TECHNICAL ANALYSIS REPORT
FOR
MINOR PERMIT AQ0034MSS03 Revision 2

Preliminary - February 21, 2024

Issued to:

Petro Star Inc.

for:

Port of Alaska Terminal

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Alaska Department of Environmental Conservation
Air Permits Program

1. INTRODUCTION

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (Department's) basis for issuing Minor Permit AQ0034MSS03 Revision 2 to Petro Star Inc. for Port of Alaska Terminal. Petro Star Inc. requested the permit revision under 18 AAC 50.502(b)(6) for construction of a stationary source containing a Port of Anchorage stationary source and under 18 AAC 50.508(6) in order to revise terms or conditions previously established in a Title I Permit.

2. STATIONARY SOURCE DESCRIPTION

The Port of Alaska Terminal is an existing stationary source. Petro Star Inc. currently operates the stationary source under Minor Permit AQ0034MSS03. The emissions unit (EU) inventory consists of multiple diesel, Jet A, and unleaded (standard and premium) storage tanks, loading racks, a vapor recovery unit, a firewater engine, a boiler, and a backup vapor combustion unit.

3. APPLICATION DESCRIPTION

The Department received an application for Minor Permit AQ0034MSS03 Revision 2 on October 26, 2023. Petro Star Inc. requests to construct additional truck racks and an enclosed VCU and removing the backup VCU from the emissions unit inventory. The following proposals are found in the minor permit revision application:

- Add EU ID 18 to the emission unit inventory (previously permitted under AQ1449MSS01 Revision 1 as Enclosed Vapor Combustion System (VCU/Flare) and Loading Rack EU IDs 2 and 3).
- Remove EU ID 16 from the emission unit inventory.
- Increase the assessable potential to emit (PTE) from 97 tpy to 106.44 tpy.

Additionally, Petro Star Inc. submitted an email January 17, 2024 to notify the Department about a change in product stored in EU ID 5 from unleaded gasoline to #2 diesel. The change in product results in a net emission decrease for EU ID 5 due to the lower true vapor pressure of diesel compared to gasoline. Emissions from the one-time tank cleaning activity associated with the product change are estimated below 1.5 tpy VOC. Because the one-time emission associated with the transition to diesel is not anticipated to occur again without additional permit action, the Department has incorporated the change to #2 diesel into the minor permit revision without incorporating a change in the source's PTE.

4. CLASSIFICATION FINDINGS

18 AAC 50.502(b)(6) requires owners or operators to obtain a minor permit before operation of a stationary source containing a Port of Alaska stationary source. As defined in 18 AAC 50.990(78), "Port of Alaska stationary source" means a stationary source located in the Port of Alaska that contains one or more emissions units subject to a standard in 18 AAC 50.085 or 18 AAC 50.090. Since the new tank is from another stationary source and subject to the

requirements in 18 AAC 50.085, a minor permit under 18 AAC 50.502(b)(6) is required before operation of the tank at the Port of Alaska Terminal.

The Department finds that Minor Permit AQ0034MSS03 Revision 2 is classified under 18 AAC 50.508(6) for revising or rescinding the terms and conditions of a Title I permit and 18 AAC 50.502(b)(6) for construction of a stationary source containing a Port of Anchorage stationary source.

5. APPLICATION REVIEW FINDINGS

The following Department findings are based on review of the permit revision 2 application.

5.1 The minor permit revision application contains the elements required in 18 AAC 50.540.

5.2 The EU ID 16 backup VCU is removed and the EU ID 18 North Truck Racks and enclosed VCU is added to the emission inventory.

5.3 Emission factors for EU 9 Rail ULSD and Jet A Loading Racks were updated by the permittee to reflect true vapor pressure at 40 F calculations. Vapor pressure for ULSD and Jet A were updated from 0.0031 and 0.0041 psia to 0.0029 and 0.0037 psia respectively, resulting in an emission factor of 0.0058 lb/1000 gallons for ULSD, and 0.0073 lb/1000 gallons for Jet A.

