permit amendment.
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 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 #3259-01 for AHRPC, the following conclusions were made:
- a. The facility's PTE is less than 100 tons/year for any 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 will be 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

The current permit action is an administrative permit amendment and does not require a BACT analysis and determination.

IV. Emission Inventory

An emission inventory was completed for AHRPC's proposal to incinerate animal remains (Emission Inventory I) and for incineration of paper documents (Emission Inventory II). The Emission Inventory I, for criteria pollutants, is based on emission factors from the AIRS FACILITY SUBSYSTEM SOURCE CLASSIFICATION CODES (FIRE) 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 (FIRE) 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 hazardous air pollutant emission inventory for the incineration of animal remains (Emission Inventory III) 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 – Criteria Pollutant Emissions (tons/year) – Animal Incineration						
Source	PM	PM₁₀	NO_x	VOC	CO	SO_x
Incinerator	3.50	2.59	1.31	1.31	0.00	3.50
LPG Combustion	NA	0.03	1.04	0.04	0.14	0.01
Total Criteria Pollutant Potential Emissions	3.50	2.62	2.35	1.35	0.14	3.51

Emission Inventory II – Criteria Pollutant Emissions (tons/year) – Paper Documents Incineration						
Source	PM	PM₁₀	NO_x	VOC	CO	SO_x
Incinerator	0.83	0.61	1.93	0.66	1.49	0.74
LPG Combustion	NA	0.03	1.04	0.04	0.14	0.01
Total Criteria Pollutant Potential Emissions	0.83	0.64	2.97	0.70	1.63	0.75

Emission Inventory III
Crematorium Hazardous Air Pollutant Emissions: Animal Remains Incineration

HAP	tons/year
Bromoform	1.30E-05
Carbon Tetrachloride	2.50E-05
Chloroform	2.40E-05
1,2-Dichloropropane	5.80E-04
Ethyl Benzene	7.10E-04
Naphthalene	5.10E-03
Tetrachloroethylene	1.80E-05
1,1,2,2-Tetrachloroethane	4.80E-05
Toluene	2.00E-03
Vinylidene Chloride	3.10E-05
Xylene	9.60E-04
Total HAP Potential Emissions	9.51E-03

CRITERIA POLLUTANT EMISSION CALCULATIONS

Emission Inventory I: Animal Remains Incineration

Incinerator

Maximum Rated Design Capacity: 200 lb/hr
 Operating Hours: 8760 hr/yr
 Conversion: 200 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 876 ton/yr

PM Emissions

Emission Factor: 8.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 876 ton/year (Maximum Rated Design)
 Calculations: 876 ton/year * 8 lb/ton * 0.0005 ton/lb = 3.50 ton/yr

PM₁₀ Emissions:

Emission Factor: 5.92 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 876 ton/year (Maximum Rated Design)
 Calculations: 876 ton/year * 5.92 lb/ton * 0.0005 ton/lb = 2.59 ton/yr

NO_x Emissions:

Emission Factor: 3.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 876 ton/year (Maximum Rated Design)
 Calculations: 876 ton/year * 3 lb/ton * 0.0005 ton/lb = 1.31 ton/yr

VOC Emissions:

Emission Factor: 3.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 876 ton/year (Maximum Rated Design)
 Calculations: 876 ton/year * 3 lb/ton * 0.0005 ton/lb = 1.31 ton/yr

CO Emissions:

Emission Factor: 0.00 lb/ton (AFSSCC 5-02-005-05, 03/90, Page 227)
 Fuel Consumption: 876 ton/year (Maximum Rated Design)
 Calculations: 876 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: 876 ton/year (Maximum Rated Design)
 Calculations: 876 ton/year * 8 lb/ton * 0.0005 ton/lb = 3.50 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: Paper Documents Incineration

Incinerator

Incinerator Operating Capacity: 200 lb/hr or 0.1 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 lb/ton * 0.10 ton/hr * 8760 hr/yr * 0.0005 ton/lb = 0.83 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 lb/ton * 0.10 ton/hr * 8760 hr/yr * 0.0005 ton/lb = 0.61 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 lb/ton * 0.10 ton/hr * 8760 hr/yr * 0.0005 ton/lb = 1.93 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 lb/ton * 0.10 ton/hr * 8760 hr/yr * 0.0005 ton/lb = 1.49 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 lb/ton * 0.10 ton/hr * 8760 hr/yr * 0.0005 ton/lb = 0.74 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 lb/ton * 0.10 ton/hr * 8760 hr/yr * 0.0005 ton/lb = 0.66 ton/yr

Liquified Petroleum Gas (LPG) Combustion

See Emission Inventory I.

