MARYLAND DEPARTMENT OF THE ENVIRONMENT
AIR AND RADIATION ADMINISTRATION

FINAL DETERMINATION CONCERNING A PERMIT-TO-CONSTRUCT APPLICATION SUBMITTED BY MARYLAND CREMATORY, LLC FOR THE INSTALLATION OF A U.S. CREMATION EQUIPMENT "CLASSIC" X-CEL HUMAN CREMATORY

I. INTRODUCTION

The Maryland Department of the Environment (the "Department") received an application from Maryland Crematory, LLC on September 5, 2017, with revisions received on October 19, 2017; January 4, 2018; January 5, 2018; January 8, 2018; January 10, 2018; January 15, 2018; January 17, 2018; January 22, 2018; and January 24, 2018 for a Permit to Construct for the installation of a U.S. Cremation Equipment "Classic" X-Cel human crematory. The U.S. Cremation Equipment "Classic" X-Cel human crematory will be located at 408 Headquarters Drive, Millersville, MD 21108.

On December 12, 2017, an informational meeting was held at the Earleigh Heights Volunteer Fire Company Hall, located at 161 Ritchie Highway, Severna Park, MD 21146 to provide interested parties opportunities to discuss with the Company and the Department the permit application and the proposed installation of a U.S. Cremation Equipment "Classic" X-Cel human crematory.

After reviewing the application and other pertinent information, the Department made a tentative determination to issue a permit-to-construct that would authorize installation of a U.S. Cremation Equipment "Classic" X-Cel human crematory as proposed in the Company's applications. A draft permit with draft conditions was made available for public review at the Glen Burnie Regional Library at 1010 Eastway, Glen Burnie, MD 21061-7392 and at MDE headquarters located at 1800 Washington Boulevard in Baltimore, Maryland 21230. A Notice of the Tentative Determination, Public Hearing, and Opportunity to Submit Written Comments was published in the Capital Gazette on May 11, 2018 and again on May 18, 2018.

On Mary 31, 2018, a public hearing was held at the Earleigh Heights Volunteer Fire Company Hall, located at 161 Ritchie Highway, Severna Park, MD 21146 to provide interested parties an opportunity to comment on the Department's tentative determination and draft permit conditions, and/or to present other pertinent concerns about the proposed installation of a U.S. Cremation Equipment "Classic" X-Cel human crematory.

II. COMMENTS RECEIVED AND THE DEPARTMENT'S RESPONSE

The public comment period on the application initially expired on June 6, 2018, but was extended until August 7, 2018 following public request for a one-time, 60-day extension. The comments received at the public hearing, and those submitted in writing during the public comment period, expressed concerns about the impact of the proposed new

installation on the surrounding community. The Department's responses to the comments are attached.

III. DEPARTMENT'S FINAL DETERMINATION

The Department has reviewed the application and the comments received and has determined that the proposed installation of a U.S. Cremation Equipment "Classic" X-Cel human crematory would not cause violations of any applicable air pollution control regulations.

The Department has made a final determination to issue the permit-to-construct. A copy of the final permit to construct conditions is included in the public docket.

MARYLAND DEPARTMENT OF THE ENVIRONMENT
AIR AND RADIATION ADMINISTRATION

RESPONSE TO:

COMMENTS RECEIVED AT THE PUBLIC HEARING HELD ON MAY 31, 2018 IN SEVERNA PARK, MARYLAND CONCERNING A PERMIT-TO-CONSTRUCT FOR A SECOND HUMAN CREMATORY,

And

WRITTEN COMMENTS SUBMITTED DURING PUBLIC COMMENT PERIOD

Purpose of the Hearing: The purpose of the public hearing was to provide a forum for the Maryland Department of the Environment ("MDE" or "Department") to solicit public comment on an application submitted by Maryland Crematory, LLC ("Maryland Crematory") for an air quality permit-to-construct to install one additional human crematory to be located at 408 Headquarters Drive, Suite 10, Millersville, MD 21108.

Date and Location: The public hearing was held on May 31, 2018 at the Earleigh Heights Volunteer Fire Company Hall, 161 Ritchie Highway, Severna Park, Maryland 21146.

Attendance: Approximately 15 members of the general public attended the hearing. Ms. Shannon Heafey of the Air and Radiation Administration (ARA) presided as Hearing Officer. Maryland Crematory, LLC was represented by Ms. Dorota Marshall, owner and Mr. Sean Marshall. Mr. Nolan Penney presented ARA's hearing statement. ARA was also represented by Ms. Suna Sariscak.

Extension of the Public Comment Period: A request was received on June 5, 2018 to grant a 60 day extension to the comment period. That request was granted on June 6, 2018, extending the comment period to August 7, 2018.

Five people made statements at the Public Hearing. Additional written comments were submitted during the public comment period.

The Department has considered all public comments that raise issues of law or material fact regarding the application for a Permit to Construct including all written comments received prior to the August 7, 2018 deadline in accordance with the Code of Maryland Regulations (COMAR) 26.11.02.11J. A summary of the comments received and the Department's response to those comments is provided below:

1. Public Participation Procedures
2. Zoning
3. Current and Future Expansion Plans
4. Hours of Operation
5. Stack Height
6. Health Effects/Toxic Air Pollutants
7. Air Emission Controls (Filters/Scrubbers)
8. Air Emissions (Mercury)
9. Odors
10. Enforcement/Compliance
11. Monitoring/Testing
12. Conflict of Interest Concerns

Appendix A – Maryland Cremation Inspection History Report dated March 14, 2018
Appendix B – Fact Sheet and Tentative Determination
Appendix C – Overview of the Toxic Pollutant Analysis

1. Public Participation Procedures

Multiple commenters expressed concern about the public participation procedures that were followed during the permitting process.

"Why were the two documents ("Draft Permit" and "Air and Radiation Administration Fact Sheet and Tentative Determination") only provided for the first time at the meeting on 31 May and not sooner so as to allow time for review and comment?"

MDE Response

The following is a summary of the public participation procedures that the Department followed with regard to this permitting process:

A. *Informational Meeting was held on December 12, 2017 at the Earleigh Heights Volunteer Fire Company located at 161 Ritchie Highway in Severna Park*
   (1) *Newspaper notices announcing the informational meeting and the locations of the docket were published on November 21 and November 28, 2017 in the Capital Gazette*
   (2) *Letters were mailed on November 13, 2017 to 13 elected officials, 166 listed interested parties, including the last known address of the Shipley's Choice Home Owners Association.*

B. *Public Hearing was held on May 31, 2018 at the Earleigh Heights Volunteer Fire Company located at 161 Ritchie Highway in Severna Park*
   (1) *Newspaper notices announcing the public hearing and the locations of the docket were published on May 11 and May 18, 2018 in the Capital Gazette.*
   (2) *Letters were mailed on May 9, 2018 to 13 elected officials, 12 listed interested parties, including the last known address of the Shipley's Choice Home Owners Association, and emailed to 9 listed interested parties*
   (3) *Supplemental information, including the Draft Permit and the Fact Sheet and Tentative Determination, were sent to the Glen Burnie Regional Library as enclosures to a letter dated May 9, 2018.*

C. *Extension of public comment period to August 7, 2018*
   (1) *Email from Paul Kaup requesting 60 day extension received on June 6, 2018*
   (2) *Email from the Department granting the 60 day extension to August 7, 2018 sent on June 6, 2018*

2. Zoning

Multiple commenters raised concerns about zoning issues.

