

**Alaska Department of Environmental Conservation
Air Permits Program**

TECHNICAL ANALYSIS REPORT

**For the terms and conditions of
Minor Permit AQ1728MSS01**

**Issued to City of King Cove
For the Solid Waste Processing Area**

Preliminary – October 19, 2023

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1. INTRODUCTION

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (Department's) basis for issuing Minor Permit AQ1728MSS01 to City of King Cove (City) for the Solid Waste Processing Area. The permit application is classified under 18 AAC 50.502(b)(4) due to constructing one or more incinerators with cumulative rated capacity of 1,000 pounds or more per hour.

2. APPLICATION DESCRIPTION

City of King Cove submitted their application on June 28, 2023. The application states the City proposes to install and operate two air curtain incinerators at the new solid waste processing facility at the King Cove Class III municipal solid waste (MSW) landfill.

The applicant proposes storage piles volume measurement and density means of estimating tonnage.

3. CLASSIFICATION FINDINGS

Minor Permit AQ1728MSS01 is classified under 18 AAC 50.502(b)(4) for one or more incinerators with a cumulative rated capacity of 1,000 pounds or more per hour.

Minor Permit AQ1728MSS01 is not classified under 18 AAC 50.326 because, while assessable PTE exceeds 100 TPY in CO, PM-2.5 and PM-10, fugitive emissions are not included in determining permit applicability per 40 CFR 51.166(b)(1), incorporated by reference under major stationary source definition 18 AAC 50.990(52).

4. APPLICATION REVIEW FINDINGS

Based on the review of the application, the Department finds that:

1. City of King Cove's minor permit application for the Solid Waste Processing Area contains the elements listed in 18 AAC 50.540.
2. Two air curtain incinerators each with the capacity to combust more than 1,000 pounds per hour are being installed at the source, in addition to one stationary diesel-fired compression ignition internal combustion engine providing power to the incinerators.
3. Operation of the two air curtain incinerators will not trigger NSPS Subpart AAAA: Standards of Performance for Small Municipal Waste Combustion Units for which construction is commenced after August 30, 1999, or NSPS Subpart E: Standards of Performance for Incinerators. In a September 19, 2023 memo, the Permittee calculated the maximum capacity of each incinerator. This capacity was reached using the air curtain incinerator burn box dimensions (16' x 5') and maximum operable ash depth (3'), dividing this volume by the ash generation factor (5%), multiplying waste density (300 pounds/cubic yard), and converting to tons. The maximum capacity was determined to be 27 tons per day (TPD). This is below the applicability limit of Subpart AAAA at 35 tons per day (40 C.F.R. 60.1010(b)) and Subpart E at 50 tons per day (40 C.F.R. 60.50(a)).
4. The Department believes using an ash generation factor of 5% by volume of MSW, which is the lower limit of MSW ash development as stated by the EPA⁸, is both

⁸ <https://www.epa.gov/smm/energy-recovery-combustion-municipal-solid-waste-msw/what>, EPA Office of Resource Conservation and Recovery, June 7th, 2023

reasonable and conservative. The lower limit is preferred over the upper limit of MSW ash generation because the overall goal is to determine maximum MSW capacity. The lower ash generation factor results in less ash that is produced from MSW. The less ash that is produced from MSW, the greater amount of MSW can be incinerated before reaching the 3' maximum operable ash depth which results in a higher, more conservative estimate of emissions.

5. Likewise, the Department believes using a density of 300 pounds per cubic yard, which is the upper limit density of uncompacted municipal solid waste is both reasonable and conservative. The applicant does not compact waste.
6. The Air Curtain Incinerators to be installed are expected by the Permittee to be similar to AirBurners, Inc. Model S116 air curtain incinerator. The operating manual for the 100 series Air Curtain Burner states "The box will operate with up to 3 feet of ash inside, but as the ash gets deeper the efficiency of the unit goes down. Three feet of ash would represent approximately 20 hours of burning. The box should not be run with over 3 feet of ash inside." The Permittee's chosen ACI model may be different from the Model S116, but because the 100 series operating manual was cited to specify the maximum operable ash depth, the chosen ACI model cannot exceed this ash depth. The Department believes that this time duration, coupled with cooling time before ash removal, adequately restricts the daily load rate for each incinerator.
7. The Department is not requiring an ambient demonstration for the project under 18 AAC 50.540(c)(2)(D) because the PTE is below the permitting thresholds of 18 AAC 50.502(c)(1) and the Department found no additional factors that would warrant an ambient demonstration.
8. Air Curtain incinerator and ash collection emissions are considered fugitive emissions as defined by 18 AAC 50.990(40), and 40 CFR 51.166(b)(20) adopted by reference. Fugitive emissions are not considered when determining permit applicability. Therefore, the listed PTEs of 180.34 TPY of CO, 125.16 TPY of PM-2.5, and 142.73 TPY of PM-10 do not constitute a Title V major source for these pollutants.

