



TECHNICAL SUPPORT DOCUMENT

**Air Discharge Permit 21-3482
Air Discharge Permit Application CO-1042**

Issued: October 14, 2021

Humane Society of Cowlitz County

SWCAA ID – 517

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ABBREVIATIONS

List of Acronyms

ADP.....	Air Discharge Permit	PSD	Prevention of Significant Deterioration
AP-42	Compilation of Emission Factors, AP-42, 5th Edition, Volume 1, Stationary Point and Area Sources – published by EPA	RACT	Reasonably Available Control Technology
ASIL.....	Acceptable Source Impact Level	RCW	Revised Code of Washington
BACT	Best available control technology	SCC	Source Classification Code
CAS#.....	Chemical Abstracts Service registry number	SDS	Safety Data Sheet
CFR.....	Code of Federal Regulations	SQER	Small Quantity Emission Rate listed in WAC 173-460
EPA.....	U.S. Environmental Protection Agency	Standard	Standard conditions at a temperature of 68°F (20°C) and a pressure of 29.92 in Hg (760 mm Hg)
EU	Emission Unit	SWCAA	Southwest Clean Air Agency
NOV	Notice of Violation/	T-BACT	Best Available Control Technology for toxic air pollutants
NSPS	New Source Performance Standard	WAC	Washington Administrative Code

List of Units and Measures

µg/m ³	Micrograms per cubic meter	MMcf	Million cubic feet
µm	Micrometer (10 ⁻⁶ meter)	ppm	Parts per million
acfm.....	Actual cubic foot per minute	ppmv	Parts per million by volume
dscfm.....	Dry Standard cubic foot per minute	ppmvd	Parts per million by volume, dry
gr/dscf	Grain per dry standard cubic foot	scfm.....	Standard cubic foot per minute
MMBtu.....	Million British thermal unit	tph	Ton per hour
		tpy	Tons per year

List of Chemical Symbols, Formulas, and Pollutants

CO.....	Carbon monoxide	O ₂	Oxygen
CO ₂	Carbon dioxide	PM.....	Particulate Matter with an aerodynamic diameter 100 μm or less
CO _{2e}	Carbon dioxide equivalent	PM ₁₀	PM with an aerodynamic diameter 10 μm or less
HAP.....	Hazardous air pollutant listed pursuant to Section 112 of the Federal Clean Air Act	PM _{2.5}	PM with an aerodynamic diameter 2.5 μm or less
HCl.....	Hydrochloric acid	SO ₂	Sulfur dioxide
Hg.....	Mercury	SO _x	Sulfur oxides
N ₂ O	Nitrous oxide	TAP	Toxic air pollutant pursuant to Chapter 173-460 WAC
NO ₂	Nitrogen dioxide	VOC	Volatile organic compound
NO _x	Nitrogen oxides		

Terms not otherwise defined have the meaning assigned to them in the referenced regulations or the dictionary definition, as appropriate.

1. FACILITY IDENTIFICATION

Applicant Name: Humane Society of Cowlitz County
Applicant Address: PO Box 172, Longview, Washington 98632

Facility Name: Humane Society of Cowlitz County
Facility Address: 909 Columbia Boulevard, Longview, Washington 98632

SWCAA Identification: 517

Contact Person: Christopher Cone, Executive Director

Primary Process: Funeral Services and Crematories
SIC/NAICS Code: 7261
81222

Facility Classification: Natural Minor

2. FACILITY DESCRIPTION

The Humane Society of Cowlitz County operates as animal control for Cowlitz County. Live and dead animals are collected, and the live ones are adopted out or euthanized. The dead animals are then disposed of in an animal crematory.

3. CURRENT PERMITTING ACTION

This permitting action is in response to Air Discharge Permit (ADP) application number CO-1042 dated September 21, 2021. Human Society of Cowlitz County submitted ADP Application CO-1042 requesting the following:

- Approval for a replacement ThermTec S-27-T Pet Cremation Unit

ADP 21-3482 will supersede ADP 06-2653 in its entirety.