"In proximity, it may be zoned and off of Veteran's Highway, which is commercial, but it backs up—it's way closer to our homes than it is to Veterans Highway…"

"As a reminder, the output at the current volumes shouldn't have been granted in the first place considering the zoning and proximity to a residential area with schools, homes, playing fields, etc."

"Will the new smoke stack be within the zoning code for a one story office park building which is near a residential community?"

"We would like a public hearing to determine if the new smoke stack that will be located in a small, one story business park is within the parameters that meet zoning requirements for that facility."

"We still believe that an error was made because its location is on a small road, not the size required for it."

MDE Response

The Department's decisions concerning issuance of a permit must be based solely upon the projected impact of air emissions, from the proposed source, on the environment. Local issues, such as zoning, are strictly within the purview of the Anne Arundel County Zoning Commission. So long as a proposed source complies with local land use and zoning, the Department is obliged to process the permit application for the source.

Per a December 14, 2017 email from Anne Arundel County, "The Circuit Court for Anne Arundel County affirmed the Board of Appeals decision that the funeral establishment with accessory crematorium use located at 408 Headquarters Dr., Millersville is an allowed permitted use in the C4 District."

Zoning hearings are a function of the Anne Arundel County Zoning Commission. The Department has no authority to request or require a zoning hearing be held. Such a request must be directed to the Anne Arundel County Zoning Commission.

3. Current and Future Expansion Plans

Multiple commenters expressed concerns about possible future expansion plans at this crematory.

"It was stated then, and is to be reminded now, that at that time, on the record, NO EXPANSION of this facility would be occurring."

MDE Response

The Department cannot deny a permit based on changing business decisions. Permit approval or denial is based on whether a source meets applicable regulatory requirements. Each new source of air pollution, proposed for a site, must proceed through the permit application and review process separately. The proposed addition of a second crematory meets all applicable requirements based on the Department's review.

4. Hours of Operation

"How many hours per day/per week/per month/per year does the crematory intend to perform actual cremations?"

"How many hours a day and at what flow will the permit allow output?"

MDE Response

The Department can only limit the number of hours a source can operate, the production at a source, or the time of day a source can operate if the Department determines that a violation of an applicable air quality standard or emission limit may occur without such a limit.

Maryland Crematory demonstrated that, with both crematories operating at their maximum potential to emit of one cremation per hour, per crematory, 24 hours per day, 365 days per year, no 1-hour or annual screening level for toxic air pollutants would be exceeded, nor would any National Ambient Air Quality Standard (NAAQS) be violated.

Maryland Crematory demonstrated that no 8-hour screening level would be violated with an operational limit of no more than 10 cremations per any 8-hour period. Accordingly, this operational limit is included in the permit to construct, Part C(1)(c,) as an enforceable condition for the facility.

5. Stack Height

Multiple comments expressed concerns about stack height details.

"Will the stack be within the parameters that meet all zoning requirements for that facility. There has been no discussion as to the size, height, or placement of said stack."

"Will you be requiring further modifications to the stack height? We want details as to the outputs and the stack?

Is the required height of the stack measured from the ground, or from the roof of the building?

"There has been no talk as to the size or placement of said stack."

MDE Response

Per a December 14, 2017 email from Anne Arundel County, "Therefore, the maximum allowable height for a crematory exhaust stack shall be no more than 15 feet above the lowest point of contact with the roof."

The proposed permit to construct specifies in Part A(6) "Each crematory stack shall discharge at least 27 feet above the ground and at least 11 feet above the roof peak."

Appendix C - Overview of the Toxic Pollutant Analysis provides a detailed discussion on stack height issues including an explanation as to why the 27 foot stack height was determined to represent worst case emissions.

As the building has a flat top roof, Maryland Crematory can comply with these three stack height requirements by placing the stack top at least 11 feet above the roof peak, no more than 15 feet above the lowest point of contact with the roof, and while being at least 27 feet above the ground.

Appendix B –Fact Sheet and Tentative Determination provides more details on Toxic Air Pollutants including Table III - Projected Maximum Emissions of Toxic Air Pollutant, Table IV - Toxic Air Pollutant Maximum Ground Level Concentrations 1-Hour Screening Levels, Table V - Toxic Air Pollutant Maximum Ground Level Concentrations 8-Hour Screening Levels and Table VI - Toxic Air Pollutant Maximum Ground Level Concentrations Annual Screening Levels.

6. Health Effects/Toxic Air Pollutants

"I believe that a decision to place a larger, pollutant generation facility in the midst, with close proximity to a large populated, residential area would be irresponsible. It risks the health of our children and families."

"We remain concerned about emissions that could be harmful to our varied population."

"Many of our homeowners are of child-bearing age & are worried about damage to unborn children."

MDE Response

There are two categories of air pollutants the Department evaluates to ensure public health is being protected - toxic air pollutants (TAPs) and criteria air pollutants. A list of TAPs, as defined under COMAR Chapters 26.11.15 & 16, emitted from the facility is provided in the Department's Tentative Determination. As part of the application review process the Department conducted an ambient impact analysis for each TAP. The analysis was based on projected worst-case hourly emissions of each TAP. The worst-case impact (i.e., highest concentration) of each TAP in the ambient air was projected using an EPA approved Screen-3 air dispersion model. The worst-case concentration is then compared to a screening level concentration that is set to be protective of public health. If the worst-case concentration is below the screening level, the emissions of that TAP are not considered to be injurious to public health. There are generally screening levels for 1-hour, 8-hour and annual exposures.

Maryland's TAP screening levels are established in accordance with COMAR 25.11.16.03. For carcinogenic pollutants, the screening level is set to ensure that an individual exposed to the maximum concentration will not have an increased cancer risk of more than 1 in 100,000. For non-carcinogenic pollutants, the screening level is set at 1/100th of the value used by the American Conference of Governmental Industrial Hygienists (ACGIH) in their efforts to protect workers from the effects of pollutants encountered in a working environment. When the projected ground-level concentration of a TAP is lower than the applicable screening level, the emissions of that TAP from the facility are deemed to not unreasonably endanger human health. A separate analysis is conducted for each TAP emitted from the facility.

Maryland Crematory demonstrated that, with both crematories operating together, each at their maximum potential to emit of one cremation per hour, 24 hours per day, 365 days per year, the highest concentration of each TAP was below that TAP's 1-hour and annual screening levels. The Department agreed with that demonstration's conclusions.

Maryland Crematory further demonstrated that , with both crematories operating together, no 8-hour screening level would be violated with an operational limit of no more than 10 total cremations per any 8-hour period. Accordingly, this operational limit is included in the permit to construct, Part C(1)(c) as an enforceable condition for the facility.

For criteria pollutants, six pollutants for which a federal, public health based ambient air quality standard has been established, such as carbon monoxide and particulate matter, the emissions from the crematory would not cause a violation of any standards.

7. Air Emission Controls (Filters/Scrubbers)

"Are the most advanced filters being employed by this crematory, to eliminate most, if not all, harmful toxins?"

"Are the most advanced, technically sophisticated scrubbers, available on the market today being used at this location?"

"The owners argued that scrubbers would be cost prohibitive for a small operation. What about now? Will you consider making this expansion contingent upon use of that existing technology?

