ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AIR PERMITS PROGRAM

TECHNICAL ANALYSIS REPORT

for

Minor Permit AQ0225MSS04

Preliminary – November 2, 2022

Alaska Power & Telephone Company

Tok Power Generating Station

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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 AQ0225MSS04 to Alaska Power & Telephone Company (AP&T) for the Tok Power Generating Station. The minor permit incorporates changes requested by AP&T and rescinds Minor Permit AQ0225MSS03.

The Tok Power Generating Station is an existing stationary source. The emissions unit (EU) inventory consists of six diesel-electric generators. The total site generating capacity is less than 12 MW. AP&T currently operates the stationary source under Operating Permit AQ0225TVP04.

2. APPLICATION DESCRIPTION

The Department received the application for Minor Permit AQ0225MSS04 on June 3, 2022 and received a revised application on July 12, 2022. AP&T submitted the application to request authorization to install a 2,500 kW diesel generator (EU ID 7a) in the place of a 1,930 kW diesel generator (EU ID 7) that was removed from the stationary source in 2014. AP&T requests the following:

2.1 Replace EU ID 7 with EU ID 7a in Conditions 6 through 8 for state emissions standards in Minor Permit AQ0225MSS03;

2.2 Revise Condition 9 in Minor Permit AQ0225MSS03 to remove EU ID 7 and add EU ID 7a to the NOx owner requested limit (ORL); and

2.3 Replace EU ID 7 with EU ID 7a in Conditions 11 and 12 in Minor Permit AQ0225MSS03.

AP&T additionally requests that the requirements of Minor Permit AQ0225MSS04 be added to the operating permit by administrative amendment.

3. CLASSIFICATION FINDINGS

The Department finds that Minor Permit AQ0225MSS04 is classified under

3.1 18 AAC 50.508(5) because AP&T requested that EU ID 7a be included in the previously established NOx ORL.

3.2 18 AAC 50.508(6) because AP&T requested revisions to conditions of a Title I permit (Minor Permit AQ0225MSS03).

4. APPLICATION REVIEW FINDINGS

Based on review of the minor permit application, the Department makes the following findings:

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

4.2 AP&T will install EU ID 7a in the place of EU ID 7, which was removed from the stationary source in 2014.

4.3 There are no changes to ambient air quality conditions. The Department did not establish any ambient air quality conditions in Minor Permit AQ0225MSS01 for the installation of EU ID 7. Therefore, no ambient air quality conditions are revised due to the installation of EU ID 7a in the place of EU ID 7.

4.4 The Department replaced EU ID 7 with EU ID 7a in Conditions 6 through 8 (state emissions standards) in Minor Permit AQ0225MSS03 because EU ID 7 has been removed from the stationary source and AP&T will install EU ID 7a in its place.

The monitoring, recordkeeping, and reporting (MR&R) requirements for the state standards for EU ID 8a are not included in Minor Permit AQ0225MSS04 because these were one-time requirements that AP&T demonstrated compliance with in 2018.

MR&R requirements for the state standards are included for EU ID 7a so those conditions of Minor Permit AQ0225MSS04 can be added to the operating permit by administrative amendment in accordance with 18 AAC 50.542(e) and 50.544(a)(7). Under 18 AAC 50.510, these conditions are solely necessary to meet a Title V operating permit requirement to qualify as an operating permit administrative amendment under 18 AAC 50.542(e) and 40 CFR 71.7(d). Therefore, subsequent revisions may be made solely in the operating permit.

4.5 The Department replaced EU ID 7 with EU ID 7a in the previously established NOx ORL (Condition 9 in Minor Permit AQ0225MSS03). This allows AP&T to continue to avoid PSD major source classification due to NOx and avoid minor permit requirements under 18 AAC 50.502(c)(3) for NOx for the installation of EU ID 7a.

The electrical generation limit for the NOx ORL presumes the NOx emission factors listed in the minor permit. NOx emission source tests are necessary to verify the emission factors. Therefore, source test requirements for the NOx emission factors are included in Minor Permit AQ0225MSS04, as required in 18 AAC 50.544(h)(1). Source testing is required if the combined electrical generation exceeds 90 percent of the limit. When the combined electrical generation approaches the limit, testing must be done to ensure the NOx emission factors for the engines remain accurate.