5.4 The Department considers the 1,200 gpm operational limit for the EU ID 18 North VCU to be conservative and reasonable. The enclosed VCU maximum capacity cannot exceed 1,200 gpm in order to meet the 98% destruction efficiency rating by the manufacturer. The North Loading Rack maximum capacity does not exceed this limit. The North Loading Rack is comprised of a top loading arm, capable of up to 500 gpm. The Permittee plans to add a bottom loading arm, also capable of up to 500 gpm. The total pump capacity is 1,000 gpm, which remains under than the VCU maximum capacity of 1,200 gpm.

5.5 The Permittee stated in the application that the North Tank Truck and Rail Loading Racks would be converted from methanol to gasoline and additionally calculated EU ID 18 PTE using gasoline emission factors. Therefore, the Department included a condition limiting EU ID 18 North Loading Rack to 1,200 gallons gasoline per minute to match the operational limit of the North VCU.

5.6 Assessable PTE is revised in accordance with Table B below and Appendix A to the TAR. The emission factor for EU 18 North Truck Loading Racks was converted from the 10 mg/L limit in 18 AAC 50.090(a)(1)(D)(i). The VOC emissions for EU 5 Diesel Fuel #2 Storage Tank was converted from 2.32 tpy to 0.31 tpy.

5.7 EU ID 5 description is changed from ‘Unleaded Storage Tank’ to ‘Diesel Fuel #2 Storage Tank’.

6. EMISSIONS SUMMARY AND PERMIT APPLICABLITY

Table B shows the emissions summary and permit applicability with assessable emissions from the stationary source. Emission factors and calculation details 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 B below.

Table B – Emissions Summary and Permit Applicability, tons per year (tpy)

Emissions	NO_X	CO	VOC	PM-2.5	PM-10	SO_2	HAPs
PTE before Modification [a]	15.61	33.64	71.80	0.61	0.61	0.57	0.60
PTE after Modification 1 [b]	15.61	33.64	46.50	0.61	0.61	0.57	0.50
PTE after Modification 2	13.05	21.87	70.34	0.61	0.61	0.57	0.57
Change in PTE [c]	-2.56	-11.77	-1.46	0	0	0	-0.03
18 AAC 50.502(c)(3) Permit Thresholds [d]	10	N/A	N/A	10	10	10	N/A
18 AAC 50.502(c)(4) Permit Thresholds [d]	40	N/A	N/A	10	15	40	N/A
502(c)(3) Applicable?	N	N/A	N/A	N	N	N	N/A
Title V Permit Thresholds	100	100	100	100	100	100	10/15
Title V Permit Required?	N	N	N	N	N	N	N
Assessable Emissions [e]	13.05	21.87	70.34	0.61	0.61	0.57	0
Total Assessable Emissions [f]	106.44						

Table Notes:

[a] – PTE before modification is from the Technical Analysis Report for Permit AQ0034MSS03.

[b] – PTE after Modification 1 is from the Technical Analysis Report for Permit AQ0034MSS03 Revision 1.

[c] – Change in PTE accounts for both Revision 1 and Revision 2 modifications in order to net contemporaneous emissions. Petro Star Inc. requested the revision applications be accepted separately to not delay AQ0034MSS03 Revision 1.

[d] – The thresholds in 18 AAC 50.502(c)(4) apply because the existing PTE is equal to or less than the 18 AAC 50.502(c)(1) threshold for the given pollutant.

[e] – Assessable emissions include fugitive emissions.

[f] – PM-2.5 emissions are not included because they are a subset of PM-10 emissions.

7. REVISIONS TO PERMIT CONDITIONS

Table C below lists the requirements carried over from Minor Permit AQ0034MSS03 into Minor Permit AQ0034MSS03 Revision 2.

