Technical Analysis Report

of the terms and conditions for
Permit AQ0085MSS04

Issued to:
Hilcorp Alaska

for their:
Platform C

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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 AQ0085MSS04 to Hilcorp Alaska (Hilcorp) for the Platform C. Their application is classified under 18 AAC 50.508(5) due to their request to establish an Owner Requested Limit (ORL) for the re-start operation of Emission Units (EU IDs 3 and 4).

2. STATIONARY SOURCE DESCRIPTION

Hilcorp owns and operates Platform C, an existing offshore crude oil and gas production platform located 5 miles from the East Forelands in Cook Inlet that produces crude oil, produced water and natural gas from several wells. The Standard Industrial Classification code for Platform C is 1311 – Crude Petroleum and Natural Gas and the North American Industrial Classification Code is 211111 – Crude Petroleum and Natural Gas Extraction. Platform C ships oil and produced water to an onshore facility on a one directional pipeline flow. Heat exchangers used during the separation process create a small amount of gas that is either used as fuel for the indirect fired heaters and boilers or is used as a blanket gas for the surge tanks. At the platform, a minimal amount of natural gas is recovered and utilized as fuel gas for various engines or is flared. Natural gas from a third party is shipped, through a separate line from the onshore facility to the platform. Normal platform operations include activities associated with the production of oil, operation, maintenance and monitoring of associated equipment.

Hilcorp currently operates under Operating Permit No. AQ0085TVP03, Minor Permit No. AQ0085MSS02, and Minor Permit No. AQ0085MSS03.

3. APPLICATION DESCRIPTION

Hilcorp submitted their application on April 7, 2017 . The application initially requested a combined 1,350 hours per year operation for the re-start operations EU IDs 3 and 4 to avoid triggering permitting requirements under 18 AAC 50.502(c)(3)(A) for nitrogen oxides (NOx) and indirect particulate matter not exceeding 2.5 microns ($PM_{2.5}$). The ORL also enables the re-start operations of EU IDs 3 and 4 to avoid permitting requirements under 18 AAC 50.306(a) for NOx, carbon monoxide (CO) and indirect $PM_{2.5}$. In an April 17, 2017 email responding to the Department's request to explain the basis of the potential emissions for the re-start project and the entire stationary source, the applicant revised the engine heat rate of EU IDs 3 and 4 from 8,000 British thermal units per horsepower-hour (Btu/hphr) to 7,000 Btu/hphr and revised the requested operating limit to 1,500 hours per year (hr/yr).

4. CLASSIFICATION FINDINGS

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

1. This project is classified under 18 AAC 50.508(5) because Hilcorp requested operating hour limits for EU IDs 3 and 4.
2. The ORL enables the restart of EU IDs 3 and 4 to avoid Prevention of Significant Deterioration (PSD) permit requirements under 18 AAC 50.306(a) and permit requirements under 18 AAC 50.502(c)(3)(A).

5. APPLICATION REVIEW FINDINGS

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

1. Hilcorp's application for a minor permit for the Platform C contains the information and materials required under 18 AAC 50.225(b)(2)-(6) and (8) as required by 18 AAC 50.540(j).
2. The minor permit must contain enforceable monitoring, recording, and reporting requirements to demonstrate that EU IDs 3 and 4 to not exceed 1,500 operating hr/yr.
3. The existing Operating Permit No. AQ0085TVP03 does not contain requirements for EU IDs 3 and 4. Therefore, the added requirements for EU IDs 3 and 4 do not contradict any condition of the existing Operating Permit No. AQ0085TVP03.

6. EMISSIONS SUMMARY AND PERMIT APPLICABLITY

Table 2 presents permit applicability for the re-start of EU IDs 3 and 4. Emission factors and detailed calculations are provided in Appendix A.

Table 2 – Permit Applicability, tons per year (tpy)

Parameter	NOx	CO	$PM_{2.5}$	PM_{10}	PM	SO_2	VOC	Total
PTE for restarting EU IDs 3 and 4	9.6	15.7	0.1	0.1	0.1	0.01	0.5	
Change in PTE for project	9.6	15.7	0.1	0.1	0.1	0.01	0.5	
18 AAC 50.502(c)(3) Thresholds	10	N/A	10	10	N/A	10	N/A	
18 AAC 50.502(c)(3) Applicable?	No	N/A	No	No	No	N/A	N/A	
PSD Modification Thresholds	40	100	10	15	25	40	40	
PSD Review required for project?	No	No	No	No	No	No	No	

Table 3 presents permit applicability for operating permit and PSD permit review.