4. PROCESS DESCRIPTION

- 4.a. Crematory Operation. The animal crematory (incinerator) will operate on a batch load basis with up to 350 pounds of animals at one time. The time of the cremation will be adjusted for the size of the load. The unit has two combustion chambers. Remains are loaded into a primary combustion chamber via a large refractory door. In the primary combustion chamber, the primary burner and air supply is controlled as to promote high temperature pyrolysis and achieve maximum volume reduction of the material. The resulting

combustion products from the primary chamber pass into a secondary combustion zone, or afterburner, where they are mixed with secondary air and additional combustion is initiated with secondary burners. The exhaust exits through a single stack.

5. EQUIPMENT/ACTIVITY IDENTIFICATION

5.a. Crematory. Details for the Therm-Tec S-27-T animal cremation unit are as follows:

Make:	Therm Tec, Inc.
Model:	S-27-T
Natural Gas Max:	1,400 cubic feet per hour (1.428 MMBtu/hr heat input)
Batch Load Capacity:	350 lbs (50 lb/hr)
Primary Burner Model:	Midco International/Incinomite J83-DS
Primary Burner Heat Input:	0.600 MMBtu/hr
Secondary Burner Model:	Midco International/Incinomite J83-DS
Secondary Burner Heat Input:	0.800 MMBtu/hr
Secondary Chamber Temp:	1500-1600° F
Secondary Chamber Time:	~1.5 seconds
Stack Height:	224 in
Stack Diameter (inside/outside):	20 in/14 in
Dimensions (W,L,H):	56 in, 84 in, 80 in
Exhaust Flow Rate:	365 dscfm @ 9% O ₂ (calculated using method 19)

5.b. Equipment/Activity Summary.

ID No.	Equipment/Activity	Control Equipment/Measure
1	Crematory Incinerator (Therm Tec model S-27-T)	Afterburner, controlled combustion

6. EMISSIONS DETERMINATION

Emissions to the ambient atmosphere from the new crematory, as proposed in ADP Application CO-1042, consist of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM) sulfur dioxide (SO₂), toxic air pollutants (TAPs), and hazardous air pollutants (HAPs).

6.a. Crematories. The manufacturer provided PM, CO, and NO_x source test data for a similar Therm Tec Model S-27-T incinerator. The test was conducted June 14, 2006 with a charge of 68 and 74 lbs for runs 1 and 2 respectively. The results of the source test are presented below.

Source Test Data, Peaceful Paws – Vancouver, WA			
Pollutant	Run 1	Run 2	Average
PM (gr/dscf @ 7% O ₂)	0.0068	0.0072	0.0070
CO (pm @ 7% O ₂)	21	2	11
NO _x (pm @ 7% O ₂)	160	117	139
O ₂ (%)	8.1	9.5	8.8
Flow Rate (dscfm)	336	335	336
Throughput (lb/charge)	68	74	71

Emissions are determined using several sources of emission factor data. There are also assumptions about the maximum number of cremations and rates that were established. The cremation rate is assumed to be 50 lb/hr, based on information provided by Them Tec, which is higher than the measured rate. Maximum operating hours per crematory unit were assumed to be 3,000 hr/yr, with a maximum weight of 150,000 lb/yr.

Emission factors for the cremation process were obtained from testing data, EPA AP-42 §2.3, and a CARB 1999 report. Although these factors may not be specific to animal cremation, they represent the best available and most widely used information for cremation emissions.