MDE Response

Maryland's Air Toxic Regulation, COMAR 26.11.15.05 requires a person to install and operate Best Available Control Technology for Toxics (T-BACT) prior to constructing and operating a new source that will discharge a toxic air pollutant to the atmosphere. T-BACT is the control technology that results in the maximum degree of emission reduction that the Department determines, on a case-by-case basis, is available for each toxic air pollutant discharged by the installation, taking into account the potency and toxicity of each toxic air pollutant and the technical and economic feasibility of control. T-BACT includes production, operation, and maintenance procedures, emission control technology and other emission reduction technologies; or a combination of these technologies and procedures.

The Department has determined that the T-BACT for this facility operating both crematories is an operating limit of no more than 10 cremations during any 8-hour period, an operating temperature of 1800 degrees in the secondary chamber, and a retention time of 1.5 seconds in the secondary chamber.

With regard to scrubber control technology, the cost of a scrubber is roughly equivalent to the cost of the crematory retort itself. The actual price varies, depending on the design complexity of the scrubber. For example, multi-stage venturi scrubbers cost substantially more than simple 1-stage impingement type scrubbers.

Maryland Crematory has shown through modeling that the worst-case air emissions from their facility operating both crematories at their maximum potential to emit will not cause off-site concentrations of toxic air pollutants to exceed applicable 1-hour and annual screening levels. An operating limit of no more than 10 cremations during any 8-hour period will not cause off-site concentrations of toxic air pollutants to exceed applicable 8-hour screening levels. These screening levels are established at levels which protect the health of the public. Due to the high cost of scrubbers, the Department did not require Maryland Crematory to evaluate a scrubber as T-BACT for their proposed crematory.

In addition, the Department found a T-BACT determination that was conducted by the Sacramento Metropolitan Air Quality Management District, located in California, in 2016 for a human crematory that stated the following:

> *"There are no Federal NSPS's [New Source Performance Standards], NESHAP's [National Emission Standards for Hazardous Air Pollutants] nor State ATCM [Airborne Toxic Control Measures] for this source category. None of the sources surveyed have any toxic T-BACT determinations published. The District contacted the SCAQMD [South Coast Air Quality Management District], the BAAQMD [Bay Area Air Quality Management District] and the SJVAPCD [San Joaquin Valley Air Pollution Control District] to enquire about any T-BACT determinations that may not have been published for this source category. In all cases, the T-BACT determinations were essentially the crematory's operational parameters that have been required as BACT."*

Both crematories will be equipped with a secondary combustion chamber, having an operating temperature of 1,800 degrees Fahrenheit (F), and a retention time of at least 1.5 seconds. The purpose of a secondary chamber is to combust the emissions that come from the cremated body in the primary chamber. Generally speaking, the higher the temperature in the secondary chamber, and the longer the retention time in the secondary chamber, the better the combustion will be of those exhaust gases, and the lower the emitted pollution from the crematory.

There will be temperature sensors and recorders to ensure the secondary chambers are operating properly. These conditions, and others, are in the permit to construct under Part A, the construction conditions, and Part C, the operating conditions.

8. Air Emissions (Mercury)

"What amounts of mercury (and other contaminants) will be released into the air per human body cremation? What is the total amount of mercury released per day? What are the actual allowable levels by the EPA, to include all other regulatory agencies environmental levels? Will the emissions from this new stack be compliant with Maryland Toxic Air Pollutant (TAP) regulations?

MDE Response

EPA, in their 1997 Report to Congress on Mercury, estimated the total emissions of mercury from all cremations across the entire country to be less than one-tenth of one ton, or approximately 200 pounds per year. EPA has not proposed mercury regulations or standards for human crematories.

For purposes of a toxic compliance demonstration, Maryland Crematory and the Department used EPA emission factors for cremation, including mercury. These emission factors were used to demonstrate compliance with Maryland air toxic regulations, as described in the Fact Sheet and Tentative Determination, which is part of the Docket made available to the public, and as Appendix B of this Response to Comments.

The toxic compliance demonstration for the facility showed a maximum potential to emit of mercury of 57 pounds per year. The maximum potential to emit is based on both crematories operating together, each cremating one body per hour, 24 hours per day, 365 days per year. In actual operation, the cremation rate will be less, and the emissions from the crematories will be less. Further, wind patterns will distribute the emissions from the crematory throughout the area surrounding the crematory. Emissions will not be focused or concentrated into any community or location.

Maryland Crematory submitted, as part of their permit application, a toxics compliance demonstration showing that no unreasonable risk to public health would be created. This compliance demonstration showed that the worst-case air emissions from their facility operating both crematories at their maximum potential to emit will not cause off-site concentrations of toxic air pollutants to exceed applicable 1-hour and annual screening levels. The toxics compliance demonstration also showed that with an operating limit of no more than 10 total cremations during any 8-hour period, no off-site concentrations of toxic air pollutants would exceed applicable 8-hour screening levels. Accordingly, this operational limit is included in the permit to construct, Part C(1)(c) as an enforceable condition for the facility.

Additional details on air emissions are detailed in Tables I-VI in Appendix B – Fact Sheet and Tentative Determination.

9. Odors

Several commenters expressed concerns about odors.

"I have smelled and I have phoned in, you know the reporting of that smell that was definitely not of the norm."

MDE Response

MDE recognizes that members of the communities in proximity to the proposed additional crematory are concerned about the potential for nuisance or noxious odors from the crematory. The permit to construct includes several conditions designed to reduce the potential for odor problems. For example, condition Part A(3) specifies that the crematories shall be equipped with a secondary combustion chamber having a retention time of at least 1.5 seconds and an operating temperature of at least 1800 degrees Fahrenheit (F). Condition Part C(4) specifies that prior to the initiation of the cremation in the primary chamber, the secondary chamber shall be preheated until the gases leaving the secondary chamber attain a temperature of at least 1800 degrees F. These conditions are to ensure off-gases from the cremation process are thoroughly combusted, eliminating the source of potential odors. Condition Part A(4) specifies that the crematories shall be equipped with a temperature chart recorder and temperature sensor located near the flue gas exit of the secondary combustion chamber to continuously monitor and record the temperature of the flue gases leaving the secondary combustion chamber. The conditions in Part D specify that, while remains are being cremated, the temperatures of the flue gases in the secondary chamber shall be continuously recorded on a chart recorder. Each chart shall be dated and annotated in such a manner that the date and time of any recorded temperature event may be easily determined. These conditions are to ensure and document that combustion of exhaust gases occurs in the secondary chamber and to provide verifiable evidence to the Department of such operation. Condition Part A(5) requires that air emissions from the crematories be discharged to the atmosphere through a vertical exhaust stack without restriction or obstruction. Condition Part A(6) requires that the crematory stacks shall discharge at least 11 feet above the roof peak and at least 27 feet above ground level. These stack parameters will ensure maximum dispersion of the exhaust gases from the crematory and reduce the potential for detecting odors.

The Department's air quality control regulations prohibit a source from causing a nuisance (See COMAR 26.11.06.08 and COMAR 26.11.06.09). The Department believes that, if Maryland Crematory complies with the requirements of the permit to construct, the facility will not cause nuisance odors in the surrounding community. MDE personnel monitor for odors when conducting inspections of the crematory and when conducting routine odor surveillance of the general area.

While there is no regulatory requirement defining a specific schedule of inspections for this type of facility, the Department has an internal policy of inspecting them at least every other year. The frequency of such inspections and surveillance will also depend to some degree upon the number and frequency of complaints the Department receives about the facility. Inspections are made on announced and unannounced bases. Routine surveillance will generally be unannounced. The Department is able to take specific enforcement actions to require Maryland Crematory to correct a problem if the company is found to be in violation of any regulation or permit condition.