5. EMISSIONS SUMMARY AND PERMIT APPLICABILITY

Table 2 shows the emissions summary and permit applicability with assessable emissions from the stationary source. Emission factors and detailed calculations are provided in Appendix A.

A summary of the potential to emit (PTE) and assessable PTE, as determined by the Department, is shown in Table 2 below.

Table 2 – Emissions Summary and Permit Applicability, tons per year (TPY)

Parameter	NO _x	CO	VOC	PM-2.5	PM-10	SO ₂	HAP
Stationary Source PTE	6.77	7.20	6.77	0.58	0.58	0.005	0.01
18 AAC 50.502(c)(1) Permit Thresholds [a]	40	N/A	N/A	10	15	40	N/A
502(c)(1) Applicable?	N	N/A	N/A	N	N	N	N/A
Title V Permit Thresholds [b]	100	100	100	100	100	100	10/25
Title V Permit Required?	N	N	N	N	N	N	N
Fugitive Emissions	19.72	180.34	20.70	125.16	142.73	46.32	7.09
Assessable Emissions [c,d]	26.49	187.54	27.47	143.31		46.33	0.91
Total Assessable [e]	432.05						

Table Notes:

[a] – The thresholds in 18 AAC 50.502(c)(1) apply to a source beginning actual construction of a new stationary source with a potential to emit greater than the threshold for that pollutant. Stationary source PTE does not include fugitive emissions.

[b] – Title V permit thresholds for HAP are 10 TPY for a single HAP or 25 TPY for any combination of HAPs. Title V major source thresholds does not include fugitive emissions.

[c] – Assessable emissions include fugitive emissions.

[d] – VOC emissions include Organic HAP emissions. PM emissions include Metallic HAP emissions. Therefore, Organic and Metallic HAPs are not counted in total assessable emissions. Total non-VOC, non-PM HAPs are 0.91 TPY, with the highest individual HAP, Hydrochloric acid, at 0.74 TPY. Highest Organic HAP is Vinyl Acetate at 1.47 TPY.

[e] – PM-10 emissions include PM-2.5 emissions. Therefore, PM-2.5 is not counted in total assessable emissions.

6. PERMIT ADMINISTRATION

No additional air quality permit has been issued to the Solid Waste Processing Area. City of King Cove may therefore operate in accordance with Minor Permit AQ1728MSS01 upon issuance.

7. PERMIT CONDITIONS

The bases for the standard and general conditions imposed in Minor Permit AQ1728MSS01 are described below.

Cover Page

18 AAC 50.544(a)(1) requires the Department to identify the stationary source, Permittee, and contact information. The Department provided this information on the cover page of the permit.

Section 1: Emissions Unit Inventory

The EUs authorized and/or restricted by this permit are listed in Table 1 of the permit. Unless otherwise noted in the permit, the information in Table 1 is for identification purposes only. Condition 1 is a general requirement to comply with AS 46.14 and 18 AAC 50 when installing a replacement EU.

Section 2: Fee Requirements

18 AAC 50.544(a)(2) requires the Department to include a requirement to pay fees in accordance with 18 AAC 50.400 – 18 AAC 50.499 in each minor permit issued under 18 AAC 50.542. The Department used the Standard Permit Condition (SPC) I language for Minor Permit AQ1728MSS01. However, the Department modified the condition by removing the requirement to only pay for emissions of each air pollutant in quantities of 10 tons per year or greater, to be consistent with the updates to the emission fees in 18 AAC 50.410(a) that went into effect September 7, 2022. The Department is in the process of incorporating these updates into SPC I.

