

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

TECHNICAL ANALYSIS REPORT

**For the terms and conditions of
Minor Permit AQ1955MSS01**

**Issued to Soil Treatment Technologies, LLC
For the Soil Remediation Unit 02**

Preliminary – March 18, 2026

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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 AQ1955MSS01 to Soil Treatment Technologies, LLC for the Soil Remediation Unit 02 (SRU02). The permit application is classified under 18 AAC 50.502(b)(2) for operation of a stationary source containing a thermal soil remediation unit with a rated capacity of at least five tons per hour of untreated material. The permit application is also classified under 18 AAC 50.508(5) for an Owner Requested Limit (ORL) to avoid the stationary source being classified as a major source of Hazardous Air Pollutants (HAPs) for Hydrogen Chloride under 18 AAC 50.316 and avoid being classified as a Title V major source under 18 AAC 50.326.

2. STATIONARY SOURCE DESCRIPTION

The SRU02 is a new mobile stationary source. The stationary source will consist of a direct fired Gencor thermal unit with a design throughput of 25 tons per hour. The thermal unit also includes a baghouse, and a thermal oxidizer. Soil contaminated with petroleum hydrocarbons will be received by the stationary source for thermal remediation. The soil will be stored in covered stockpiles before remediation, to mitigate exposure and potential fugitive dust emissions.

The soil will be loaded into a feed hopper which evenly deposits the soil onto a conveyer, which discharges the soil into a rotary dryer drum. The temperature inside the dryer drum will be heated to and maintained between 600 and 700 degrees Fahrenheit (°F) in order to volatilize the petroleum hydrocarbon compounds.

The steam, gas, and suspended particles generated by the thermal unit will be processed out of the drum and into a cyclone before entering the baghouse via an induced draft fan. Coarse particulate matter drops out from the air stream in the cyclone. Finer particles are filtered out by an array of high efficiency filter bags. Exhaust air is pulled through a plenum to the fan while the collected dust in the baghouse is transferred to the treated soil via an auger. The exhaust air enters a thermal oxidizer which combusts the volatile organic compounds (VOC). The thermal oxidizer will operate at a temperature of 1,500 °F with a minimum 99% organic compound destruction efficiency. After treatment, the gas will exhaust to the atmosphere. The remediated soil will be water cooled and conveyed to storage piles for post treatment analytical sampling.

3. PERMIT HISTORY RELEVANT TO PROJECT

The Permittee maintains a permit for a previous Soil Remediation Unit located in Nikiski, AK, AQ1657MSS01.

4. APPLICATION DESCRIPTION

Soil Treatment Technologies, LLC submitted their application on December 23, 2025. The Department received the application on December 31, 2025. The application indicated that the SRU02 will be operated in Anchorage, Alaska, fueled entirely on natural gas, and operate only during non-frozen periods of the year. However, the application included emission estimates for continuous operation year round, which is appropriate for worst case potential to emit (PTE).

The application indicated that the Permittee may request to treat soil contaminated with chlorinated compounds on a case-by-case basis. Should this occur, the Permittee shall first receive approval by the Department's Division of Spill Prevention and Response, Contaminated Sites Program (CSP). This matches the process required in AQ1657MSS01.

5. CLASSIFICATION FINDINGS

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

1. Minor Permit AQ1955MSS01 is classified under 18 AAC 50.502(b)(2) for construction and operation of a thermal soil remediation unit with a rated capacity of at least five tons per hour of untreated material.
2. Minor Permit AQ1955MSS01 is classified under 18 AAC 50.508(5) for an ORL to avoid classification as a HAP major source under 18 AAC 50.316 and a Title V major source under 18 AAC 50.326.