Pollutant	Crematory		Source
	Emission Factor (lb/ton)	PTE * (ton/yr)	
NO _x †	14.8	0.56	Emission Limit
CO †	2.52	0.09	Emission Limit
VOC (as C ₃ H ₈)	0.30	0.01	AP-42 § 2.3 (7/1993)
SO ₂	2.17	0.08	AP-42 § 2.3 (7/1993)
PM	0.68	0.011	Source Test Data
PM ₁₀	0.44	0.0073	65.0% of PM (AP-42 § 2.3)
PM _{2.5}	0.29	0.0049	43.3% of PM (AP-42 § 2.3)
CO _{2e}	1,356	50.85	40 CFR 98 ‡
acetaldehyde [75-07-0]	9.01×10 ⁻⁴	3.4×10 ⁻⁵	CARB Research (1999) #
arsenic [7440-38-2]	4.96×10 ⁻⁴	1.9×10 ⁻⁵	CARB Research (1999) #
barium [7440-39-3]	2.43×10 ⁻⁴	9×10 ⁻⁶	CARB Research (1999) #
beryllium [7440-41-7]	1.71×10 ⁻⁵	1×10 ⁻⁶	CARB Research (1999) #
cadmium [7440-43-9]	1.11×10 ⁻⁴	4×10 ⁻⁶	CARB Research (1999) #
chromium (total) [7440-47-3]	3.71×10 ⁻⁴	1.4×10 ⁻⁵	CARB Research (1999) #
chromium (VI) [18540-29-9]	1.78×10 ⁻⁴	7×10 ⁻⁶	CARB Research (1999) #
cobalt [7440-48-4]	8.62×10 ⁻⁵	3×10 ⁻⁶	CARB Research (1999) #

Pollutant	Crematory Emission		Source
	Factor (lb/ton)	PTE * (ton/yr)	
copper [7440-50-8]	3.21×10^{-4}	1.2×10^{-5}	CARB Research (1999) #
dioxin/furans, total **	2.97×10^{-9}	1.1×10^{-10}	CARB Research (1999) #
formaldehyde [50-00-0]	2.40×10^{-4}	9×10^{-6}	CARB Research (1999) #
hydrochloric acid [7647-01-0]	0.750	0.0281	CARB Research (1999) #
hydrogen fluoride [7664-39-3]	8.41×10^{-3}	3.15×10^{-4}	CARB Research (1999) #
lead [7439-92-1]	6.97×10^{-4}	2.6×10^{-5}	CARB Research (1999) #
mercury [7439-97-6]	0.054	2.02×10^{-3}	CARB Research (1999) #
naphthalene [91-20-3]	7.31×10^{-4}	2.7×10^{-5}	CARB Research (1999) #
nickel [7440-02-0]	4.03×10^{-4}	1.5×10^{-5}	CARB Research (1999) #
PAH, total ††	7.59×10^{-4}	2.8×10^{-5}	CARB Research (1999) #
selenium [7782-49-2]	4.83×10^{-4}	1.8×10^{-5}	CARB Research (1999) #
silver [7440-22-4]	8.73×10^{-5}	3×10^{-6}	CARB Research (1999) #
zinc [7440-66-6]	3.86×10^{-3}	1.45×10^{-4}	CARB Research (1999) #
<p>* The calculation assumes maximum hours of operation of 3,000 hours per year and 50 lb/hr material combusted, which is a figure provided by Therm Tec</p> <p>† The emission factor is based emission rates measured during a source test completed on June 14, 2006 for a unit of the same model</p> <p>‡ Based on the carbon content of a human body (18%, Wikipedia), and assuming 100% conversion of this carbon to CO₂, a factor of 1,356 lb/ton was determined. Animals are assumed to have a similar composition.</p> <p># Emission factors (lb/body cremated) are from Table 19 "Point Source Emission Factors", Crematory Major Group (pg. 127) in the December 1999 CARB research report, Development of Toxics Emission Factors from Source Test Data Collected Under the Air Toxics Hot Spots Program Part II Final Report Volume I, test data from a 1993 crematory source test.</p> <p>** Dioxins/furans total includes individual emission factors for dioxins, 4D total; dioxin, 5D total; dioxin, 6D total; dioxin, 7D total; furan, 4F total; furan, 5F total; furan, 6F total; and furan, 7F total. A ratio was applied to these factors adjusting for the toxic equivalency factor (TEF)¹ to 2,3,7,8-TCDD as follows: 1.0, 0.50, 0.040, 0.0010, 0.10, 0.10, 0.010, and 0.0010, respectively.</p> <p>†† PAHs total includes individual emission factors for acenaphthene [83-32-9]; acenaphthylene [208-96-8]; anthracene [120-12-7]; benzo(a)anthracene [56-55-3]; benzo(a)pyrene [50-32-8]; benzo(b)fluoranthene [205-99-2]; benzo(g,h,i)perylene [191-24-2]; benzo(k)fluoranthene [207-08-9]; chrysene [218-01-9]; dibenz(a,h)anthracene [53-70-3]; fluoranthene [206-44-0]; fluorene [86-73-7]; indeno(1,2,3-cd)pyrene [193-39-5]; naphthalene [91-20-3]; phenanthrene [85-01-8]; and pyrene [129-00-0].</p>			