As indicated by Condition 5.3, if the stationary source has not commenced construction or operation on or before March 31, the Permittee is required to submit a transmittal letter certified by the responsible official under 18 AAC 50.205 indicating that the assessable emissions for the source are zero for the previous fiscal year and provide estimates for when construction or operation will commence.

While the permit does not require recording quantity of waste combusted in the incinerators as a permit condition, these records will be necessary to submit emission estimates under both Assessable Emission Estimates Condition 5.1 and Emission Inventory Reporting Condition 22.

Section 3: State Emission Standards

Condition 7, Visible Emissions

The City of King Cove's Solid Waste Processing Area is not subject to Title V permitting as a result of this project. Therefore, the facility will not be subject to any ongoing monitoring, record keeping, and reporting (MR&R) under Title V permitting for state emission standards.

Visible emissions, excluding condensed water vapor, from an industrial process or fuel-burning equipment may not reduce visibility through the effluent by more than 20 percent averaged over six consecutive minutes, under 18 AAC 50.055(a)(1).

Diesel fired engines have the tendency to exceed the VE standards. As such, the Department is requiring an initial compliance demonstration within 60 days of startup of the new EUs 1a. The Department has included a requirement to perform Method 9 testing to ensure initial compliance with the standard.

Condition 8, Incinerator Visible Emissions

Visibility through the exhaust effluent of an incinerator, including an air curtain incinerator, may not be more than 20 percent averaged over any six consecutive minutes, under 18 AAC 50.055(a)(1).

The Department is requiring an initial compliance demonstration within 60 days of startup of the new incinerator EUs 1 and 2.

Condition 9, Particulate Matter (PM)

Particulate Matter emitted from an industrial process or fuel burning equipment may not exceed 0.05 grains per cubic foot of exhaust gas (gr/dscf), averaged over three hours, under 18 AAC 50.055(b).

Experience has shown there is a correlation between opacity and particulate matter. 20 percent visible emissions would normally comply with the 0.05 gr/dscf. As such, compliance with opacity limits is included as a surrogate method of assuring compliance with the PM standards.

Condition 10, Incinerator Particulate Matter Emissions

Particulate Matter emissions from an incinerator with rated capacity greater than or equal to 2,000 pounds per hour may not exceed 0.08 gr/dscf, corrected to 12 percent carbon dioxide and standard conditions, averaged over three hours, under 18 AAC 50.050(b), Table 4.

Condition 11, Sulfur Compound Emissions

Sulfur compound emissions from an industrial process or fuel burning equipment may not exceed 500 ppm averaged over a period of three hours, under 18 AAC 50.055(c).

Diesel fuel grades that require less than 0.5 percent fuel sulfur will meet the state emissions standard. Diesel fuel higher than 0.5 percent fuel sulfur is not available at King Cove.

Therefore, the Department is not including specific monitoring, recording, and reporting requirements for compliance with the standard.

Condition 12, Fugitive Dust Control Requirements

A person who causes or permits bulk materials to be handled, transported, or stored, or who engages in an industrial activity or construction project shall take reasonable precautions to prevent particulate matter from being emitted into the ambient air, under 18 AAC 50.045(d).

The operation of incinerators containing higher ash content is known by the Department to reduce incinerator efficiency and increase emissions.

In addition to complying with the requirements of Solid Waste Permit SW3A068-24, the Department has added conditions for the Permittee to prevent particulate matter becoming airborne during incinerator operations and periodic ash removal.

Section 4: General Recordkeeping, Reporting, and Certification Requirements

Condition 13, Recordkeeping Requirements

The condition restates the regulatory requirements for recordkeeping, and supplements the recordkeeping defined for specific conditions in the permit. The records being kept provide evidence of compliance with this requirement.

Condition 14, Certification

18 AAC 50.205 requires the Permittee to certify any permit application, report, affirmation, or compliance certification submitted to the Department. The Department used the language in Standard Permit Condition (SPC) XVII. This requirement is reiterated as a standard permit condition in 18 AAC 50.345(j).

Condition 15 Submittals

Condition 15 clarifies where the Permittee should send their reports, certifications, and other submittals required by the permit. The Department used the language in SPC XVII. The Department included this condition from a practical perspective rather than a regulatory obligation.

Condition 16, Information Requests

AS 46.14.020(b) allows the Department to obtain a wide variety of emissions, design and operational information from the owner and operator of a stationary source. This statutory provision is reiterated as a standard permit condition in 18 AAC 50.345(i). The Department used the standard language in Minor Permit AQ1728MSS01.