4.6 The Department replaced EU ID 7 with EU ID 7a in Condition 11 in Minor Permit AQ0225MSS03. This fuel limit ensures there is no increase in SO_2 emissions due to the installation of EU ID 7a and no new permit requirements due to SO_2.

4.7 The Department did not replace EU ID 7 with EU ID 7a in Condition 12 in Minor Permit AQ0225MSS03 because the condition is not included in Minor Permit AQ0225MSS04. This fuel limit was established in Minor Permit AQ0225MSS01 to avoid a minor permit due to SO_2 emissions for the installation of EU ID 7. Therefore, minor permitting was not required due to SO_2, and no ambient demonstration was required for SO_2. This means the fuel condition could not be for ambient air quality, which is the reason provided in Condition 12 in Minor Permit AQ0225MSS03.

4.8 The Department included the applicable requirements of 40 CFR 60 Subparts A and IIII and 40 CFR 63 Subpart ZZZZ for EU ID 7a so those conditions can be added to the operating permit by administrative amendment in accordance with 18 AAC 50.542(e) and 50.544(a)(7). Under 18 AAC 50.510, these conditions are solely necessary to meet a Title V operating permit requirement to qualify as an operating permit administrative amendment under 18 AAC 50.542(e) and 40 CFR 71.7(d). Therefore, subsequent revisions may be made solely in the operating permit.

5. EMISSIONS SUMMARY AND PERMIT APPLICABLITY

Table C shows the PTE and assessable emissions summary. Table D and Table E show permit applicability. Emission factors and detailed calculations are provided in Appendix A.

Table C – Emissions Summary

Emissions (tpy)	NOx	CO	VOC	PM-10	SO_2
PTE After Modification	249.0	104.6	11.1	9.7	68.6
Assessable Emissions [a]	249	105	11	10	69
Total Assessable	444				

Table Notes:
[a] – Assessable emissions include any pollutant, other than greenhouse gas (GHG), greater than or equal to 10 tpy. PM-2.5 emissions are not included because they are a subset of PM-10 emissions.

Table D – Minor Permit Applicability

Emissions/Thresholds (tpy)	NOx	CO	VOC	PM-2.5	PM-10	SO_2
PTE Prior to Project	249	129	14	13	13	66
Change in PTE due to Project	0	-24	-3	-3	-3	2
18 AAC 50.502(c)(3) Permit Threshold [a] [b]	10	N/A	N/A	10	N/A	10
Minor Permit Required?	No	N/A	N/A	No	N/A	No
18 AAC 50.502(c)(4) Permit Threshold [a] [c]	N/A	N/A	N/A	N/A	15	N/A
Minor Permit Required?	N/A	N/A	N/A	N/A	No	N/A

Table Notes:
[a] – There is no minor permit VOC threshold. Facility is not located within 10 kilometers of a CO nonattainment area, so there is no minor permit CO threshold.
[b] – The 18 AAC 50.502(c)(3) thresholds only apply if the existing PTE is greater than the 18 AAC 50.502(c)(1) threshold for the given pollutant.
[c] – The 18 AAC 50.502(c)(4) thresholds only apply if the existing PTE is equal to or less than the 18 AAC 50.502(c)(1) threshold for the given pollutant.

Table E – PSD Permit Applicability

Emissions/Threshold (tpy)	NOx	CO	VOC	PM-2.5	PM-10	PM	SO_2
PTE for EU ID 7a Without Limits	185	15	4	1	1	1	53
Major Source Threshold [a]	250	250	250	250	250	250	250
PSD Permit Required?	No	No	No	No	No	No	No

Table Notes:
[a] – Under 40 CFR 51.166(b)(1)(i)(c) major stationary source means any physical change that would occur at a stationary source not otherwise qualifying under 40 CFR 51.166(b)(1) as a major stationary source, if the change would constitute a major stationary source by itself.

6. REVISIONS TO PERMIT CONDITIONS

Table F below lists the requirements carried over from Minor Permit AQ0225MSS03 into Minor Permit AQ0225MSS04.