Based upon the Department's experience with crematories over the years, these operations do not cause odors in the neighborhoods in which they are located. However, if residents in the vicinity of the crematory should detect nuisance odors, any incidences of nuisance odor can be reported to MDE for investigation. Complainants should make an effort to contact MDE as soon as possible about incidents of odor nuisance and other air pollution control violations so that the Department has the best opportunity to investigate and identify the likely source and the causes contributing to the problem. For incidents involving nuisance odors it is helpful if the complainant makes note of the time and local wind direction at the time of the incident and reports this information when contacting MDE. During normal business hours (8:00 a.m. through 5:00 p.m. Monday through Friday) air quality complaints can be reported directly to MDE by phone at 410-537-3215. During non-business hours such complaints can be reported at 1-866-633-4686.

Specifically, as of March 14, 2018, Maryland Crematory has received 16 physical inspections by an MDE Compliance Program inspector since the company received its initial permit to construct in July 2013. A Maryland Cremation Inspection History Report is attached as Appendix A.

10. Enforcement/Compliance

Commenter asked about monitoring and record keeping and "how often the MDE will do the check of these recordings for the emissions."

MDE Response

MDE air quality compliance personnel have conducted and will continue to conduct routine inspections of Maryland Crematory. During inspections, inspectors observe the operations of the crematory and make a visual observation of the exhaust gases from the stack in order to verify that the operations are in compliance with operating parameters which are specified in the permit. In addition, the inspector audits all the records required by the permit, such as temperature charts and charge times and weights. At a minimum, a crematory will have a full compliance evaluation conducted once during the five-year term of the air quality state operating permit which is required for crematories.

Additional inspections occur should the Department receive a compliant of nuisance or odors. Corrective action will be taken by the Department if a nuisance or odor problem is observed or if there is a violation of any permit condition.

In addition to a site inspection, the inspector audits the annual emissions certification report which is submitted to the Department on April 1 of each year. If the review of the report raises questions, a site visit and inspection may be conducted.

The Department is authorized to initiate an enforcement actions against any company the Department determines is in violation of any regulation or air quality permit condition. Enforcement actions include the requirement to perform corrective actions by the company and may include an assessment of monetary penalties.

Specifically, as of March 14, 2018, Maryland Crematory has received 16 physical inspections by an MDE Compliance Program inspector since the company received its initial permit to construct in July 2013. A Maryland Cremation Inspection History Report is attached as Appendix A.

11. Monitoring/Testing

"Will periodic monitoring of the cremation equipment be recorded and all documents held indefinitely for MDE and public review? How often will MDE review these records?"

What about requiring regular air quality testing and not just reliance on modeling? We want testing for mercury and other contaminants.

MDE Response

With regard to records retention, the Department maintains records in accordance with approved records retention schedules.

Air sampling or testing programs are not necessary for determining the impact of a facility's air emissions on local ambient air quality. EPA has spent a lot of time and effort over many years developing, testing, refining, and validating air dispersion models that can predict local ambient concentrations of pollutants when the model's input data is specific to the affected source (facility) and to the local geography.

A modeling approach is the only feasible way to evaluate if potential pollutant emissions of a source will have an adverse effect on local ambient air quality. Due to a source not being able to emit pollutant emissions until after a permit is issued, agencies (e.g. EPA and MDE) rely on modeling to predict a maximum pollutant impact (concentration) of a source on the surrounding local ambient air. Doing a screening modeling analysis is the most conservative modeling approach that can be used to predict worst case pollutant concentrations. A screening modeling analysis consists of using a source's maximum pollutant emission rate, a full range of meteorological conditions (including all stability classes and wind speeds), and receptor locations that represent maximum surface terrain heights based on the area topography. The end result of this screening modeling analysis is a predicted maximum pollutant concentration that's more conservative (i.e., higher pollutant concentration) than if a refined dispersion modeling analysis approach had been used.

EPA has demonstrated the efficacy of approved models by comparing empirical results to results predicted by the models. EPA has found that screening models used by Maryland Crematory in this case provides conservative values for ambient concentrations.

With regard to mercury stack testing, testing for mercury in crematoria emissions was conducted by the Environmental Protection Agency using EPA Method 29 for metal emissions testing. Nine human cremations were tested at the Woodland Cemetery in the Bronx, New York. The tests showed that measured mercury emissions were consistently less than the conservative EPA-established emission factors used to estimate emissions from Maryland Crematory's operations.

Mercury emissions from crematory operations originate from silver amalgam dental fillings found in some human bodies. Since the Woodland Cemetery tests were conducted, there has been a continued decline in silver amalgam dental fillings containing mercury. As an example, the Interstate Mercury Education and Reduction Clearinghouse reported a decline of approximately 48% in the use of mercury in dental amalgam sold in the U.S. from 2001 to 2013. As such, actual mercury emissions from Maryland Crematory's operations are expected to be lower than the conservative worst-case emission estimates used to demonstrate compliance.

12. Conflict of Interest Concerns

"If MDE grants permission for Maryland Cremation Services to add a second cremation equipment at their location in Millersville, will all MDE members involved in this decision be willing to sign an official statement that no member will accept any services from Maryland Cremation Services?

MDE Response

The Conflict of Interest provisions of the Public Ethics Law, Maryland Code Annotated, General Provisions, Title 5, Subtitle 5, apply to all state employees.

Maryland Crematory, LLC Permit to Construct
Final Determination

Appendix A - Maryland Crematory, LLC
Inspection History Report

Maryland Cremation Inspection History Report

March 14, 2018

Maryland Crematory has received 16 physical inspections of the facility by an MDE Compliance Program inspector since it has received its initial permit to construct on July 2013. These inspections are summarized below:

Date	Type of Inspection	Summary
October 12, 2017	Unannounced	Operating, no visible emissions
September 22, 2017	Unannounced	Operating, no visible emissions
June 3, 2017	Unannounced	Operating, no visible emissions
February 16, 2017	Unannounced	No visible emissions
April 22, 2016	Announced	Operating, no visible emissions
April 14, 2016	Unannounced	Operating, no visible emissions
March 2, 2016	Compliant Response	See Note 1 below
February 12, 2016	Unannounced	Operating, no visible emissions
April 2, 2015	Unannounced	Operating, no visible emissions
March 12, 2015	Unannounced	Operating, no visible emissions
January 14, 2015	Unannounced	Operating, no visible emissions
January 2, 2015	Compliant Response	See Note 2 below
October 7, 2014	Compliant Response	See Note 3 below
June 2, 2014	Unannounced	Not operating
February 21, 2014	Unannounced	Operating, no visible emissions
December 5, 2013	Compliant Response	See Note 4 below

Notes:

1. A complaint of visible emissions on February 23, 2016 at 2:50PM was received by the Department. An inspection of the chart recorder for the crematory showed the unit appeared to have operated normally. Maryland Crematory self-reported during the inspection that a thermocouple had malfunctioned at approximately 9:40AM and that the unit was shut down. The thermocouple was replaced and then the unit was restarted. The unit was operating at the time of the inspection and no visible emissions were observed.

2. A complaint of chemical/plastic odors on December 28 and 29, 2014 was received by the Department and the complainants wanted to know if the crematory was operating on December 28 and 29, 2014. An inspection of the temperature chart records for the

crematory revealed that it was not operated on December 28 and 29, 2014. The unit was operating at the time of the inspection and no visible emissions were observed nor were any odors detected.