Condition 17 and Section 10, Excess Emission and Permit Deviation Reports and Notification Form

This condition reiterates the notification requirements in 18 AAC 50.235(a)(2) and 18 AAC 50.240 regarding unavoidable emergencies, malfunctions, and excess emissions. Also, the Permittee is required to notify the Department when emissions or operations deviate from the requirements of the permit. The Department used the language in SPCs III and IV, except as follows:

The Department has modified Condition 17 and the Notification Form in Section 10 to reflect the electronic submittal requirements in 18 AAC 50.270 using the Department's online form the submit notification of excess emissions and permit deviations beginning September 7, 2023. The electronic notification form is found at the Division of Air Quality's Air Online Service (AOS) system webpage

<http://dec.alaska.gov/applications/air/airtoolsweb> using the Permittee Portal option.

Submittal through other methods may be allowed only upon written Department approval. Beyond as noted, the Department has determined that the standard conditions adequately meet the requirements of 40 C.F.R. 71.6(a)(3).

Condition 18, Operating Reports

The Department mostly used the SPC VII language for the operating report condition. However, the Department modified or eliminated the Title V only aspects in order to make the language applicable for a minor permit.

Condition 19, Annual Affirmation

The Permittee shall submit to the Department by March 31 of each year an affirmation certified according to Condition 13 of whether the stationary source is still accurately described by the application and this permit, and whether any changes have been made to the stationary source that would trigger the requirement for a new permit under 18 AAC 50.

Condition 20, Title V Major Source Application Submittal Date

For a stationary source that directly emits, or has the potential to emit, 100 TPY or more of any air pollutant subject to regulation, the Permittee shall file a complete application to obtain the part 70 Title V Operating Permit within 12 months after commencing operation or exceeding the 100 TPY threshold as required by 40 C.F.R. 70.5. Fugitive emissions are not considered when determining permit applicability.

Condition 21, Air Pollution Prohibited

18 AAC 50.110 prohibits any emission which is injurious to human health or welfare, animal or plant life, or property, or which would unreasonably interfere with the enjoyment of life or property. Condition 21 reiterates this prohibition as a permit condition. The Department used the SPC II language for Minor Permit AQ1728MSS01.

Condition 22, Emission Inventory Reporting

This condition requires the Permittee to submit emissions data to the state so the state is able to satisfy the federal requirement to submit emission inventory data from point sources to the EPA as required under 40 C.F.R. 51.15 and 51.321. The federal emission inventory requirement applies to sources defined as point sources in 40 C.F.R. 51.50. Under 18 AAC 50.275, the state also requires reporting of emissions triennially for stationary sources with an air quality permit, regardless of permit classification. This includes sources that do not meet the federal emission thresholds in Table 1 to Appendix A of 40 C.F.R. 51 Subpart A. The state must report emissions data as described in 40 C.F.R. 51.15 and the data elements in Tables 2a and 2b to Appendix A of 40 C.F.R. 51 Subpart A to EPA.

The Department modified the language in SPC XV for the permit condition by lowering the thresholds that require reporting to include all stationary sources regardless of permit classification (excluding ORLs and PAELs) to capture the new requirements found in 18 AAC 50.275, effective September 7, 2022.

As of the issue date of this permit, the City of King Cove's Solid Waste Processing Area is required to report under Condition 22.2 for other stationary sources, as applicable.

Condition 23, Consistency of Reporting Methodologies

Condition 23 is from 18 AAC 50.275(a) and requires all stationary sources, regardless of permit classification (with the exception of owner requested limits (ORLs) issued under 18 AAC 50.225 and preapproved emission limits (PAELs) issued under 18 AAC 50.230), to report actual emissions to the state so that the state can meet its obligation under 40 C.F.R. 51. Condition 23.1 is from 18 AAC 50.275(b) and requires consistency on the stationary sources' actual emissions reports submitted for NEI and the state's assessable emissions.

The regulation was added to 18 AAC 50 on September 7, 2022, to include all stationary sources required to report actual emissions for the purpose of federal emissions inventory and to avoid inconsistencies in actual emissions reports submitted. When reporting actual emissions under Condition 22 or assessable emissions under Condition 4.2 consistent emission factors and calculation methods shall be used for all reporting requirements for the stationary source.