Annual emissions must be determined by the total tons of bodies cremated multiplied by the emission factors above, unless otherwise specified by SWCAA.

¹ U.S. EPA. "Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and dibenzofurans (CDDs and CDFs). 1989 Update." EPA /625/3-89/016. March 1989

6.b. Emissions Summary

Criteria Air Pollutant	Facility-wide Anticipated Emissions (tpy)	Emission Increase (tpy)
NO _x	0.56	+0.08
CO [630-08-0]	0.09	N/A
VOC	0.03	-0.14
SO ₂ [7446-09-5]	0.08	-0.06
PM	0.011	-0.03
PM ₁₀	0.0073	N/A
PM _{2.5}	0.0049	N/A
CO ₂ /CO _{2e}	50.85	N/A

Toxic/Hazardous Air Pollutant	HAP?	Facility-wide Anticipated Emissions (lb/yr)	Emission Increase (tpy)
acetaldehyde [75-07-0]	Yes	0.067	+0.017
arsenic [7440-38-2]	Yes	0.037	N/A
barium [7440-39-3]	Yes	0.018	N/A
beryllium [7440-41-7]	Yes	0.0012	N/A
cadmium [7440-43-9]	Yes	0.0083	N/A
chromium (total) [7440-47-3]	No	0.027	N/A
chromium (VI) [18540-29-9]	Yes	0.013	-0.07
cobalt [7440-48-4]	Yes	0.0065	N/A
copper [7440-50-8]	Yes	0.024	N/A
dioxin/furans, total	Yes	2.2×10^{-7}	N/A
formaldehyde [50-00-0]	Yes	0.018	N/A
hydrochloric acid [7647-01-0]	Yes	56.25	-70.85
hydrogen fluoride [7664-39-3]	Yes	0.63	-0.47
lead [7439-92-1]	Yes	0.052	-0.048
mercury [7439-97-6]	Yes	4.05	-1.85
naphthalene [91-20-3]	Yes	0.054	N/A
nickel [7440-02-0]	Yes	0.030	-0.04
PAH, total	Yes	0.057	N/A
selenium [7782-49-2]	Yes	0.036	N/A
silver [7440-22-4]	No	0.0065	N/A

Toxic/Hazardous Air Pollutant	HAP?	Facility-wide Anticipated Emissions (lb/yr)	Emission Increase (tpy)
zinc [7440-66-6]	No	0.29	N/A
Total TAPs		61.68	N/A
Total HAPs		61.34	N/A

7. REGULATIONS AND EMISSION STANDARDS

Regulations have been established for the control of emissions of air pollutants to the ambient air. Regulations applicable to the proposed facility that have been used to evaluate the acceptability of the proposed facility and establish emission limits and control requirements include, but are not limited to, the following regulations, codes, or requirements. These items establish maximum emissions limits that could be allowed and are not to be exceeded for new or existing facilities. More stringent limits are established in this Permit consistent with implementation of Best Available Control Technology (BACT):