3. A complaint of smoke on September 25, 2014 was received by the Department. An inspection of the chart recorder for the crematory showed the unit appeared to have operated normally. The unit was operating at the time of the inspection and no visible emissions were observed.

4. A complaint of smoke and odors on November 27, 2013 was received by the Department. Maryland Crematory self-reported during the inspection that the primary chamber thermocouple failed and that the unit shut down. The thermocouple was replaced and then the unit was restarted. The cardboard cremation container had already ignited and some smoke from this combustion escaped through the stack during this incident. The unit was not operating at the time of the inspection.

Additionally, on January 15, 2015 Maryland Cremation self-reported visible emissions on January 14, 2015 from approximately 5:06 PM to 5:11 PM. After which the opacity sensor returned to normal. No further smoke was reported.

Maryland Crematory, LLC Permit to Construct
Final Determination

Appendix B - Tentative Determination

MARYLAND DEPARTMENT OF ENVIRONMENT

AIR AND RADIATION ADMINISTRATION
FACT SHEET AND TENTATIVE DETERMINATION

MARYLAND CREMATORY, LLC

Addition of one (1) U.S. Cremation Equipment "Classic" X-Cel human crematory to an existing crematory facility.

I. INTRODUCTION

The Maryland Department of the Environment (the "Department") received an application from Maryland Crematory on September 5, 2017, for a Permit to Construct for the addition of one (1) U.S. Cremation Equipment "Classic" X-Cel human crematory. The crematory will be located at 408 Headquarters Drive, Suite 10, Millersville, MD 21108, in Anne Arundel County.

A notice was placed in The Capital Gazette on November 21 and November 28, 2017 announcing an informational meeting to discuss the application for a Permit to Construct. The informational meeting was held on December 12, 2017 at 6:30 pm at the Earleigh Heights Volunteer Fire Company Hall, located at 161 Ritchie Highway, Severna Park, MD 21146.

The Department has reviewed the application, and has made a tentative determination that the proposed installation is expected to comply with all applicable air quality regulations. A public hearing has been scheduled for May 31st, 2018 at 6:30 PM at the Earleigh Heights Volunteer Fire Company Hall located at 161 Ritchie Highway, Severna Park, MD 21146 to provide interested parties an opportunity to comment on the Department's tentative determination and draft permit conditions, and/or to present other pertinent concerns about the proposed facility. Notices concerning the date, time and location of the public hearing will be published in the legal section of a newspaper with circulation in general area of the proposed facility. Interested parties may also submit written comments.

If the Department does not receive any comments that are adverse to the tentative determination, the tentative determination will automatically become a final determination. If adverse comments are received, the Department will review the comments, and will then make a final determination with regard to issuance or denial of the permit. A notice of final determination will be published in a newspaper of general circulation in the affected area. The final determination is subject to judicial review pursuant to Sections 1-601(c), 1-605 and 1-606 of the Environment Article, Annotated Code of Maryland.

II. EXISTING FACILITY

Maryland Crematory owns and operates one existing human crematory, which is required to have an air quality Permit to Operate with the Department. The existing human crematory is a U.S. Cremation Equipment "Classic" human crematory installed in September 2013.

III. PROPOSED INSTALLATION

Maryland Crematory, LLC is proposing to install a U.S. Cremation Systems "Classic" X-Cel human crematory. The proposed crematory is a multiple-chamber crematory that has the capacity to cremate human remains at a maximum rate of 400 pounds per hour and a maximum charge capacity of 1200 pounds. The proposed crematory consists of: a primary chamber, where combustion of the human remains takes place, and a secondary chamber, which provides the necessary conditions (residence time, turbulence, and elevated temperature) to assure control of particulate matter, visible emissions, and odors. The secondary chamber contains an afterburner that raises the combustion gases to the permit specified operating temperature of at least 1800°F to ensure minimal release of toxic air pollutant emissions.

Prior to each cremation, the secondary chamber is preheated to the permit specified temperature before the primary burner is switched on and the combustion of the human remains begins. Continuous fuel and air modulation is controlled by a time/temperature actuated system. The temperature of the gases leaving the secondary combustion chamber is continuously monitored by a thermocouple and recorded by a chart recorder. The total volume of the chamber is sufficient to assure a residence time of at least 2.0 seconds at the permit specified operating temperature of at least 1800°F.

EQUIPMENT SPECIFICATIONS	U.S. Cremation Systems "Classic" X-Cel
Mode of operation:	Batch mode
Maximum design process rate:	400 lb/hr
Maximum batch load:	1200 lb
Primary chamber burner:	1,500,000 Btu/hr
Secondary chamber burner:	2,500,000 Btu/hr
Retention time	>2.0 seconds
Operating temperature	1,800 °F

IV. APPLICABLE REGULATIONS

This source is subject to all applicable federal and State air quality control regulations, including, but not limited to the following:

A. COMAR 26.11.01.07C, which requires that the Permittee report to the Department occurrences of excess emissions.

B. COMAR 26.11.02.09A which requires the Permittee to obtain a Permit to Construct if an installation is modified in such a manner that there is a change in the quantity, nature, or characteristics of emissions from the source from those provided in this permit.

C. COMAR 26.11.02.13A(1) which requires the Permittee to obtain a Permit to Operate from the Department before operating the crematory.

D. COMAR 26.11.02.19C & D, which require that the Permittee submit to the Department annual certifications of emissions, and that the Permittee maintain sufficient records to support the emissions information presented in the submittals.

E. COMAR 26.11.06.08 and 26.11.06.09 which generally prohibit the discharge of emissions beyond the property line in such a manner that a nuisance or air pollution is created.

F. COMAR 26.11.08.04B which prohibits the discharge of emissions, other than water in an uncombined form, which is visible to human observers.

G. COMAR 26.11.08.04C which provides exceptions to the visible emissions regulations during start-up, adjustments or occasional cleaning of control equipment, but which limits the emissions to no more than 40 percent opacity for not more than 6 consecutive minutes in any 60 minute period.

H. COMAR 26.11.08.05 which limits particulate matter emissions to 0.10 grains per standard cubic foot of dry gas, corrected to 12 percent carbon dioxide.

I. COMAR 26.11.15.05 which requires the Permittee to use the Best Available Control Technology for Toxics (T-BACT) to minimize toxic air pollutants.

J. COMAR 26.11.15.06 which prohibits the discharge of toxic air pollutants to the extent that the emissions will unreasonably endanger human health.

V. GENERAL AIR QUALITY

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: (1) sulfur dioxide, (2) particulate matter, (3) carbon monoxide, (4) nitrogen dioxide, (5) ozone, and (6) lead. The primary standards were established to protect public health, and the secondary standards were developed to protect against non-health effects such as damage to property and vegetation.

The Department operates an air monitoring network throughout the State in accordance with EPA guidelines to measure the concentrations of the criteria pollutants in the ambient air. These measurements have been used to project State-wide ambient air quality and have indicated that the Baltimore metropolitan area meets all of the criteria pollutant standards except ozone.

