



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 052010-002 Project Number: 2010-01-022

Parent Company: The Patriot Corporation, Inc.

Parent Company Address: 1823 State Hwy 8, Park Hills, MO 63601

Installation Name: The Patriot Corporation, Inc.

Installation Number: 187-0085

Installation Address: 1823 State Hwy 8, Park Hills, MO 63601

Location Information: St. Francois County, S2, T36N, R4E

Application for Authority to Construct was made for:
one Matthews Power-Pak II Human Cremator and one Matthews Power-Pak II Pet
Cremator. This review was conducted in accordance with Section (5), Missouri State Rule
10 CSR 10-6.060, *Construction Permits Required*.

Standard Conditions (on reverse) are applicable to this permit.

Standard Conditions (on reverse) and Special Conditions are applicable to
this permit.

MAY 4 2010

EFFECTIVE DATE


DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Department's Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources Regional office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

The Patriot Corporation, Inc.
St. Francois County, S2, T36N, R4E

1. Process Requirements for the Human Crematory (EU-01)
 - A. The Patriot Corporation, Inc. will burn exclusively non-infectious human bodies or body parts (as defined in the Installation Description) and containers not containing chlorine.
 - B. Charging of remains between burn cycles is prohibited.
 - C. Remains shall be incinerated at a rate not exceeding 160.0 pounds per hour.
 - D. Attachment A or a form approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Condition 1.C.
 - E. The crematory shall be equipped with a continuous chart recorder that monitors, displays and records the temperature in the final combustion chamber with an accuracy of two percent ($\pm 2\%$).
 - F. The Patriot Corporation, Inc. shall maintain the temperature in the final combustion chamber at or above 1,600 degrees Fahrenheit.
2. Process Requirements for the Pet Crematory (EU-02)
 - A. The Patriot Corporation, Inc. will burn exclusively non-infectious animal carcasses or body parts (as defined in the Installation Description) and containers not containing chlorine.
 - B. Charging of remains between burn cycles is prohibited.
 - C. Batch weight shall not exceed 730.0 pounds of remains.
 - D. Remains shall be incinerated at a rate not exceeding 205.0 pounds per hour.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- E. Attachment B or a form approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Conditions 2.B and 2.C.
 - F. The crematory shall be equipped with a continuous chart recorder that monitors, displays and records the temperature in the final combustion chamber with an accuracy of two percent ($\pm 2\%$).
 - G. The Patriot Corporation, Inc. shall maintain the temperature in the final combustion chamber at or above 1,600 degrees Fahrenheit.
3. Opacity
The crematories (EU-01 and EU-02) shall individually have opacity of less than ten percent (10%) at all times.
4. Requirements for Operators of the Human and Pet Crematories (EU-01 and EU-02)
- A. All crematory operators shall attend a training program equivalent to that developed by the American Society of Mechanical Engineers (ASME), by the crematory manufacturer or by an individual with more than one (1) year experience in the operation of the crematory. The training shall include basic combustion theory, operating procedures, monitoring of combustion control parameters and all emergency procedures to be followed if the crematory should malfunction or exceed operating parameters.
 - B. The crematory operator shall have the essential steps necessary for satisfactory operation of the crematory readily available in manual.
5. Restriction of Emission of Odors
If a continued situation of verified nuisance odors exists in violation of 10 CSR 10-3.090, the Director may require through written notice that The Patriot Corporation, Inc. submit within ten days a corrective action plan adequate to timely and significantly mitigate the odors. The Patriot Corporation, Inc. shall implement any such plan immediately upon its approval by the Director. Failure to either submit or implement such a plan shall be in violation of this permit.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

6. **Record Keeping and Reporting Requirements**
 - A. The Patriot Corporation Inc. shall maintain all records required by this permit for not less than five (5) years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include Material Safety Data Sheets (MSDS) for all materials used.
 - B. The Patriot Corporation Inc. shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, Missouri 65102, no later than ten days after the end of the month during which any record required by this permit show an exceedance of a limitation imposed by this permit.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW

Project Number: 2010-01-022
Installation ID Number: 187-0085
Permit Number:

The Patriot Corporation, Inc.
1823 State Hwy 8
Park Hills, MO 63601

Complete: January 11, 2010

Parent Company:
The Patriot Corporation, Inc.
1823 State Hwy 8
Park Hills, MO 63601

St. Francois County, S2, T36N, R4E

REVIEW SUMMARY

- The Patriot Corporation, Inc. has applied for authority to construct one Matthews Power-Pak II Human Cremator and one Matthews Power-Pak II Pet Cremator.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. HAPs of concern from this process are from the combustion of remains and natural gas. Potential mercury emissions from the human cremator are above the Screening Model Action Level (SMAL).
- None of the New Source Performance Standards (NSPS) apply to the installation.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) apply to this installation. None of the currently promulgated Maximum Achievable Control Technology (MACT) regulations apply to the proposed equipment.
- Afterburners installed by the manufacturer are being used in association with the new equipment, as control devices.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, Construction Permits Required. Potential emissions of criteria pollutants are below de minimis levels. Section (1)(B) requires all incinerators to obtain construction permits.
- This installation is located in St. Francois County, an attainment area for all criteria pollutants.
- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.