- 7.a. 40 CFR 60.7 "Notification and Recordkeeping" requires that notification must be submitted to SWCAA, the delegated authority, for date construction commenced, anticipated initial startup, and initial startup.
- 7.b. 40 CFR 60.8 "Performance Tests" requires that emission tests be conducted according to test methods approved in advance by the permitting authority and a copy of the results be submitted to the permitting authority.
- 7.c. 40 CFR 60 Subpart Dc "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units" applies to any steam generating unit with a heat input greater than or equal to 10 MMBtu/hr, but less than or equal to 100 MMBtu/hr constructed, modified, or reconstructed after June 9, 1989. The crematory is not a boiler; therefore, this regulation does not apply to the crematory.
- 7.d. 40 CFR 60 Subpart E "Standards of Performance for Incinerators" applies to incinerators with a charging rate of more than 45 metric ton/day (50 ton/day) of solid waste. Animal remains do not meet the definition of solid waste, so the crematory is not considered an incinerator; therefore, this regulation does not apply to the crematory.
- 7.e. 40 CFR 63.7 "Performance testing requirements" requires that emission tests be conducted according to test methods approved in advance by the permitting authority and a copy of the results be submitted to the permitting authority.
- 7.f. 40 CFR 63.9 "Notification Requirements" requires that the delegated authority be notified when any unit subject to 40 CFR 64 begins initial startup.

- 7.g. Revised Code of Washington (RCW) 70A.15.2040 empowers any activated air pollution control authority to prepare and develop a comprehensive plan or plans for the prevention, abatement and control of air pollution within its jurisdiction. An air pollution control authority may issue such orders as may be necessary to effectuate the purposes of the Washington Clean Air Act (RCW 70A.15) and enforce the same by all appropriate administrative and judicial proceedings subject to the rights of appeal as provided in Chapter 62, Laws of 1970 ex. sess. This law applies to the facility.
- 7.h. RCW 70A.15.2210 provides for the inclusion of conditions of operation as are reasonably necessary to assure the maintenance of compliance with the applicable ordinances, resolutions, rules and regulations when issuing an ADP for installation and establishment of an air contaminant source. This law applies to the facility.
- 7.i. WAC 173-401 "Operating Permit Regulation" requires all major sources and other sources as defined in WAC 173-401-300 to obtain an operating permit. This regulation is not applicable because this source is not a potential major source and does not meet the applicability criteria set forth in WAC 173-401-300. The facility does not emit any criteria pollutants or HAP above major thresholds; therefore, this regulation does not apply to the facility.
- 7.j. WAC 173-460 "Controls for New Sources of Toxic Air Pollutants" (as in effect August 21, 1998) requires BACT for toxic air pollutants (T-BACT), identification and quantification of emissions of toxic air pollutants and demonstration of protection of human health and safety.
- The facility emits TAPs; therefore, this regulation applies to the facility.
- 7.k. WAC 173-476 "Ambient Air Quality Standards" establishes ambient air quality standards for PM₁₀, PM_{2.5}, lead, SO₂, NO_x, ozone, and CO in the ambient air, which must not be exceeded. The facility emits PM₁₀, PM_{2.5}, SO_x, NO_x, and CO; therefore, certain sections of this regulation apply.
- 7.l. SWCAA 400-040 "General Standards for Maximum Emissions" requires all new and existing sources and emission units to meet certain performance standards with respect to Reasonably Available Control Technology (RACT), visible emissions, fallout, fugitive emissions, odors, emissions detrimental to persons or property, SO₂, concealment and masking, and fugitive dust. This regulation applies to the facility.
- 7.m. SWCAA 400-040(1) "Visible Emissions" requires that emissions of an air contaminant from any emissions unit must not exceed twenty percent opacity for more than three minutes in any one hour at the emission point, or within a reasonable distance of the emission point. This regulation applies to the facility.
- 7.n. SWCAA 400-040(2) "Fallout" requires that emissions of PM from any source must not be deposited beyond the property under direct control of the owner(s) or operator(s) of the

source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited. This regulation applies to the facility.