Ground level ozone continues to present a problem for the entire Baltimore metropolitan area, which is classified as a non-attainment area for ozone. The primary contributors to the formation of ozone are emissions of oxides of nitrogen (NOx), primarily from combustion equipment, and emissions of Volatile Organic Compounds (VOC) such as paint solvents and gasoline vapors. Anne Arundel County is included in the non-attainment area for ozone. In accordance with the EPA guidance, a source is major for NOx or VOC if it emits or has the potential to emit 25 tons per year of either NOx or VOC. Total yearly potential emissions from the facility operated continuously at its maximum potential to emit would be 7.4 tons of NOx and 2.25 tons of VOC which are each less than the major source level of 25 tons per year per pollutant. Therefore, based on EPA guidance, the proposed installation will not trigger non-attainment New Source Review for either NOx or VOC.

With regard to toxic air pollutants (TAPs), screening levels (i.e., acceptable ambient concentrations for toxic air pollutants) are generally established at 1/100 of allowed worker exposure levels (TLVs). The Department has also developed additional screening levels for carcinogenic compounds. The additional screening levels are established such that continuous exposure to the subject TAP at the screening level for a period of 70 years is expected to cause an increase in lifetime cancer risk of no more than 1 in 100,000.

VI. CRITERIA POLLUTANT COMPLIANCE DEMONSTRATION AND ANALYSIS

The proposed construction must comply with all State imposed emissions limitations and must not cause or contribute to a violation of any National Ambient Air Quality Standard (NAAQS). The ARA has conducted an engineering and air quality review of the application. The emissions were projected based on crematory capacity, permit limits, and the U.S. EPA approved emission factors (AP-42). The U.S. EPA's Screen3 model was used to project the maximum ground level concentrations from the proposed crematory, which were then compared to the NAAQS.

A. Estimated Emissions - The projected criteria pollutant emissions from the facility at its maximum potential to emit are listed in Table I.

B. Compliance with National Ambient Air Quality Standards - The facility will not cause or contribute significantly to a violation of any National Ambient Air Quality Standard. Contributions to the background concentrations from the facility at its maximum potential to emit are described in Table II.

VII. TOXIC AIR POLLUTANT COMPLIANCE DEMONSTRATION AND ANALYSIS

The proposed construction must comply with all State imposed emissions limitations and screening levels for toxic air pollutants. The ARA has conducted an engineering and air quality review of the application. The emissions were projected based on crematory capacity, permit limits, and U.S. Environmental Protection Agency (EPA) emission factors. The U.S. EPA Screen3 model was used to project the maximum ground level concentrations from the proposed crematory, which were then compared to the MDE screening levels

A. Quantification of Emissions – COMAR 26.11.15.04 requires the quantification of all toxic air pollutants from a source. The projected TAP emissions from the facility at its maximum potential to emit are listed in Table III.

Emission factors for crematories were obtained from the U.S. EPA Factor Information Retrieval (FIRE) software, version 6.25. The emissions are given on a full cremation cycle (single body) basis.

B. Control Technology (T-BACT) Requirements – COMAR 26.11.15.05 requires a new source of toxic air pollution to install and operate T-BACT in order to reduce air pollution. T-BACT is determined on a case by case basis, taking into account the potency and toxicity of each toxic air pollutant and the technical and economic feasibility of control. Maryland Crematory and the Department have chosen the following control methods and operating procedures to minimize the emissions of toxic air pollutants, and to comply with Maryland T-BACT requirements:

1. A secondary combustion chamber with a temperature of at least 1800° F for both crematories.
2. A secondary combustion chamber with a retention time of at least 1.5 seconds for the existing U.S. Cremation Equipment "Classic" human crematory and at least 2.0 seconds for the proposed U.S. Cremation Equipment "Classic" X-Cel human crematory.
3. A temperature monitor and recorder for the secondary combustion chamber for both crematories.
4. The prohibition of the burning of halogenated plastics, including PVC body bags or pipes in either crematory.
5. A minimum stack height of 27' above the ground, and 11' above the roof peak for both crematories.

C. Ambient Impact Requirements – COMAR 26.11.15.06 requires a demonstration that the total allowable emissions from the facility will not unreasonably endanger human health. The projected maximum off-site ground level concentrations from the facility, in any direction, for Toxic Air Pollutants are at or below all applicable screening levels. These concentrations are listed in Tables IV, V and VI.

D. Premises Wide Operating Limit – In order to comply with the above ambient impact requirement Maryland Crematory and the Department have chosen the following facility-wide (premises) operating limit on cremations:

No more than 10 human cremations during any rolling 8-hour period.

VIII. TENTATIVE DETERMINATION

Based on the above information, the ARA has concluded that the proposed installation will comply with all applicable Federal, State, and local air quality control requirements. In accordance with the Administrative Procedure Act, ARA has made a tentative determination to issue the Permit to Construct.

Enclosed with the tentative determination is a copy of the draft Permit to Construct.

TABLE I.
MAXIMUM POTENTIAL EMISSIONS OF CRITERIA POLLUTANTS

Pollutant[1]	Emissions (lb/day)[2]	Emissions (ton/year)[3]
Particulate Matter ($PM_{10, 2.5}$)	6.23	1.14
Sulfur Dioxide (SO_2)	7.99	1.46
Volatile Organic Compounds (VOC)	12.30	2.25
Nitrogen Oxides (NOx)	40.57	7.40
Carbon Monoxide (CO)	34.33	6.26
Lead (Pb)	0.00	0.00

[1]Source: EPA AP-42 emission factors

[2]Projected emissions assuming facility is operating at maximum potential to emit continuously for a 24 hour day.

[3]Projected emissions assuming facility is operating at maximum potential to emit continuously for the year.

TABLE II
CRITERIA POLLUTANT EMISSIONS

CRITERIA POLLUTANT	MAXIMUM GROUND LEVEL CONCENTRATION FROM CREMATORY EMISSIONS[1] ($\mu g/m^3$)	AMBIENT BACKGROUND CONCENTRATION[2] ($\mu g/m^3$)	NATIONAL AMBIENT AIR QUALITY STANDARD ($\mu g/m^3$)
Nitrogen Dioxide (NO_2)	0.69 (Annual) 8.67 (1-hour)	17.7 (Annual) 75 (1-hour)	100 (Annual) 188 (1-hour)
Carbon Monoxide (CO)	20.92 (8-hour) 47.81 (1-hour)	1031 (8-hour) 1655 (1-hour)	10,000 (8-hour) 40,000 (1-hour)
Sulfur Dioxide (SO_2)	10.02 (3-hour) 11.13 (1-hour)	65.5 (3-hour) 10 (1-hour)	1300 (3-hour) 196 (1-hour)
Particulate Matter (PM-10)	2.17 (24-hour)	27 (24-hour)	150 (24-hour)

Note: $\mu g/m^3$ = micrograms per cubic meter

[1]Projected emissions assuming facility is operating at maximum potential to emit continuously for the year.

[2]Background concentrations were obtained from Maryland air monitoring stations as follows:
NO_2, CO and SO_2 – HU-Beltsville Monitoring Station in Prince George's County
PM10 – Glen Burnie Monitoring Station in Anne Arundel County.