Table C - Comparison of AQ0034MSS03 to AQ0034MSS03 Revision 2 Conditions[7]

Permit AQ0034MSS03 Condition No.	Description of Requirement	Permit AQ0034MSS03 Revision 1 Condition No.	How Condition was Revised
Table A	Emissions Inventory	Table A	Removed EU ID 16. Added EU ID 18. Revised EU ID 5.
4 & 5	Assessable Emissions	4 & 5	Revised Assessable PTE. Updated to match 18 AAC 50.410(a), SPC 1
16	Gasoline Loading limits	16	Added condition limiting EU ID 18 gasoline loading limit
24	VCU operating and maintenance guidelines	24	Updated condition originally referring to EU ID 16 to EU ID 18.
29	Excess Emissions and Permit Deviation Reporting	29	Updated to match 18 AAC 50.270
-	Emission Inventory Reporting	33	Condition reflects SPC XV
Attachment 1	Notification Form	Section 12	Updated to match SPC IV, 18 AAC 50.270

[7] This table does not include all standard and general conditions.

8. PERMIT CONDITIONS

The bases for the terms and conditions of Minor Permit AQ0034MSS03 Revision 2 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 emission units authorized and/or restricted by the permit are listed in Table A of the minor permit. Unless otherwise noted in the permit, the information in Table A 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 emission unit.

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 through 18 AAC 50.499 in each minor permit issued under 18 AAC 50.542. The Department used Standard Permit Condition (SPC) I for Minor Permit AQ0034MSS03 Revision 2. 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.

Section 3: State Emissions Standards

Condition 7, Visible Emissions (VE).

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).

Condition 8, Particulate Matter (PM) Emissions.

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 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). The Permittee must comply with the sulfur compound emissions standard under 18 AAC 50.055(c).

Section 4: Port of Anchorage Requirements

Conditions 10 through 12, Storage Tanks.

Volatile liquid storage tanks located in the Port of Alaska must meet the requirements of 18 AAC 50.085.

Conditions 13 through 16, Loading Racks and Delivery Tanks.

Volatile liquid loading racks located in the Port of Alaska must meet the requirements of 18 AAC 50.090.

The Department imposed a gasoline loading limit to ensure the VOC emissions control equipment functions properly and that VOC PTE is limited.

Section 5: AQ0034MSS01 Requirements

Conditions 17 through 24.

These conditions contain requirements from Minor Permit AQ0034MSS01 that remain applicable to emission units at Anchorage Terminal I.

Condition 24 was not in Minor Permit AQ0034MSS01. However, because EU ID 18 controls VOC emissions for the North Truck Loading Racks, , the condition is added to Minor Permit AQ0034MSS03.

Section 6: General Recordkeeping, Reporting, and Certification Requirements

Condition 25, 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 26, 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 27, Submittals.

This condition 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 28, 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 AQ0034MSS03.

Condition 29 and Section 11, 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 29 and the Notification Form in Section 11 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 CFR 71.6(a)(3).

Condition 30, Operating Reports.

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

Condition 31, Annual Affirmation.

The Permittee shall submit to the Department by March 31 of each year an affirmation certified according to Condition 26 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 32, 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 32 reiterates this prohibition as a permit condition. The Department used SPC II language for Minor Permit AQ0034MSS03.

Condition 33, Triennial 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.

Condition 34, Consistency of Reporting Methodologies

Condition 34 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 34.1 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 33 or assessable emissions under Condition 5.1, consistent emission factors and calculation methods shall be used for all reporting requirements for the stationary source.

Section 7: Standard Permit Conditions

Conditions 35 through 40, 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 subsections (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 AQ0034MSS03 Revision 2. The Department incorporated these standard conditions as follows:

- 18 AAC 50.345(c)(1) and (2) is incorporated as Condition 35;
- 18 AAC 50.345(d) through (h) are incorporated as Conditions 36 through 40, respectively;
- As previously discussed, 18 AAC 50.345(i) is incorporated as Condition 28 and 18 AAC 50.345(j) is incorporated as Condition 25 of Section 6 of the minor permit; and
- 18 AAC 50.345(k) is incorporated as Condition 41, and 18 AAC 50.345(l) through (o) are incorporated as Conditions 45 through 48, respectively, of Section 8 of the minor permit.