- 7.o. SWCAA 400-040(3) "Fugitive Emissions" requires that reasonable precautions be taken to prevent the fugitive release of air contaminants to the atmosphere. This regulation applies to the facility.
- 7.p. SWCAA 400-040(4) "Odors" requires any source which generates odors that may unreasonably interfere with any other property owner's use and enjoyment of their property to use recognized good practice and procedures to reduce these odors to a reasonable minimum. This source must be managed properly to maintain compliance with this regulation. This regulation applies to the facility.
- 7.q. SWCAA 400-050 "Emission Standards for Combustion and Incineration Units" requires that all provisions of SWCAA 400-040 be met and that no person is allowed to cause or permit the emission of PM from any combustion or incineration unit in excess of 0.23 g/Nm³_{dry} (0.1 gr/dscf) of exhaust gas at standard conditions. The facility has combustion units; therefore, this regulation applies to the facility.
- 7.r. SWCAA 400-060 "Emission Standards for General Process Units" requires that all new and existing general process units do not emit PM in excess of 0.23 g/Nm³_{dry} (0.1 gr/dscf) of exhaust gas. The facility has general process units; therefore, this regulation applies to the facility.
- 7.s. SWCAA 400-110 "New Source Review" requires that SWCAA issue an ADP in response to an ADP application prior to establishment of the new source, emission unit, or modification. The new units meet the definition of a new source; therefore, this regulation applies to the facility.
- 7.t. SWCAA 400-113 "Requirements for New Sources in Attainment or Nonclassifiable Areas" requires that no approval to construct or alter an air contaminant source will be granted unless it is evidenced that:
- (1) The equipment or technology is designed and will be installed to operate without causing a violation of the applicable emission standards;
 - (2) BACT will be employed for all air contaminants to be emitted by the proposed equipment;
 - (3) The proposed equipment will not cause any ambient air quality standard to be exceeded; and
 - (4) If the proposed equipment or facility will emit any toxic air pollutant regulated under WAC 173-460, the proposed equipment and control measures will meet all the requirements of that Chapter.

The facility is located in an area that is in attainment for (PM, NO_x, CO, SO₂, O₃); therefore, this regulation applies to the facility.

8. RACT/BACT/BART/LAER/PSD/CAM DETERMINATIONS

The proposed equipment and control systems incorporate BACT for the types and amounts of air contaminants emitted by the processes as described below:

- 8.a. BACT Determination – Crematory. The proposed operation with the use of an afterburner operating at a temperature in excess of 1,500°F with a residence time greater than 0.5 second has been determined to meet the requirements of BACT and T-BACT for cremation operations at this facility.

PM is expected to be primarily controlled by the afterburner. No short-term limit was specified as previous testing data was used to determine emissions. Based on a review of other jurisdictions that did specify short-term emission rates and testing, the following rates were noted: Oregon Department of Environmental Quality as 0.080 gr/dscf, Washington Department of Ecology as 0.025 gr/dscf (PCHB Case 00-014). Emissions testing was completed for an emission unit of the same model on June 14, 2006. The calculated emission concentration for this test was 0.007 gr/dscf @ 7% O₂.

The technology used to control emissions is also considered BACT according to Bay Area Air Quality Management District guidelines.

- 8.b. Prevention of Significant Deterioration (PSD) Applicability Determination. This permitting action will not result in a potential increase in emissions equal to or greater than the PSD thresholds. Therefore, PSD review is not applicable to this action.
- 8.c. Compliance Assurance Monitoring (CAM) Applicability Determination. CAM is not applicable to any emission unit at this facility because it is not a major source and is not required to obtain a Part 70 (Title V) permit.

9. AMBIENT IMPACT ANALYSIS

- 9.a. Criteria Air Pollutant Review. Emissions of NO_x, CO, PM, VOC (as a precursor to O₃), SO₂, and lead are emitted at levels where no adverse ambient air quality impact is anticipated.
- 9.b. Toxic Air Pollutant Review. Based on the emission calculations in accordance with Section 6 for the emission units and activities described in ADP application CO-1042, with some exceptions listed below, none of the estimated emission rates for the operation of the new crematory unit exceeded the respective Small Quantity Emission Rate (SQER) specified in WAC 173-460 (July 1998), therefore, no adverse ambient air quality impact is anticipated.