Table F – Comparison of Minor Permit AQ0225MSS03 to Minor Permit AQ0225MSS04

AQ0225MSS03 Condition No.	Description of Requirement	AQ0225MSS04 Condition No.	How Condition is Revised
1	Emissions unit authorization	1	Not revised.
2	General maintenance	None	Addressed by NSPS and NESHAP requirements in the operating permit.
3	Administration fees	2	Not revised.
4	Assessable emissions	3	PTE is updated in accordance with Table C and conditions are updated in accordance with Standard Condition I, which was revised July 22, 2020.
5	Assessable emission estimates	4	Conditions are updated in accordance with Standard Condition I, which was revised July 22, 2020.
6	State visible emissions standard	5	EU ID 7 is replaced with EU ID 7a, and MR&R requirements are included for EU ID 7a. The MR&R requirements for EU ID 8a in Minor Permit AQ0225MSS03 are not included in Minor Permit AQ0225MSS04.
7	State particulate matter emissions standard	6	EU ID 7 is replaced with EU ID 7a, and MR&R requirements are included for EU ID 7a. The MR&R requirements for EU ID 8a in Minor Permit AQ0225MSS03 are not included in Minor Permit AQ0225MSS04.

AQ0225MSS03 Condition No.	Description of Requirement	AQ0225MSS04 Condition No.	How Condition is Revised
8	State sulfur compound emissions standard	7	EU ID 7 is replaced with EU ID 7a, and MR&R requirements are included for EU ID 7a.
9	ORL to avoid classification as PSD major for NOx	8	Replaced EU ID 7 with EU ID 7a. Changed "fuel burning source" in Condition 9.1a in Minor Permit AQ0225MSS03 to "emissions unit". Condition 9.1a.i in Minor Permit AQ0225MSS03 is not included in Minor Permit AQ0225MSS04 because it is an explanation and doesn't contain any specific requirement. Source test requirements are included in Minor Permit AQ0225MSS04.
10	Engine replacement	9	Not revised.
11	ORL to avoid minor permit requirements for SO_2	10	Replaced EU ID 7 with EU ID 7a. Condition 11.1 from Minor Permit AQ0225MSS03 is not included because it is not necessary.
12	Requirement to protect ambient air quality for SO_2	None	The MR&R in Conditions 12.1 through 12.4 in Minor Permit AQ0225MSS03 are included as Conditions 10.1 through 10.4 in Minor Permit AQ0225MSS04 because the ORL in Condition 11 in Minor Permit AQ0225MSS03 required compliance with these conditions.

Table Notes:
1. This table does not include all standard and general conditions.

7. PERMIT CONDITIONS

The bases for the conditions imposed in Minor Permit AQ0225MSS04 are described below.

Cover Page

18 AAC 50.544(a)(1) requires the Department to identify the stationary source, Permittee, and contact information.

Section 1: Emissions Unit Inventory

The emissions units authorized and/or restricted by the permit are listed in Table A of the minor permit.

Condition 1 is a general requirement to comply with AS 46.14 and 18 AAC 50 when installing a replacement emissions 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 50.499 in each minor permit issued under 18 AAC 50.542.

Condition 2 addresses administration fees and the Department used Standard Permit Condition (SPC) I in **Conditions 3 and 4** to address emission fees.

Section 3: State Emission Standards

Condition 5, Visible Emissions. The Permittee must comply with the visible emissions (VE) standard under 18 AAC 50.055(a)(1).

These conditions are from Standard Permit Condition (SPC) IX – Visible Emissions and Particulate Matter Monitoring Plan for Liquid Fuel-Burning Equipment and Flares. EU ID 7a is the only new emissions unit at the stationary source, so it is the only emissions unit with MR&R requirements for the VE standard.

Conditions 6, Particulate Matter (PM) Emissions. The Permittee must comply with the particulate matter emissions standard under 18 AAC 50.055(b).

These conditions are also from SPC IX. EU ID 7a is the only new emissions unit at the stationary source, so it is the only emissions unit with MR&R requirements for the PM standard.

Condition 7, Sulfur Compound Emissions. The Permittee must comply with the sulfur compound emissions standard under 18 AAC 50.055(c).

These conditions are from SPC XI – SO_2 Emissions From Liquid Fuel-Burning Equipment. EU ID 7a is the only new emissions unit at the stationary source, so it is the only emissions unit with MR&R requirements for the sulfur compound standard.

