Technical Analysis Report

For the terms and conditions of

Minor Permit AQ0741MSS03

Issued to Cook Inlet Energy, LLC

For the Kustatan Production Facility

Alaska Department of Environmental Conservation
Air Permits Program

Prepared by Alan Schuler

Preliminary – March 22, 2018

1. INTRODUCTION

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (Department's) basis for issuing Air Quality Control Minor Permit AQ0741MSS03 to Cook Inlet Energy, LLC (CIE) for the Kustatan Production Facility (KPF). CIE requested the permit under 18 AAC 50.508(6) in order to revise terms or conditions previously established in a Title I Permit (Minor Permit AQ0741MSS02).

2. STATIONARY SOURCE DESCRIPTION

KPF is an existing stationary source. It is located on the West Foreland peninsula on the west side of Cook Inlet. The emissions unit (EU) inventory consists of combustion turbines, heaters, reciprocating engines, liquid storage tanks, and a process flare. CIE is currently operating the stationary source under Minor Permit AQ0741MSS02 and Operating Permit AQ0741TVP03.

3. APPLICATION DESCRIPTION

CIE submitted their application for Minor Permit AQ0741MSS03 on February 28, 2018. The project description may be found in Section 8 of their application. In summary, CIE made the following two requests:

- Remove EU 2a, a 5.6 megawatt (MW) turbine generator, from the EU inventory and all permit conditions; and
- Add the term "malfunction" to the exceptions listed in Condition 7.3 of Minor Permit AQ0741MSS02 – an operational requirement under the carbon monoxide (CO) owner requested limit (ORL).

With respect to EU 2a, CIE stated that it is no longer in service and was removed from the stationary source in 2012. Condition 7.3 of Minor Permit AQ0741MSS02 prohibited CIE from operating the three turbine generators, EUs 1, 2 and 2a, at less than 50 percent load or the minimum load for which CO source tests were conducted, except during startup, shutdown, or performance/emission tests. CIA requested that "malfunction" be added to the list since malfunctions can be considered as unavoidable conditions under various federal and Department citations.

4. APPLICATION REVIEW FINDINGS

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

1. CIE's minor permit application contains the elements listed in 18 AAC 50.540.
2. EU 2a may be removed from the EU inventory and permit conditions since it no longer exists at KPF.
3. The cleanest approach for removing EU 2a from Minor Permit AQ0741MSS02 is to rescind and replace the entire permit, rather than issuing a permit that revises Minor Permit AQ0741MSS02 without rescinding it.
4. CIE's request to add "malfunction" to the list of exceptions in Condition 7.3 of Minor Permit AQ0741MSS02 is reasonable and acceptable. However, CIE's reference to 40 CFR 60.8 as a basis for their request is inadequate since that provision only regards performance tests. The Department nevertheless granted their request since malfunctions typically do not last for long periods of time, and it's unlikely that malfunctions would

lead to an exceedance since the potential emissions are far below the 250 tpy PSD threshold (see Table 1 below). The Department further notes that malfunctions must be corrected as soon as practicable after their occurrence. To the extent that an unexpected event arises during a startup, shutdown, or malfunction, an owner or operator must comply by minimizing emissions during such a startup, shutdown, and malfunction event consistent with safety and good air pollution control practices.

5. EMISSIONS SUMMARY

Table 1 shows the revised potential to emit (PTE) for the following pollutants: oxides of nitrogen (NOx), CO, sulfur dioxide (SO_2), volatile organic compounds (VOC), and particulate matter with an aerodynamic diameter of 2.5 microns or less (PM-2.5) and particulate matter with an aerodynamic diameter of 10 microns or less (PM-10). The detailed calculations are provided in Appendix A. Table 1 also shows the new assessable emissions of each regulated air pollutant for which the PTE is 10 tpy or more, rounded to the nearest ton.

Table 2 – PTE and Assessable Emissions (tpy)

Parameter	NOx	CO	SO_2	VOC	PM-2.5/ PM-10
PTE	87.0	153.0	37.7	57.5	6.4
Assessable Emissions	87	153	38	58	0
	336				

6. REVISIONS TO PERMIT CONDITIONS

Table 2 below lists the KPF-specific requirements carried over from Minor Permit AQ0741MSS02 into Minor Permit AQ0741MSS03. The standard and general conditions are not included, unless noted otherwise, but they are discussed in Section 7 of this TAR.