Arsenic, Beryllium, Cadmium, Chromium VI, Dioxins/Furans, and Polyaromatic Hydrocarbons (PAH). There were several TAPs emitted by the crematory that were either above the SQER or for which there was no listed SQER. EPA AERSCREEN model (v. 21112) was used during the original permitting to determine dispersion factors using the

crematory source characteristics. Dispersion factors of $3.586 \mu\text{g}/\text{m}^3$ per lb/hr (annual) and $21.520 \mu\text{g}/\text{m}^3$ per lb/hr (24-hr) were determined. Using the emission factors from Section 6, the maximum rate for the crematory of 50 lb/hr, and the dispersion factors above, the following maximum modeled ambient concentrations were calculated:

Pollutant	Hourly Emission Rate (lb/hr)	Acceptable Source Impact Level ($\mu\text{g}/\text{m}^3$)	ASIL Avg. Period	Modeled Ambient Concentration ($\mu\text{g}/\text{m}^3$)
arsenic [7440-38-2]	1.24×10^{-5}	2.3×10^{-4}	Annual	4.45×10^{-5}
beryllium [7440-41-7]	4.28×10^{-7}	4.2×10^{-4}	Annual	1.53×10^{-6}
cadmium [7440-43-9]	2.78×10^{-6}	5.6×10^{-4}	Annual	9.95×10^{-6}
chromium (VI) [18540-29-9]	4.45×10^{-6}	8.3×10^{-5}	Annual	1.60×10^{-5}
dioxins/furans, total	1.48×10^{-10}	3.0×10^{-8}	Annual	2.66×10^{-10}
PAH, total	3.80×10^{-5}	4.8×10^{-4}	Annual	6.80×10^{-5}

Because all of these TAPs were modeled at the maximum emission rate for the new crematory unit to be less than the ASIL, no anticipated adverse ambient air quality impact is expected.

Conclusions

- 9.c. Construction and operation of the crematory, as proposed in ADP Application CO-1042, will not cause the ambient air quality requirements of 40 CFR 50 "National Primary and Secondary Ambient Air Quality Standards" to be violated.
- 9.d. Construction and operation of the crematory, as proposed in ADP Application CO-1042, will not cause the requirements of WAC 173-460 "Controls for New Sources of Toxic Air Pollutants" or WAC 173-476 "Ambient Air Quality Standards" to be violated.
- 9.e. After construction, the crematory, as proposed in ADP Application CO-1042, can be operated without causing a violation of emission standards for sources as established under SWCAA General Regulations Sections 400-040 "General Standards for Maximum Emissions," 400-050 "Emission Standards for Combustion and Incineration Units," and 400-060 "Emission Standards for General Process Units."

10. DISCUSSION OF APPROVAL CONDITIONS

SWCAA has made a determination to issue ADP 21-3482 in response to ADP Application CO-1042. ADP 21-3482 contains approval requirements deemed necessary to assure compliance with applicable regulations and emission standards as discussed below.

- 10.a. Supersession of Previous Permits. This permit supersedes ADP 06-2653 in its entirety.
- 10.b. Emission Limits. The emission limits are based on the calculations performed in Section 6 assuming a maximum throughput of 150,000 lb/yr. The short-term NO_x and CO limits were established after review of emission monitoring results of crematory units (both human and

pet) within the jurisdiction. The range of emission limits was from 72 to 140 ppmvd NO_x and 0.0 to 29.4 ppmvd CO. While it is possible that the unit may be able to meet a lower limit, the variability in the data indicates that a higher limit may be warranted. A NO_x limit of 140 ppmvd was chosen based on the upper maximum of the data and is twice the lowest monitored value. A CO limit of 40 ppmvd was chosen based on the upper maximum of the data with a 33% increase, representing a higher expected variability with CO. These limits are expected to be achievable in practice.

Visible emissions have been limited to 5% opacity for the initial fifteen (15) minutes of operation and 0% thereafter, consistent with proper operation. Because the after burner is an effective means of PM control, the expectation is the unit will be able to meet this limit in practice.

- 10.c. Operational Limits and Requirements. To assure that emissions are properly controlled, the secondary chamber must be heated to 1,500°F prior to firing the primary chamber of the crematory.

Because emissions from the crematory were only reviewed only for the scenario where the burners are fired on natural gas, operation of the crematory on other, potentially dirtier fuels, was prohibited.