Section 4: Owner Requested Limits (ORLs) to Avoid PSD Classification

Condition 8, NOx Limits. 18 AAC 50.544(h) describes the requirements for a permit classified under 18 AAC 50.508(5) for establishing an ORL to avoid one or more permit classifications under AS 46.14.130. As required, this condition describes the ORL, including specific testing, monitoring, recordkeeping, and reporting requirements; it lists all equipment covered by the ORL; and describes the classification that the limit allows the applicant to avoid. This condition includes both a ton per year limit and an operational limit.

Condition 9 addresses engine replacement and was established in the construction permit issued in 1999. The condition has been carried forward in all Title I permits issued since then.

Condition 10, SO_2 Limit. The Department established this condition in Minor Permit AQ0225MSS01 for the installation of EU ID 7. The condition has been carried forward in all Title I permits issued since then. The Permittee requested that this limit now apply to EU ID 7a.

Section 5: Federal Requirements

The Department included the conditions in this section so the conditions can be added to the operating permit by administrative amendment

The Permittee identifies EU ID 7a as a model year 2007 combustion ignition engine. Therefore, the engine is subject to the requirements of 40 CFR 60 Subpart IIII and the general requirements in 40 CFR 60 Subpart A. **Condition 11** contains the Subpart A applicable requirement in 40 CFR 60.12.

Condition 12 contains the applicable requirements for EU ID 7a in 40 CFR 60 Subpart IIII. EU ID 7a is a 2007 model year engine rated at more than 3,000 horsepower and has displacement of less than 10 liters/cylinder. Therefore, the engine is subject to the emission limits in Table 1 to Subpart IIII under 40 CFR 60.4201(b) and 60.4204(b). Under 40 CFR 60.4216(d), the fuel requirements in 40 CFR 60.4207 do not apply because the engine is located in a remote area of Alaska as defined in 40 CFR 60.4219. 40 CFR 60.4211(c) requires the Permittee to comply with the emission limits by purchasing an engine certified to the emission standards. Since EU ID 7a is a non-emergency engine greater than 3,000 horsepower, 40 CFR 60.4214(a) is also applicable.

Condition 13 contains the applicable requirements for EU ID 7a in 40 CFR 63 Subpart ZZZZ. The engine is a new engine under Subpart ZZZZ and the stationary source is an area source of hazardous air pollutant emissions. Therefore, under 40 CFR 63.6590(c), the requirements of 40 CFR 63 must be met by meeting the requirements of 40 CFR 60 Subpart IIII.

Section 6: General Recordkeeping, Reporting, and Certification Requirements

Condition 14, Certification. 18 AAC 50.205 requires the Permittee to certify any permit application, report, affirmation, or compliance certification submitted to the Department. This requirement is reiterated as a standard permit condition in 18 AAC 50.345(j). The Department used the language of SPC XVII.

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 of SPC XVII.

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).

Condition 17, Recordkeeping Requirements. The condition restates the regulatory requirements for recordkeeping, and supplements the recordkeeping defined for specific conditions in the permit.

Condition 18, Excess Emission and Permit Deviation Reports. 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. The Permittee is required to notify the Department when emissions or operations deviate from the requirements of the permit. The Department used the language of SPC III.

Condition 19, Operating Reports. The Department mostly used the language of SPC VII for the 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 20, 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. This condition reiterates this prohibition. The Department used the language of SPC II.

Section 7: Standard Permit Conditions

Conditions 21 through 26, 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 AQ0225MSS04. The Department incorporated these standard conditions as follows:

- 18 AAC 50.345(c)(1) and (2) is incorporated as Condition 21;
- 18 AAC 50.345(d) through (h) are incorporated as Conditions 22 through 26, respectively;
- As previously discussed, 18 AAC 50.345(i) is incorporated as Condition 16 and 18 AAC 50.345(j) is incorporated as Condition 14 of 10.1 of the minor permit; and
- 18 AAC 50.345(k) is incorporated as Condition 27, and 18 AAC 50.345(l) through (o) are incorporated as **Conditions 30 through 33**, respectively, of Section 8 of the minor permit.

Section 8: General Source Test Requirements

Condition 28, Operating Conditions. This condition reiterates the requirements in 18 AAC 50.220(b) for source testing.