TABLE III
PROJECTED MAXIMUM EMISSIONS OF TOXIC AIR POLLUTANTS

TAP Name	Maximum Hourly Emissions[1] Premises-Wide (pounds)	Maximum Yearly Emissions[1] Premises-Wide (pounds)
Acenaphthene	0.0000002220	0.0019447200
Acenaphthylene	0.0000002440	0.0021374400
Anthracene	0.0000006480	0.0056764800
Antimony	0.0000604000	0.5291040000
Arsenic	0.0000600000	0.5256000000
Barium	0.0000480000	0.4204800000
Benzo (a) anthracene	0.0000000195	0.0001709952
Benzo (a) pyrene	0.0000000582	0.0005098320
Benzo (b) fluoranthene	0.0000000318	0.0002785680
Benzo (g,h,i) perylene	0.0000000582	0.0005098320
Benzo (k) fluoranthene	0.0000000284	0.0002487840
Beryllium	0.0000027400	0.0240024000
Cadmium	0.0000222000	0.1944720000
Chromium	0.0000598000	0.5238480000
Chromium (VI)	0.0000270000	0.2365200000
Chrysene	0.0000001080	0.0009460800
Cobalt	0.0000035000	0.0306600000
Copper	0.0000548000	0.4800480000
Dibenzo(a,h) anthracene	0.0000000254	0.0002225040
Fluoranthene	0.0000004100	0.0035916000
Fluorene	0.0000008340	0.0073058400
Hydrogen chloride	0.1440000000	1,261.4400000000
Hydrogen fluoride	0.0013100000	11.4756000000
Indeno(1,2,3-cd)pyrene	0.0000000308	0.0002698080
Lead	0.0001324000	1.1598240000
Mercury	0.0065800000	57.6408000000
Molybdenum	0.0000334000	0.2925840000
Nickel	0.0000764000	0.6692640000
Phenanthrene	0.0000045800	0.0401208000
Pyrene	0.0000003240	0.0028382400
Selenium	0.0000872000	0.7638720000
Silver	0.0000146000	0.1278960000
Thallium	0.0001704000	1.4927040000
Vanadium	0.0001158000	1.0144080000
Zinc	0.0007060000	6.1845600000
PM, filterable	0.1700000000	1,489.2000000000
Polycyclic aromatic hydrocarbons (PAH)	0.0000075200	0.0658752000
Total Dioxins & Furans - TEQ balanced	0.0000000000	0.0000000000

[1]Projected emissions from the crematory are EPA WebFIRE emission factor based, assuming facility is operating at its maximum potential to emit.

TABLE IV
TOXIC AIR POLLUTANT MAXIMUM GROUND LEVEL CONCENTRATIONS
1-HOUR SCREENING LEVELS

TAP	Screening Level (ug/m3)	Maximum Off-Site Concentration[1] (ug/m3)	Maximum Off-Site Concentration (% of screening level)
Hydrogen chloride	29.8323108384	4.8139200000	16.14
Hydrogen fluoride	16.3680981595	0.0437933000	0.27
Mercury	0.3000000000	0.2199694000	73.32
Zinc	1000.0000000000	0.0236015800	0.00

Note: $\mu g/m^3$ = micrograms per cubic meter

[1]In developing the concentration levels, emissions from the facility were projected using EPA WebFire-based emission factors and assuming the facility is operating at its maximum potential to emit.

TABLE V
TOXIC AIR POLLUTANT MAXIMUM GROUND LEVEL CONCENTRATIONS
8-HOUR SCREENING LEVELS

TAP	Screening Level (ug/m3)	Maximum Off-Site Concentration[1] (ug/m3)	Maximum Off-Site Concentration (% of screening level)
Acenaphthene	20.3000000000	0.0000032469	0.00
Acenaphthylene	24.6400000000	0.0000035687	0.00
Anthracene	20.0000000000	0.0000094774	0.00
Antimony	5.0000000000	0.0008833878	0.02
Arsenic	0.1000000000	0.0008775375	0.88
Barium	5.0000000000	0.0007020300	0.01
Benzo (g,h,i) perylene	20.0000000000	0.0000008512	0.00
Beryllium	0.0005000000	0.0000400742	8.01
Cadmium	0.0200000000	0.0003246889	1.62
Chromium	5.0000000000	0.0008746124	0.02
Chromium (VI)	0.1000000000	0.0003948919	0.39
Cobalt	0.2000000000	0.0000511897	0.03
Copper	2.0000000000	0.0008014843	0.04
Fluoranthene	82.0000000000	0.0000059965	0.00
Fluorene	20.0000000000	0.0000121978	0.00
Hydrogen chloride	165.2710020400	2.1060900000	1.27
Hydrogen fluoride	4.0920245399	0.0191595688	0.47
Lead	0.5000000000	0.0019364328	0.39
Mercury	0.1000000000	0.0962366125	96.24
Molybdenum	5.0000000000	0.0004884959	0.01
Nickel	1.0000000000	0.0011173978	0.11
Phenanthrene	9.8000000000	0.0000669854	0.00
Pyrene	20.0000000000	0.0000047387	0.00
Selenium	2.0000000000	0.0012753545	0.06
Silver	0.1000000000	0.0002135341	0.21
Thallium	0.2000000000	0.0024922065	1.25
Vanadium	0.5000000000	0.0016936474	0.34
Zinc	500.0000000000	0.0103256913	0.00
Total Dioxins & Furans - TEQ balanced	0.0008200000	0.0000000412	0.01

Note: $\mu g/m^3$ = micrograms per cubic meter

[1]In developing the concentration levels, emissions from the facility were projected using EPA WebFire-based emission factors and assuming the facility is operating at its maximum permit limit.

TABLE VI

TOXIC AIR POLLUTANT MAXIMUM GROUND LEVEL CONCENTRATIONS ANNUAL SCREENING LEVELS

TAP	Screening Level (ug/m3)	Maximum Off-Site Concentration[1] (ug/m3)	Maximum Off-Site Concentration (% of screening level)
Acenaphthene	0.0800000000	0.0000005937	0.00
Arsenic	0.0002000000	0.0001604640	80.23
Beryllium	0.0004000000	0.0000073279	1.83
Cadmium	0.0006000000	0.0000593717	9.90
Chromium (VI)	0.0000800000	0.0000722088	90.26
Hydrogen chloride	0.7000000000	0.3851136000	55.02
Total Dioxins & Furans - TEQ balanced	0.0000000300	0.0000000075	25.08

Note: $\mu g/m^3$ = micrograms per cubic meter

[1]In developing the concentration levels, emissions from the facility were projected using EPA WebFire-based emission factors and assuming the facility is operating at its maximum potential to emit.

Maryland Crematory, LLC Permit to Construct Final Determination

Appendix C – Overview of the Toxic Pollutant Analysis

Overview of the Toxic Pollutant Analysis Report
February 20, 2018

Grove Scientific & Engineering Company (hereby referred to as Grove) submitted, on behalf of Maryland Crematory, a Toxic Pollutant Analysis report as part of the application package received on September 5, 2017. This report was determined by the Department to be incorrect and insufficient in several areas, including building dimensions, merged stack parameters, terrain type, property boundaries, emission rates and the proposed rejection of a secondary combustion chamber. An email outlining these deficiencies was sent to the applicant and Grove on October 13, 2017.

Grove submitted its 1st revision to the Toxic Air Pollutant Analysis by email on October 19, 2017. This revision was determined by the Department to be inconsistent with regards to stack diameter, exit velocity and stack gas exit temperature. An email outlining these deficiencies was sent to Grove on January 4, 2018.

Grove submitted its 2nd revision to the Toxic Air Pollutant Analysis by email on January 4, 2018. This revision was determined by the Department to be incorrect on the stack parameters and inconsistent with the described vendor literature and stack tests. An email outlining these deficiencies was sent to Grove on January 5, 2018.

Grove submitted its 3rd and 4th revisions to the Toxic Air Pollutant Analysis by email on January 5, 2018.