- Ambient air quality modeling was performed to determine the ambient impact of mercury.
- Emissions testing is not required for the animal crematory.
- A Basic Operating Permit application is required for this installation within 30 days of equipment startup according to 10 CSR 10-6.065 Operating Permits (1)(B).
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

The Patriot Corporation, Inc. (Patriot) is an existing vault and burial services company. Patriot is located near the intersection of State Highway 8 and Maple Street in Gumbo, Missouri. However, the mailing address is 1823 State Highway 8, Park Hills, Missouri. No permits have been issued to Patriot from the Air Pollution Control Program.

PROJECT DESCRIPTION

Patriot is installing one Matthews Power-Pak II human cremator and one Matthews Power-Pak II pet cremator. Both units are designated model IE43-PPII from the manufacturer (Matthews). Both units have a primary and secondary/afterburner chamber, and are natural gas fired. Stack testing performed on the human crematory in 2004 was conducted at an average rate of 160 pounds per hour. The stack test was submitted to the Air Pollution Control Program under construction permit 032009-013. Matthews lists the MHDR of the pet/animal model at 200 pounds per hour, and maximum capacity at 750 pounds. However, stack testing performed on this model was conducted at an average rate of 205 pounds per hour, and capacity of 730 pounds. The stack test was conducted in 2010 and submitted to the Air Pollution Control Program for this review.

Stack test requirements include that a crematory achieve a combustion efficiency of 99.9%, that the maximum particulate concentration in the crematory's stack gas is less than 0.09 grains per dry standard cubic feet and that the crematory's opacity does not exceed 10%. These requirements were developed to ensure proper combustion.

The human crematory is permitted to cremate non-infectious human bodies and body parts. The animal crematory is permitted to cremate non-infectious animal carcasses and body parts. The Air Pollution Control Program's definition of the term "non-infectious human bodies and body parts" is human bodies and body parts that do not fit the definition of medical/infectious waste as defined in the Code of Federal Regulations, 40 CFR 60.51, *Standards of Performance for New Stationary Sources*, Subpart Ec— "Standards of Performance for Hospital/Medical/Infectious Waste

Incinerators for Which Construction is Commenced After June 20, 1996". The Air Pollution Control Program's definition of the term "non-infectious animal carcasses and body parts" is animal carcasses and body parts that do not fit the definition of medical/infectious waste as defined in the aforementioned rule. The rule defines medical/infectious waste as:

Medical/infectious waste means any waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals that are listed in paragraphs (1) through (7) of this definition. The definition of medical/infectious waste does not include hazardous waste identified or listed under the regulations in part 261 of this chapter; household waste, as defined in §261.4(b)(1) of this chapter; ash from incineration of medical/infectious waste, once the incineration process has been completed; human corpses, remains, and anatomical parts that are intended for interment; and domestic sewage materials identified in §261.4(a)(1) of this chapter.

- (1) Cultures and stocks of infectious agents and associated biologicals, including: cultures from medical and pathological laboratories; cultures and stocks of infectious agents from research and industrial laboratories; wastes from the production of biologicals; discarded live and attenuated vaccines; and culture dishes and devices used to transfer, inoculate, and mix cultures.
- (2) Human pathological waste, including tissues, organs, and body parts and body fluids that are removed during surgery or autopsy, or other medical procedures, and specimens of body fluids and their containers.
- (3) Human blood and blood products including:
 - (i) Liquid waste human blood;
 - (ii) Products of blood;
 - (iii) Items saturated and/or dripping with human blood; or
 - (iv) Items that were saturated and/or dripping with human blood that are now caked with dried human blood; including serum, plasma, and other blood components, and their containers, which were used or intended for use in either patient care, testing and laboratory analysis or the development of pharmaceuticals. Intravenous bags are also included in this category.
- (4) Sharps that have been used in animal or human patient care or treatment or in medical, research, or industrial laboratories, including hypodermic needles, syringes (with or without the attached needle), pasteur pipettes, scalpel blades, blood vials, needles with attached tubing, and culture dishes (regardless of presence of infectious agents). Also included are other types of broken or unbroken glassware that were in contact with infectious agents, such as used slides and cover slips.
- (5) Animal waste including contaminated animal carcasses, body parts, and bedding of animals that were known to have been exposed to infectious agents during research (including research in veterinary hospitals), production of biologicals or

testing of pharmaceuticals.