Emission Inventory III: HAPs Emission Calculations for Animal Remains Incineration

Maximum Design Capacity: 876 ton/yr

Bromoform

Emission Factor: 2.90E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 200 lb/hr or 0.1 ton/hr
Calculations: 2.90 E-05 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 3.65E-07 g/sec
3.65E-07 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 2.90E-06 lb/hr
2.90E-06 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 1.30E-05 ton/yr

Carbon Tetrachloride

Emission Factor: 5.74E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 200 lb/hr or 0.1 ton/hr
Calculations: 5.74E-05 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 7.23E-07 g/sec
7.23E-07 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 5.74E-06 lb/hr
5.74E-06 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 2.50E-05 ton/yr

Chloroform

Emission Factor: 5.45E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 200 lb/hr or 0.1 ton/hr
Calculations: 5.45E-05 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 6.87E-07 g/sec
6.87E-07 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 5.45E-06 lb/hr
5.45E-06 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 2.40E-05 ton/yr

1,2-Dichloropropane

Emission Factor: 1.32E-03 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 200 lb/hr or 0.1 ton/hr
Calculations: 1.32E-03 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 1.66E-05 g/sec
1.66E-05 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 1.32E-04 lb/hr
1.32E-04 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 5.80E-04 ton/yr

Ethyl Benzene

Emission Factor: 1.61E-03 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 200 lb/hr or 0.1 ton/hr
Calculations: 1.61E-03 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 2.03E-05 g/sec
2.03E-05 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 1.61E-04 lb/hr
1.61E-04 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 7.10E-04 ton/yr

Naphthalene

Emission Factor: 1.16E-02 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 200 lb/hr or 0.1 ton/hr
Calculations: 1.16E-02 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 1.46E-04 g/sec
1.46E-04 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 1.16E-03 lb/hr
1.16E-03 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 5.10E-03 ton/yr

Tetrachloroethylene

Emission Factor: 4.03E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
Operating Capacity: 200 lb/hr or 0.1 ton/hr
Calculations: 4.03E-05 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 5.08E-07 g/sec
5.08E-07 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 4.03E-06 lb/hr
4.03E-06 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 1.80E-05 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: 200 lb/hr or 0.1 ton/hr
 Calculations: 1.10E-04 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 1.39E-06 g/sec
 1.39E-06 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 1.10E-05 lb/hr
 1.10E-05 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 4.80E-05 ton/yr

Toluene

Emission Factor: 4.62E-03 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 200 lb/hr or 0.1 ton/hr
 Calculations: 4.62E-03 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 5.82E-05 g/sec
 5.82E-05 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 4.62E-04 lb/hr
 4.62E-04 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 2.00E-03 ton/yr

Vinylidene Chloride

Emission Factor: 7.10E-05 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 200 lb/hr or 0.1 ton/hr
 Calculations: 7.10E-05 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 8.95E-07 g/sec
 8.95E-07 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 7.10E-06 lb/hr
 7.10E-06 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 3.10E-05 ton/yr

Xylene

Emission Factor: 2.20E-03 lb/ton (FIRE, 5-02-005-05, Pathological Incineration, 03/90)
 Operating Capacity: 200 lb/hr or 0.1 ton/hr
 Calculations: 2.20E-03 lb/ton * 0.1 ton/hr * 453.6 g/lb * 1 min/3600 sec = 2.77E-05 g/sec
 2.77E-05 g/sec * 1 lb/453.6 g * 60 sec/min * 60 min/hr = 2.20E-04 lb/hr
 2.20E-04 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 9.60E-04 ton/yr

V. Air Quality Impacts

The Department conducted Screen View air dispersion modeling, an EPA-approved screening model, using the indicated inputs obtained from the initial permit application (#3259-00) and an emission rate of 2.74E-04 gram per second, which is the sum of all the hazardous air pollutant emissions from the proposed crematorium incinerating animal remains. The individual one-hour results for each pollutant were then calculated by multiplying the modeled impact of 0.1133 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

Simple Terrain Inputs:

Source Type	=	POINT
Emission Rate (G/S)	=	0.274E-03
Stack Height (M)	=	5.49
Stack Inside Diam (M)	=	0.27
Stack Exit Velocity (M/S)	=	5.16
Stack Gas Exit Temp (K)	=	1007.60
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 2100 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	0.1133	0.04532	0.01133	98	0

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 hazardous air pollutants for which there were established emission factors were considered in the emission inventory.

Hazardous Air Pollutant	Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Cancer Potency Factor	ELCR	Non-Cancer RFC Factor	Non-Cancer Hazard Quotient
Bromoform	1.51E-05	1.10E-06	1.66E-11	ND	ND
Carbon Tetrachloride	3.00E-05	1.50E-05	4.49E-10	ND	ND
Chloroform	2.84E-05	2.30E-05	6.54E-10	ND	ND
1,2-Dichloropropane	6.89E-04	ND	ND	ND	ND
Ethyl Benzene	8.40E-04	ND	ND	1.00E03	8.40E-07
Naphthalene	6.05E-03	ND	ND	ND	ND
Tetrachloroethylene	2.10E-05	5.90E-06	1.24E-10	ND	ND
1,1,2,2-Tetrachloroethane	5.74E-05	5.80E-05	3.33E-09	ND	ND
Toluene	2.41E-03	ND	ND	4.00E2	6.03E-06
Vinylidene Chloride	3.70E-05	5.00E-05	1.85E-09	ND	ND
Xylene	1.15E-03	ND	ND	ND	ND
Total Risks		-----	6.43E-09	-----	6.87E-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.

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 table 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 is 6.87E-06, 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.

VIII. Environmental Assessment

The current permit action is an administrative permit amendment and does not require an environmental assessment.

Permit Analysis Prepared By: M. Eric Merchant, MPH

Date: January 5, 2004