6. APPLICATION REVIEW FINDINGS

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

1. Soil Treatment Technologies, LLC's minor permit application for the Soil Remediation Unit 02 contains the elements listed in 18 AAC 50.540.
2. An ambient demonstration is not warranted under 18 AAC 50.540(c)(2)(D) due to the source's minimal PTE. Emissions are below the permitting thresholds of 18 AAC 50.502(c)(1), at which modeling is required. The Department found no additional factors that would warrant an ambient demonstration. For this same reason, the Department does not find it necessary to include a siting restriction or minimum set-back from occupied structures.
3. The application did not include an owner requested limit to avoid major HAP classification. The application however did assume that, should the source remediate soil contaminated with chlorinated compounds, the highest single HAP emissions would not exceed 10 TPY. The highest single HAP emission calculated from thermally remediating soil contaminated with chlorinated compounds is HCl. The Department reached out to the applicant and received confirmation requesting the assumed limit should be implemented. Therefore, the Department is including an HCl limit as well as monitoring, recordkeeping, and reporting requirements in order to avoid the major HAP permitting threshold.
4. The Permittee may remediate soil contaminated with chlorinated compounds following approval by the Department's Spill Prevention and Response division, Contaminated Sites Program (CSP). Following this approval, the Permittee is required to conduct an initial source test to verify that emissions of HCl will not exceed the estimated emission rate utilized in the application. The Permittee must perform subsequent source testing should any batch of soil have chlorinated compounds measured higher than the level measured in the previous source test.

7. EMISSIONS SUMMARY AND PERMIT APPLICABILITY

Table 5 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 5 below.

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

Parameter	NO _x	CO	VOC	PM _{2.5} ⁴	PM ₁₀ ⁴	SO ₂	HAP
Stationary Source PTE (excluding fugitives)	12.07	10.10	27.99	2.42	7.25	27.45	10.23
18 AAC 50.502(c)(1) Permit Thresholds	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	100	100	100	100	100	100	10/25
Title V Permit Required?	N	N	N	N	N	N	N
Fugitive Emissions ¹					0.62		
Assessable Emissions ²	12.07	10.10	27.99	0	7.87	27.45	9.9
Total Assessable Emissions ³	95.38						

Notes:

1. Fugitive emissions do not count towards permit applicability.
2. Assessable emissions include fugitive emissions but do not include nonroad engines emissions.
3. PM₁₀ emissions include PM_{2.5} emissions. Therefore, PM_{2.5} is not counted in total assessable emissions.
4. HAP emissions excluding Hydrogen Chloride are a subset of either VOC or PM10 emissions, and are therefore not counted in total assessable emissions.
5. Highest individual HAP is Hydrogen Chloride at 9.9 TPY.

8. PERMIT CONDITIONS

The bases for the standard and general conditions imposed in Minor Permit AQ1955MSS01 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.

Condition 2 is a general requirement for good air pollution control practices and maintenance of EUs operated at the stationary source. Maintaining and operating equipment in good working order is fundamental to preventing unnecessary or excess emissions. Standard conditions for monitoring compliance with emission standards are based on the assumption that good maintenance is performed. Without appropriate maintenance,

equipment can deteriorate more quickly than with appropriate maintenance. The Permittee is required to keep maintenance records to show that proper maintenance procedures were followed, and to make the records available to the Department.

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 AQ1955MSS01. 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.

Condition 5.3 applies only to permitted new stationary sources that have not yet commenced construction or operations or existing stationary sources that are inactive but are keeping their operating permits current. As indicated by this condition, 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.

Section 3: State Emission Standards

Condition 7, Visible Emissions

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). Per 18 AAC 50.990(39), “fuel-burning equipment” does not include mobile internal combustion engines (e.g., NREs).

EU ID 1 will combust natural gas. The Department has found that gas fired equipment inherently has low particulate matter emissions, In addition, Condition 11 requires the operation of a baghouse at all times that EU ID 1 operates. Therefore, the Department is not requiring initial or ongoing visible emissions observations.

Conditions 8, 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).

Conditions 11 and 13 include MR&R requirements for the SRU to prevent the release of airborne particulate matter and fugitive dust. Therefore, the Department is not requiring initial or ongoing demonstrations of compliance with the particulate matter standard.

Condition 9, 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).

Calculations show that fuel gas with sulfur content less than 4,000 parts per million by volume will comply with the state standards. Since pipeline quality gas contains less than 100 ppmv, burning pipeline quality gas would comply with the standard. The Department is not requiring any initial or ongoing MR&R because it is unlikely that SO₂ emissions from the contaminated soil and the natural gas combusted in EU ID 1 will exceed the state emissions standard.