Table 2 – Comparison of AQ0741MSS02 to AQ0741MSS03 Conditions

Permit AQ0741MSS02 Condition # / Table # / Section #	Description of Requirement	Permit AQ0741MSS03 Condition # / Table # / Section #	How Condition was Revised
Cover Page	Permit identification	Cover Page	• Dropped the previously listed information that is not required under 18 AAC 50.544(a) • Updated the contact information and introductory language
Abbreviations / Acronyms	The abbreviations and acronyms used in the permit	Abbreviations / Acronyms	• Updated and reformatted the list
Section 1	EU Inventory	Section 1	• Removed EU 2a from the EU Inventory table • Moved the acronyms previously listed as a footnote to the EU

Permit AQ0741MSS02 Condition # / Table # / Section #	Description of Requirement	Permit AQ0741MSS03 Condition # / Table # / Section #	How Condition was Revised
			Inventory to the Abbreviations / Acronyms section • Updated the EU authorization language and added a condition reminding the Permittee to comply with AS 46.15 and 18 AAC 50 when replacing an EU
Section 2	Emission Fees	Section 2	• Updated the Section title • Added a general condition regarding the payment of fees that reflects 18 AAC 50.544(a)(2) • Used the current Standard Permit Condition I language • Updated the assessable PTE
Section 3	Ambient Air Quality Standards and Increments	Section 3	• No change
Section 4	Limits to Avoid Classification as PSD Major Source	Section 4	• Removed all references to EU 2a • Minor editorial changes • Revised footnote 1 so that it now references the source test date rather than saying "most recent Department approved source test"
Condition 7.3	Turbine load requirement	Condition 8.3	• Added "malfunction" to the list of exemptions
Condition 7.6.1	CO reporting requirement	Condition 8.6a	• Deleted the last sentence, "The Permittee is exempt from reporting CO emissions prior to submission of source test results," since the pre-source test scenario no longer exists
Section 5	State Emission Standards	No equivalent	• These provisions are better addressed in the Title V permit
Condition 17	Inspector authorization	No equivalent	• This provisions is better addressed in the Title V permit
Section 7	Permit Documentation	Section 6	• Added the documentation associated with Minor Permit AQ0741MSS03 • Made minor editorial revisions to the past history

7. PERMIT CONDITIONS

The bases for the standard and general conditions imposed in Minor Permit AQ0741MSS03 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: Emission Fees

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 I language for Minor Permit AQ0741MSS03.

Section 5: Standard Permit Conditions

Conditions 10 - 14, 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 subparts (c)(1) and (2) as Condition 10, and subparts (d) through (g) as Conditions 11 through 14, respectively. The Department did not include the remaining subparts since those provisions are adequately addressed by the Title V operating permit.

8. PERMIT ADMINISTRATION

CIA asked the Department to add the conditions of Minor Permit AQ0741MSS03 to their Title V permit through administrative amendment. The Department has done so through Operating Permit AQ0741TVP01 Revision 1. CIE may therefore operate in accordance with Minor Permit AQ0741MSS03 upon issuance.

APPENDIX A: EMISSIONS CALCULATIONS

Table A presents details of the KPF EUs, their characteristics, and emissions. The Department assumed continuous operation for all EUs, except for those constrained by an ORL. The Department also continued to assume that the fire water pump (EU 9) only operates 500 hours per year, as stated in the Statement of Basis for Operating Permit AQ0741TVP03.