A minimum stack height was required and the installation of a device that inhibits vertical dispersion was prohibited to minimize the impact on local ambient air quality. In addition, the maximum charge rate and hours of operation per calendar year was limited to assure that emissions will not cause an exceedance of an SQER or an ASIL listed in WAC 173-460.

The ADP allows the crematory to operate up to 24 hours per day, which constitutes written permission per SWCAA 400-050(3)(b).

Monitoring and maintenance requirements were included to ensure proper operation of the crematory. The crematory is required to be maintained at least annually.

- 10.d. Monitoring and Recordkeeping Requirements. ADP 21-3482 establishes monitoring and recordkeeping requirements sufficient to document compliance with applicable emission limits, ensure proper operation of approved equipment and provide for compliance with generally applicable requirements.

An emission monitoring requirement was included to ensure, at least once every five (5) years, that the crematory is operating in compliance with the emission limits established in the ADP.

- 10.e. Reporting Requirements. ADP 21-3482 establishes general reporting requirements for annual air emissions, upset conditions and excess emissions. Specific reporting requirements are established for general operation of the crematory.

Emission monitoring results are due within fifteen (15) days of completion. A one-time initial notification for operation of the crematory is required within ten (10) days of start up.

11. START-UP AND SHUTDOWN/ALTERNATIVE OPERATING SCENARIOS/POLLUTION PREVENTION

- 11.a. Start-up and Shutdown Provisions. Pursuant to SWCAA 400-081 "Start-up and Shutdown", technology based emission standards and control technology determinations must take into consideration the physical and operational ability of a source to comply with the applicable standards during start-up or shutdown. Where it is determined that a source is not capable of achieving continuous compliance with an emission standard during start-up or shutdown, SWCAA will include appropriate emission limitations, operating parameters, or other criteria to regulate performance of the source during start-up or shutdown.

To SWCAA's knowledge, this facility can comply with all applicable standards during startup and shutdown.

- 11.b. Alternate Operating Scenarios. SWCAA conducted a review of alternate operating scenarios applicable to equipment affected by this permitting action. The permittee did not propose or identify any applicable alternate operating scenarios. Therefore, none were included in the approval conditions.
- 11.c. Pollution Prevention Measures. SWCAA conducted a review of possible pollution prevention measures for the facility. No pollution prevention measures were identified by either the permittee or SWCAA separate or in addition to those measures required under BACT considerations. Therefore, none were included in the approval conditions.

12. EMISSION MONITORING AND TESTING

- 12.a. Emission Testing Requirements. There are no emission testing requirements established as part of this permitting action.
- 12.b. Emission Monitoring Requirements – Crematory. The crematory is required to be monitored every five years to verify compliance with the emission limits specified in the ADP. Corrective action is required to be taken if the crematory is found to not be meeting the emission limit.

13. FACILITY HISTORY

- 13.a. General History. The crematory began operation September 18, 2006
- 13.b. Previous Permitting Actions. The following past permitting actions have been taken by SWCAA for this facility:

Permit	Application	Date Issued	Description
06-2653	CO-800	January 11, 2006	Approval for a Wasteco Company CAE300 incinerator with a Therm Tec Animal cremation unit

13.c. Compliance History. A search of source records on file at SWCAA did not identify any previous or outstanding compliance issues over the past five (5) years.

14. PUBLIC INVOLVEMENT OPPORTUNITY

14.a. Public Notice for ADP Application CO-1042. Public notice for ADP Application CO-1042 was published on the SWCAA website for a minimum of fifteen (15) days beginning on September 22, 2021.

14.b. Public/Applicant Comment for ADP Application CO-1042. SWCAA did not receive specific comments, a comment period request, or any other inquiry from the public or the applicant regarding ADP Application CO-1042. Therefore, no public comment period was provided for this permitting action.

14.c. State Environmental Policy Act. After review of the SEPA Checklist for this project, SWCAA has determined that the project does not have a probable significant impact on the environment and has issued Determination of Non-Significance 21-029. An Environmental Impact Statement is not required under RCW 43.21C.030(2)(c).