Section 4: Operation & Maintenance Requirements

Condition 10, Plan Approval

Condition 10 requires that the Permittee operate in accordance with the most recent Thermal Operations Plan approved by the Department's CSP.

Conditions 11 and 12, Control Devices

The baghouse and thermal oxidizer control devices are integral parts of the soil remediation unit's emission control and must be operated properly to achieve the vendor provided emission rates. In addition, operation of the baghouse (including the auger and induced draft fan) will ensure compliance with the state PM standard, as required by 18 AAC 50.544(b).

Condition 11 requires that the Permittee operate the baghouse and thermal oxidizer at all times that EU ID 1 is operating. It also requires baghouse inspections at least once every 30 days.

Condition 12 requires that the control devices be operated within the manufacturer's recommended temperature and pressure ranges and that corrective actions be taken if they are operated outside of those ranges.

Condition 13, Reasonable Precautions

Condition 13 requires the Permittee to comply with 18 AAC 50.045(d) when handling bulk materials and take reasonable precautions to prevent fugitive dust from being emitted into the ambient air. Bulk material handling requirements apply to the Permittee because the Permittee will engage in bulk material handling, transporting, or storing; or will engage in industrial activity at the stationary source. Condition 13.2 requires daily inspections of fugitive dust sources and Condition 13.4 requires recordkeeping of complaints and corrective actions.

Section 5: Permit Classification Avoidance

Conditions 14, 15, PFAS & Hazardous Waste Prohibition

These conditions prohibit the Permittee from treating soils that may be contaminated with per- or poly-fluoroalkyl substances (PFAS), or accepting soils classified as hazardous waste under 40 C.F.R. 261.4(b) and 18 AAC 62. Compliance with these general prohibitions will result in avoidance of classification as a HAP major source.

Condition 16, HCl Limit

Condition 16 describes specific requirements with which the Permittee must comply in order to avoid classification as a HAP major source.

The Permittee indicated that soils contaminated with chlorinated compounds may potentially be treated on a case-by-case basis following approval by the Department's CSP. When the

chlorinated compounds in the soil are combusted, HCl emissions are generated. HCl is classified as a HAP. If emissions of a single HAP reach 10 tons per year, the stationary source is then classified as a major source of HAP and additional permitting requirements are applicable.

Condition 16 requires that the Permittee limit HCl emissions to 9.9 TPY. Condition 16.1 requires that the Permittee have prior approval from the CSP to remediate soil contaminated with chlorinated compounds. Condition 16.2 requires that the Permittee determine concentrations of chlorinated hydrocarbons in each batch of soil that may contain chlorinated hydrocarbons, and Condition 16.3 requires the Permittee to conduct source tests and track HCl emissions when remediating soils contaminated with chlorinated compounds.

Section 6: General Recordkeeping, Reporting, and Certification Requirements

Condition 17, 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 an evidence of compliance with this requirement.

Condition 18, 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 SPC XVII. This requirement is reiterated as a standard permit condition in 18 AAC 50.345(j).

Condition 19 Submittals

Condition 19 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 20, 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 AQ1955MSS01.

Condition 21 and Section 12, 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 21.3 and the Notification Form in Section 12 to reflect the electronic submittal requirements in 18 AAC 50.270 using the Department's online form to 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 Services (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 22, 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 23, Regional Haze Visibility Protection Area

Condition 23 contains requirements from 18 AAC 50.265(1) and 50.265(4)(B) for stationary sources located in the Regional Haze Visibility Protection Area (RHVPA), as specified in 18 AAC 50.025(a)(4), which is shown in Figure III.K.13 H-1 of the July 5, 2022 Amendments to: State Air Quality Control Plan (Regional Haze SIP) ⁸ and adopted by reference in 18 AAC 50.030. Condition 23.1 contains the requirements from 18 AAC 50.265(1) which requires Permittee's to maintain onsite for 10 years, records of any maintenance to any significant emissions unit that has or may have an effect on any emission that affects visibility of Class I areas. Condition 23.2 contains the requirements from 18 AAC 50.265(4)(B) which requires Permittee's to report a best estimate of the projected equipment life in the first operating report required in Condition 107 after a new significant emissions unit is installed (i.e., significant EUs installed after July 5, 2022) at the stationary source.