- (6) Isolation wastes including biological waste and discarded materials contaminated with blood, excretions, exudates, or secretions from humans who are isolated to protect others from certain highly communicable diseases, or isolated animals known to be infected with highly communicable diseases.
- (7) Unused sharps including the following unused, discarded sharps: hypodermic needles, suture needles, syringes, and scalpel blades.

EMISSIONS/CONTROLS EVALUATION

For the human crematory, the emission rates for particulate matter less than ten microns in aerodynamic diameter (PM₁₀) and carbon monoxide (CO) were obtained from the human model stack test mentioned earlier. Emissions of sulfur dioxide (SO_x) were calculated using the emission factor from the Environmental Protection Agency (EPA) document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition Table 1.4-2. Nitrogen oxide (NO_x) and volatile organic compound (VOC) emissions were calculated using an emission factor from Factor Information Retrieval (FIRE) source classification code (SCC) 5-02-001-01. The emission factors used in the analysis of HAP emissions were obtained from FIRE for SCC 3-15-021-01. The composite emission factor of HAPs listed in FIRE was 0.076 pounds of HAP per body cremated.

For the pet/animal crematory, the emission rates for PM₁₀ and CO were obtained from the pet model stack test submitted for this review. Emissions of SO_x, NO_x, VOC, and HAP were calculated using the same emission factors as the human crematory, except mercury was not considered emitted. Significant mercury emissions would be present only from combusting human remains containing mercury dental amalgam fillings.

As this installation has not previously been reviewed by the Air Pollution Control Program, there are no existing potential or actual emissions. Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8,760 hours per year). The following table provides an emissions summary for this project.

Table 1: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Potential Emissions of EU-01	Potential Emissions of EU-02	Potential Emissions of the Installation	New Installation Conditioned Potential
PM ₁₀	15.0	0.29	0.78	1.07	N/A
SO _x	40.0	0.67	0.67	1.34	N/A
NO _x	40.0	4.38	4.38	8.76	N/A
VOC	40.0	0.02	0.02	0.04	N/A
CO	100.0	0.02	0.01	0.03	N/A
Lead	0.6	2.90E-04	2.90E-04	5.80E-04	N/A
Combined HAPs	25.0	0.33	0.32	0.65	N/A
Mercury	¹ 0.01	1.44E-02	N/A	1.44E-02	N/A

N/A = Not Applicable

¹ Screening Model Action Level (SMAL)

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of criteria pollutants are below de minimis levels. Section (1)(B) requires all incinerators to obtain construction permits.

APPLICABLE REQUIREMENTS

The Patriot Corporation, Inc. shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110. The emission fee is the amount established by the Missouri Air Conservation Commission annually under Missouri Air Law 643.079(1). Submission of an Emissions Inventory Questionnaire (EIQ) is required June 1 for the previous year's emissions.
- *Operating Permits*, 10 CSR 10-6.065
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-3.090

AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient air quality modeling was performed to determine the ambient impact of mercury from the human crematory. Modeling was required because the potential emissions of mercury are above its Screening Model Action Level (SMAL). The emissions were modeled using EPA's SCREEN3. The stack parameters are included in Table 2, and the results of the analysis are included in Table 3. The stack parameters used in SCREEN3 were taken from the 2004 stack test. The analysis showed that the risk assessment level (RAL) for elemental mercury will not be exceeded. According to the model, the highest impact occurs within the Patriot property boundary, approximately 11 meters from the stack.

Table 2: Stack Parameters

Stack Height (m)	Stack Inside Diameter (m)	Stack Gas Velocity (m/s)	Stack Gas Temperature (K)
6.4008	0.5081	4.3485	933.15

Table 3: Ambient Air Quality Analysis Results

Pollutant	Modeled Impact ($\mu\text{g}/\text{m}^3$)	Risk Assessment Level ($\mu\text{g}/\text{m}^3$)	Time Period
Mercury	0.0984	0.14	24 hour
	0.0197	0.07	annual

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

David Little
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated January 11, 2010, received January 11, 2010, designating The Patriot Corporation, Inc. as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Southeast Regional Office Site Survey, dated January 26, 2010.