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

EU	EU Name	Rating	Fuel Type	NOx		CO		SO_2		VOC		PM-10	
				Emission Factor	PTE tpy	Emission Factor	PTE tpy	Emission Factor	PTE tpy	Emission Factor	PTE tpy	Emission Factor	PTE tpy
1	Turbine Gas Generator No. 1	5.652 MW (62.3 MMBtu/hr)	Lean Fuel Gas	3.9 lb/hr[1]	64.5	7.92 lb/hr[1]	136	100 ppmv H_2S[2]	4.7	2.244 lb/hr[3]	9.8	0.0066 lb/MMBtu[4]	1.8
2	Turbine Gas Generator No. 2	5.652 MW (62.3 MMBtu/hr)	Lean Fuel Gas	4.1 lb/hr[1]		15.18 lb/hr[1]		100 ppmv H_2S[2]	4.7	2.244 lb/hr[3]	9.8	0.0066 lb/MMBtu[4]	1.8
3	Heater Treater No. 1	6.2 MMBtu/hr	Raw Fuel Gas	0.51 lb/hr[1]	2.2	0.005 lb/hr[1]	0.2	700 ppmv H_2S[2]	3.3	5.5 lb/MMscf[5]	0.1	7.6 lb/MMscf[5]	0.20
4	Heater Treater No. 2	6.2 MMBtu/hr	Raw Fuel Gas	0.51 lb/hr[1]	2.2	0.005 lb/hr[1]	0.2	700 ppmv H_2S[2]	3.3	5.5 lb/MMscf[5]	0.1	7.6 lb/MMscf[5]	0.20
5	Heater Treater No. 3	6.2 MMBtu/hr	Raw Fuel Gas	0.51 lb/hr[1]	2.2	0.005 lb/hr[1]	0.2	700 ppmv H_2S[2]	3.3	5.5 lb/MMscf[5]	0.1	7.6 lb/MMscf[5]	0.20
6	Crude Heater No. 1	8 MMBtu/hr	Raw Fuel Gas	0.68 lb/hr[1]	3.0	0.11 lb/hr[1]	0.5	700 ppmv H_2S[2]	4.2	5.5 lb/MMscf[5]	0.2	7.6 lb/MMscf[5]	0.26
7	Crude Heater No. 2	8 MMBtu/hr	Raw Fuel Gas	0.68 lb/hr[1]	3.0	0.11 lb/hr[1]	0.5	700 ppmv H_2S[2]	4.2	5.5 lb/MMscf[5]	0.2	7.6 lb/MMscf[5]	0.26
8	Crude Heater No. 3	8 MMBtu/hr	Raw Fuel Gas	0.68 lb/hr[1]	3.0	0.11 lb/hr[1]	0.5	700 ppmv H_2S[2]	4.2	5.5 lb/MMscf[5]	0.2	7.6 lb/MMscf[5]	0.26
9	Fire Water Pump	200 hp	Diesel	0.031 lb/hp-hr[6]	1.6	0.0067 lb/hp-hr[6]	0.3	0.5 wt %S[2]	0.2	0.00247 lb/hp-hr[6]	0.12	0.0022 lb/hp-hr[6]	0.11
9a	Backup Generator	320 kW	Diesel	7.74 lb/hr[3]	1.9	1.47 lb/hr[3]	0.4	0.5 wt %S[2]	0.4	0.09 lb/hr[3]	0.02	0.16 lb/hr[3]	0.04
10a	Small Space Heaters	0.5 MMBtu/hr	Diesel	20 lb/kgal[8]	0.3	5.0 lb/kgal[8]	0.1	0.5 wt %S[2]	1.1	0.34 lb/kgal[8]	0.01	2.0 lb/kgal[8]	0.03
10	Process Flare	70 MMscf/yr	Raw Fuel Gas	0.068 lb/MMBtu[7]	3.1	0.31 lb/MMBtu[7]	14.1	700 ppmv H_2S[2]	4.1	0.66 lb/MMBtu[7]	30.1	40.0 µg/L[7]	1.2
12	Crude Oil Tank No. 1	10,000 bbl		--	--	--	--	--	--	TANKS 4.0[9]	1.0	--	--
13	Crude Oil Tank No. 2	10,000 bbl		--	--	--	--	--	--	TANKS 4.0[9]	1.0	--	--
14	Crude Oil Tank No. 3	10,000 bbl		--	--	--	--	--	--	TANKS 4.0[9]	1.0	--	--
15	Slop Oil Tank	10,000 bbl		--	--	--	--	--	--	TANKS 4.0[9]	3.7	--	--
16	Produced Water Tank	10,000 bbl		--	--	--	--	--	--	--	--	--	--
			Total		87.0		153.0		37.7		57.5		6.4

Table Notes :

[1]Source Test
[2]Mass Balance
[3]Vendor Data
[4]AP-42, Table 3.1-2a
[5]AP-42, Table 1.4-1
[6]AP-42, Table 3.3-1
[7]AP-42, Table 13.5-1 (December 2016 version)
[8]AP-42, Table 1.3-1
[9]Emissions for crude tanks, slop oil tank, and produced water tank are reduced by 95 percent to reflect VOC controls

Diesel Fuel Assumptions
Density = 7.1 lb/gal
Heating value = 137,000 Btu/gal (from AP-42)
Sulfur content = 0.5 percent by weight (ambient air limit)

Reciprocating Engine Assumptions
Brake-specific fuel Consumption = 7,000 Btu/hp-hr
kW per hp = 1.341
Backup generator efficiency = 90 percent

Lean Fuel Gas Assumptions
Heating value = 983 Btu/scf
H_2S content = 100 ppmv

Raw Gas Assumptions
Heating value = 1301 Btu/scf
H_2S content = 700 ppmv

Exhaust Gas Assumptions
379 scf/lb-mole
64 lb/lb-mole