Table 3 – Emissions Summary and Permit Applicability, tons per year (tpy)

Parameter	NOx	CO	$PM_{2.5}$	PM_{10}	PM	SO_2	VOC	Total
PTE before Modification	452.9	213.5	13.4	13.4	13.4	45.2	40.2	
PTE for EU IDs 3 and 4 restart	9.6	15.7	0.1	0.1	0.1	0.01	0.5	
PTE after Modification	462.5	229.2	13.4	13.4	13.4	45.2	40.8	
Title V Permit Thresholds	100	100	100	100	100	100	100	
Title V Permit Required for PTE?	Yes	Yes	No	No	No	No	No	
PSD Major Source Thresholds	250	250	250	250	250	250	250	
Is Stationary Source PSD Major?	Yes	No	No	No	No	No	No	
Assessable Emissions	463	229	Included in PM		13	45	41	791

7. REVISIONS TO PERMIT CONDITIONS

Minor Permit No. AQ0085MSS04 does not revise the conditions in any permit and does not contradict any condition in the existing Operating Permit No. AQ0085TVP03.

8. PERMIT CONDITIONS

The bases for the conditions imposed in Minor Permit AQ0085MSS04 are described below.

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

Section 1: Emissions Unit Inventory

The emission units authorized and restricted by this permit are listed in Table 1. Except as noted elsewhere in this 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 emission unit.

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 the fee requirements in Minor Permit AQ0085MSS04.

Section 3: ORLs to Avoid Permit Classification

Condition 5, Limits for NOx Emission, CO Emissions, and Operating Hours

18 AAC 50.544(h) describes the requirements for a permit classified under 18 AAC 50.508(5). This permit describes the ORL, including monitoring, recordkeeping, and reporting requirements. The permit lists all equipment covered by the ORL and describes the classification that the limit allows the applicant to avoid.

The permit contains an ORL restricting the NOx and CO emissions from EU IDs 3 and 4 to avoid PSD permit requirements under 18 AAC 50.306 and permitting requirements under 18 AAC 50.502(c)(3)(A) by restricting the combined operating hours of EU IDs 3 and 4 to no more than 1,500 hr/yr.

This condition includes both a ton per year limit and an operating hours limit.

Section 4: Recordkeeping, Reporting, and Certification Requirements

Condition 6, 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). Minor Permit No. AQ0085MSS04 uses the standard permit condition language, but also expands it by allowing the Permittee to provide electronic signatures.

Condition 7 Submittals

Condition 7 clarifies where the Permittee should send their reports, certifications, and other submittals required by the permit. The Department included this condition from a practical perspective rather than a regulatory obligation.

Section 5: Standard Permit Conditions

Conditions 8 - 12, 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 AQ0085MSS04. The Department incorporated these standard conditions as follows:

- 18 AAC 50.345(c)(1) and (2) is incorporated as Condition 8 of Section 5 (Standard Permit Conditions);
- 18 AAC 50.345(d) through (h) is incorporated as Conditions 9 through 13, respectively, of Section 5 (Standard Permit Conditions);