Condition 29, 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 A1 presents emission factors for the emissions units and Tables A2 and A3 present potential emissions. Potential emissions are calculated using maximum annual operation for all equipment unless noted otherwise. Calculations also take into account federally-enforceable limits, including operational limits.

Table A1 – Emission Factors [1, 2]

EU ID	Description	Maximum Rating or Capacity	NOx [3]		CO		VOC		PM-2.5/PM-10	
3	Caterpillar 3516B	1,320 kW	0.0264	lb/kWh	0.85	lb/MMBtu	0.09	lb/MMBtu	0.10	lb/MMBtu
4	Caterpillar 3516	1,135 kW	0.0348	lb/kWh						
5	Caterpillar 3516	1,135 kW	0.0348	lb/kWh						
7	Caterpillar C175-16	1,930 kW	0.0162	lb/kWh						
7a [4]	Caterpillar 3516C	2,500 kW	0.0169	lb/kWh	1,515	grams/hr	376	grams/hr	132.5	grams/hr
8a	Caterpillar 3508A STD	600 kW	0.0463	lb/kWh	0.85	lb/MMBtu	0.09	lb/MMBtu	0.10	lb/MMBtu
9	Caterpillar 3512C	1,030 kW	0.0159	lb/kWh					0.25 [5]	g/kWh

Table Notes:

1 SO_2 emissions are based on mass balance calculations. Diesel weight is assumed to be 7.1 lb/gal and sulfur content is assumed to be 0.5 weight percent.

2 Emission factors are from EPA's AP 42 Compilation of Air Emissions Factors unless noted otherwise.

3 Except for EU IDs 7 & 7a, emission factors are from source testing conducted in 2017. NOx emission factor for EU ID 7 is from testing in 2012.

4 Emission factors for this engine are from manufacturer's data.

5 Emission factor is the not-to-exceed (NTE) value from 40 CFR 60 Subpart IIII (0.2 × 1.25).

Table A2 – Potential to Emit Before the Project (tpy) [1]

EU ID	Maximum Fuel Rating	Operating Limit	NOx	CO [2]	VOC [2]	PM-2.5/PM-10 [3]	SO_2 [2]
3	90.4 gal/hr	10.75 GWh/yr	249	14.3	1.5	4.7	7.4
4	76.2 gal/hr			0	0	0	0
5	76.2 gal/hr			0	0	0	0
7	117.7 gal/hr			71.1	7.5	8.4	36.6
8a	43.8 gal/hr			0	0	0	0
9	72.0 gal/hr			43.5	4.6	0	22.4

Table Notes:

[1] As noted by the Permittee in the minor permit application, 15 percent is added to CO, VOC, and PM emissions to account for partial load.

[2] Worst case hours of operation while maintaining compliance with 249 tpy NOx limit:
EU ID 3: 2,300
EU ID 7: 8,760
EU ID 9: 8,760

[3] Worst case hours of operation while maintaining compliance with 249 tpy NOx limit:
EU ID 3: 6,425
EU ID 7: 8,760

Table A3 – Potential to Emit After the Project (tpy) [1]

EU ID	Maximum Fuel Rating	Operating Limit	NOx	CO [2]	VOC [2]	PM-2.5/PM-10 [2]	SO_2 [3]
3	90.4 gal/hr	10.75 GWh/yr	249	54.6	5.8	6.4	8.7
4	76.2 gal/hr			6.5	0.7	0.8	0
5	76.2 gal/hr			0	0	0	0
7a	171.3 gal/hr			0	0	0	37.5
8a	43.8 gal/hr			0	0	0	0
9	72.0 gal/hr			43.5	4.6	2.5	22.4

Table Notes:

[1] As noted by the Permittee in the minor permit application, 15 percent is added to CO, VOC, and PM emissions to account for partial load.

[2] Worst case hours of operation while maintaining compliance with 249 tpy NOx limit:
EU ID 3: 8,760
EU ID 4: 1,245
EU ID 9: 8,760

[3] Worst case hours of operation while maintaining compliance with 249 tpy NOx limit:
EU ID 3: 2,720
EU ID 7a: 6,158 (due to fuel limit of 1,055,000 gallons/yr)
EU ID 9: 8,760