Grove submitted its 5th revision to the Toxic Air Pollutant Analysis by email on January 8, 2018. This revision was determined by the Department to be incorrect in several areas, including stack heights, volumetric flows, merged stack procedures and having inadequate documentation of assumptions made. An email outlining these deficiencies was sent to Grove on January 10, 2018.

Grove submitted its 6th revision to the Toxics Air Pollutant Analysis by email on January 10, 2018. This revision was determined by the Department to be incorrect in several areas, including volumetric flow, stack diameter and merged stack procedures. An email outlining these deficiencies was sent to Grove on January 10, 2018.

Grove submitted its 7th revision to the Toxics Air Pollutant Analysis by email on January 10, 2018. This revision was determined by the Department to be incorrect in several areas, including stack diameters, volumetric flows and stack velocities. An email outlining these deficiencies was sent to Grove on January 11, 2018.

Grove submitted its 8th revision to the Toxics Air Pollutant Analysis by email on January 15, 2018. This revision was determined by the Department to be incorrect and inadequate in several areas, including stack velocities and documentation. The Department also noted that Grove was proposing an annual operating limit when the applicant did not wish for one and the modeling submitted by Grove did not support the

need for an annual operating limit. An email outlining these deficiencies was sent to Grove on January 17, 2018.

Grove submitted its 9th revision to the Toxics Air Pollutant Analysis by email on January 17, 2018. This revision was determined by the Department to still be inadequate in documentation. An email outlining this was sent to Grove on January 19, 2018.

Grove submitted its 10th revision to the Toxics Air Pollutant Analysis by email on January 22, 2018. This revision was determined by the Department to be technically correct, but still placing an unnecessary annual operating limit on Maryland Crematory. An email outlining this was sent to Grove on January 24, 2018.

Grove submitted its 11th revision to the Toxics Air Pollutant Analysis by email on January 24, 2018. This revision was determined by the Department to be incorrect on the off-site concentration, but as this mistake was in the direction of over-estimating emissions and did not change proposed operating limits, it was deemed inconsequential and the overall Toxic Air Pollutant Analysis was accepted as sufficiently technically correct and adequate.

Emission Factors

The United States Environmental Protection Agency (EPA) provides emission factors from various source categories, including crematories, through their webFIRE application, which can be accessed through this link: http://cfpub.epa.gov/webfire/. The emission factors are given in pounds, on a per body basis.

These are the emission factors used by Grove in their Toxic Air Pollutant Analysis report.

The Department accepts these emission factors as being representative of crematory emissions.

Stack Height (Merged Stack)

EPA allows for the concept of a "merged stack" when dealing with multiple stacks in a screening model. These procedures are outlined in section 2.2 of EPA Report Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revisited, EPA 454/R-92/019, which can be downloaded from this link: https://www3.epa.gov/scram001/guidance/guide/EPA-454R-92-019_OCR.pdf.

Fundamentally, this procedure compares the multiple stacks, and finds the stack that will produce the highest ground level concentration of pollution. This "representative" stack is then used in the model for all the stacks, representing them as a single worse case stack.

Grove used this merged stack approach using the data from the two stack tests submitted with the application; A March 5, 2015 stack test of a US Cremation Equipment "Classic" at Guiding Light Cremations in West Park, Florida, and a May 1, 2017 stack test of a US Cremation Equipment "Classic" X-Cel at Evans Eagle Vaults in Leola, Pennsylvania. Both tests were performed by Beatty Environmental Services of Cape Coral, Florida.

Using this merged stack approach, Grove went through several stack height variations, ultimately settling on a 27 foot stack height as the merged or representative stack, and as the proposed height of both stacks at Maryland Crematory.

The Department accepts this 27 foot stack height, and has placed it as a legally enforceable permit condition for both crematories in the proposed Permit to Construct.

Screen3

Compliance with the COMAR 26.11.15.06 requirement to demonstrate that the source will not unreasonably endanger human health is normally performed with an air pollution screening model. Grove used the EPA Screen3 model for this task, which can be downloaded from this link: https://www.epa.gov/scram/air-quality-dispersion-modeling-screening-models.

The input variables used in the Screen3 model were sufficiently accurate representations of the site and the area surrounding the site. The Department accepts the input values of the Screen3 model as given by Grove.

The stack height in the final Screen3 model was 27 feet, which resulted in acceptable offsite concentrations when the Screen3 model was run for this facility.

The screen3 model can be run with a single value for the emission rate, such as 1 pound per hour (lb/hr). This gives offsite concentrations based on that emission rate. For sources emitting multiple chemicals at different emission rates the offsite concentration can be determined by simply multiplying the simple offsite concentration by the actual emission rate. For example, if a simple emission rate of 1 lb/hr results in a maximum offsite concentration of 20 ug/m3, an emission rate of 0.5 lb/hr will result in a maximum offsite concentration of 10 ug/m3 (20 X 0.5 = 10).

Grove chose this technique, using a single emission rate for the model of 1 lb/hr, and then multiplying the maximum offsite concentration by the various emission factors.

The Department accepts this technique as being a valid use of the Screen3 model.

The Departmental Screen3 model run of 1 lb/hr gave nearly identical values to the model run submitted by Grove. The Department accepts the Screen3 model run submitted by Grove as valid.

Spreadsheet

Grove utilized a Department provided spreadsheet (Toxytool 2012) made available to all crematory permit applicants. This spreadsheet utilizes EPA emission factors, Screen3 output data and crematory operating rates to quantify toxic air pollutant emissions, criteria pollution emissions, maximum off-site concentrations of toxic air pollutants, and to demonstrate compliance with Departmental screening levels.

For reasons unknown, in its final revision Grove increased the Screen3 modeling concentration value used in the spreadsheet from the correct 33.44ug/m3 to a higher 34.03 ug/m3. The Department noted this and determined it to be a mistake by Grove. However, as this mistake was more conservative than the correct value would be, and was not sufficient to create a change in proposed operating limits due to exceeding screening levels, the mistake was not required to be corrected.

The Departmental use of the Toxytool 2012 spreadsheet gave nearly identical values to those submitted by Grove, and showed no changes in proposed operating limits being required. The Department accepts Groves's use of this spreadsheet as being a valid method of emissions quantification and compliance demonstration.

Operating Rate

Grove modeled the operation of the facility at a rate of 1 human remains per hour per crematory (2 crematories are proposed for the facility). This was extended to 8 human remains per 8-hour and 8760 human remains per year per crematory (16 human remains per 8-hour and 17520 human remains per year for the facility).

Using the Screen3 model and the Departmental spreadsheet, the projected toxic air pollutant emissions for the proposed crematories at their maximum potential to emit did show the facility exceeding the 8-hour screening levels for mercury. Reducing the number of cremations to 10 for any 8-hour period brought facility wide emissions under the 8-hour screening levels for all toxic air pollutant emissions, including mercury. Therefore, a premises wide operating limit of no more than 10 cremations per any rolling 8-hour period was proposed and submitted by Grove as an operating limit.

The projected toxic air pollutant emissions for the proposed crematories at their maximum potential to emit did show the facility exceeding any 1-hour or annual screening levels for any chemicals. Therefore, no 1-hour or annual operating limits for the crematories were necessary in the permit to construct.

The Departmental evaluation of emissions and the off-site concentration gave identical results to those submitted by Grove. The Department accepts the proposed 8-hour operating limit and the finding of no 1-hour or annual operating limits submitted by Grove as valid.

The Department has included in the proposed permit to construct a premises wide operational limit of no more than 10 cremations per any rolling 8-hour period.