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	Description	Rating	hr/yr	NOx		CO		$PM_{2.5}$ / PM_{10} / PM		VOC		SO_2
				EF	tpy	EF	tpy	EF	tpy	EF	tpy	tpy
3	Gas-fired, Waukesha	804 hp	1,500	2.27 lb/mmbtu	9.58	3.72 lb/mmbtu	15.70	0.019 lb/mmbtu	0.08	0.128 lb/mmbtu	0.54	0.01
4	4GSI-5790, 4S-RB gen	804 hp		2.27 lb/mmbtu		3.72 lb/mmbtu		0.019 lb/mmbtu				
	Subtotal for Project Under Review				**9.58**		**15.70**		**0.08**		**0.54**	**0.01**
5	Waukesha Gas gen	804 hp	8,760	2.27 lb/mmbtu	55.96	3.72 lb/mmbtu	91.7	0.019 lb/mmbtu	0.48	0.128 lb/mmbtu	3.16	0.04
6	Cooper Gas generator	1,100 hp	8,760	3.17 lb/mmbtu	106.9	.386 lb/mmbtu	13.0	0.044 lb/mmbtu	1.63	0.12 lb/mmbtu	4.05	0.05
10	Diesel CAT D399	1,000 hp	8,760	0.024 lb/hphr	105.1	0.0055 lb/hphr	24.1	0.0007 lb/hphr	3.07	0.000705 lb/hphr	2.81	15.8
11	engines		8,760	0.024 lb/hphr	105.1	0.0055 lb/hphr	24.1	0.0007 lb/hphr	3.07	0.000705 lb/hphr	2.81	15.8
16	Process Safety Flare	60 mmscf/yr	8,760	.068 lb/mmbtu	2.40	0.37 lb/mmbtu	10.9	40 ug/liter	0.80	0.14 lb/mmbtu	23.2	0.06
17	Diesel compressor	100 hp	500	0.031 lb/hphr	0.78	.00668 lb/hphr	0.17	0.0022 lb/hphr	0.06	0.00247 lb/hphr	0.06	0.09
18	Gas-fired Solar Centaur	4,500 hp	8,760	95 ppmv in	18.0	20 ppmv in	2.3	0.0066	1.19	0.0021 lb/mmbtu	0.38	0.31
19	40 turbines	each	8,760	exhaust	18.0	exhaust	2.3	lb/MMBtu	1.19	0.0021 lb/mmbtu	0.38	0.31
20	Diesel CATC18 engines	600 hp	3,000	3.41 g/hphr	6.76	3.26 g/hphr	6.47	0.19 g/hphr	0.37	0.323 g/hphr	0.64	3.24
21			8,760	3.41 g/hphr	19.73	3.26 g/hphr	18.9	0.19 g/hphr	1.08	0.323 g/hphr	1.87	9.47
N/A	Three gas-fired boilers	4.1 mmBtu	8,760	100 lb/mmscf	1.53	84 lb/mmscf	1.28	7.6 lb/mmscf	0.12	5.5 lb/mmscf	0.08	0.03
N/A		per hour each	8,760	100 lb/mmscf	1.53	84 lb/mmscf	1.28	7.6 lb/mmscf	0.12	5.5 lb/mmscf	0.08	0.03
N/A			8,760	100 lb/mmscf	1.53	84 lb/mmscf	1.28	7.6 lb/mmscf	0.12	5.5 lb/mmscf	0.08	0.03
	Subtotal for Existing Potential Emissions				**452.9**		**213.5**		**13.4**		**40.2**	**45.2**
	New Potential Emissions After Modification				**462.5**		**229.2**		**13.4**		**40.8**	**45.2**

Table Notes: Source of Emission Factors and Emissions
EUs 3, 4, and 5: AP-42, Table 3.2-3 for 4-stroke, rich burn; EF for NOx and CO is selected as the bigger of the available EFs; PM is condensable plus filterable.
EU 6: AP-42, Table 3.2-1 for 2-stroke, lean burn engines.
EUs 10 and 11: AP-42, Table 3.4-1.
EU 16: AP-42, Table 13.5-1 for NOx emission factor; Table 13.5-2 for CO and VOC emission factors; PM emissions taken from application.
EU 17: AP-42, Table 3.3-1. Horsepower adjusted to 100 hp as allowed by Condition 11 of AQ0085TVP03.
EUs 18 and 19: NOx and CO emissions taken from application. PM and VOC come from AP-42, Table 3-1-2a.
EUs 20 and 21: NOx, CO, and PM from Vendor data, EPA Tier 3 multiplied by 1.25 to obtain not-to-exceed emission factors, VOC from AP-42, Table 3.3-1.
Gas-fired Boilers: AP-42, Table 1.4-1.
SO_2 emissions from fuel gas burning assume 1,174.9 Btu/scf and ppmv H_2S content for the fuel gas.
SO_2 emissions from diesel burning assume 0.5 percent sulfur by weight as given in Table D-7a of the application for AQ0085TVP03.