Section 5: Standard Permit Conditions

Conditions 24 – 29, Standard Permit Conditions

18 AAC 50.544(a)(5) requires each minor permit issued under 18 AAC 50.542 to contain the standard permit conditions in 18 AAC 50.345, as applicable. 18 AAC 50.345(a) clarifies that subparts (c)(1) and (2), and (d) through (o), may be applicable for a minor permit.

The Department included all of the minor permit-related standard conditions of 18 AAC 50.345 in Minor Permit AQ1728MSS01. The Department incorporated these standard conditions as follows:

- 18 AAC 50.345(c)(1) and (2) is incorporated as Condition 24 of Section 5 (Standard Permit Conditions);
- 18 AAC 50.345(d) through (h) is incorporated as Conditions 25 through 29, respectively, of Section 5 (Standard Permit Conditions);

- As previously discussed, 18 AAC 50.345(i) is incorporated as Condition 16 and 18 AAC 50.345(j) is incorporated as Condition 13 of Section 4 (Recordkeeping, Reporting, and Certification Requirements); and
- 18 AAC 50.345(k) is incorporated as Condition 30, and 18 AAC 50.345(l) through (o) is incorporated as Conditions 33 through 38, respectively, of Section 6 (General Source Testing Requirements). See the following discussion.

Section 6: General Source Test Requirements

AS 46.14.180 states that monitoring requirements must be, “based on test methods, analytical procedures, and statistical conventions approved by the federal administrator or the department or otherwise generally accepted as scientifically competent.” The Department incorporated this requirement as follows:

- Condition 31 requires the Permittee to conduct their source tests under conditions that reflects the actual discharge to ambient air; and
- Condition 32 requires the Permittee to use specific EPA reference methods when conducting a source test.

Section 6 also includes the previously discussed standard conditions for source testing.

APPENDIX A: Emissions Calculations

Table A-1 presents details of the EUs, their characteristics, and emissions. Potential emissions are estimated using maximum annual operation for all fuel burning equipment as defined in 18 AAC 50.990(39) subject to any operating limits. Fugitive emissions, as those produced by EUs 1, 2, and Ash Removal & Handling, are not considered when determining permit applicability.

Table A-1 – Emissions Summary, in Tons Per Year (TPY)

EU ID	Unit ID/ Description	Maximum Rating or Capacity	NO _x		CO		VOC		PM-2.5 / PM-10		SO ₂
			EF	PTE (TPY)	EF	PTE (TPY)	EF	PTE (TPY)	EF	PTE (TPY)	PTE (TPY)
1a	Air Curtain Incinerator Diesel-Fired Engine	100 bhp	9.4 g/kW- hr ¹	6.77	10.0 g/kW- hr ¹	7.20	9.4 g/kW- hr ¹	6.77	0.8 g/kW- hr ¹	0.58	0.005 ²
1	Air Curtain Incinerator 1	27 TPD	2.0 lb/ton ³	9.86	18.3 lb/ton ³	90.17	2.1 lb/ton ³	10.35	14.4 lb/ton ³	70.96	23.16
2	Air Curtain Incinerator 2	27 TPD	2.0 lb/ton ³	9.86	18.3 lb/ton ³	90.17	2.1 lb/ton ³	10.35	14.4 lb/ton ³	70.96	23.16
N/A	Ash Removal & Handling ⁴	19.2 TPD ⁵							0.23 lb/ton ⁶	0.81	
Total Potential to Emit				26.49		187.54		27.47		143.31	46.33

1 40 CFR 1039.101 Table 1, 1.25 NTE multiplier

2 Mass Balance

3 EPA ORD, *Managing Debris after a Natural Disaster: Evaluation of the Combustion of Storm-Generated Vegetative and C&D Debris in an Air Curtain Burner: Source Emissions Measurement Results*, Nov. 17, 2016

4 Fugitive particle emissions will be generated during the periodic removal of residual ash from the air curtain incinerators

5 Based on the combined limited capacity of the air curtain incinerators and maximum MSW ash content value of 30 percent by weight (EPA ORD, Nov. 17, 2016)

6 Mueller, S.F., et al. , *Fugitive Particulate Emission Factors for Dry Fly Ash Disposal*, Journal of the Air & Waste Management Association, April 22, 2013