Condition 24, Annual Affirmation

The Permittee shall submit to the Department by March 31 of each year an affirmation certified according to Condition 17 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 25, 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.

Condition 26, 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 26 reiterates this prohibition as a permit condition. The Department used the SPC II language for Minor Permit AQ1955MSS01.

⁸ The July 5, 2022 Amendments to: State Air Quality Control Plan for the Regional Haze SIP can be found at the following website: <https://dec.alaska.gov/media/25964/section-iii-k-13-second-implementation-period-combined-sip-section-adopted-07-05-22.pdf>.

Condition 27, 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 Soil Remediation Unit 02 is required to report triennially under Condition 27.1.

Condition 28, Consistency of Reporting Methodologies

Condition 28, 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 28.1 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 27 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 7: Standard Permit Conditions

Conditions 29 – 34, 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 AQ1955MSS01. The Department incorporated these standard conditions as follows:

- 18 AAC 50.345(c)(1) and (2) is incorporated as Condition 29 of Section 7 (Standard Permit Conditions);
- 18 AAC 50.345(d) through (h) is incorporated as Conditions 30 through 34, respectively, of Section 7 (Standard Permit Conditions);

- As previously discussed, 18 AAC 50.345(i) is incorporated as Condition 20 and 18 AAC 50.345(j) is incorporated as Condition 18 of Section 6 (Recordkeeping, Reporting, and Certification Requirements); and
- 18 AAC 50.345(k) is incorporated as Condition 35, and 18 AAC 50.345(l) through (o) is incorporated as Conditions 38 through 43, respectively, of Section 8 (General Source Test Requirements). See the following discussion.

Section 8: 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 36 requires the Permittee to conduct their source tests under conditions that reflects the actual discharge to ambient air; and
- Condition 37 requires the Permittee to use specific EPA reference methods when conducting a source test.

Section 8 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.

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

EU ID	Unit ID/ Description	Maximum Rating	NO _x		CO		VOC		PM _{2.5} / PM ₁₀		SO ₂	
			EF	PTE (TPY)	EF	PTE (TPY)	EF	PTE (TPY)	EF	PTE (TPY)	EF	PTE (TPY)
1	SRU:											
1,2	--Dryer	20.66 MMBtu/hr	0.098	8.87	0.082	7.42	0.005	0.45	0.007	0.63	6E10 ⁻⁴	0.05
1,2	--Oxidizer	7.46 MMBtu/hr	0.098	3.20	0.082	2.68	0.005	0.16	0.007	0.23	6E10 ⁻⁴	0.02
3 - 6	--Soil	25 tph					6.25	27.38	1.46	6.39	6.25	27.38
7,8	Fugitive Dust								1.42	0.62		
Total Potential to Emit				12.07		10.10		27.99		7.87		27.45

Notes:

1. NO_x, CO, VOC, PM, SO₂ emission factors from AP-42, Tables 1.4-1, 1.4-2, 1.4-3 for small natural gas boilers < 100 MMBtu/hr.
2. All Dryer and Oxidizer emission factors in units of lb/MMBtu. Converted from lb/MMscf natural gas using conversion factors: 1,020 MMBtu/MMscf natural gas.
3. VOC, PM_{2.5}, PM₁₀, SO₂ emission factors from Tarmac International: manufacturer data sheets and mass balance of conservatively contaminated soil (saturated with chlorinated compounds, 500 ppmw sulfur petroleum constituents)
4. All Soil emission factors in units of lb/hr.
5. VOC emission factor derived from manufacturer’s conservative estimate of 12,500 ppm hydrocarbon concentration at 99% destruction efficiency.
6. PM_{2.5} is 33% of total PM per AP-42 Table 11.1-2 for Sand and Gravel Dryers
7. Fugitive Dust emission factors derived from AP-42 Table 13.2.2. Conservatively assumes 8,760 traffic vehicles per year, 0.10 miles each.
8. Fugitive Dust emission factor in units of lb/vehicle mile traveled.