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 41, Requested Source Tests. This condition is discussed under Section 6 above.

Condition 42, Operating Conditions. This condition reiterates the requirements in 18 AAC 50.220(b) regarding the location and operating conditions for source testing.

Condition 43, Reference Test Methods. This condition reiterates the requirements in 18 AAC 50.220(c) regarding the methods for source testing.

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 A1 – Emission 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)
2	Gasoline Storage Tanks	10,000 barrels					See note 2	1.61			
3		20,000 barrels					See note 2	2.18			
6		50,000 barrels					See note 2	3.47			
4	Diesel Fuel #2 Storage Tanks	20,000 barrels					See note 3	0.23			
5		30,000 barrels					See note 3	0.31			
8		29,000 barrels					See note 3	0.39			
7	Jet A Storage Tank	50,000 barrels					See note 3	0.74			
9	Truck and Rail Loading Racks – Gasoline	2,100 gpm [4]					0.0475 lb/1000 gal [5]	26.22			
	Rail Loading Rack – Jet A	1,200 gpm					0.0073 lb/1000 gal [6]	2.31			
	Rail Loading Rack – Diesel	1,200 gpm					0.0058 lb/1000 gal [6]	1.82			
10	Component Leaks						See note 7	0.62			
11 - 13	Additive Storage Tanks	280 200 14 barrels					See note 8	0.01			
14	Firewater Pump Engine	63 Hp	0.031 lb/hp-hr [9]	8.55	0.00668 Lb/hp-hr [9]	1.84	0.00251 lb/hp-hr [9]	0.69	0.0022 lb/hp-hr [9]	0.61	0.57
15	Boiler	0.164 MMBtu/hr	100 lb/MMscf [10]	0.07	84 lb/MMscf [10]	0.06	5.5 lb/MMscf [10]	0.004	7.6 lb/MMscf [10]	0.005	0.001

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)
17	Gasoline Storage Tank	50,000 barrels					See note 2	3.36			
18	North Truck Loading Rack	1,200 gpm [11]					0.0834 lb/1000 gal [12]	26.29			
	North VCU	14.70 MMBtu/hr [13]	0.068 lb/MMBtu [14]	4.38	0.31 lb/MMBtu [15]	19.96	0.0012 lb/MMBtu [16]	0.08	0 µg/L [14]	0	0
	Pilot flare	60 scf/hr [17]	170 lb/MMscf	0.05	24 lb/MMscf	0.01	5.5 lb/MMscf	0.001	7.6 lb/MMscf	0.001	0
Total Potential to Emit				**13.05**		**21.87**		**70.34**		**0.61**	**0.57**

Table Notes:

1 SO_2 emissions are based on mass balance calculations. Diesel sulfur content assumed 0.5 weight percent. Gas H_2S concentration assumed 25 ppm.
2 AP 42 Section 7.1.3.2 (Rim seal, withdrawal, and deck fitting losses)
3 AP 42 Section 7.1.3.1 (Working and standing storage losses)
4 EU 9 gasoline loading max capacity is 3,400 gallons per minute (gpm) but limited to permit limit of 2,100 gpm
5 Emission factor from 2019 Source Test
6 Uncontrolled loading losses AP-42 equation 1, Chapter 5.2.2.1.1, Saturation factor S = 0.6
7 EPA 1995 Protocol for Equipment Leak Emission Estimates, Table 2-3
8 TANKS 4.0.9d
9 AP 42 Table 3.3-1
10 AP 42 Tables 1.4-1, 1.4-2
11 North Loading Rack is limited to VCU max capacity of 1,200 gpm.
12 North VCU VOC EF converted from 10 mg/L limit per 18 AAC 50.090(a)(1)(D)(i).
13 North VCU 14.70 MMBtu/hr max capacity from vendor data.
14 AP 42 Table 13.5-1
15 AP 42 Table 13.5-2
16 North VCU VOC emission factors from AP-42 Table 13.5-1
17 North VCU pilot combustion emission factors from AP-42 Tables 1.4-1 and 1.4-2.